









## TDK-Lambda Power Supplies and DC-DC Converters



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# TDK-Lambda The Power to Shape Your World

The choice and application of the power supply is an important one. Working with TDK-Lambda can help you save time and money, from design concept to years after your system or product is first installed.

## Why TDK-Lambda?

- ◆ Over the last 71 years, TDK-Lambda has developed a worldwide reputation and heritage for high quality, robust power products.
- ◆ We at TDK-Lambda stand behind our products with industry leading warranties of up to a lifetime (limited).
- ◆ Our research and development budget is one of the largest in the industry, helping you design-in reliable, cutting edge technology, ahead of your competition.
- ◆ A broad range of product enables our customers to choose the right model for the application, and assists with their vendor reduction programs.
- ◆ Multiple manufacturing and design facilities across the globe. We can provide crucial local support when programs move between Asia, North America, and Europe. With those multiple factories we also have proven risk mitigation against natural disasters. Plus, our manufacturing sites are ISO9001 and ISO14001 certified.
- ◆ Our technical support can get your product to market faster. Please call 1-800-LAMBDA-4 (1-800-526-2324).



TDK-Lambda offers a broad range of standard power supplies for many applications. This Catalog is designed to provide easy navigation of product selection by application and product type. The product ranges are sorted into special categories on the next page. Data sheets are supplied to make a selection of possible models for your application. For additional technical data, please follow the web link at the bottom of each data sheet.

Each product page contains the following symbols to indicate the main applications that each product is designed for. The symbols are intended to give a quick guideline for many applications. For assistance in finding a product for your application, please contact our technical sales department.



Medical



Industrial



COTS



Test



COMM



LED



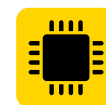
Railroad



Broadcast



Renewable



Semi-Fab

Thank you for your interest in TDK-Lambda products

## Medical

Listed by Wattage



Medical

Wattage	Series	Category	Page	Wattage	Series	Category	Page
3W	PXC-M03	DC-DC	154	250W	DTM250-D	AC-DC	144
6W	PXC-M06	DC-DC	156	300W	DTM300-D	AC-DC	146
10W	PXC-M10	DC-DC	158	350-420W	CUS350M	AC-DC	30
15-40W	KM	AC-DC	90	350-1150W	NV350/700	AC-DC	62
15-60W	KMS-A	AC-DC	92	500W	CSS500	AC-DC	34
30-60W	CUS30M/60M	AC-DC	94	500W	XMS500	AC-DC	36
40-65W	DTM65C8	AC-DC	132	400W	CUS400M	AC-DC	32
40-65W	DTM65-D	AC-DC	134	450-900W	Vega	AC-DC	64
90-110W	DTM110-C	AC-DC	138	550-900W	Vega-Lite	AC-DC	66
100W	CUS100ME	AC-DC	102	600W	CM4	AC-DC	68
110W	DTM110-C8	AC-DC	142	600W	GXE600	AC-DC	40
150W	CUS150M	AC-DC	104	1000-1500W	RWS1000/1500-B/ME	AC-DC	44
175-200W	NV175	AC-DC	106	1500W	CUS1500M	AC-DC	48
200-250W	CUS200M	AC-DC	108	Filter 3-300A	RSHN	Filter	226

## Industrial

Listed by Wattage



Industrial

Wattage	Series	Category	Page	Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152	150-200W	LS200	AC-DC	24
2-4W	KAS	AC-DC	82	175-200W	NV175	AC-DC	106
3W	PXC-M03	DC-DC	154	200W	CN-A110	DC-DC	168
4-15W	KPSA	AC-DC	84	200-250W	CUS200M	AC-DC	108
5-25W	KWSA	AC-DC	86	200-800W	Z+	Programmable	220
6W	PXC-M06	DC-DC	156	200-800W	Z+ HV	Programmable	222
10W	PXC-M10	DC-DC	158	250W	i6A	DC-DC	212
10-30W	ZWS10-30B	AC-DC	88	250W	i6A4W	DC-DC	214
10-100W	DRL10-100	AC-DC	120	300W	i7C	DC-DC	216
15W	CCG15	DC-DC	160	300W	ZWS300BAF	AC-DC	114
15-40W	KM	AC-DC	90	300W	IEH	DC-DC	166
15-60W	KMS-A	AC-DC	92	300-450W	iQG	DC-DC	184
15-100W	DRB15-100	AC-DC	122	300-450W	PAH300-450	DC-DC	186
15-150W	HWS15A-150A/A	AC-DC	12	300-456W	iHG	DC-DC	188
20-30W	PXE	DC-DC	162	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
25-150W	LS	AC-DC	14	300-1500W	HWS300-1500	AC-DC	28
30-60W	CUS30M/60M	AC-DC	94	350-420W	CUS350M	AC-DC	30
30-100W	CN-A110	DC-DC	168	350-1150W	NV350/700	AC-DC	62
33-150W	ZWS50-150BAF	AC-DC	96	400W	CUS400M	AC-DC	32
35W	CUT35	AC-DC	98	450-900W	Vega	AC-DC	64
40-60W	DPX	DC-DC	124	480W	DRB480	AC-DC	128
40-60W	PXF	DC-DC	164	500W	CSS500	AC-DC	34
40-65W	CSW65	AC-DC	18	500W	PFH500F	AC-DC	116
40-65W	DTM65-C	AC-DC	132	500W	XMS500	AC-DC	36
40-80W	DT62/80-D	AC-DC	136	500-1500W	LZSA	AC-DC	38
49-204W	iQE	DC-DC	170	550-900W	Vega-Lite	AC-DC	66
50-100W	CN-A24	DC-DC	172	600W	CM4	AC-DC	68
50-150W	PHA-280	DC-DC	174	600W	GXE600	AC-DC	40
50-600W	RWS-B	AC-DC	20	600W	PAF600F	DC-DC	190
50-1500W	HWS/HD	AC-DC	16	700-1500W	QM	AC-DC	70
72-308W	iQL	DC-DC	176	720-1000W	CPFE1000FI	AC-DC	42
75W	CUT75	AC-DC	100	1000W	iJA35A	DC-DC	204
75W	i6AN	DC-DC	196	1000-1500W	RWS1000/1500-B	AC-DC	44
79-153W	CUS200LD	AC-DC	22	1500W	CUS1500M	AC-DC	48
80W	iBH	DC-DC	198	1800W	HWS1800T	AC-DC	52
85W	iCH	DC-DC	200	1600W	HFE1600	AC-DC	76
85W	HQA85	DC-DC	178	1600W	RFE1600	AC-DC	50
90-110W	DTM110-C	AC-DC	138	2000-4000W	TPS4000	AC-DC	58
100W	CUS100ME	AC-DC	102	2500W	HFE2500	AC-DC	78
100W	i3A	DC-DC	202	2500W	RFE2500	AC-DC	54
100-150W	DT100/150-D	AC-DC	140	3200W	TPS3000	AC-DC	56
120W	iJB	DC-DC	206	Filter 3-300A	RSHN	Filter	226
120W	GQA	DC-DC	180	Filter 6-30A	RSEV	Filter	228
120W	HQA120	DC-DC	182	Filter 6-60A	RTAN	Filter	230
120-960W	DRF120-960	AC-DC	126	Filter 6-300A	RTHN	Filter	232
150W	CUS150M	AC-DC	104	Filter 10A	iDQ	Filter	234
150W	iAH	DC-DC	210	Filter 50A	RDEN	Filter	240
150W	iJC	DC-DC	208				

## COTS

Listed by Wattage



COTS

Wattage	Series	Category	Page	Wattage	Series	Category	Page
30-1500W	HWS/HD	AC-DC	16	600-602W	PAF600F	DC-DC	190
50-100W	CN-A24	DC-DC	172	720-1008W	CPFE1000FI	AC-DC	42
50-150W	PH-A280	DC-DC	174	1600W	HFE1600	AC-DC	76
85W	HQA85	DC-DC	178	1600W	RFE1600	AC-DC	50
120W	GQA	DC-DC	180	2000-4000W	TPS4000	AC-DC	50
120W	HQA120	DC-DC	182	2500W	HFE2500	AC-DC	58
300-450W	PAH300-450	DC-DC	186	2500W	RFE2500	AC-DC	54
300-1008W	PFE300SA/500F/1000FA	AC-DC	112	3200W	TPS3000	AC-DC	56
500W	PFH500F	AC-DC	116	Filter 20A	FQA	Filter	236
500-1500W	LZSA	AC-DC	38	Filter 20A	FQB	Filter	238
600W	CM4	AC-DC	68				

## Test

Listed by Wattage



Test

Wattage	Series	Category	Page	Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152	200-250W	CUS200M	AC-DC	108
2-4W	KAS	AC-DC	82	240W	ZWS240RC-24	AC-DC	110
3W	PXC-M03	DC-DC	154	250W	CUS250LD	AC-DC	26
4-15W	KPSA	AC-DC	84	250W	DTM250-D	AC-DC	144
5-25W	KWSA	AC-DC	86	250W	i6A	DC-DC	212
6W	PXC-M06	DC-DC	156	250W	i6A4W	DC-DC	214
10W	PXC-M10	DC-DC	158	300W	i7C	DC-DC	216
10-30W	ZWS10-30B	AC-DC	88	300W	DTM300-D	AC-DC	146
10-100W	DRL10-100	AC-DC	120	300W	ZWS300BAF	AC-DC	96
15W	CCG15	DC-DC	160	300W	IEH	DC-DC	166
15-40W	KM	AC-DC	90	300-450W	iQG	DC-DC	184
15-60W	KMS-A	AC-DC	92	300-450W	PAH300-450	DC-DC	186
15-100W	DRB15-100	AC-DC	122	300-456W	iHG	DC-DC	188
15-150W	HWS15A-150A/A	AC-DC	12	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
20-30W	PXE	DC-DC	162	300-1500W	HWS300-1500	AC-DC	28
25-150W	LS	AC-DC	14	350-420W	CUS350M	AC-DC	30
30-60W	CUS30M/60M	AC-DC	94	350-1150W	NV350/700	AC-DC	62
30-1500W	HWS/HD	AC-DC	16	400W	CUS400M	AC-DC	32
33-150W	ZWS50-150BAF	AC-DC	96	450-900W	Vega	AC-DC	64
35	CUT35	AC-DC	98	480W	DRB480	AC-DC	128
40-60W	PF	DC-DC	164	500W	CSS500	AC-DC	34
40-65W	CSW65	AC-DC	18	500W	PFH500F	AC-DC	116
40-80W	DT62/80-D	AC-DC	136	500W	XMS500	AC-DC	36
49-204W	iQE	DC-DC	170	550-900W	Vega-Lite	AC-DC	66
50-600W	RWS-B	AC-DC	20	600W	CM4	AC-DC	68
72-308W	iQL	DC-DC	176	600W	GXE600	AC-DC	40
75W	CUT75	AC-DC	100	600W	PAF600F	DC-DC	190
75W	i6AN	DC-DC	196	700-1500W	QM	AC-DC	70
79-153W	CUS200LD	AC-DC	22	1000W	iJA35A	DC-DC	204
80W	iBH	DC-DC	198	1000-1500W	RWS1000/1500-B	AC-DC	44
85W	iCH	DC-DC	200	1500W	CUS1500M	AC-DC	48
90-110W	DTM110-C	AC-DC	138	1600W	HFE1600	AC-DC	76
100W	CUS100ME	AC-DC	102	1600W	RFE1600	AC-DC	50
100W	i3A	DC-DC	202	1800W	HWS1800T	AC-DC	52
100-150W	DT100/150-D	AC-DC	140	2000-4000W	TPS4000	AC-DC	58
110W	DTM110-C8	AC-DC	138	2500W	HFE2500	AC-DC	78
120W	iJB	DC-DC	206	2500W	RFE2500	AC-DC	54
120-960W	DRF120-960	AC-DC	126	3200W	TPS3000	AC-DC	56
150W	CUS150M	AC-DC	104	Filter 3-300A	RSHN	Filter	226
150W	iAH	DC-DC	210	Filter 6-30A	RSEV	Filter	228
150W	iJC	DC-DC	208	Filter 6-60A	RTAN	Filter	230
150-200W	LS200	AC-DC	24	Filter 6-300A	RTHN	Filter	232
175-200W	NV175	AC-DC	106	Filter 10A	iDQ	Filter	234
200-800W	Z+	Programmable	220	Filter 50A	RDEN	Filter	240
200-800W	Z+ HV	Programmable	222				

## COMM

Listed by Wattage



COMM

Wattage	Series	Category	Page	Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152	250W	i6A	DC-DC	212
2-4W	KAS	AC-DC	82	250W	i6A4W	DC-DC	214
3W	PXC-M03	DC-DC	154	250W	DTM250-D	AC-DC	144
4-15W	KPSA	AC-DC	84	300W	DTM300-D	AC-DC	146
5-25W	KWSA	AC-DC	86	300W	ZWS300BAF	AC-DC	96
6W	PXC-M06	DC-DC	156	300W	i7C	DC-DC	216
10W	PXC-M10	DC-DC	158	300W	IEH	DC-DC	166
10-30W	ZWS10-30B	AC-DC	88	300W	DTM300-D	AC-DC	146
15W	CCG15	DC-DC	160	300W	ZWS300BAF	AC-DC	96
15-40W	KM	AC-DC	90	300-450W	iQG	DC-DC	184
15-60W	KMS-A	AC-DC	92	300-450W	PAH300-450	DC-DC	186
15-150W	HWS15A-150A/A	AC-DC	12	300-456W	iHG	DC-DC	188
20-30W	PXE	DC-DC	162	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
25-150W	LS	AC-DC	14	300-1500W	HWS300-1500	AC-DC	28
30-60W	CUS30M/60M	AC-DC	94	350-420W	CUS350M	AC-DC	30
30-1500W	HWS/HD	AC-DC	16	350-1150W	NV350/700	AC-DC	62
33-150W	ZWS50-150BAF	AC-DC	96	400W	CUS400M	AC-DC	32
40-60W	PF	DC-DC	164	450-900W	Vega	AC-DC	64
40-65W	CSW65	AC-DC	18	500W	CSS500	AC-DC	34
40-80W	DT62/80-D	AC-DC	136	500W	PFH500F	AC-DC	116
49-204W	iQE	DC-DC	170	500W	XMS500	AC-DC	36
50-300W	PHA-280	DC-DC	174	550-900W	Vega-Lite	AC-DC	66
50-600W	RWS-B	AC-DC	20	600W	CM4	AC-DC	68
72-308W	iQL	DC-DC	176	600W	GXE600	AC-DC	40
75W	i6AN	DC-DC	196	600-602W	PAF600F	DC-DC	190
79-153W	CUS200LD	AC-DC	22	700-1500W	QM	AC-DC	70
80W	iBH	DC-DC	198	720-1000W	CPFE1000FI	AC-DC	42
85W	iCH	DC-DC	200	1000W	iJA35A	DC-DC	204
85W	HQA85	DC-DC	178	1000-1500W	RWS1000/1500-B	AC-DC	44
90-110W	DTM110-C	AC-DC	138	1500W	CUS1500M	AC-DC	48
100W	i3A	DC-DC	202	1600W	HFE1600	AC-DC	76
100-150W	DT100/150-D	AC-DC	140	1600W	RFE1600	AC-DC	54
110W	DTM110-C8	AC-DC	138	1800W	HWS1800T	AC-DC	52
120W	GQA	DC-DC	180	2000-4000W	TPS4000	AC-DC	58
120W	HQA120	DC-DC	182	2500W	HFE2500	AC-DC	78
120W	iJB	DC-DC	206	2500W	RFE2500	AC-DC	54
150W	iAH	DC-DC	210	3200W	TPS3000	AC-DC	56
150W	iJC	DC-DC	208	Filter 3-300A	RSHN	Filter	226
150-200W	LS200	AC-DC	24	Filter 6-30A	RSEV	Filter	228
175-200W	NV175	AC-DC	106	Filter 6-60A	RTAN	Filter	230
200-250W	CUS200M	AC-DC	108	Filter 6-300A	RTHN	Filter	232
250W	CUS250LD	AC-DC	26	Filter 10A	iDQ	Filter	234
				Filter 50A	RDEN	Filter	240

## LED

Listed by Wattage



LED

Wattage	Series	Category	Page	Wattage	Series	Category	Page
15-150W	HWS15A-150A/A	AC-DC	12	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
25-150W	LS	AC-DC	14	300-1500W	HWS300-1500	AC-DC	28
30-1500W	HWS/HD	AC-DC	16	400W	CUS400M	AC-DC	32
33-150W	ZWS50-150BAF	AC-DC	96	500W	PFH500F	AC-DC	116
50-600W	RWS-B	AC-DC	20	500-1500W	LZSA	AC-DC	38
79-153W	CUS200LD	AC-DC	22	720-1000W	CPFE1000FI	AC-DC	42
100W	CUS100ME	AC-DC	102	1000-1500W	RWS1000/1500-B	AC-DC	44
150W	CUS150M	AC-DC	104	1500W	CUS1500M	AC-DC	48
150-200W	LS200	AC-DC	24				

## Railroad

Listed by Wattage



Railroad

Wattage	Series	Category	Page	Wattage	Series	Category	Page
30-200W	CN-A110	DC-DC	168	50-100W	CN-A24	DC-DC	172

## Broadcast

Listed by Wattage



Broadcast

Wattage	Series	Category	Page	Wattage	Series	Category	Page
1.5-25W	CC-E	DC-DC	152	150W	iJC	DC-DC	208
2-4W	KAS	AC-DC	82	150-200W	LS200	AC-DC	24
3W	PXC-M03	DC-DC	154	175-200W	NV175	AC-DC	106
4-15W	KPSA	AC-DC	84	200-250W	CUS200M	AC-DC	108
5-25W	KWSA	AC-DC	86	250W	CUS250LD	AC-DC	26
6W	PXC-M06	DC-DC	156	250W	DTM250-D	AC-DC	144
10W	PXC-M10	DC-DC	158	250W	i6A	DC-DC	212
10-30W	ZWS10-30B	AC-DC	88	250W	i6A4W	DC-DC	214
15W	CCG15	DC-DC	160	300W	i7C	DC-DC	216
15-40W	KM	AC-DC	90	300W	DTM300-D	AC-DC	146
15-60W	KMS-A	AC-DC	92	300W	IEH	DC-DC	166
15-150W	HWS15A-150A/A	AC-DC	12	300-450W	iQG	DC-DC	184
20-30W	PXE	DC-DC	162	300-456W	iHG	DC-DC	188
25-150W	LS	AC-DC	14	300-1008W	PFE300SA/500F/1000FA	AC-DC	112
30-60W	CUS30M/60M	AC-DC	94	300-1500W	HWS300-1500	AC-DC	28
30-1500W	HWS/HD	AC-DC	16	350-420W	CUS350M	AC-DC	30
35W	CUT35	AC-DC	98	350-1150W	NV350/700	AC-DC	62
40-60W	PXF	DC-DC	164	400W	CUS400M	AC-DC	32
40-65W	CSW65	AC-DC	18	450-900W	Vega	AC-DC	64
40-80W	DT62/80-D	AC-DC	136	500W	CSS500	AC-DC	34
49-204W	iQE	DC-DC	170	500W	PFH500F	AC-DC	116
50-150W	ZWS50-150BAF	AC-DC	96	500W	XMS500	AC-DC	36
50-600W	RWS-B	AC-DC	20	550-900W	Vega-Lite	AC-DC	66
72-308W	iQL	DC-DC	176	600W	CM4	AC-DC	68
75W	CUT75	AC-DC	100	600W	GXE600	AC-DC	40
75W	i6AN	DC-DC	196	700-1500W	QM	AC-DC	70
79-153W	CUS200LD	AC-DC	22	720-1000W	CPFE1000FI	AC-DC	42
80W	iBH	DC-DC	198	1000W	iJA35A	DC-DC	204
85W	iCH	DC-DC	200	1000-1500W	RWS1000/1500-B	AC-DC	46
90-110W	DTM110-C	AC-DC	138	1500W	CUS1500M	AC-DC	48
100W	CUS100ME	AC-DC	102	1600W	HFE1600	AC-DC	76
100W	i3A	DC-DC	202	1800W	HWS1800T	AC-DC	52
100-150W	DT100/150-D	AC-DC	140	2000-4000W	TPS4000	AC-DC	58
100W	DTM110-C8	AC-DC	142	2500W	HFE2500	AC-DC	78
120W	iJB	DC-DC	206	3200W	TPS3000	AC-DC	56
150W	CUS150M	AC-DC	104	Filter 10A	iDQ	Filter	234
150W	iAH	DC-DC	210				

## Renewable

Listed by Wattage



Renewable

Wattage	Series	Category	Page	Wattage	Series	Category	Page
350-1150W	NV350/700	AC-DC	62	600W	CM4	AC-DC	68
450-900W	Vega	AC-DC	64	700-1500W	QM	AC-DC	70
500W	XMS500	AC-DC	36	11,000W	EZA11K-320240	DC-DC	192
550-900W	Vega-Lite	AC-DC	66				

The TDK-Lambda website (<http://us.tdk-lambda.com/lp>) has a huge library of data:

◆ Installation manuals

◆ Detailed specifications

◆ Evaluation data

◆ Outline drawings

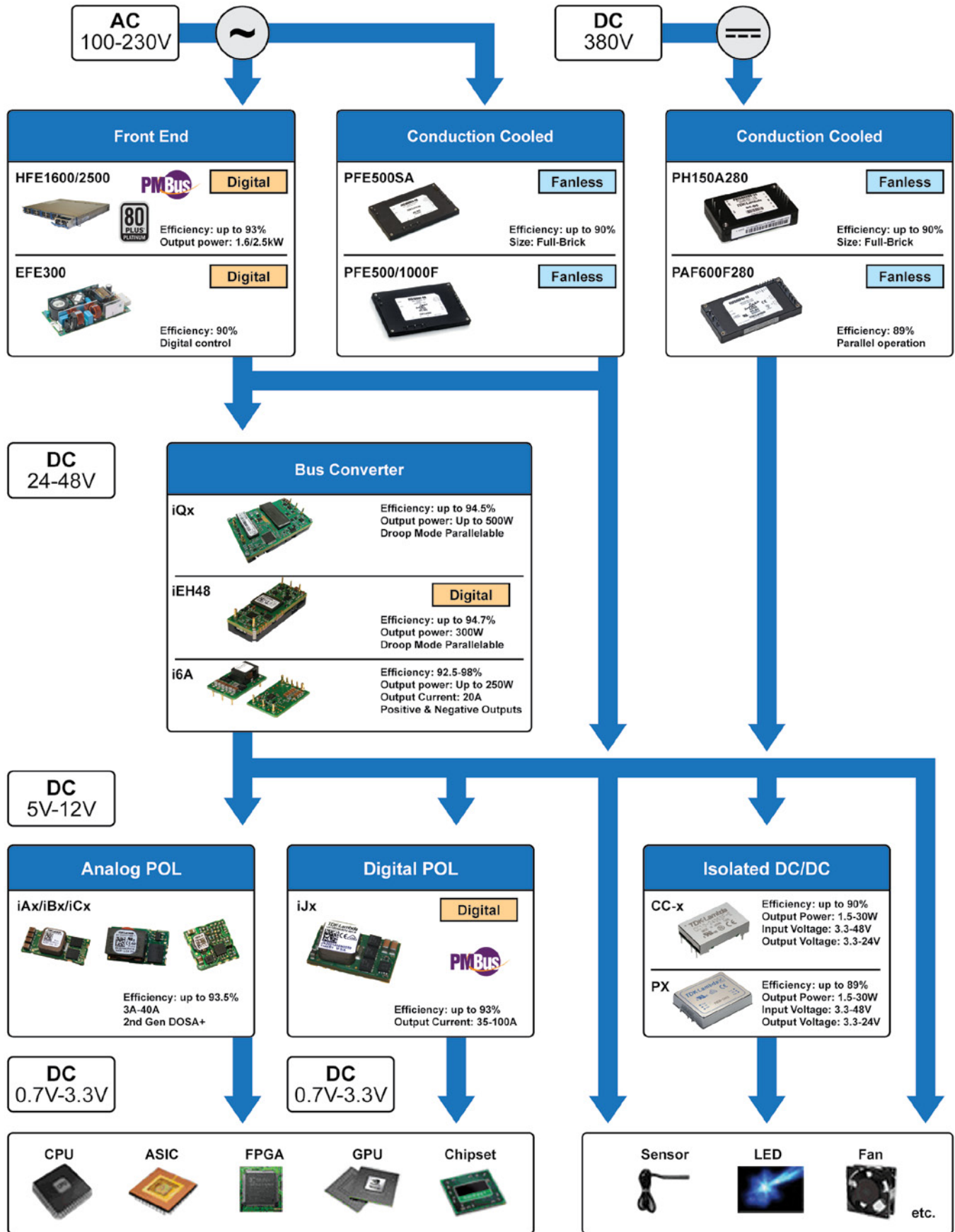
◆ MTBF predictions

◆ Reliability data

◆ Application Notes

## Want Engineering Support?

- ◆ Please call 1-800-LAMBDA-4 (1-800-526-2324) to speak to our inside technical support team, or email [lambda.techsupport@us.tdk-lambda.com](mailto:lambda.techsupport@us.tdk-lambda.com)
- ◆ TDK-Lambda's Field Application Engineers are available for in-depth advice at your facility. Please contact your local TDK-Lambda Salesperson to schedule a visit.





 **AC-DC Power Supplies**



**Applications**

- ◆ Industrial
- ◆ Medical
- ◆ Test & Measurement
- ◆ Communications
- ◆ Broadcast
- ◆ Lighting
- ◆ Transportation
- ◆ COTS (Commercial off the shelf)
- ◆ Renewables

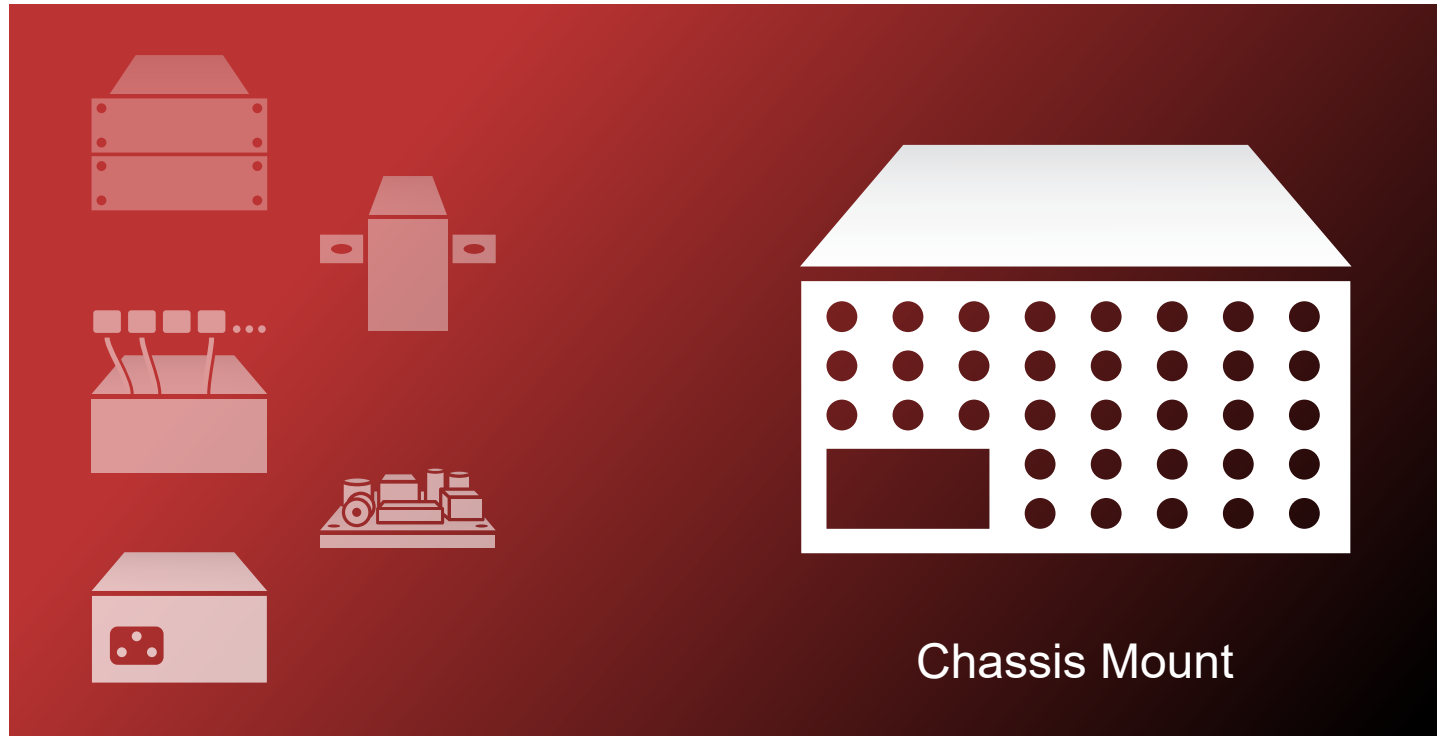
**Features**

- ◆ Very broad product offering
- ◆ High reliability & quality
- ◆ Single & three phase input models
- ◆ ITE & medical safety approvals
- ◆ Convection conduction & forced air cooled
- ◆ Enclosed, open frame & module type
- ◆ High MTBF
- ◆ High efficiency
- ◆ Long warranties (up to lifetime)

Wattage	Number of Outputs	Series	Page	Wattage	Number of Outputs	Series	Page
2-4W	1	KAS	82	240W	1	ZWS240RC-24	110
4-15W	1	KPSA	84	250W	1	CUS250LD	22
5-25W	1	KWSA	86	250W	1	DTM250-D	144
10-30W	1	ZWS10-30B	88	300W	1	DTM300-D	146
10-100W	1	DRL	120	300W	1	ZWS300BAF	114
15-40W	1,2,3	KM	90	300-1000W	1	PFE300SA/500F/1000FA	112
15-60W	1	KMS-A	92	300-1500W	1	HWS300/1500	28
15-100W	1	DRB15-100	122	350-420W	1	CUS350M	30
15-150W	1	HWS15A-150A/A	12	350-1150W	1-8	NV350/700	62
25-150W	1	LS	14	400	1	CUS400M	32
30-60W	1	CUS30/60M	94	450-900W	1-10	Vega	64
30-1500W	1	HWS/HD	16	480W	1	DRB480	128
33-150W	1	ZWS50-150BAF	96	500W	1	CSS500	34
35W	3	CUT35	98	500W	1	PFH500F	116
40-65W	1	CSW65	18	500W	1	XMS500	36
40-65W	1	DTM65-C8	132	500-1500W	1	LZSA	38
40-65	1	DTM65-D	134	550-900W	1-10	Vega-Lite	66
50-600W	1	RWS-B	20	600W	1	GXE600	40
62-80W	1	DT62-80D	136	600W	1-4	CM4	68
75W	3	CUT75	100	700-1500W	1-18	QM	70
79-153W	1	CUS200LD	22	720-1000W	1	CPFE1000FI	42
90-110W	1	DTM110-C	138	1000-1500W	1	RWS1000/1500-B	44
100W	1	CUS100ME	102	1000-1500W	1	RWS1000/1500-B/ME	46
100-150W	1	DT100-150-D	140	15000W	1	CUS1500M	48
110W	1	DTM110C-8	142	1600W	1	RFE1600	50
120-960W	1	DRF120-960	126	1600W	1	HFE1600	76
150W	1	CUS150M	104	1800W	1	HWS1800T	52
150-200W	1	LS200	24	2000-4080W	1	TPS4000	58
175-200W	1-5	NV175	106	2500W	1	HFE2500	78
200-800W	1	Z+	220	2500W	1	RFE2500	54
200-800W	1	Z+ HV	222	3200W	1	TPS3000	56
200-250W	1	CUS200M	108				

Listed by Wattage

 **AC-DC Power Supplies**



**Applications**

- ◆ Embedded (built-in) power supplies for a broad range of applications
- ◆ Suitable for industrial applications, automation, test equipment
- ◆ High reliability and low cost products available

**Features**

- ◆ 5 to 1800W output power
- ◆ Single-phase wide range input 85 – 265VAC  
Three-phase input 170 – 265VAC
- ◆ Power factor correction meets EN61000-3-2 class A harmonics
- ◆ Input/output connection with screw terminals or PCB connectors
- ◆ Enclosed or open frame case style
- ◆ Safety meets EN/IEC/UL 60950-1 standard. CE marked for Low Voltage Directive

Wattage	Series	Page
15-150W	HWS15A-150A/A	12
25-150W	LS	14
30-1500W	HWS/HD	16
40-65W	CSW65	18
50-600W	RWS-B	20
79-153W	CUS200LD	22
150-200W	LS200	24
250W	CUS250LD	26
300-1500W	HWS300/1500	28
350-420W	CUS350M	30
400W	CUS400M	32
500W	CSS500	34
500W	XMS500	36
500-1500W	LZSA	38
600W	GXE600	40
720-1000W	CPFE100FI	42
1000-1500W	RWS1000/15000-B	44
1000-1500W	RWS1000/15000-B/ME	46
1500W	CUS1500M	48
1600W	RFE1600	50
1800W	HWS1800T	52
2000-4080W	TPS4000	54
2500W	RFE2500	56
3200W	TPS3000	58

Listed by Wattage

**50-150W Single Output Industrial Power Supplies**

**Features**

- ◆ Limited Lifetime Warranty
- ◆ UL508 approved
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ Higher Efficiency Than HWS series



**Key Market Segments & Applications**



Specifications		HWS15A/A	HWS30A/A	HWS50A/A	HWS100A/A	HWS150A/A
Input Voltage Range	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC* (Withstands 300VAC for 5s)				
Input Current (Typ) (1)	A	0.35 / 0.2	0.65 / 0.4	0.65 / 0.35	1.3 / 0.65	1.9 / 0.95
Inrush Current (1)	A	14 / 28				
Power Factor (1)	-	Meets EN61000-3-2				
Temperature Coefficient	%/°C	<0.02%/°C				
Overcurrent Protection	%	>105%				
Overvoltage Protection	V	Yes				
Hold Up Time (Typ)	ms	20				
Leakage Current (max)	mA	>0.5mA (Typ 0.2mA at 100VAC, 0.4mA at 230VAC)				
Remote Sense	-	No			Yes	
Indicator	-	Green LED = ON				
Operating Temperature (with cover)	°C	-10°C to +70°C, derate linearly to 20% load from 50°C to 70°C (2)				
Storage Temperature	°C	-30 to +85°C				
Humidity (non condensing)	%RH	Operating: 30 - 90%RH, Non operating 10 - 95%RH				
Cooling	-	Convection				
Withstand Voltage	VAC	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.				
Isolation Resistance	M Ohms	>100M at 25°C & 70%RH, Output to Ground 500VDC				
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour				
Shock	m/s <sup>2</sup>	< 196.1 m/s <sup>2</sup>				
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark				
Line Dips	-	SEMI-F47 (200VAC input)				
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B				
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11; IEC61000-6-2				
Weight (Typ)	g	190	240	300	470	520
Size (WxHxD) (with cover)	Inches	1.24x3.23x3.15	1.24x3.23x3.74	1.24x3.23x4.72	1.3x3.23x6.3	1.65x3.23x6.3
	mm	31.5x82x80	31.5x82x95	31.5x82x120	33x82x160	42x82x160
MTBF - Telcordia SR-332 issue 3**	Hours	12,116,851	8,169,868	3,726,622	2,963,512	2,676,081
Warranty	-	Limited lifetime warranty (See website for terms & conditions)				

\* Safety certified for AC input only \*\* 24V output model, 25°C ambient, full load, 230VAC input

- (1) 100/200VAC
- (2) HWS15A/A derates linearly to 50% load from 50 to 70°C

Output Ratings								
Model	Voltage V	Adjust Range V	Max Current A	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Overvoltage V	Efficiency (typ) % (1)
HWS15A-3/A	3.3V	2.97 - 3.96	3	40	20	120	4.13-4.95	70/71
HWS30A-3/A	3.3V	2.97 - 3.96	6	40	20	120	4.13-4.95	75/77
HWS50A-3/A	3.3V	2.97 - 3.96	10	40	20	120	4.13-4.95	76/78
HWS100A-3/A	3.3V	2.97 - 3.96	20	40	20	120	4.13-4.95	82/84
HWS150A-3/A	3.3V	2.97 - 3.96	30	40	20	120	4.13-4.95	82/84
HWS15A-5/A	5V	4.0 - 6.0	3	40	20	120	6.25-7.25	77/79
HWS30A-5/A	5V	4.0 - 6.0	6	40	20	120	6.25-7.25	80/82
HWS50A-5/A	5V	4.0 - 6.0	10	40	20	120	6.25-7.25	82/84
HWS100A-5/A	5V	4.0 - 6.0	20	40	20	120	6.25-7.25	84/86
HWS150A-5/A	5V	4.0 - 6.0	30	40	20	120	6.25-7.25	85/87
HWS15A-12/A	12V	9.6 - 14.4	1.3	96	48	150	15-17.4	80/83
HWS30A-12/A	12V	9.6 - 14.4	2.5	96	48	150	15-17.4	84/86
HWS50A-12/A	12V	9.6 - 14.4	4.3	96	48	150	15-17.4	83/85
HWS100A-12/A	12V	9.6 - 14.4	8.5	96	48	150	15-17.4	86/88
HWS150A-12/A	12V	9.6 - 14.4	13	96	48	150	15-17.4	85/88
HWS15A-15/A	15V	12.0 - 18.0	1	120	60	150	18.8-21.8	81/84
HWS30A-15/A	15V	12.0 - 18.0	2	120	60	150	18.8-21.8	85/87
HWS50A-15/A	15V	12.0 - 18.0	3.5	120	60	150	18.8-21.8	83/86
HWS100A-15/A	15V	12.0 - 18.0	7	120	60	150	18.8-21.8	86/88
HWS150A-15/A	15V	12.0 - 18.0	10	120	60	150	18.8-21.8	86/89
HWS15A-24/A	24V	19.2 - 28.8	0.65	150	96	150	30-34.8	82/85
HWS30A-24/A	24V	19.2 - 28.8	1.3	150	96	150	30-34.8	86/88
HWS50A-24/A	24V	19.2 - 28.8	2.2	150	96	150	30-34.8	84/87
HWS100A-24/A	24V	19.2 - 28.8	4.5	150	96	150	30-34.8	87/89
HWS150A-24/A	24V	19.2 - 28.8	6.5	150	96	150	30-34.8	88/90
HWS15A-48/A	48V	38.4 - 52.8	0.33	240	192	200	55.2-64.8	80/80
HWS30A-48/A	48V	38.4 - 52.8	0.65	240	192	200	55.2-64.8	82/83
HWS50A-48/A	48V	38.4 - 52.8	1.1	240	192	200	55.2-64.8	84/86
HWS100A-48/A	48V	38.4 - 52.8	2.1	240	192	200	55.2-64.8	88/90
HWS150A-48/A	48V	38.4 - 52.8	3.3	240	192	200	55.2-64.8	89/91

Options	
Suffix	Description
Blank	No cover
/A	Cover
/HD	See HWS/HD datasheet for details. -40°C start up & pcb coating (Not available on HWS15A)
/ME	See HWS/ME datasheet for details. ES/EN/CSA 60601-1 medical certification (Not available on HWS15A)
/R	Remote on/off (HWS50A to HWS150A only)
Example: HWS50A-24/RA	

Other Industrial Products	
HWS300-1800	300W to 1800W
LZSA	500W to 1500W (MIL STD)
DRB, DRF, DSP & DPP	10W to 960W DIN Rail Mount
RWS-B	50W to 600W (5 year warranty)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/hwsa-series.htm](http://us.tdk-lambda.com/lp/products/hwsa-series.htm)



**25-150W Single Output General Purpose Power Supplies**

**Features**

- ◆ Very low cost
- ◆ 25W to 150W
- ◆ Small size
- ◆ 115VAC or 230VAC input
- ◆ Withstands 300VAC surges (5s)
- ◆ Five year warranty



**Key Market Segments & Applications**



Specifications								
Model		LS25	LS35	LS50	LS75	LS100	LS150	
AC Input Voltage (300VAC for 5s)	VAC	88 - 264VAC (See note (2) for LS100)						88-132/176-264VAC(1)
Input Frequency	Hz	47 - 63Hz						
DC Input Voltage	VDC	125 - 373VDC*						248 - 273VDC*
Inrush Current (230VAC, cold start)	A	30	40	40	40	60	40	
Power Factor	-	Meets EN61000-3-2, -3						
Input Current (115/230VAC)	A	0.7 / 0.4	0.8 / 0.55	1.3 / 0.8	1.6 / 1.0	2.2 / 1.2	3.5 / 2	
Temperature Coefficient	-	<0.02%/°C						
Overcurrent Protection	-	> 110%						
Overvoltage Protection	V	3.3V: 3.8-4.45V, 5V: 5.75-6.75V, 12V: 13.8-16.2V, 15V: 17.25-20.25V, 24V: 27.6-32.4V, 36V: 41.4-48.6V, 48V: 55.2-64.8V						
Hold Up Time (115 / 230V input)	ms	14 / 80	12 / 80	14 / 60	14 / 60	25 / 150	20 / 28	
Leakage Current (230VAC 60Hz)	mA	<1mA						
Remote Sense	-	No						
LED Indicator	-	Green LED = On						
Operating Temperature	°C	-25 to +70°C. Derate linearly to 50% load from +50 to +70°C (2)						
Storage Temperature	°C	-40 to +85°C						
Operating Humidity	-	20 - 90% RH (non condensing)						
Storage Humidity	-	10 - 95% RH (non condensing)						
Cooling	-	Convection						
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.						
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC						
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour						
Shock	-	< 196.1 m/s <sup>2</sup> (20G)						
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11						
Safety Agency Approvals	-	UL /CSA (cUL) /IEC 60950-1 (2nd Ed), CE Mark (Additionally evaluated to EN 60950-1)						
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B						
MTBF (MIL-HDBK-217F)	hrs	906,997	706,464	712,890	648,786	545,375	505,393	
Weight (Typ)	g	170	270	350	410	600	700	
Size (LxWxH)	in	3.1 x 2.0 x 1.1	3.9 x 3.2 x 1.4	3.9 x 3.8 x 1.4	5.1 x 3.8 x 1.5	6.3 x 3.8 x 1.5	7.8 x 3.9 x 1.5	
Warranty	yrs	Five Years						

Notes: (1) Switch selectable for 115 or 230VAC (2) LS25-3 Derate linearly to 60% load from +40 to +70°C. LS50, LS75-3 & -5 Derate linearly to 70% load from +50 to +70°C. LS25-5 to 48, LS75-12 to 48 Derate linearly to 60% load from +50 to +70°C. LS100-3 & -5 Derate linearly to 60% load from +45 to +70°C. Derate linearly to 80% load from 115V to 88VAC input. LS100-12, -15, -24, -36, -48 Derate linearly to 60% load from +50 to +70°C. Derate linearly to 80% load from 115V to 88VAC input. LS150-3 & -5, Derate linearly to 50% load from +40 to +70°C. LS150-12, -15, -24, -36, -48 Derate linearly to 70% load from +50 to +70°C.

\*Safety certified for AC input only

Output Ratings							
Model	Voltage	Adjust Range (V)	Max Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) %
LS25-3.3	3.3V	2.85 - 3.6	6.0	40	20	80	75
LS25-5	5V	4.5 - 5.5	5.0	40	20	80	79
LS25-12	12V	10.8 - 13.2	2.1	96	48	120	83
LS25-15	15V	13.5 - 16.5	1.7	120	60	120	83
LS25-24	24V	22 - 27.6	1.1	192	96	120	84
LS25-36	36V	32 - 40	0.75	288	144	150	84
LS25-48	48V	42 - 54	0.57	384	192	200	85
LS35-3.3	3.3V	2.85 - 3.6	7.0	40	20	80	75
LS35-5	5V	4.5 - 5.5	7.0	40	20	80	78
LS35-12	12V	10.8 - 13.2	3.0	96	48	120	82
LS35-15	15V	13.5 - 16.5	2.4	120	60	120	83
LS35-24	24V	22 - 27.6	1.5	192	96	120	84
LS35-36	36V	32 - 40	1.0	288	144	150	84
LS35-48	48V	42 - 54	0.8	384	192	200	84
LS50-3.3	3.3V	3.0 - 3.6	10.0	40	20	80	75
LS50-5	5V	4.75 - 5.5	10.0	40	20	80	80
LS50-12	12V	10.8 - 13.2	4.2	96	48	120	84
LS50-15	15V	13.5 - 16.5	3.4	120	60	120	85
LS50-24	24V	22 - 27.2	2.2	192	96	120	86
LS50-36	36V	32 - 40	1.4	288	144	150	86
LS50-48	48V	42 - 54	1.1	384	192	200	86
LS75-3.3	3.3V	3.0 - 3.6	15.0	40	20	80	75
LS75-5	5V	4.75 - 5.5	12.0	40	20	80	79
LS75-12	12V	10.8 - 13.2	6.0	96	48	120	84
LS75-15	15V	13.5 - 16.5	5.0	120	60	120	85
LS75-24	24V	22 - 27.2	3.2	192	96	120	86
LS75-36	36V	32 - 40	2.1	288	144	150	86
LS75-48	48V	42 - 54	1.6	384	192	200	87
LS100-3.3	3.3V	3.0 - 3.6	20.0	40	20	80	75
LS100-5	5V	4.75 - 5.5	16.0	40	25	80	79
LS100-12	12V	10.8 - 13.2	8.5	96	48	120	82
LS100-15	15V	13.5 - 16.5	7.0	120	60	120	84
LS100-24	24V	22 - 27.2	4.5	192	96	120	86
LS100-36	36V	32 - 40	3.0	288	144	150	86
LS100-48	48V	42 - 54	2.3	384	192	200	86
LS150-3.3	3.3V	3.0 - 3.6	30.0	40	20	80	75
LS150-5	5V	4.75 - 5.5	26.0	40	20	80	79
LS150-12	12V	10.8 - 13.2	12.5	96	48	120	83
LS150-15	15V	13.5 - 16.5	10.0	120	60	120	85
LS150-24	24V	22 - 27.2	6.5	192	96	120	86
LS150-36	36V	32 - 40	4.3	288	144	150	87
LS150-48	48V	42 - 54	3.3	384	192	200	87

For Additional Information, please visit [us.tdk-lambda.com/lp/products/ls-series.htm](http://us.tdk-lambda.com/lp/products/ls-series.htm)





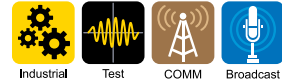
**40-65W 90-305V AC-DC Power Supplies**

**Features**

- ◆ Accepts 115/230/277VAC Nominal Inputs
- ◆ DIN Rail Mount Option
- ◆ Global Safety Agency Compliance
- ◆ <150mW Off-Load Power Consumption
- ◆ DOE Efficiency Level VI, ErP Tier 2
- ◆ Class 2 24V Model to UL1310



**Key Market Segments & Applications**



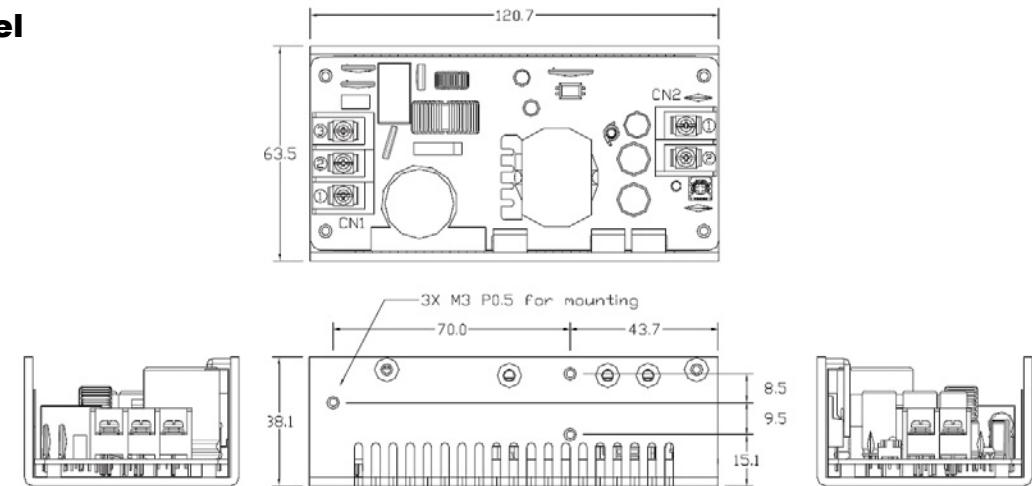
Specifications		
Model	CSW65	
Input Voltage range	-	90 - 305VAC (47 - 63Hz)
Inrush Current (230VAC)	A	Less than 65A, 25°C ambient cold start
Input Current (115/230VAC)	A	2 / 1
Hold Up Time (Typ)	ms	>10ms at 115VAC input
Off-Load Power Consumption	W	<150mW
Average Efficiency	%	5V: 87.2%, 12-54V: 89%
Temperature Coefficient	%/°C	±0.05%/°C
Output Voltage Accuracy	%	±1%
Output Adjustment Range	-	None
Remote Sense	-	No
Minimum Load	A	None
Output Regulation	%	5-24V: ±3%, 28-54V: ±2%
Ripple & Noise	%	See Model Selector
Overcurrent Protection	-	105 - 160%, Auto-Recovery
Overvoltage Protection	V	See Model Selector (Cycle AC to reset)
Operating Temperature	°C	-10 to +70°C derate linearly to 50% load from 50 to 70°C*
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 3kVAC Output to Ground 500VDC
Isolation Resistance	MΩ	>20MΩ at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Certifications	-	UL/CSA/IEC/EN60950-1, UL1310 Class 2 (1), CE Mark
Conducted & Radiated EMI	-	EN55032-B, FCC Class B
Immunity	-	EN55024
Weight (Typ)	g	U channel: 250, /A: 270, /D: 290
Size (WxLxH) U-Channel	in	2.5 x 4.75 x 1.5"
	mm	63.5 x 120.7 x 38.1mm
Warranty	yrs	Three Years

Note:

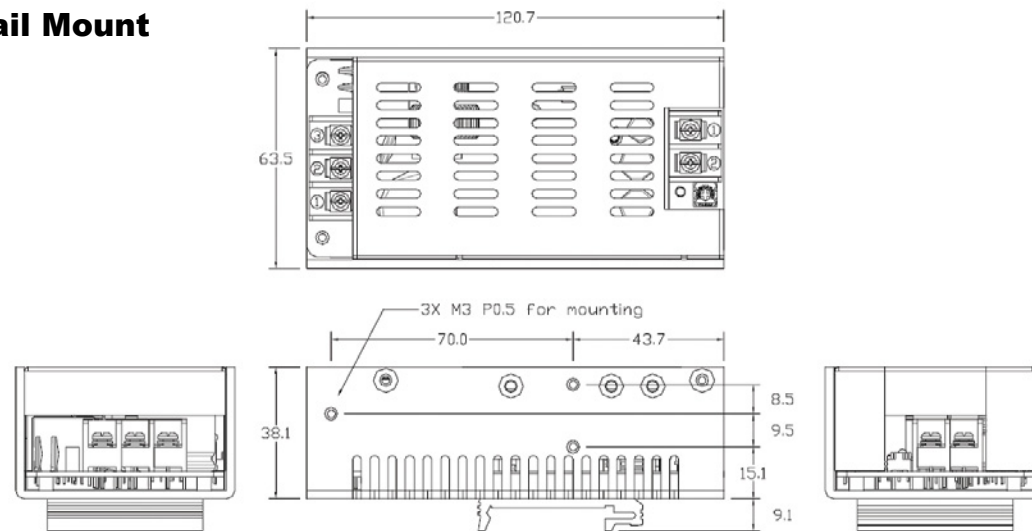
\* Derate linearly to 90% load from 0°C to -10°C  
(1) NEC Class 2 in accordance with UL1310. CSW65-24 only)

**Outline Drawings**

**U Channel**



**/D DIN Rail Mount**



**Model Selector**

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Ripple and Noise (mV)	Overvoltage (V)
CSW65-5	5	8.0	40	100	6 - 8
CSW65-12	12	5.42	65	120	13.2 - 15.6
CSW65-15	15	4.34	65	150	16.5 - 19.5
CSW65-18	18	3.62	65	180	19.8 - 23.4
CSW65-24	24	2.71	65	240	26.4 - 31.2
CSW65-28	28	2.33	65	280	30.8 - 36.4
CSW65-48	48	1.36	65	280	52.8 - 62.4
CSW65-54	54	1.21	65	280	59.4 - 64.8

**Options**

Suffix	Description
Blank	U-Channel
/A	U-Channel & Cover
/D	U-Channel, Cover & DIN Rail Bracket

For Additional Information, please visit  
us.tdk-lambda.com/lp/products/csw-series.htm



**50-600W Single Output General Purpose Power Supplies**

**Features**

- ◆ Low Cost
- ◆ Wide Range AC Input 85 - 265VAC (300VAC for 5s)
- ◆ UL508 Certification on Select Models
- ◆ Enclosed Construction
- ◆ Compact Size
- ◆ 7 Year Warranty



**Key Market Segments & Applications**

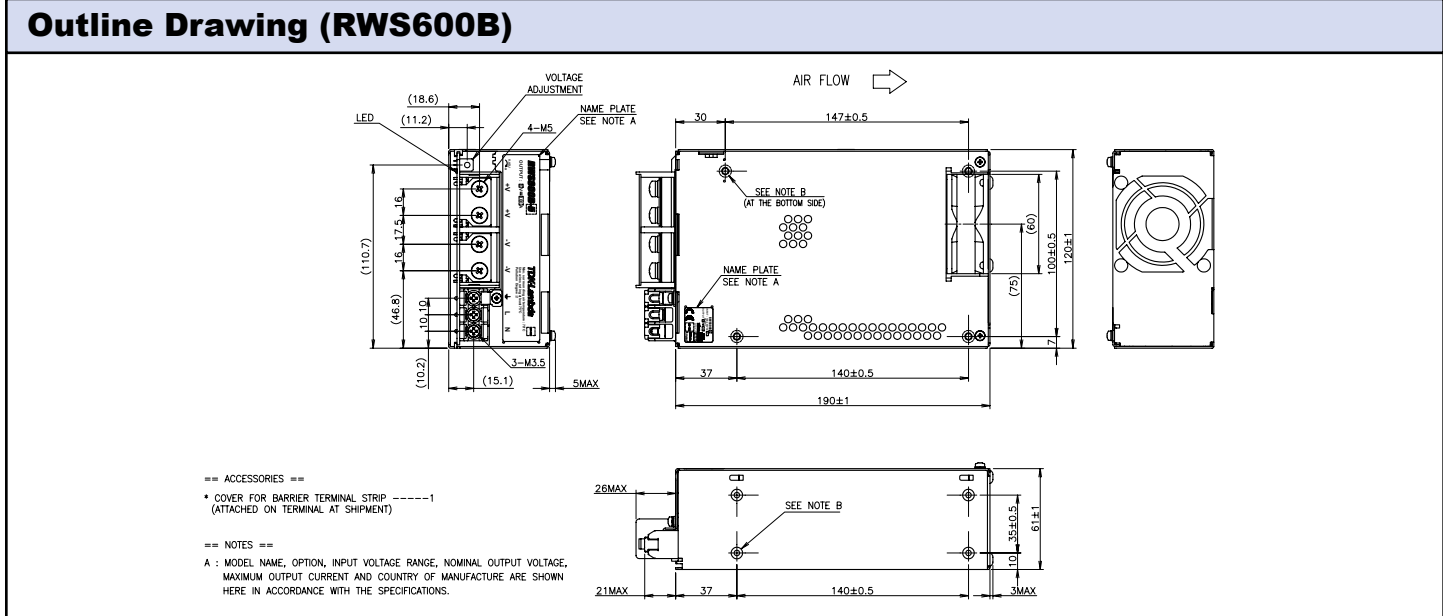


Specifications		RWS50B	RWS100B	RWS150B	RWS300B	RWS600B
AC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz), 300VAC for 5 seconds				
DC Input Voltage range	VDC	120 - 370VDC (330VDC for RWS600B)*				
Inrush Current (100 / 200VAC)	A	18 / 36	15 / 30	16 / 32	17 / 34	20 / 40
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.95 / 0.9)				
Input Current (115/230VAC) (Typ)	A	1.0 / 0.65	1.2 / 0.6 (5V: 0.9/0.45)	1.8 / 0.9 (5V: 1.3/0.7)	3.6 / 1.9 (5V: 3.1/1.6)	6.6 / 3.6 (5V: 6.2/3.2)
Temperature Coefficient	-	<0.02%/°C				
Regulation	-	See sheet 2				
Overcurrent Protection	-	>105%, Constant Current Style				
Overvoltage Protection	V	115-140%, Cycle AC line to reset				
Hold Up Time (Typ at 100% load)	ms	20ms (RWS50B: 15ms at 100VAC input)				
Leakage Current (max)	uA	750uA maximum, typically 175uA at 115VAC, 63Hz				
Remote Sense	-	No				
Operating Temperature	-	-20 to +70°C, see note (3) and instruction manual for low temperature derating				
Storage Temperature	-	-30 to +75°C				
Operating Humidity (non condensing)	%RH	30 - 90%RH				
Storage Humidity (non condensing)	%RH	10 - 90%RH				
Cooling	-	Convection		Internal Fan		
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.				
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC				
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> (sweep 1 min) X, Y, Z for 1 hour				
Shock	-	< 196.1 m/s <sup>2</sup>				
Safety Agency Approvals (2)	-	UL / CSA(cUL) / IEC 60950-1 (2nd Ed), UL:508, CSA C22.2 No.107.1-01, CE Mark (Additionally evaluated to EN 60950-1)				
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B				
Line Dips	-	SEMI-F47 (200VAC input)				
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2				
Weight (Typ)	g	230	400	480	900	1600
Size (WxHxD)	mm	82 x 34 x 81.5	94 x 39 x 108	94 x 41 x 128	102 x 41 x 170	120 x 61 x 190
	In	3.23 x 1.34 x 3.2	3.7 x 1.54 x 4.25	3.7 x 1.61 x 5.04	4.02 x 1.61 x 6.7	4.72 x 2.4 x 7.48
MTBF - Telcordia SR-332 issue 3**	Hours	4,170,949	1,978,533	2,235,743	2,027,824	2,157,340
Warranty	Yrs	Seven Years				

\*Safety certified for AC input only \*\* 24V output model, 25°C ambient, full load, 230VAC input

Notes: (1) See instruction manual for derating below 115VAC input  
 (2) UL508 & CSA C22.2 No.107.1-01 on RWS50B-5, -12, -24, RWS100B-5, -12, -24, RWS150B-5, -12, -24, RWS300B-12, -15, -24, -36 & -48 RWS600B-24 only  
 (3) RWS50-100B derates linearly above 45°C to 20% load at 70°C, 150B derates above 40°C and 300-600B derates above 50°C to 50% load at 70°C

Output Ratings								
Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
RWS50B-5	5V	4.5-5.75V	10	50	40	20	120	78 / 79
RWS100B-5	5V	4.5-5.75V	14	70	40	20	120	77.5 / 79
RWS150B-5	5V	4.5-5.75V	21	105	40	20	120	77.5 / 79.5
RWS300B-5	5V	4.5-5.75V	50	250	40	20	120	75 / 78.5
RWS600B-5	5V	4.5-5.75V	100	500	70	20	120	74 / 77.5
RWS50B-12	12V	10.8-13.8V	4.3	51.6	96	48	150	83 / 84
RWS100B-12	12V	10.8-13.8V	8.5	102	96	48	150	83 / 84
RWS150B-12	12V	10.8-13.8V	13	156	96	48	150	84.5 / 87.5
RWS300B-12	12V	10.8-13.8V	25	300	96	48	150	79.5 / 82.5
RWS600B-12	12V	10.8-13.8V	50	600	96	48	150	82 / 84.5
RWS100B-15	15V	13.5-17.25V	6.8	102	120	60	150	84 / 85
RWS150B-15	15V	13.5-17.25V	10	150	120	60	150	84.5 / 87.5
RWS300B-15	15V	13.5-17.2V	20	300	120	60	150	81.5 / 84.5
RWS600B-15	15V	13.5-17.2V	40	600	120	60	150	82 / 84.5
RWS50B-24	24V	21.6-27.6V	2.2	52.8	192	96	150	86 / 87
RWS100B-24	24V	21.6-27.6V	4.5	108	192	96	150	86 / 87.5
RWS150B-24	24V	21.6-27.6V	6.5	156	192	96	150	86.5 / 89.5
RWS300B-24	24V	21.6-27.6V	12.5	300	192	96	150	85 / 88
RWS600B-24	24V	21.6-27.6V	25	600	192	96	150	85 / 88.5
RWS150B-28	28V	25.2-32.2V	5.4	151.2	224	112	180	86.5 / 89.5
RWS300B-36	36V	32.4-41.4	8.4	302.4	288	144	200	85 / 88
RWS600B-36	36V	32.4-41.4	16.7	601.2	288	144	200	84 / 88.5
RWS50B-48	48V	43.2-52.8	1.1	52.8	384	192	200	87 / 88
RWS100B-48	48V	43.2-52.8	2.1	100.8	384	192	200	86 / 87
RWS150B-48	48V	43.2-52.8	3.3	158.4	384	192	200	86.5 / 89.5
RWS300B-48	48V	43.2-52.8	6.3	302.4	384	192	200	85 / 88
RWS600B-48	48V	43.2-52.8	12.5	600	384	192	200	85 / 88.5



Options	Suffix	Description
/CO2		Double Sided Board Coating
/R		Remote On/Off (RWS300B only)
/RFO		Remote On/Off, Remote Sense, Parallel Operation, DC Good Signal (RWS600B only)

Other TDK-Lambda Industrial Products	
HWS	15W to 1500W Single output
LS	25W to 200W Single output low cost
RWS1000/1500B	1000W to 1500W Single output (including medical /ME)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/rwsb-series.htm](http://us.tdk-lambda.com/lp/products/rwsb-series.htm)



**79-153W Single Output Power Supplies**

**Features**

- ◆ Convection or Conduction Cooled
- ◆ Up to 206W Peak Power Capability
- ◆ Low 31mm Height
- ◆ -40°C Ambient temperature Start Up



**Key Market Segments & Applications**



Specifications		CUS200LD
Model		CUS200LD
AC Input Voltage	VAC	85 - 265VAC <sup>(1)</sup>
Input Frequency	Hz	47 - 63Hz
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC
Power Factor	-	Meets EN61000-3-2 (Typical PF 0.95/0.9) <sup>(2)</sup>
Input Current	A	Varies by model, please see detailed specification on website
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	> 101% of peak current rating
Overvoltage Protection <sup>(3)</sup>	V	See model selector
Hold Up Time (115 / 230V input)	ms	20ms typical
Leakage Current	mA	<0.75mA at 265VAC, 60Hz
Ripple and Noise	%	3.3-7.5V: 120mV, 12-24V: 150mV, 28-48V: 200mV
Line and Load Regulation	%	See model selector
Remote Sense	-	No
Operating Temperature	°C	-25 to +70°C. Start up at -40°C Convection cooled: Derate linearly to 40% load from +40 to +70°C Conduction cooled: Derate linearly to 40% load from +45 to +70°C
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)
Cooling	-	Convection or Conduction Cooled (Mounted on a 2mm thick aluminium plate 400x400mm)
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11
Safety Agency Certifications	-	IEC/UL/CSA/EN 60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011-B, EN55032-B, FCC Class B
Weight (Typ)	g	430
Size (LxWxH)	mm (in)	160 x 62 x 31mm (6.3 x 2.44 x 1.22")
Warranty	yrs	Three Years

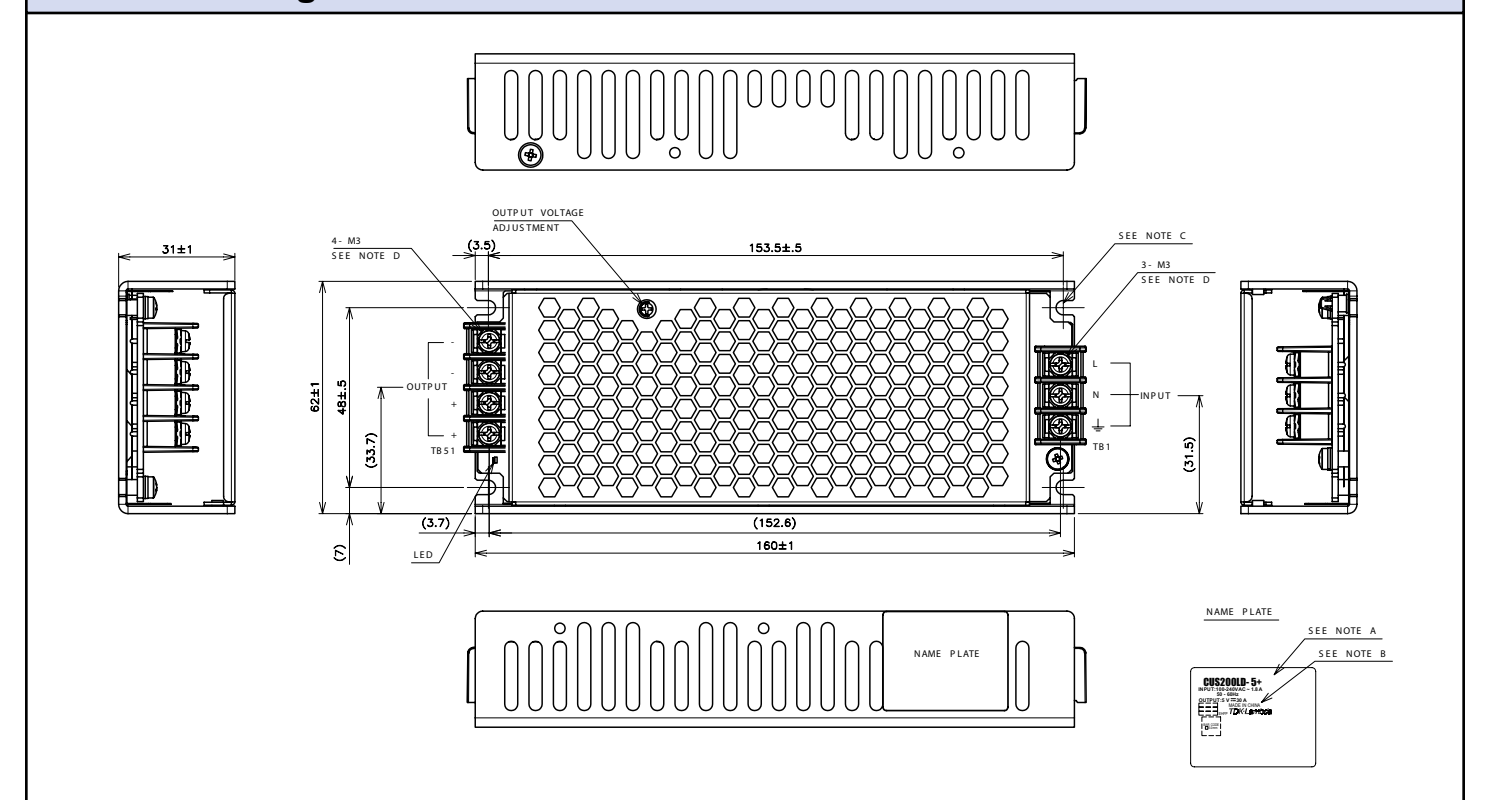
- Notes:  
 See specification for conditions and test methods  
 (1) 4.2V model: Derate linearly to 90% load from 115 to 85VAC input. 5-48V models: Derate linearly to 80% load from 115 to 85VAC input  
 (2) 115 / 230VAC input  
 (3) Cycle AC to reset

**Model Selector**

Model	Output Voltage	Adjust Range (V)	Max Current Convection (A)	Max Power Convection (W)	Max Current Conduction (A)	Max Power Conduction (W)	Peak Current <sup>(4)</sup> (A)	Load Reg (mV)	Line Reg (mV)	Overvoltage	Efficiency (typ) % <sup>(5)</sup>
CUS200LD-3	3.3V	2.97 - 3.63V	24A	79.2W	30A	99W	40A	26mV	13mV	3.8 - 5.44V	82 / 83%
CUS200LD-4	4.2V	3.78 - 4.62V	24A	100.8W	30A	126W	40A	33mV	16mV	4.83 - 6.51V	85 / 87%
CUS200LD-5	5V	4.5 - 5.5V	24A	120W	30A	150W	40A	40mV	20mV	5.75 - 7.5V	87 / 89%
CUS200LD-7R5	7.5V	6.375 - 8.25V	16A	120W	20A	150W	26.6A	60mV	30mV	8.63 - 10.87V	88 / 90%
CUS200LD-12	12V	10.8 - 13.2V	10A	120W	12.5A	150W	16.7A	96mV	48mV	13.8 - 17.4V	87 / 89%
CUS200LD-15	15V	13.5 - 16.5V	8A	120W	10A	150W	13.4A	120mV	60mV	17.25 - 21.75V	87 / 89%
CUS200LD-24	24V	21.6 - 26.4V	5A	120W	6.3A	151.2W	8.4A	192mV	96mV	27.6 - 34.8V	87 / 89%
CUS200LD-28	28V	25.2 - 30.8V	4.3A	120.4W	5.4A	151.2W	7.2A	224mV	112mV	32.2 - 40.6V	87 / 90%
CUS200LD-48	48V	43.2 - 52.8V	2.5A	120W	3.15A	151.2W	4.2A	384mV	192mV	55.2 - 69.6V	88 / 90%

- Notes:  
 See specification for conditions and test methods  
 (4) Convection cooling: Peak current for less than 10 seconds, with a duty cycle of <35%  
 Conduction cooling: Peak current for less than 5 seconds, with a duty cycle of <35%  
 (5) 115 / 230VAC input. Conduction cooled ratings

**Outline Drawing**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/cus-series.htm](http://us.tdk-lambda.com/lp/products/cus-series.htm)





**150-200W Single Output General Purpose Power Supplies**

**Features**

- ◆ Very low cost
- ◆ Small Size
- ◆ Wide Range AC Input
- ◆ Convection or Fan Cooled
- ◆ Five year warranty
- ◆ 1.6" high (For 1U racking)



**Key Market Segments & Applications**



**Specifications**

Model	LS200 (Enclosed style with internal fan)	LS200/L (U channel style - no internal fan)
AC Input Voltage (300VAC for 5s)	VAC 85 - 264VAC	85 - 264VAC (3)
Input Frequency	Hz 47 - 63Hz	
DC Input Voltage	VDC 120 - 373VDC*	
Inrush Current (230VAC, cold start)	A 60	
Power Factor	Meets EN61000-3-2, -3 (Typical PF 0.98/0.95)(1)	
Input Current (115/230VAC)	A 3.5 / 1.7 (typical)	
Temperature Coefficient	<0.02%/°C (0 - 50°C)	
Overcurrent Protection	>105% of nominal or peak. Constant current style	
Overvoltage Protection (2)	V 3.3V: 3.8 - 4.45V, 5V: 5.75 - 6.75V, 7.5V: 8.6 - 10.1V, 12V: 15.1 - 17.75V 15V: 17.25 - 20.25V, 24V: 30.25 - 35.5V, 36V: 41.4 - 48.6V, 48V: 60 - 69.6V	
Overtemperature Protection (2)	Yes	
Hold Up Time (115/230V input)	ms 20ms	
Leakage Current (230VAC 60Hz)	mA <1mA	
Remote Sense	Yes	
Remote On/Off	On: 0 - 0.8V; Off: 3 - 12V	
LED Indicator	Green LED = On	
Operating Temperature	°C Fan or forced air rating: -25 to +70°C. Derate linearly to 60% load from +50 to +70°C	
Storage Temperature	°C -40 to +85°C	
Operating Humidity	20 - 90% RH (non condensing)	
Storage Humidity	10 - 95% RH (non condensing)	
Cooling	Internal Fan (air exhausts from fan end)	Convection or customer supplied airflow
Withstand Voltage	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.	
Isolation Resistance	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour	
Shock	< 196.1 m/s <sup>2</sup> (20G)	
Immunity	IEC61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	UL /CSA (cUL) /IEC 60950-1 (2nd Ed), CE Mark (Additionally evaluated to EN 60950-1)	
Conducted & Radiated EMI	EN55011/EN55022-B, FCC--B	
Weight (Typ)	g 700	600
Size (LxWxH)	in 7.8 x 3.9 x 1.61"	
Warranty	yrs Five Years	

Notes: \*Safety certified for AC input only

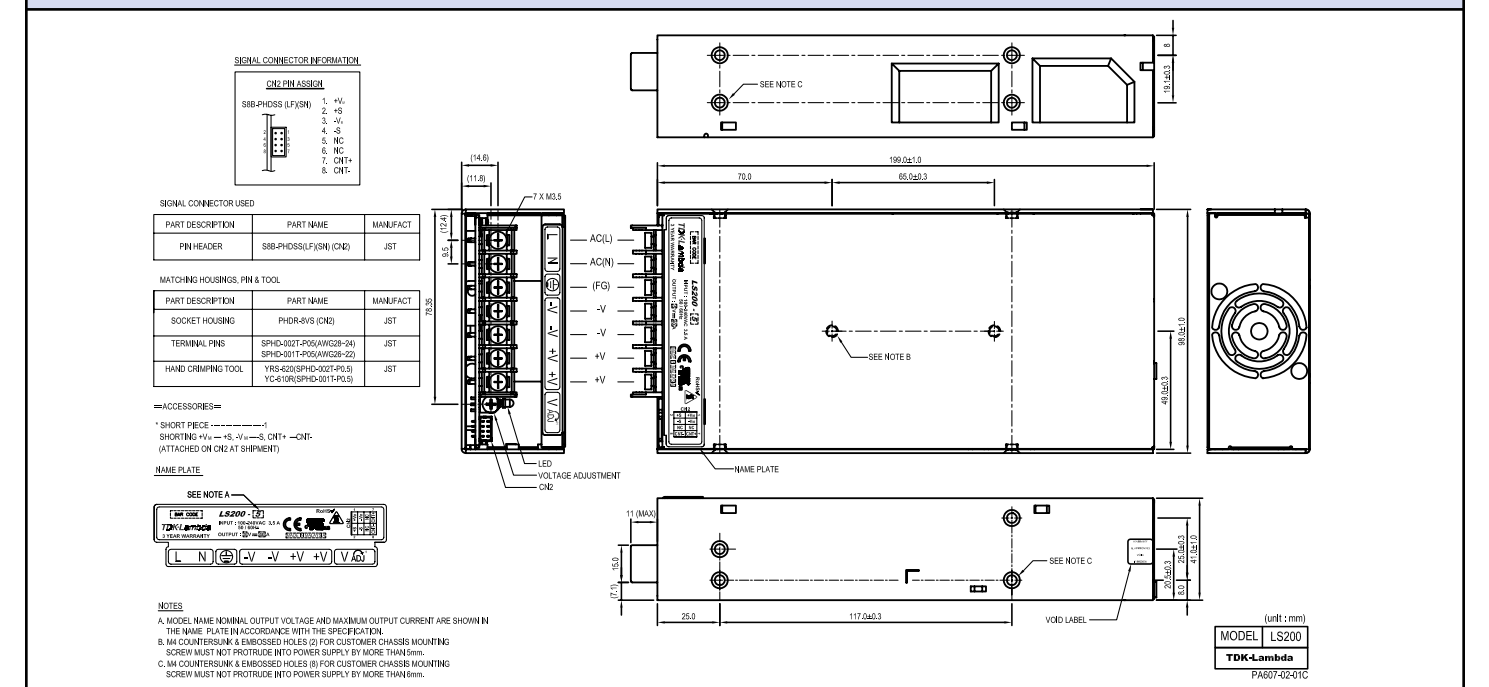
- (1) 115 / 230VAC input
- (2) Recycle AC to reset
- (3) (Derate linearly to 65% load from 115VAC to 85VAC)

**Output Ratings**

Model	Voltage	Adjust Range (V)	Max Current Forced Air(A) <sup>(4)</sup>	Max Current Convect.(A) <sup>(5)</sup>	Peak Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % <sup>(1)</sup>
LS200-3.3	3.3V	3.0 - 3.6	40.0	N/A	-	40	16	80	67 / 68
LS200-5	5V	4.75 - 5.5	40.0	N/A	-	40	20	80	72 / 75
LS200-7.5	7.5V	6.8 - 8.2	26.7	N/A	-	40	20	80	74 / 77
LS200-12	12V	10.8 - 14.4	16.7	N/A	-	96	48	120	76 / 79
LS200-15	15V	13.5 - 16.5	13.4	N/A	-	120	60	120	80 / 83
LS200-24	24V	22 - 28.8	8.4	N/A	10.4	192	96	120	82 / 84
LS200-36	36V	32 - 40	5.6	N/A	6.9	288	144	150	82 / 85
LS200-48	48V	42 - 57.6	4.2	N/A	-	384	192	200	82 / 85
LS200-3.3/L	3.3V	3.0 - 3.6	40.0	26	-	40	16	80	67 / 68
LS200-5/L	5V	4.75 - 5.5	40.0	26	-	40	20	80	72 / 75
LS200-7.5/L	7.5V	6.8 - 8.2	26.7	17.3	-	40	20	80	74 / 77
LS200-12/L	12V	10.8 - 14.4	16.7	11.6	-	96	48	120	76 / 79
LS200-15/L	15V	13.5 - 16.5	13.4	9.3	-	120	60	120	80 / 83
LS200-24/L	24V	22 - 28.8	8.4	5.8	10.4	192	96	120	82 / 84
LS200-36/L	36V	32 - 40	5.6	3.9	6.9	288	144	150	82 / 85
LS200-48/L	48V	42 - 57.6	4.2	2.9	-	384	192	200	82 / 85

Notes  
 (4) With internal fan version LS200-xx or LS200-xx/L version with external airflow.  
 (5) See Installation manual for derating curve.

**Outline Drawing**



**Other Related Products**

LS25 - 150	25W to 150W low cost
HWS15 - 1800	15W to 1800W limited lifetime warranty
SWS300 - 1000	300 to 1000W single output

**Options**

Suffix	Description
/L	No cover or fan (U channel)
Blank	Cover and fan

For Additional Information, please visit [us.tdk-lambda.com/lp/products/lis-series.htm](http://us.tdk-lambda.com/lp/products/lis-series.htm)



**250W Single Output Low Profile Power Supplies**

**Features**

- ◆ High Efficiency, up to 90%
- ◆ 1.18" high
- ◆ Wide Range AC Input
- ◆ Convection Cooled
- ◆ Coated pcb as standard
- ◆ Three year warranty



**Key Market Segments & Applications**



Specifications		
Model	CUS250LD	
AC Input Voltage (300VAC for 5s)	VAC	85 - 265VAC
Input Frequency	Hz	47 - 63Hz
DC Input Voltage	VDC	120 - 370VDC (No safety certification)
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC
Power Factor	-	Meets EN61000-3-2 (Typical PF 0.98/0.95)(1)
Input Current (115/230VAC)	A	2.8 / 1.4
Temperature Coefficient	-	<0.02%/°C (0 - 50°C)
Overcurrent Protection	-	> 105%
Overvoltage Protection (2)	V	3.3V: 4 - 5.25V, 4.2V: 5 - 6.5V, 5V: 5.75 - 7.5V, 12V: 13.8 - 16.2V, 24V: 27.6 - 32.4V
Hold Up Time	ms	20ms
Leakage Current (240VAC 60Hz)	mA	<0.75mA
Remote Sense	-	No
LED Indicator	-	Green LED = On
Operating Temperature (3)	°C	U Channel: -25 to +70°C. Full load at 40°C. Derate to 50% load at 70°C
Storage Temperature	°C	With Cover: -25 to +70°C. Full load at 40°C. Derate to 40% load at 70°C
Operating Humidity (non condensing)	%	-30 to +75°C
Storage Humidity (non condensing)	%	30 - 90% RH
Cooling	-	10 - 90% RH
Withstand Voltage	-	Convection
Isolation Resistance	MΩ	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Vibration (non operating)	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Shock	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Immunity	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Certifications	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11
Conducted & Radiated EMI	-	UL60950-1, CSA60950-1-07 (cTUVus), EN60950-1, CE Mark
Weight (Typ)	g	EN55022-B, FCC-B
Size (LxWxH)	in(mm)	700
Warranty	yrs	U Channel: 7.8 x 4 x 1.18" (198 x 102 x 30)
		With Cover: 7.8 x 4 x 1.34" (198 x 102 x 34)
		Three Years

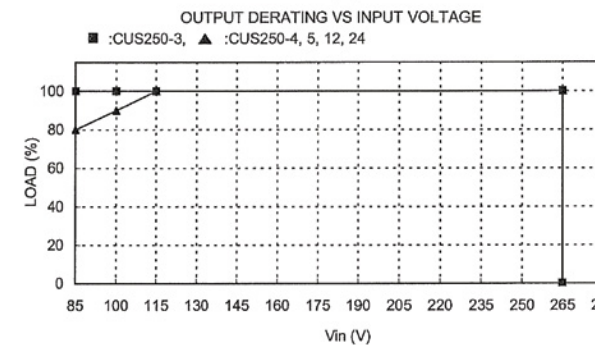
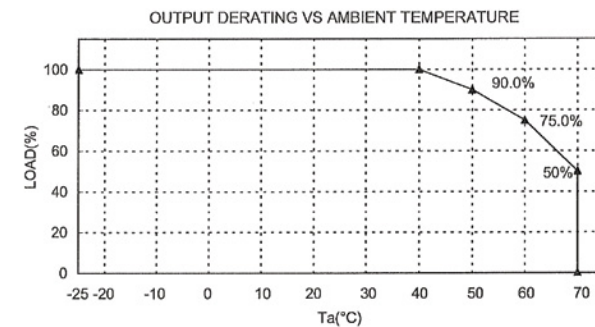
**Notes:**

- (1) 115 / 230VAC input
- (2) Cycle AC to reset
- (3) See derating curves on page 2. Derates linearly to 80% load from 115VAC to 85VAC input (excluding 3.3V model). -40°C start up above 88VAC input.

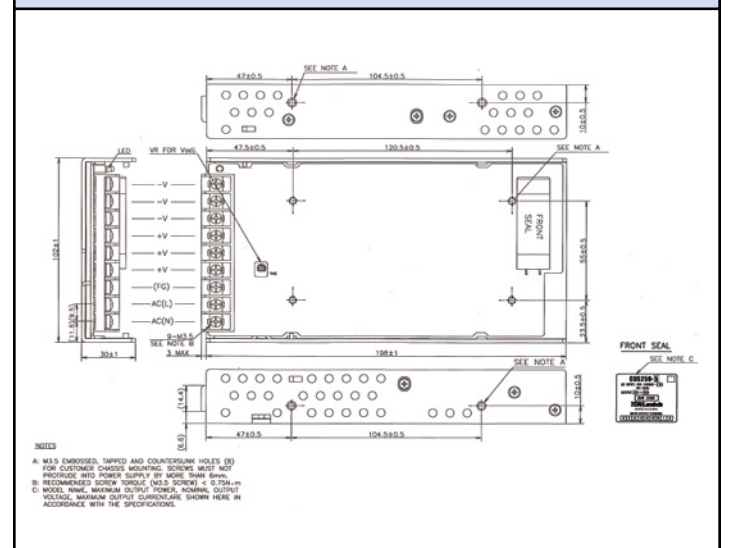
**Model Selector**

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % (1)
CUS250LD-3	3.3V	2.97 - 3.63	50	165	40	20	120	86 / 88
CUS250LD-4	4.2V	3.78 - 4.62	50	210	40	20	120	87 / 89
CUS250LD-5	5V	4.5 - 5.5	50	250	40	20	120	88 / 90
CUS250LD-12	12V	10.8 - 13.2	21	252	96	48	120	88 / 90
CUS250LD-24	24V	21.6 - 26.4	10.5	252	192	96	150	88 / 90

**Derating Curve (See website for covered version)**



**Outline Drawing (See website for covered version)**



**Options**

Suffix	Description
Blank	No cover
/A	Cover

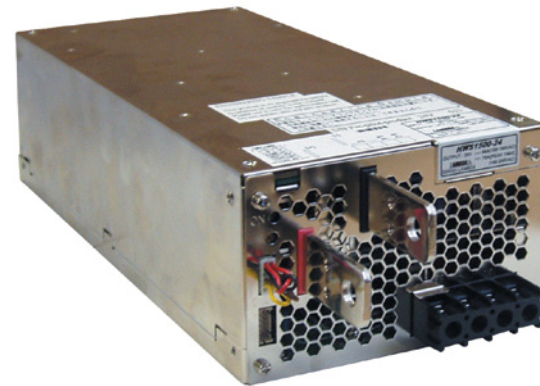
For Additional Information, please visit [us.tdk-lambda.com/lp/products/cus-series.htm](http://us.tdk-lambda.com/lp/products/cus-series.htm)



**300-1500W Single Output Industrial Power Supplies**

**Features**

- ◆ Limited Lifetime Warranty
- ◆ UL508 approved
- ◆ SEMI F47 Compliant (high line AC)
- ◆ Universal Input (85 - 265VAC)
- ◆ High Efficiency
- ◆ Class 1 Div 2 option (/RY suffix)
- ◆ Wide Range AC Input



**Key Market Segments & Applications**



Specifications		HWS300	HWS600	HWS1000	HWS1500
Input Voltage range (47-63Hz)	-	85 - 265VAC or 120 - 330VDC (6)**			
Input Current (Typ) (1)	A	5V: 3.8/1.9; 12-48V: 4.2/2.1	5V: 7.5/3.6; 12-48V: 8.1/3.9	3.3V: 9.6/5.0; 5-60V: 13.5/7.0	3.3V: 15.0/8.0; 5-60V: 19.5/10.0
Inrush Current (1)	A	20 / 40			
Power Factor	-	Meets EN61000-3-2			
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection	-	>105% (>101% of peak current for peak current capable models)			
Overvoltage Protection	V	See table on page 2 (Recycle AC or remote on/off to reset)			
Hold Up Time (Typ)	ms	20			
Leakage Curr. (at 240VAC, 60Hz)	mA	<0.75mA		<1.2mA	<1.5mA
Remote Sense	-	Yes			
Indicator	-	Green LED = ON			
Remote on/off	-	Yes (Isolated from output)			
Parallel operation	-	Single wire connection (up to 5 units)			
DC Good	-	Yes			
Remote Adjust (PV)	-	External voltage adjusts output, see options table			
Operating Temperature	-	-10°C to +70°C, derate linearly to 50% load from 50C to 70C (2, 3)			
Storage Temperature	°C	-30 to +85°C			
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH			
Cooling	-	Internal fan			
Withstand Voltage (4)	-	Input to Ground 2.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s <sup>2</sup>			
Safety Agency Certifications (5)	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508, CE Mark			
Line Dips	-	SEMI-F47 (200VAC input)			
Conducted & Radiated EMI	-	EN55011 / EN55022, FCC VCCI (HWS300, 600 & 1000: Class B, HWS1500: Class A)			
Immunity	-	IEC61000-4-2, -3, -4, -6 (Level 3), -5, -8 (Level 4), -11			
Weight (Typ)	g	1,000	1,600	3,200	3,3-7.5V: 4000; 12V+: 3800
Size (WxHxD)	in	2.4 x 3.23 x 6.5"	3.94 x 3.23 x 6.5"	5 x 3.25 x 9.45"	5 x 3.25 x 11"
MTBF - Telcordia SR-332 issue 3***	hours	2,145,809	1,998,996	1,087,031	1,152,309
Warranty	yrs	Limited lifetime warranty (See TDK-Lambda's terms and conditions)			

(1) 100/200VAC  
 (2) HWS start up -20°C. (-40°C see options table)  
 (3) HWS1000/1500 with 85VAC input: See installation manual  
 (4) 2kVAC HWS1000/1500 Input to ground  
 HWS1000: -10 to +71°C. HWS1000-5, HWS1500-3, -5 derate linearly above 40°C

(5) UL60601-1, EN60601-1, see options.  
 UL508; HWS300/600 5V, 12V, 24V & 48V models  
 (6) Not on HWS1500/ME, /HD or /RY versions  
 (\*) Class 1 Div 2 option (/RY suffix)  
 (\*\*) Safety certified for AC input only  
 (\*\*\*) 24V output model, 25°C ambient, full load, 230VAC input

**Output Ratings**

Model	Voltage V	Adjust Range V(3)	Max Curr. A	Peak Curr. A(2)	Max. Pwr. W	Load Reg mV	Line Reg mV	Ripple Noise mV	Over-voltage V	Eff. typ % (1)
HWS300-3	3.3V	2.64 - 3.96	60	-	198	30	20	120	4.13 - 4.95	74/77
HWS600-3	3.3V	2.64 - 3.96	120	-	396	30	20	120	4.13 - 4.95	75/78
HWS1000-3	3.3V	2.64 - 3.96	200	-	660	40	20	120	4.13 - 4.62	71/73
HWS1500-3	3.3V	2.64 - 3.96	300	-	990	60	36	150	4.12 - 4.62	72/75
HWS300-5	5V	4 - 6	60	-	300	30	20	120	6.25 - 7.25	79/82
HWS600-5	5V	4 - 6	120	-	600	30	20	120	6.25 - 7.25	80/83
HWS1000-5	5V	4 - 6	200	-	1000	40	20	120	6.25 - 7.0	76/78
HWS1500-5	5V	4 - 6	300	-	1500	60	36	150	6.25 - 7.0	77/81
HWS1000-6	6V	4.8 - 7.2	167	-	1002	60	36	150	7.5 - 8.4	79/81
HWS1500-6	6V	4.8 - 7.2	250	300	1500	60	36	150	7.5 - 8.4	79/82
HWS1000-7	7.5V	6 - 9V	134	160	1005	60	36	150	9.38 - 10.5	80/82
HWS1500-7	7.5V	6 - 9V	200	240	1500	60	40	150	9.37 - 10.5	81/83
HWS300-12	12V	9.6 - 14.4	27	-	324	96	48	120	15 - 17.4	80/83
HWS600-12	12V	9.6 - 14.4	53	-	648	96	48	120	15 - 17.4	80/83
HWS1000-12	12V	9.6 - 14.4	88	100	1056	100	48	150	15 - 17.4	83/85
HWS1500-12	12V	9.6 - 14.4	125	-	1500	72	48	150	15 - 17.4	82/85
HWS300-15	15V	12 - 18	22	-	330	120	60	150	18.8 - 21.8	82/85
HWS600-15	15V	12 - 18	43	-	645	120	60	150	18.8 - 21.8	82/85
HWS1000-15	15V	12 - 18	70	80	1050	120	60	150	18.8 - 21.8	83/85
HWS1500-15	15V	12 - 18	100	-	1500	90	60	150	18.7 - 21.8	83/87
HWS300-24	24V	19.2 - 28.8	14	16.5	336	192	96	150	30 - 34.8	82/85
HWS600-24	24V	19.2 - 28.8	27	31	648	192	96	150	30 - 34.8	82/85
HWS1000-24	24V	19.2 - 28.8	44	50	1056	150	96	150	30 - 34.8	85/87
HWS1500-24	24V	19.2 - 28.8	65/70 (1)	105	1560	144	96	200	30 - 34.8	84/88
HWS1000-36	36V	28.8 - 43.2	29.3	33.3	1055	150	144	200	45 - 49.7	85/88
HWS1500-36	36V	28.8 - 43.2	42/46.5 (1)	70	1512	150	144	200	45 - 49.7	84/88
HWS300-48	48V	38.4 - 52.8	7	-	336	384	192	200	55.2 - 64.8	82/85
HWS600-48	48V	38.4 - 52.8	13	-	624	384	192	200	55.2 - 64.8	82/85
HWS1000-48	48V	38.4 - 52.8	22	25	1056	300	192	200	55.2 - 64.8	86/88
HWS1500-48	48V	38.4 - 52.8	32	-	1536	288	192	200	55.2 - 64.8	86/90
HWS1000-60	60V	48 - 66	17.6	20	1056	360	240	400	69 - 75	85/88
HWS1500-60	60V	48 - 66	25.6/28 (1)	42	1536	360	240	400	69 - 75	86/90

Notes  
 (1) 100/200VAC  
 (2) 200-265VAC Input, 10s maximum on time with 35% duty cycle  
 (3) Use program input (PV) to adjust from 20-120% of nominal (20-110% for 48V & 60V models)

**Options**

Suffix	Description
Blank	HWS300-1500 the cover is fitted as standard
/A	Not Applicable
/PV	HWS300-1500 the cover is fitted as standard HWS300, 600 (Standard on HWS1000 & 1500): 1-6V program voltage input to adjust output 20-120% of nominal (20-110% for 48V) (12V-48V models only)
/HD	See HWS50-1500/HD Datasheet for details. -40 to +71(74)°C operation, conformally coated PCBs
/ME	See HWS30-1500/ME Datasheet for details. UL60601-1, EN60950-1 medical certification
/RY	ISA 12.12.01 (UL1604) - Class 1 Div 2 with dry contact relay DC Good signal (300W, 600W and 1500W 24V output models only, no UL508 certification, no remote on/off function.)

**Other Industrial Products**

HWS	15W to 150W single output
LZSA	500W to 1500W Single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 480W DIN Rail Mount

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/hws-series.htm](http://us.tdk-lambda.com/lp/products/hws-series.htm)



**Single Output 350W/420W Medical & ITE Power Supplies**

**Features**

- ◆ High Efficiency, up to 94%
- ◆ 1.6" high
- ◆ 350W Convection Cooled, 420W Forced Air Rating
- ◆ BF Rated
- ◆ 5V Standby & 12V Fan Output



**Key Market Segments & Applications**



Specifications		
Model	CUS350M/F	
AC Input Voltage	VAC	85 - 265VAC(1)
Input Frequency	Hz	47 - 63Hz
DC Input Voltage	VDC	120 - 370VDC (No safety certification)
Inrush Current (cold start)	A	20A at 115VAC, 40A at 230VAC
Power Factor	-	Meets EN61000-3-2 (Typical PF 0.99/0.95)(2)
Input Current (115/230VAC)	A	350W: 4 / 2A; 420W: 4.5 / 2.3A (typical)
Off-load Power Draw	W	<0.5W at 230VAC (In standby mode using remote on/off)
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	12V: >38A, 18V: > 26A, 24V: > 20A, 36V: >13A, 48V: > 10A
Overvoltage Protection (3)	V	12V: 13.8-16.2V, 18V: 20.7-24.3V, 24V: 27.6-32.4V, 36V: 41.4-48.6V, 48V: 55.2-64.8V
Hold Up Time (115 / 230V input)	ms	20ms typical at 350W output
Leakage Current	mA	<0.3mA at 265VAC, 60Hz
Ripple and Noise	%	1%
Line Regulation	%	0.5%
Load Regulation	%	1%
Remote Sense	-	Yes, compensates for 0.5V total cable drop
Remote On/Off	-	Apply voltage to isolated terminals to shut unit down
Power Good (/F or /PG option)	-	Isolated transistor, On = Good. Gives >5ms warning of AC power loss
Standby Voltage	-	5V 0.5A
Fan Supply (/F or /FN options)	-	12V 0.3A
Operating Temperature	°C	-20 to +70°C. See derating curves
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)
Cooling	-	Convection or Forced Air Cooled (1.5m/s across terminals)
Withstand Voltage	-	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC (1xMOPP) BF Rated
Isolation Resistance	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11, EN60601-1-2:2015 (Ed4)
Safety Agency Certifications	-	EN/IEC/UL/ES/CSA 60601-1, EN/IEC/UL/CSA60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011-B, FCC Class B (Radiated Class A) 350W output
Weight (Typ)	g	850
Size (LxWxH)	mm(in)	190 x 87 x 40mm (7.5 x 3.4 x 1.6")
Warranty	yrs	Three Years

**Notes:**

See specification for conditions and test methods

- (1) Derate linearly to 80% load from 115 to 85VAC input (convection); derate linearly to 90% load from 95 to 85VAC (forced air cooling)
- (2) 115 / 230VAC input
- (3) Cycle AC to reset

**Model Selector**

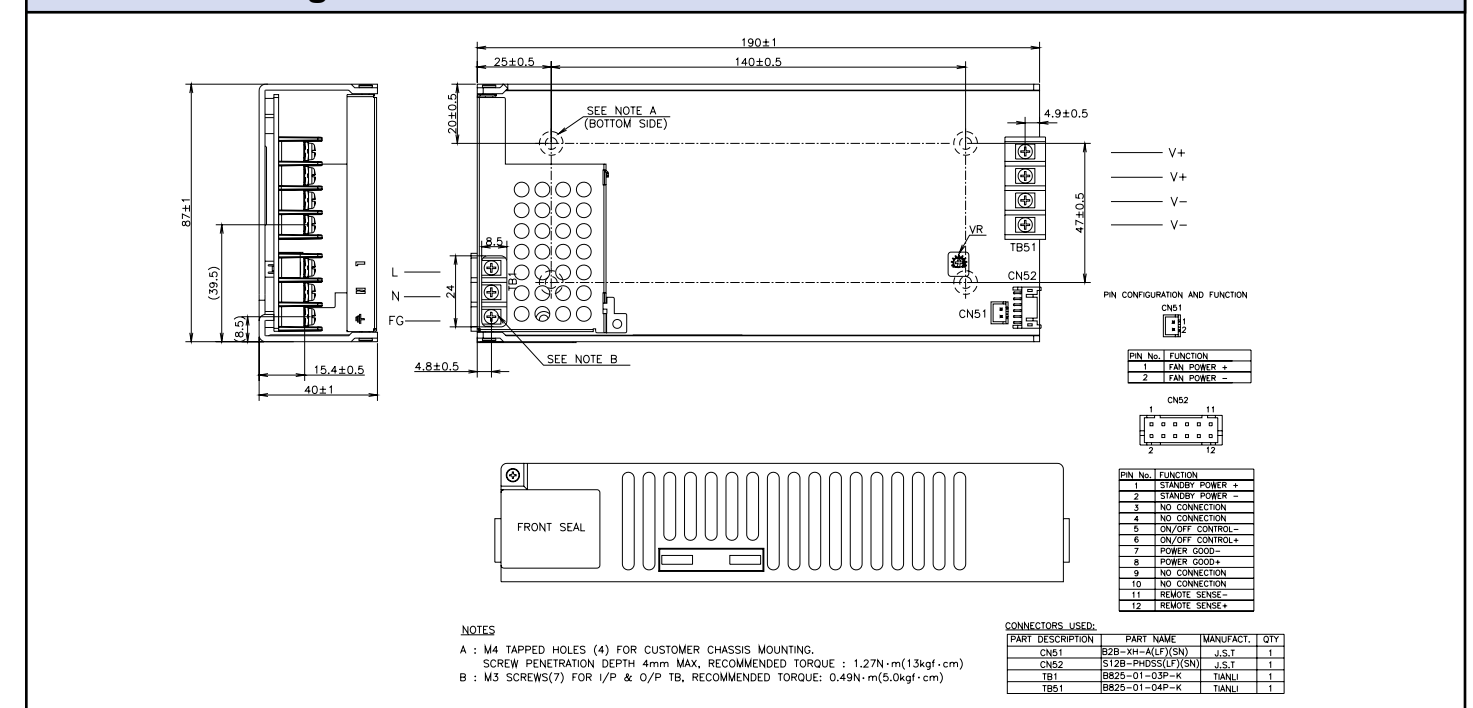
Model	Voltage	Adjust Range (V)	Max Current (A) Convection	Max Power (W) Convection	Max Current (A) Forced Air	Max Power (W) Forced Air	Ripple Noise (mV)	Efficiency (typ) % <sup>(4)</sup>
CUS350M-12/F	12V	11.4 - 12.6	29.0	348.0	34.5	414.0	120	91 / 93
CUS350M-18/F	18V	17.1 - 18.9	19.4	349.2	23.0	414.0	180	91 / 94
CUS350M-24/F	24V	22.8 - 25.2	14.7	352.8	17.5	420.0	240	91 / 94
CUS350M-36/F	36V	34.2- 37.8	9.7	349.2	11.5	414.0	240	91 / 94
CUS350M-48/F	48V	45.6 - 50.4	7.3	350.4	8.7	417.6	480	91 / 94

**Notes:**

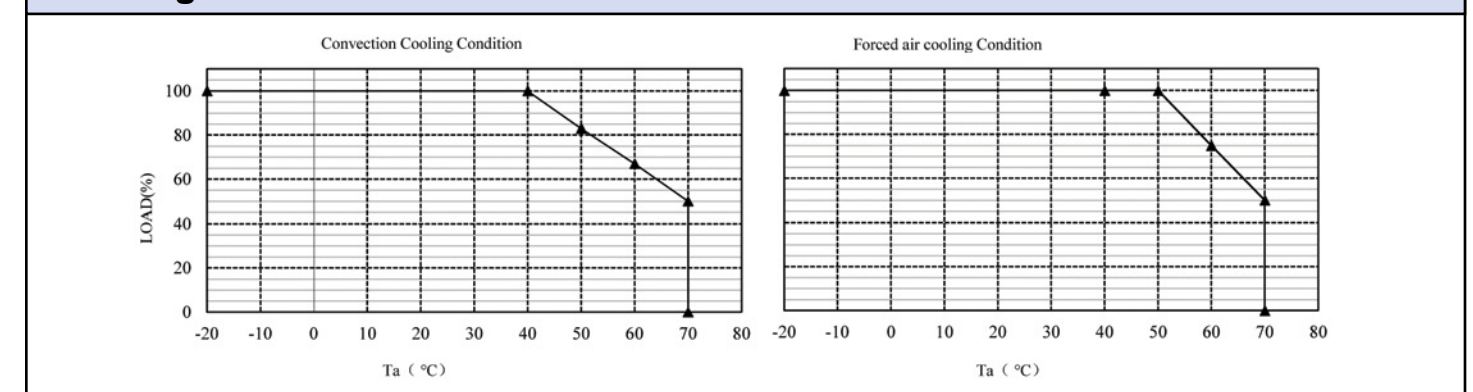
See specification for conditions and test methods

(4) 115 / 230VAC input. Convection and forced air ratings

**Outline Drawing**



**Derating Curve**



For Additional Information, please visit  
us.tdk-lambda.com/lp/products/cus-m-series



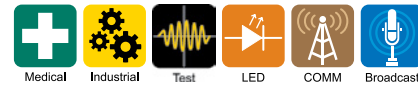
**3 x 5" 400W AC-DC Power Supplies**

**Features**

- ◆ 250W (400W Peak) Convection Rating
- ◆ 400W with Forced Air
- ◆ Medical Certifications (2 x MOPP)
- ◆ Class B Conducted and Radiated EMI
- ◆ Suitable for Class I and Class II installations
- ◆ Compact 3 x 5 x 1.4" Footprint
- ◆ Enclosure & Signal Options



**Key Market Segments & Applications**

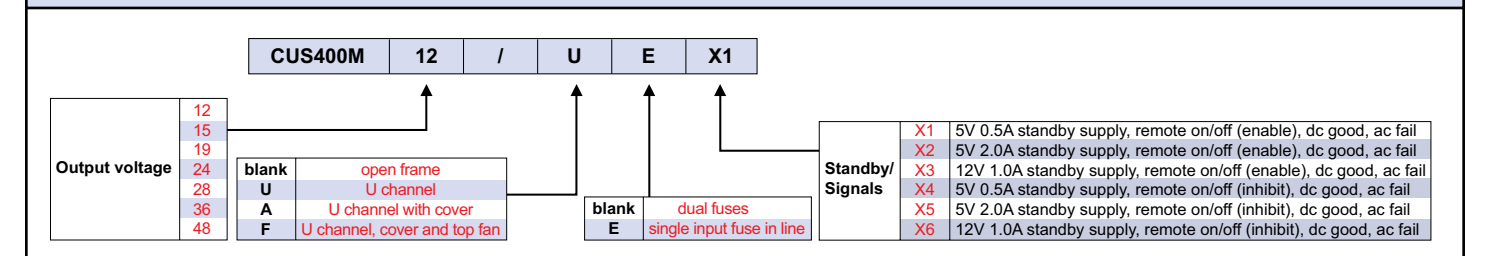


Specifications		CUS400M
Model		CUS400M
Input Voltage range	VAC	85 - 264VAC (47 - 63Hz). See derating curves
Input Current	A	<4A at 115V and <2A at 230V
Inrush Current (Cold start at 230VAC input)	A	<40A
Hold Up Time	mS	>12ms (400W load)
Harmonic Compliance	-	EN/IEC61000-3-2 class A
Leakage Current	uA	<250uA at 240VAC 63Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	%/°C	±0.02%/°C
No Load Power Consumption	W	<0.5W when unit is inhibited. 230Vac input
Ripple & Noise	%Vout	<1% (0°C - 70°C)
Load Regulation	%Vout	1% (0 - 100% load)
Line Regulation	%Vout	0.1% (90 - 264VAC)
Remote Sense	-	0.5V total compensation
Remote on/off	-	Opto-isolated. Inhibit: High = ON, Low = OFF, Enable: High = OFF, Low = ON
DC Good Signal	-	Opto isolated, <500ms after output good
AC Fail Signal	-	Opto isolated, 5ms warning before DC loss
Over Current Protection	%	101 to 140%. Hiccup mode, automatic recovery
Overvoltage Protection	-	Latching (unit shutdown), cycle AC input to reset
Overtemperature Protection	-	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 93%
Operating Temperature	-	-20 to +70°C, derate linearly above 50°C to 50% load
Storage Temperature	°C	-40 to +85°C (70°C maximum for fan version /F)
Operational Altitude	m	5,000m
Humidity (non condensing)	%RH	5 - 95%RH (15 - 90%RH for /F fan version)
Cooling	-	Convection cooling or forced air
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Insulation Class	-	Construction suitable for Class I or Class II installation
Vibration (non operating)	-	2G, 10-200Hz for 1 hour
Shock	-	30G, 11ms half sine
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1, ES60601-1, IEC/EN/UL62368-1. Designed to meet IEC61010-1 & IEC60065-1
Conducted & Radiated EMI Immunity	-	EN55032/EN55011-B (See application notes for conditions) EN61000-4-2 (Lvl 4), -3 (Lvl 3), -4 (Lvl 4), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 4) -11 (class 3), -12 (3), -14 (class 3), EN60601-1-2:2015 (Ed4)
Weight (Typ)	g	TBD
Size (WxLxH)	In (mm)	Open frame version: 3 x 5 x 1.4" (76.5 x 127 x 35mm)
Connectors	-	Input: JST VAR-2, Output: M3 screws, Fan: Molex 51191-0200, Signals: Molex 51110-1051
Warranty	yrs	Five years

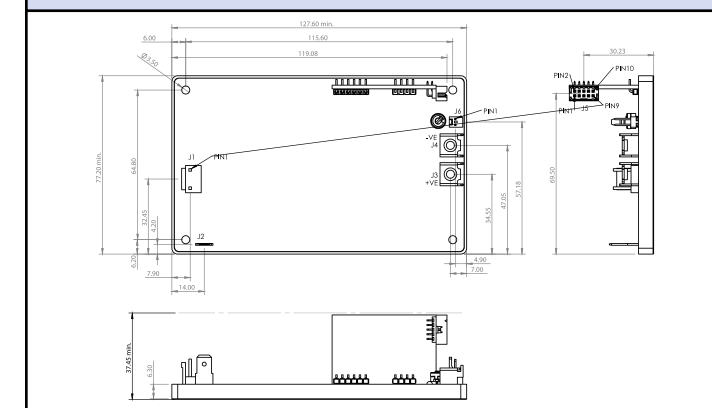
**Model Selector**

Model	Nominal Output Voltage (V)	Output Adjustment (V)	Maximum Current Convection (A)	Maximum Current Forced Air (A)	Maximum Power Convection (W)	Maximum Power Forced Air (W)
CUS400M-12	12	12 - 13.2	20.83	33.5	250	402
CUS400M-15	15	15 - 16.5	16.67	26.7	250	400.5
CUS400M-19	19	19 - 20.9	13.16	21.05	250	399.95
CUS400M-24	24	24 - 26.4	10.42	16.7	250	400.8
CUS400M-28	28	28 - 30.8	8.93	14.3	250	400.4
CUS400M-36	36	36 - 39.6	6.94	11.2	250	403.2
CUS400M-48	48	48 - 49.9	5.21	8.5	250	408

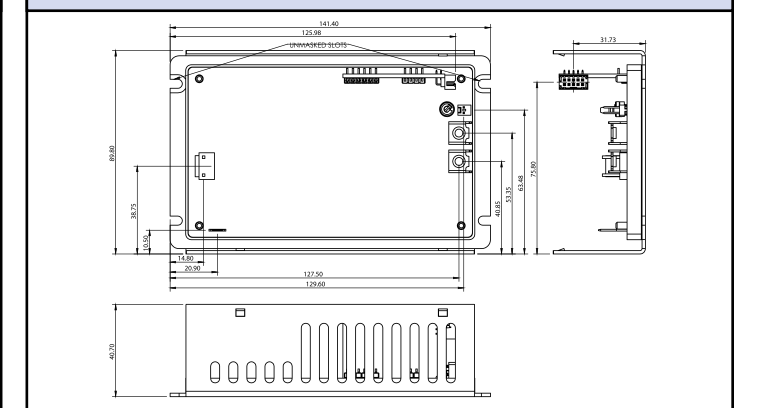
**Part Numbering Scheme**



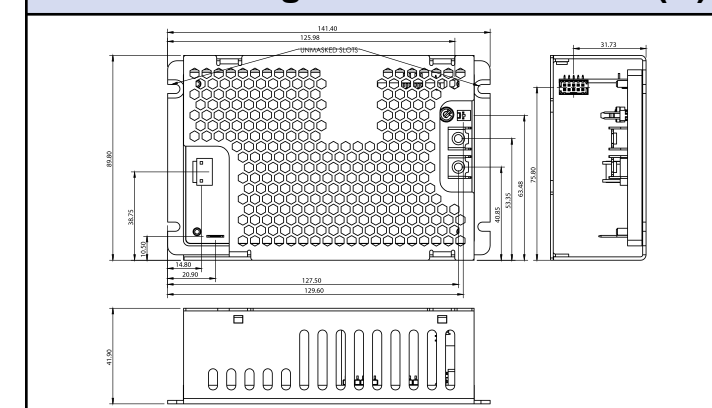
**Outline drawing Open Frame**



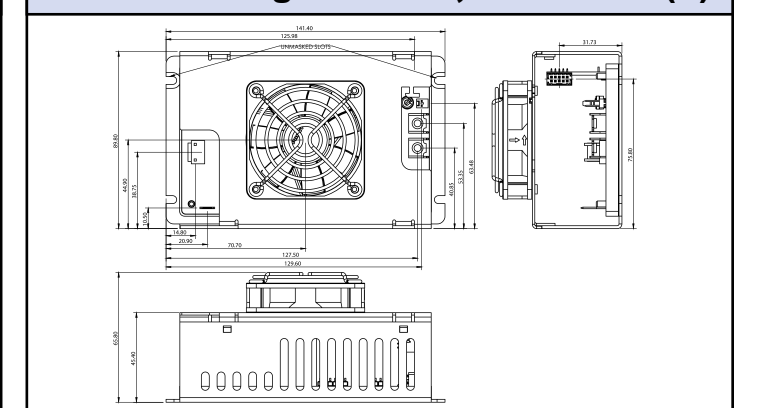
**Outline Drawing U Channel (/U)**



**Outline Drawing U Channel with Cover (/A)**



**Outline Drawing U Channel, Cover & Fan (/F)**



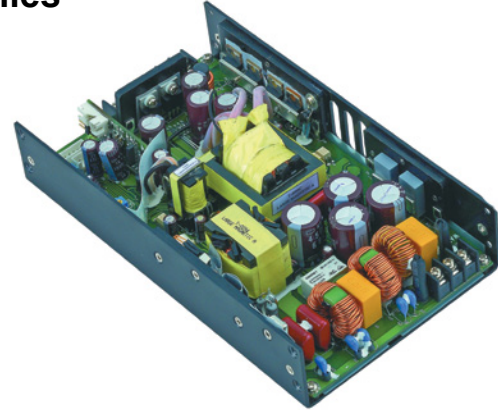
For Additional Information, please visit <http://www.us.tdk-lambda.com/lp/products/cus-m-series>



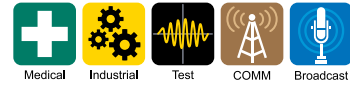
**500W AC-DC Medical or Industrial Power Supplies**

**Features**

- ◆ 360W Convection rating
- ◆ High Efficiency
- ◆ IEC60601-1 or IEC60950-1 certifications
- ◆ ORing FET & Current Share
- ◆ Dual input fuses



**Key Market Segments & Applications**



Specifications	
Model	CSS500
Input Voltage range	- 90 - 264VAC (47 - 63Hz)
Inrush Current	A <50A maximum at 230VAC input, 25°C ambient cold start
Input Current (115/230VAC)	A 6 / 3A
Power Factor Correction	- Meets EN61000-3-2, >0.9
Leakage Current	µA <300µA 264VAC 63Hz
Hold Up Time (Typ)	ms 20ms at 115VAC input, 360W loading
Temperature Coefficient	- ±0.04%/°C
Voltage Accuracy	% ±1% at 60% load
Adjustment Range	% None
Regulation	- Load Regulation ±1%, Line Regulation ±0.5%
Ripple & Noise	% 1% peak to peak (5Vsb also)
Overcurrent Protection	- 110 - 150%
Overvoltage Protection	V 110 - 130% of nominal (Cycle input power or use remote on/off to reset)
Overtemperature Protection	- Yes (Cycle input power or use remote on/off to reset)
Remote On/Off	- Unit on: Floating or high 3.5 - 5.25V, Unit off: Low or <0 - 0.5V
Remote Sense	- Yes
Efficiency	% 87% to 92%, model & input dependant
Standby Voltage	- 5V 1A (5V 0.25A when convection cooled or when inhibit is activated)
Fan Output	- 12V 1A
Current Share	- Single wire, up to 4 units can be shared within 10% accuracy at full load
DC Good & Fan Fail Signals	- Both Low on Fail
ORing FET	- Yes, for redundant operation
Operating Temperature	°C Convection (U channel): 0 to +70°C, derate linearly to 35% load from 40 to 70°C Forced air (or internal fan): 0 to +70°C, derate linearly to 50% load from 50 to 70°C
Storage Temperature	°C -10 to +85°C
Humidity (non condensing)	% 10 - 95% RH
Cooling	- Convection or forced air (30CFM or 3.1m/s). Internal fan is temperature controlled
Withstand Voltage (1)	- Input to Ground 1.5kVAC, Input to Output 4kVAC(1), Output to Ground 500VAC for 1 min.
Isolation Resistance	- >20M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	- 19.6m/s <sup>2</sup> (10~55Hz:2G Constant, X,Y,Z 60min each.)
Shock	- < 196.1 m/s <sup>2</sup> (20G)
Safety Agency Approvals	- Medical Version: UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, Industrial Version: UL/CSA/IEC/EN 60950-1, CE Mark
Conducted & Radiated EMI Immunity	- Medical Version: EN55011-B, FCC Class B, Industrial: EN55022, FCC Class B Medical Version: EN60601-1-2, Industrial: EN55024
MTBF	- >68,695 (MIL-217F-HDBK)
Weight (Typ)	g 860g (U channel), 980g (End Fan)
Size (WxLxH)	in U Channel: 8 x 4.7 x 1.51", End Fan (/S) 9 x 4.7 x 1.63", Top Fan (/T) 8 x 4.7 x 2.85"
Warranty	yrs Two Years

(1) Industrial version (I suffix): 3kVAC  
Medical version 4kVAC (Reinforced) (2 x MOPPS 3rd Edition)

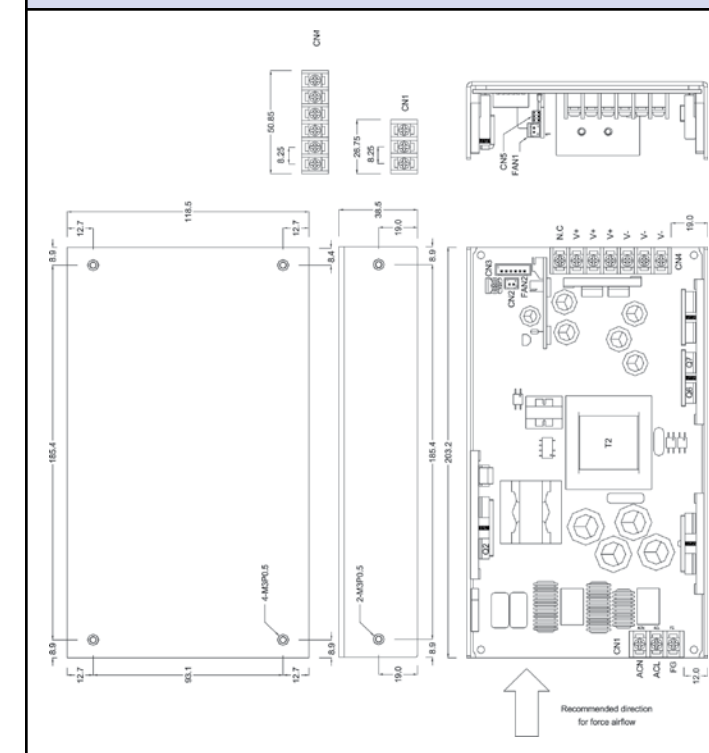
**Model Selector**

Model	Output Voltage (V)	Maximum Curr. Conv. (A)	Maximum Power Conv. (W)	Maximum Curr. Forced Air	Maximum Pwr Forced Air
CSS500-12	12V	30A	360W	41.67A	500W
CSS500-24	24V	15A	360W	20.84A	500W
CSS500-30	30V	12A	360W	16.67A	500W
CSS500-36	36V	10A	360W	13.89A	500W
CSS500-48	48V	7.5A	360W	10.42A	500W
CSS500-54	54V	6.67A	360W	9.26A	500W
CSS500-57	57V	6.32A	360W	8.78A	500W

**Options**

Suffix	Mechanical			Safety Certifications	
	U channel	End Fan	Top Fan	Medical	Industrial
Blank	Yes	-	-	Yes	-
/S	-	Yes	-	Yes	-
/T	-	-	Yes	Yes	-
I	Yes	-	-	-	Yes
/SI	-	Yes	-	-	Yes
/TI	-	-	Yes	-	Yes

**Outline Drawing**



**Other Medical Products**

KM	15 - 40W pcb mount medical
CSS65, 150	40 - 150W open frame
NV175	175 - 200W 1-4 outputs
NV300	300W 1-4 outputs

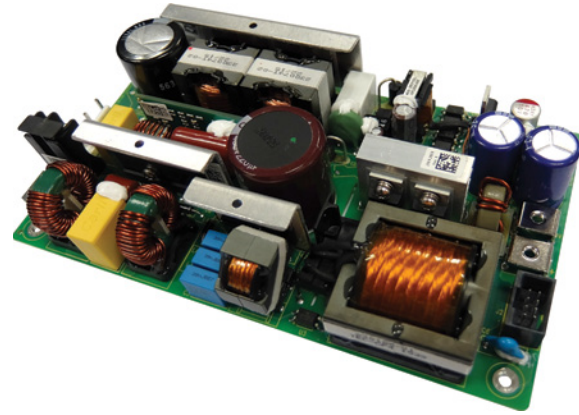
For Additional Information, please visit [us.tdk-lambda.com/lp/products/css-series.htm](http://us.tdk-lambda.com/lp/products/css-series.htm)



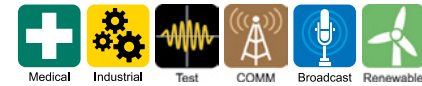
**500W Configurable AC-DC Power Supplies**

**Features**

- ◆ ITE & Medical Certifications (2 x MOPP)
- ◆ Class I and Class II operation with Level B EMC
- ◆ Compact 4 x 7.1" Footprint
- ◆ Suitable for B and BF Rated Equipment
- ◆ Five Year Warranty



**Key Market Segments & Applications**

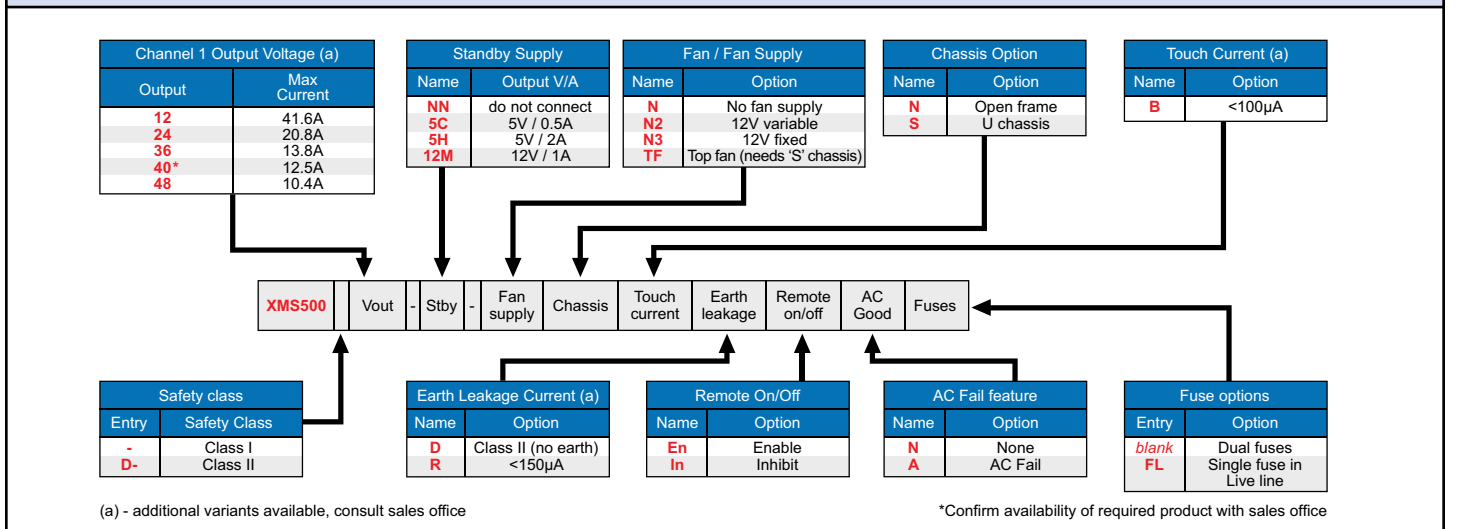


**Specifications (1)**

Model		XMS500
Input Voltage range		90 - 264VAC (47 - 63Hz)
Inrush Current (Cold start at 264VAC input)		<40A
Hold Up Time (Typ)	ms	≥16ms
Harmonic Compliance	-	EN/IEC61000-3-2 compliant. 0.97 at 110Vac input
Leakage Current	uA	<150uA (Class I construction) - See model selector
Touch Current (enclosure leakage)	uA	<100uA - See model selector
Ripple & Noise	mV (pk-pk)	≤1%
Total Regulation	%	≤2% (Line, load and temperature)
Short Circuit Protection	-	Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 92% (230VAC input, 100% load)
Operating Temperature	°C	0 to +70°C, derate linearly to 50% load from 50 to 70°C. -20°C start-up
Storage Temperature	°C	-40 to +85°C (+70°C for top fan versions)
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Forced air (500W): 1m/s airflow or top mount fan; Convection (250W minimum) <sup>(2)</sup>
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP) Class I only, Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP) Class I only
Insulation Class	-	Class I or Class II - See model selector
Vibration (non operating)	-	10 to 200Hz at 2G. Conforms to IEC610068-2-6, IEC68-2-6 MIL-STD-810G, Method 514.6, Pro I, Cat 4, 10
Shock	-	±3 x 30g shocks in each plane, total 18 shocks, 30g shock = 11ms (±0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810G, Method 516.6, Pro I, IV
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ANSI/AAMI ES60601-1. Designed to meet IEC61010-1
Altitude	m	-200 to 5000m operational (3000m for 60601-1) (-200 to 5000m storage/transportation)
Conducted & Radiated EMI	-	EN55011 / EN55032 Class B, EN60601-1-2:2015 4th Edition
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11, -12 and -14, EN60601-1-2:2015 4th Edition
Weight (Typ)	g	See application notes
Size (WxLxH) Open frame version	In (mm)	4 x 7.1 x 1.46" (102 x 180 x 37mm)
Warranty	yrs	Five years
Connectors	-	Molex as standard with separate ground faston See Installation Manual for part numbers

Note: 1. See website for detailed specifications  
2. Higher convection rating possible depending on configuration, mounting orientation, and specific application operating conditions. Please contact Tech Support with detailed requirements.

**How to Create a Product Description**

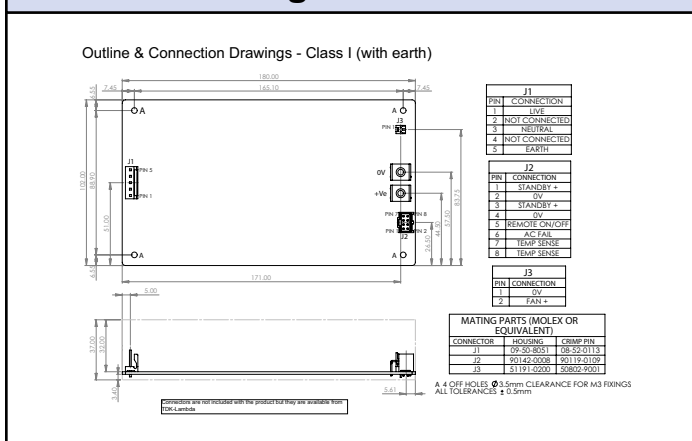


**Quick Selector (Standard models)\***

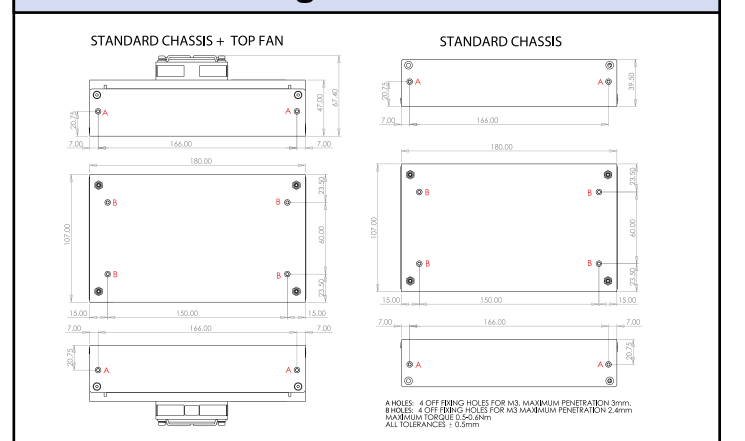
Output Volts	Current	Cover / Chassis / Fan type	Class I		Class II	
			Product Description	Order Code	Product Description	Order Code
12V	41.6A	Open Frame	XMS500-12-5H-N2NBRInA	XMS5001M	XMS500D-12-5H-N2NBDInA	XMS50024
		U chassis	XMS500-12-5H-N2SBRInA	XMS5003X	XMS500D-12-5H-N2SBDInA	XMS5004F
		Top fan	XMS500-12-5H-TFSBRInA	XMS5005Y	XMS500D-12-5H-TFSBDInA	XMS5006G
24V	20.8A	Open Frame	XMS500-24-5H-N2NBRInA	XMS50070	XMS500D-24-5H-N2NBDInA	XMS5008H
		U chassis	XMS500-24-5H-N2SBRInA	XMS50091	XMS500D-24-5H-N2SBDInA	XMS500BN
		Top fan	XMS500-24-5H-TFSBRInA	XMS500C6	XMS500D-24-5H-TFSBDInA	XMS500DP
36V	13.8A	Open Frame	XMS500-36-5H-N2NBRInA	XMS500FR	XMS500D-36-5H-N2NBDInA	XMS500G8
		U chassis	XMS500-36-5H-N2SBRInA	XMS500HS	XMS500D-36-5H-N2SBDInA	XMS500JT
		Top fan	XMS500-36-5H-TFSBRInA	XMS500KB	XMS500D-36-5H-TFSBDInA	XMS500LV
48V	10.4A	Open Frame	XMS500-48-5H-N2NBRInA	XMS500MC	XMS500D-48-5H-N2NBDInA	XMS500NW
		U chassis	XMS500-48-5H-N2SBRInA	XMS500PX	XMS500D-48-5H-N2SBDInA	XMS500RY
		Top fan	XMS500-48-5H-TFSBRInA	XMS500SG	XMS500D-48-5H-TFSBDInA	XMS500T0

\*Note: Additional variants available - see 'How To Create A Product Description'  
Standard models include: '5H' standby (5V / 2A), 'N2' fan supply (12V / 0.3A variable supply voltage) [except on Top fan variants], 'B' touch current (<100µA), 'In' remote on/off (inhibit) and 'A' AC Fail. Class I standard models include 'R' earth leakage (<150µA).

**Outline Drawing**



**Outline Drawing**



For Additional Information, please visit  
us.tdk-lambda.com/lp/products/xms-series.htm



**500-1500W Single Output Industrial Power Supplies**

**Features**

- ◆ 5 Year Warranty
- ◆ -40°C to +71°C Operation
- ◆ MIL-STD-810E Vibration / Shock
- ◆ Input transient protected
- ◆ UL508, SEMIF47, Factory Mutual (Class 1, Division 2)
- ◆ Rugged mechanical design with coating on pcbs
- ◆ Superior thermal design
- ◆ Wide range adjustment of output



**Key Market Segments & Applications**

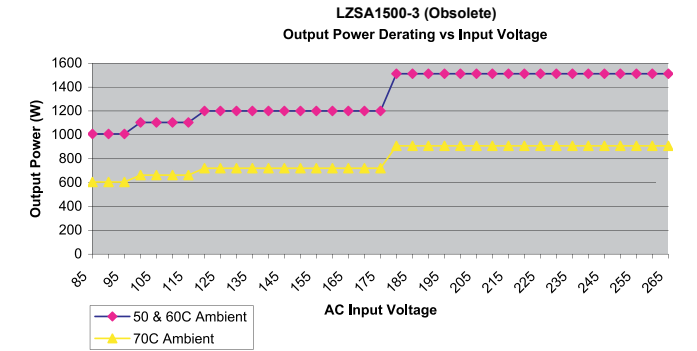
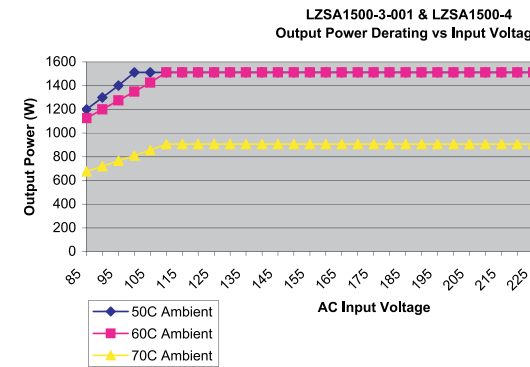


Specifications		LZSA500	LZSA1000	LZSA1500
Model		LZSA500	LZSA1000	LZSA1500
Input Voltage (47-440Hz) (*)	-	85 - 265VAC (LZSA1500 - see output derating graphs on page 2), 100-380VDC (1)		
Inrush Current (110 / 220VAC)	A	25 / 45A	30 / 40A	
Power Factor	-	EN61000-3-2 Class A		
Efficiency (typical)	%	84%		
Ripple & Noise (Pk-Pk)(max)	-	75mV	75mV	24V: 75mV; 48V: 150mV
Line Regulation	%	0.1%		
Load Regulation	%	0.1%		
Transient Response	-	±1% deviation, recovering to ±0.2% in <1.25ms (25% load change)		
Overcurrent Protection	-	110 - 130%		
Overvoltage Protection	V	User adjustable from front panel		
Thermal Protection	-	Internal thermostat. Recycle AC to reset		
Hold Up Time at 110VAC	ms	20ms Hold Up, 20ms Ride Through		
Remote Sense	-	Compensates for a total of 1V cable drop		
Remote Adjust	-	Using front panel potentiometer, Resistance (1k/V), or Voltage (1V/V)		
Remote On / Off	-	TTL compatible, active high		
Signals	-	Optocoupled transistor for AC Fail, DC Good, Inverter OK. 200kHz sync signal (Ref-sense)		
Indicators	-	Green LED indicates output good, red LED indicates overvoltage or over temperature		
Parallel Connection	-	Single wire current share		
Operating Temperature	°C	-40° to +71°C, derate linearly to 60% load from 60°C~71°C (20 min warm up period needed for <-30°C)		
Storage Temperature	°C	-40° to +85°C		
Temperature Coefficient	-	0.01%/°C		
Humidity (non condensing)	%RH	10 - 90%RH		
Cooling	-	Internal fan		
Withstand Voltage	-	Input - Ground 2,121VDC, Input - Output 4,242VDC, Output - Ground 500VDC		
Vibration	-	MIL-STD-810E, Method 514.4, Category 1, 9		
Shock	-	MIL-STD-810E, Method 516.4 Proc. I, II, IV, VI		
Safety Agency Certifications	-	UL/CSA60950-1, UL508, EN60950-1, FM 3600, 3611, 3810, & CE Mark. SEMIF47(>100VAC)		
Leakage current	uA	<500uA at 265VAC, 60Hz		
Emissions	-	EN55022/EN55011 Class B, EN61000-3-3, MIL STD 461/462D CE102		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11. IEEE C62.41 (6kV/30 Ohm, Criteria A)		
Altitude	m	3,000m operating, 12,000m non operating		
Weight	lbs	6.5	8.1	
Size (WxHxD)(w/o bus bars)	ins	4.25 x 4.75 x 10.25	5.62 x 4.75 x 10.5	
Warranty	yrs	Five Years		

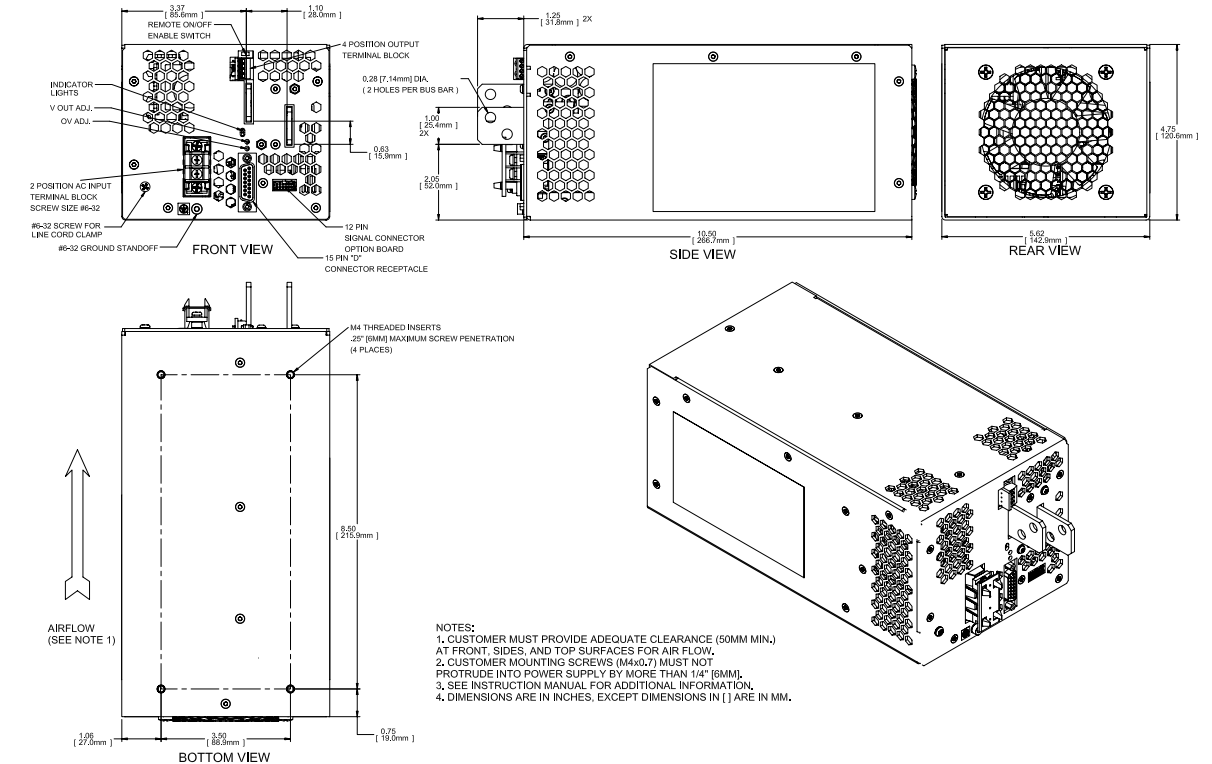
(1) Startup > 110VDC

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes) (\*) Reduced power factor above 63Hz

**Derating Charts**



**Outline Drawing (LZSA1500)**



**Options**

Model	Nominal Voltage (V)	Adjustment Range (V)	Maximum Current (A)	Maximum Power (W)
LZSA1000-2	12	10 - 15.75	84	1008
LZSA500-3	24	18 - 29.4	21	504
LZSA1000-3	24	18 - 29.4	42	1008
LZSA1500-3	24	18 - 29.4	63	1512
LZSA1500-3-001	24	18 - 29.4	63	1512
LZSA1500-4	48	36 - 56	31.5	1512

\*Model highlighted in blue is obsolete. Please use LZSA1500-3-001.

**Other Industrial Products**

HWS	15W to 1800W Single Output
DLP, DPP, DSP	15W to 960W DIN Rail
PFE	300W to 1000W Power Modules

For Additional Information, please visit [us.tdk-lambda.com/lp/products/lzsa-series.htm](http://us.tdk-lambda.com/lp/products/lzsa-series.htm)

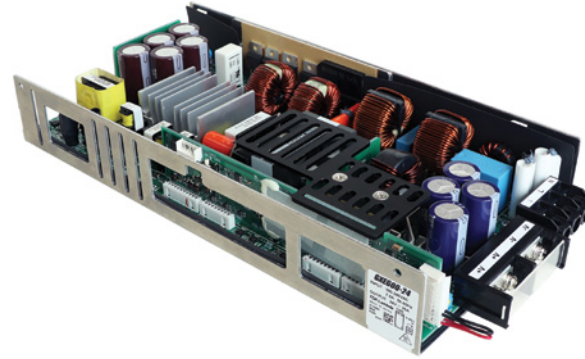




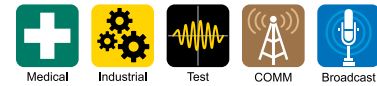
**Single output 600W Programmable Medical and ITE Power Supplies**

**Features**

- ◆ Convection Cooled
- ◆ Up to 95% Efficient
- ◆ RS-485 Read-Write Communication (Modbus RTU protocol)
- ◆ Constant Voltage & Constant Current Modes
- ◆ Monitoring & Programming Functions
- ◆ Digital or Analog Programming
- ◆ Seven Year Warranty



**Key Market Segments & Applications**



Specifications		GXE600-24	GXE600-48
AC Input Voltage range <sup>(1)</sup>	VAC	85 - 265VAC (47 - 63Hz). Withstands 300VAC for 5s	
Inrush Current (100 / 200VAC)	A	40 / 40A	
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.99 / 0.95)	
Input Current (115/230VAC) (Typ)	A	6.1 / 3.1A	
Nominal Output Voltage	VDC	24V	48V
Maximum Output Current	A	25A	12.5A
Output Voltage Range (Manual Adjust)	VDC	19.2 - 28.8V	38.4 - 57.6V
Output Voltage Range (Via Programming) <sup>(2)</sup>	VDC	4.8 - 28.8V	9.6 - 57.6V
Current Limit Set Point (Via Programming) <sup>(2)</sup>	A	5 - 28.8A	2.5 - 14.4A
Temperature Coefficient	%/°C	<0.02%/°C	
Regulation	-	See Model Selector	
Overcurrent Protection <sup>(3)</sup>	-	>28.8A	>14.4A
Overvoltage Protection <sup>(3)</sup>	V	28.8 - 31.2V	57.6 - 62.4V
Hold Up Time (Typ at 100% load)	ms	20ms	
Leakage Current (max)	mA	<0.3mA	
Standby Voltage Vsb)	-	4.8V - 5.2V 1A	
Remote Sense	-	Yes	
Remote On/Off	-	Isolated opto-coupler. Unit off when current is flowing through the opto diode	
Power Fail Signal	-	Signal is high when the output voltage drops due to AC loss or OCP, OVP, OTP	
AC Fail Signal	-	Signal goes high when the AC input is not present	
Parallel Operation	-	Yes, up to five units	
Operating Temperature (-40°C start up)	°C	Convection: -20 to +70°C, derate linearly to 50% load from 50 to 70°C <sup>(4)</sup>	
Storage Temperature	°C	-40 to +85°C	
Operating Humidity (non condensing)	%RH	20 - 90%RH	
Storage Humidity (non condensing)	%RH	10 - 90%RH	
Cooling	-	Convection or forced air cooling	
Withstand Voltage	VAC	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP), Output to Signals 100VAC for 1 min.	
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> (sweep 1 min) X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s <sup>2</sup>	
Safety Agency Certifications	-	IEC/UL/CSA/EN60950-1, IEC/UL/CSA/EN62368-1, IEC/ES/CSA/EN60601-1, IEC/EN62477-1 (OVC III), CE Mark SEMI-F47 (200VAC input)	
Line Dips	-	EN55011 / EN55032-B, FCC Class B, VCCI-B	
Conducted & Radiated EMI	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, IEC60601-1-2 Ed 4	
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, IEC60601-1-2 Ed 4	
Weight (Typ)	g	1300	
Size (WxHxD)	mm/In	127 x 41 x 254mm / 5 x 1.61 x 10"	
MTBF - Telcordia SR-332 issue 3*	Hours	511,677 hours	
Warranty	Yrs	Seven Years	

<sup>(1)</sup> 85Vac: 360W, 100 to <170Vac: 500W, 170V to 265Vac: 600W (Convection cooled), 600W when forced air is applied (see installation manual)  
<sup>(2)</sup> Using RS-485 communications or external 1-6V voltage source. See installation manual for details  
<sup>(3)</sup> Overcurrent & Overvoltage limits and recovery modes can be set using the RS-485 communications  
<sup>(4)</sup> See installation manual for full derating curves \*24V output model, 25°C ambient, full load, 230VAC input

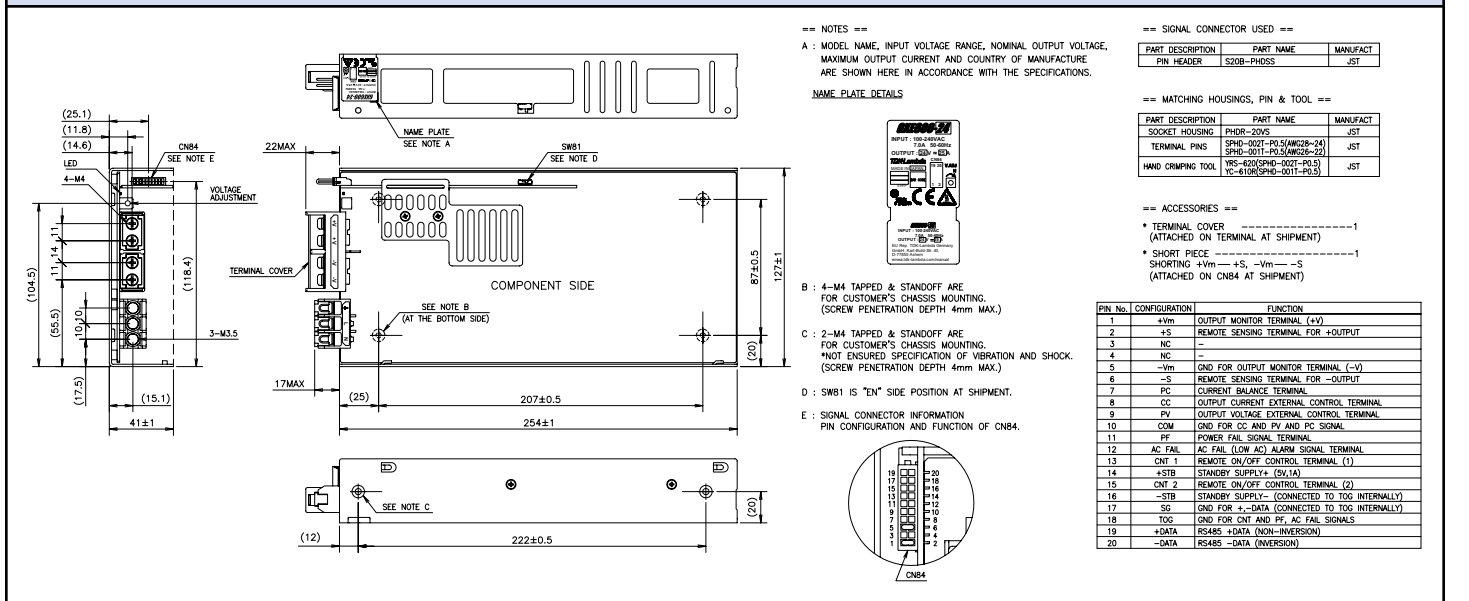
**Model Selector**

Model	Output Voltage (V)	Max Output Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230 VAC
GXE600-24	24	600	144	96	150	92 / 95
GXE600-48	48	600	288	192	350	92 / 95

**Monitoring and Programming Functions**

Function	Digital (RS-485) Control	Analog Control
Output Voltage Monitor	Read back	No
Output Current Monitor	Read back	No
Output Voltage Programming	Adjustable	Adjustable, use a 1-6V external voltage source
Output Current Programming	Adjustable	Adjustable, use a 1-6V external voltage source
Over Voltage Protection Set Point	Adjustable	Fixed
Over Voltage Recovery	Auto-recovery or manual settings	Cycle AC input or use the remote on/off
Over Current Set Point	Adjustable	Fixed
Over Current Recovery	Auto recovery: Constant current, hiccup or foldback Latching: Constant current or foldback	Constant current, auto-recovery
Over Temperature Recovery	Cycle AC input or use the remote on/off	Cycle AC input or use the remote on/off
Remote On/Off	Yes, enable or inhibit type	Yes, enable or inhibit type
Internal Temperature Monitoring	Yes, -20 to +100°C	No
Operating Run Time Log	Records more than 20 years of data	No
Remaining Electrolytic Capacitor Life	Indicates hours left	No
Alarm History	OCP, OVP, OTP, remote on/off, system error	No
Slew Rate (Rise-time) Control	Voltage and current	No
Communication Configuration	ID, Baud Rate, Parity	Not applicable
Product Information	Model #, serial #, lot #, firmware version	Not applicable
Power Fail Signal Threshold	Adjustable for either output voltage or current	Fixed (voltage only)

**Outline Drawing**



**Options**

Suffix	Description
.JA	Cover

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/gxe-series.htm](http://us.tdk-lambda.com/lp/products/gxe-series.htm)



**720-1000W Conduction Cooled Power Supplies**

**Features**

- ◆ Smaller size than CPFE1000F
- ◆ Base plate cooled, no fan required
- ◆ Protective coating option
- ◆ I<sup>2</sup>C Interface



**Key Market Segments & Applications**

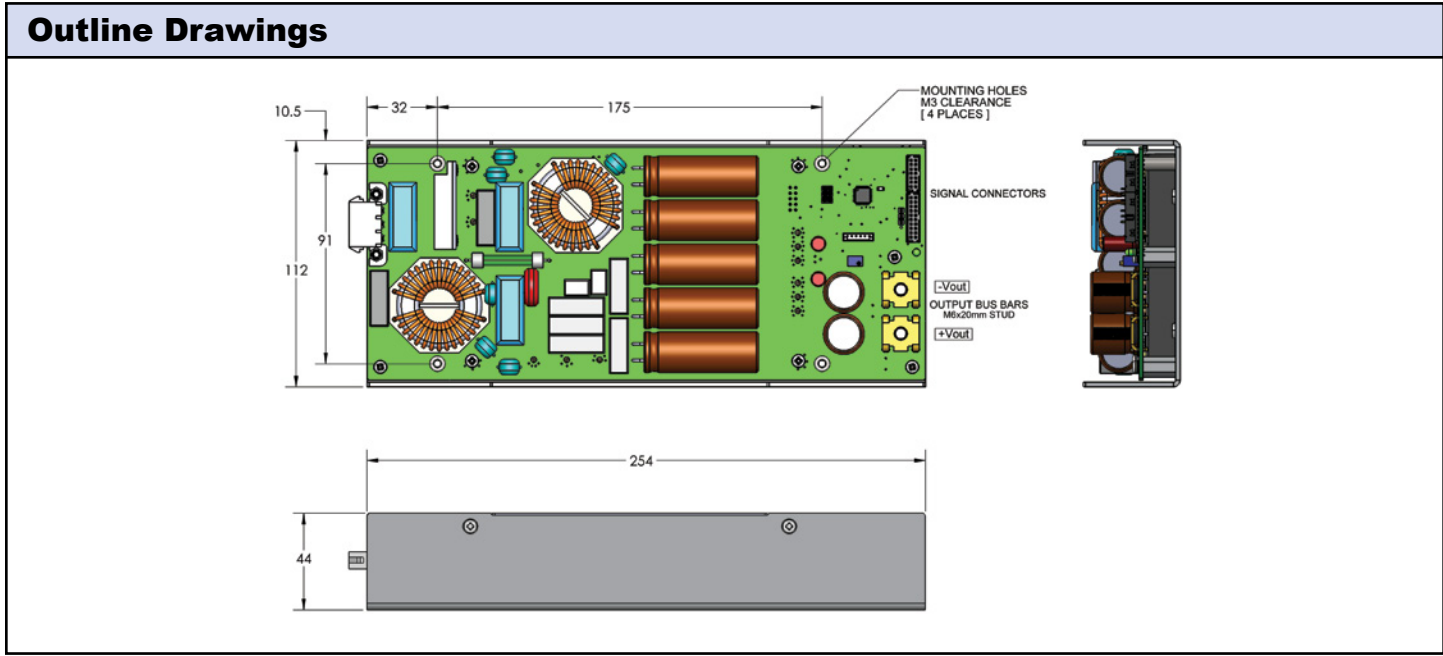


Specifications		
Model		
AC Input	VAC	90 to 265VAC, 47-63Hz
Input Current (1)	A	13.6 / 6.6 (Model dependant)
Inrush Current (110 / 220VAC)	A	20 / 40 peak
Power Factor	-	Meets EN61000-3-2
Efficiency (typical) (2)	%	79 to 86% (Model dependant)
Output Voltage Setpoint Accuracy	-	±2% at 50% load
Line Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Load Regulation	mV	12V: 48mV, 28V: 56mV, 48V: 96mV
Ripple and Noise (20MHz BW) (3)	-	1% (2% below 0°C)
Over Current Protection	%	105 - 140% (Automatic recovery)
Over Voltage Protection	-	125 - 145% (Automatic recovery)
Parallel Operation	-	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present
Auxiliary Supply	-	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	High = On
Temperature Coefficient	°C	<0.02%/°C
Overtemperature	°C	Shuts down between 90 - 115°C (Auto recovery)
Hold Up Time (230VAC)	ms	20ms @ 25°C and warmer
Leakage Current (at 230VAC, 50Hz)	uA	< 1.5mA
Remote Sense	-	Yes, compensates up to 500mV cable drop
I <sup>2</sup> C Interface	-	Provides manufacturing location, date, serial number, part number, unit revision, output voltage & current read back, base plate temperature, remote on/off, IOG, DC good and over temperature warning
Operating Temperature	°C	-40 to +70°C ambient, (See reverse side for derating) (85°C baseplate, maximum)
Storage Temperature	°C	-40 to +100°C
Humidity	-	Operating: 20 - 90%RH, Non operating 10 - 95%RH (Pcb assembly protective coated)
Cooling	-	Conduction cooled
Withstand Voltage	-	Input to Output 4242VDC, Input to Ground 2121VDC, Output to ground 500VDC
Vibration (non operating)	-	MIL-STD-810F, Method 514.5, Proc 1, Category 4, 10
Shock	-	MIL-STD-810F, Method 516.5, Proc. I, IV, VI
Safety Agency Approvals	-	UL60950-1, CSA 22.2 No 60950-1, EN60950-1 (Ed 2), CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted & Radiated EMI	-	Conducted: EN55022/EN55011 Class B, Radiated: Class A
Immunity	-	IEC61000-4-2 (Contact Level 2, Air discharge Lvl 3), -3 (Lvl 3), -4(Lvl 3), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 3), -11 (Class 3), -12 (Lvl 3), -14 (Class 3)
Weight (Typ)	g	1240g (without cover)
Size (L x W x H)	mm	254 x 112 x 44mm (262mm including AC connector)
Warranty	ys	2 years

(1) 110/220VAC  
 (2) 100% loading required.  
 (3) Warm up period of 30 minutes below -30°C for ripple. Jeita RC-9131C Method, see instruction manual for test methods.

Model Selector				
Model	Output Voltage (V)	Adjust Range (V)	Maximum Current	Efficiency (%) (110/220VAC)
CPFE1000FI-12	12	9.6 - 14.4	60	79 / 81
CPFE1000FI-28	28	22.4 - 33.6	36	83 / 86
CPFE1000FI-48	48	38.4 - 57.6	21	83 / 86

Derating (Ambient Temperature) <sup>(4)</sup>					
Model	Input Voltage	Output Power (W)			
		45°C	50°C	60°C	70°C
CPFE1000FI-12	85VAC to 170VAC	720	720	720	720
	170VAC to 265VAC	720	720	720	720
CPFE1000FI-28	85VAC to 170VAC	1008	980	952	896
	170VAC to 265VAC	1008	1008	1008	1008
CPFE1000FI-48	85VAC to 170VAC	1008	1008	1008	1008
	170VAC to 265VAC	1008	1008	1008	1008



(4) Models mounted in the horizontal orientation. See instruction manual for alternative mounting positions and the corresponding derating guidelines.

Options	
Suffix	Description
/C	Cover
/H	Pcb coating
/P	No U channel (pcb type)
Example:	CPFE1000FI-28/CH

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cpfe1000fi-series.htm](http://us.tdk-lambda.com/lp/products/cpfe1000fi-series.htm)



**1000W to 1500W Single Output General Purpose Power Supplies**

**Features**

- ◆ Cost Effective
- ◆ Wide Range AC Input 85 - 265VAC
- ◆ Enclosed Construction
- ◆ Compact Sizes
- ◆ SEMI F47 Line Dips
- ◆ 7 Year Warranty



**Key Market Segments & Applications**



**Specifications**

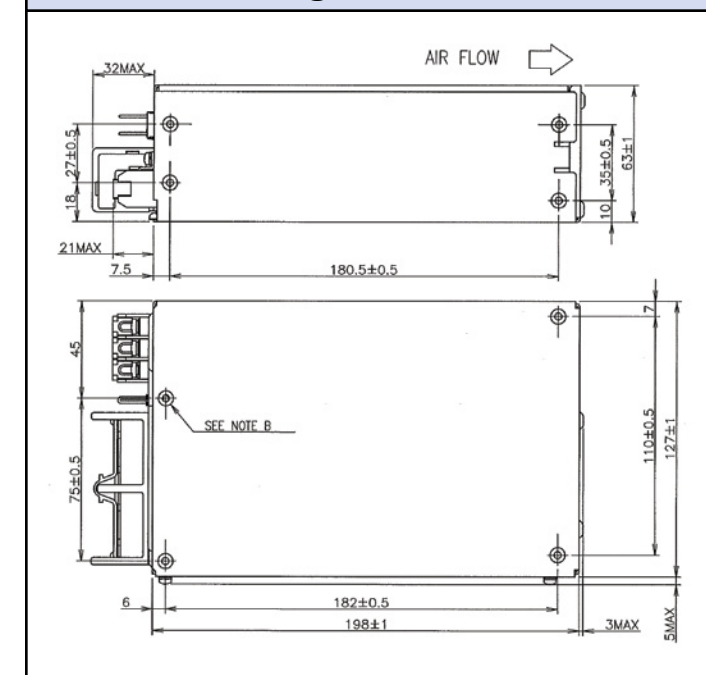
Model	RWS1000B	RWS1500B
AC Input Voltage range (1)	VAC 85 - 265VAC (47 - 63Hz)	
DC Input Voltage range*	VDC 120 - 340VDC*	
Inrush Current (100 / 200VAC)	A 60 / 60A	
Power Factor (100 / 200VAC)	- Meets EN61000-3-2 (0.98 / 0.95)	
Input Current (100/200VAC) (Typ)	A 13 / 7A	A 19 / 10A
Temperature Coefficient	%°C <0.02%/°C	
Regulation	- See Model Selector	
Overcurrent Protection	- >105%, Constant Current Style. After 5s unit will shutdown	
Overvoltage Protection (2)	V Shuts down output, cycle AC line or remote on/off to reset	
Hold Up Time (Typ at 100% load)	ms 20ms	
Leakage Current (max)	mA <1.2mA	
Standby Voltage (Vsb)	- 5V 1A (always on). See options table (/S suffix)	
Remote Sense	- Yes	
Remote On/Off	- See options table. Apply external voltage or Vsb to enable output voltage	
DC Good, Fan Alarm	- See options table	
Parallel Operation	- See options table	
Series Operation	- Yes	
Operating Temperature	°C -20 to +60°C, derate linearly to 60% load from 50 to 60°C	
Storage Temperature	°C -30 to +75°C	
Operating Humidity (non condensing)	%RH 20 - 90%RH	
Storage Humidity (non condensing)	%RH 10 - 90%RH	
Cooling	- Internal Fan, air intake from input/output terminals	
Withstand Voltage	VAC Input to Ground 2kVAC, Input to Output 4kVAC, Output to Ground 1.5kVAC for 1 min.	
Isolation Resistance	MΩ >100MΩ at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	10 - 55Hz: 19.6m/s <sup>2</sup> (sweep 1 min) X, Y, Z for 1 hour	
Shock	- < 196.1 m/s <sup>2</sup>	
Safety Agency Certifications	- UL60950-1, CSA60950, EN60950-1, CE Mark	
Line Dips	- SEMI-F47 (200VAC input)	
Conducted & Radiated EMI	- EN55011 / EN55032-B, FCC Class B, VCCI-B	
Immunity	- IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2	
Weight (Typ)	g 2,000g	g 3,000g
Size (WxHxD)	mm 127 x 63 x 198mm	mm 127 x 63 x 261mm
	In 5 x 2.48 x 7.8"	In 5 x 2.48 x 10.28"
MTBF - Telcordia SR-332 issue 3**	hours 1,834,313	hours 1,222,361
Warranty	yrs Seven Years	

(1) Derate linearly to 80% load from 90 to 85VAC input \*Safety certified for AC input only \*\*24V output model, 25°C ambient, full load, 230VAC input  
 (2) See specifications on website for individual limits. Note the remote on/off function is an option - see options table

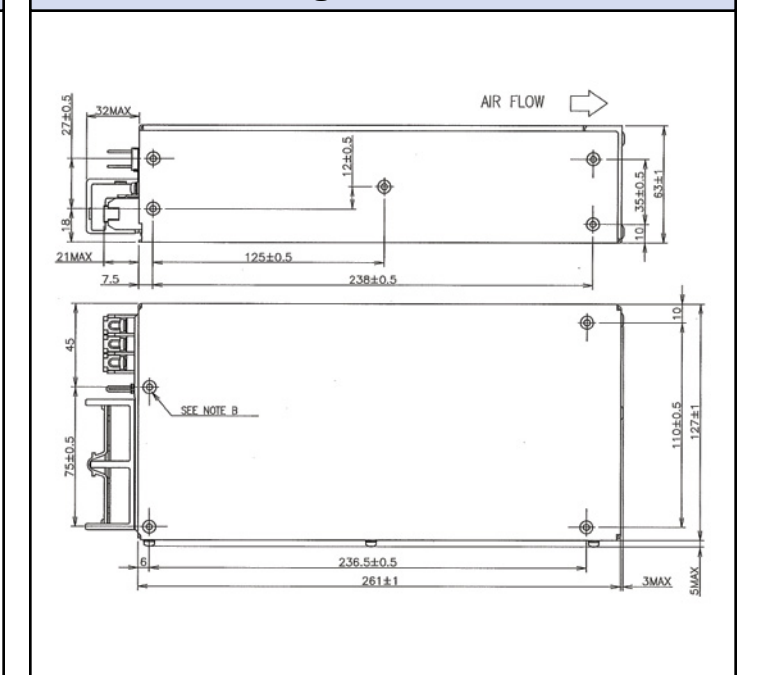
**Output Ratings**

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power (w)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
RWS1000B-12	12V	10.2-13.8V	84	1008	96	48	150	82 / 85
RWS1000B-12/S	12V	10.2-13.8V	84	1008	96	48	150	82 / 85
RWS1500B-12	12V	10.2-14.4V	125	1500	96	48	150	81 / 85
RWS1500B-12/S	12V	10.2-14.4V	125	1500	96	48	150	81 / 85
RWS1000B-15	15V	12.8-17.2V	67	1005	120	60	150	82 / 85
RWS1000B-15/S	15V	12.8-17.2V	67	1005	120	60	150	82 / 85
RWS1500B-15	15V	12.8-18.0V	100	1500	120	60	150	82 / 85
RWS1500B-15/S	15V	12.8-18.0V	100	1500	120	60	150	82 / 85
RWS1000B-24	24V	20.4-28.8V	42	1008	144	96	180	85 / 88
RWS1000B-24/S	24V	20.4-28.8V	42	1008	144	96	180	85 / 88
RWS1500B-24	24V	20.4-28.8V	63	1512	144	96	180	85 / 88
RWS1500B-24/S	24V	20.4-28.8V	63	1512	144	96	180	85 / 88
RWS1000B-36	36V	30.6-41.4	28	1008	216	144	250	85 / 88
RWS1000B-36/S	36V	30.6-41.4	28	1008	216	144	250	85 / 88
RWS1500B-36	36V	30.6-43.2	42	1512	216	144	250	85 / 88
RWS1500B-36/S	36V	30.6-43.2	42	1512	216	144	250	85 / 88
RWS1000B-48	48V	40.8-57.6	21	1008	288	192	300	85 / 88
RWS1000B-48/S	48V	40.8-57.6	21	1008	288	192	300	85 / 88
RWS1500B-48	48V	40.8-57.6	32	1536	288	192	300	85 / 88
RWS1500B-48/S	48V	40.8-57.6	32	1536	288	192	300	85 / 88

**Outline Drawing RWS 1000B**



**Outline Drawing RWS 1500B**



**Options**

Suffix	Description
/CO2	Double Sided Board Coating
/FO	Parallel Operation, DC Good and Fan Alarm Signals
/R	Remote On/Off
/RF	Reverse Fan (Air exits over input/output terminals)
/RFO	Remote On/Off, Parallel Operation, DC Good and Fan Alarm Signals
/S	Remote On/Off, 5V 1A Standby Output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/rwsb-series.htm](http://us.tdk-lambda.com/lp/products/rwsb-series.htm)



# TDK-Lambda RWS1000/1500-B/ME Series

## 1000W to 1500W Single Output Medical Power Supplies

### Features

- ◆ Cost Effective
- ◆ Wide Range AC Input 85 - 265VAC
- ◆ Enclosed Construction
- ◆ Compact Sizes
- ◆ Suitable for B & BF Rated Equipment
- ◆ 7 Year Warranty



### Key Market Segments & Applications



Specifications		
Model	RWS1000B/ME	RWS1500B/ME
AAC Input Voltage range (1)	VAC 85 - 265VAC (47 - 63Hz)	
DC Input Voltage range*	VDC 120 - 340VDC*	
Inrush Current (100 / 200VAC)	A 60 / 60A	
Power Factor (100 / 200VAC)	- Meets EN61000-3-2 (0.98 / 0.95)	
Input Current (100/200VAC) (Typ)	A 13 / 7A	A 19 / 10A
Temperature Coefficient	%°C <0.02%/°C	
Regulation	- See Model Selector	
Overcurrent Protection	- >105%, Constant Current Style. After 5s unit will shutdown	
Overvoltage Protection	V 120-145% (115-125% for 48V), Cycle AC line to reset	
Hold Up Time (Typ at 100% load)	ms 20ms	
Leakage Current (max)	mA <0.3mA	
Remote Sense	- Yes	
Remote On/Off	- See options table. Apply external voltage to enable output voltage	
DC Good, Fan Alarm	- See options table	
Parallel Operation	- See options table	
Series Operation	- Yes	
Operating Temperature	°C -20 to +60°C, derate linearly to 60% load from 50 to 60°C	
Storage Temperature	°C -30 to +75°C	
Operating Humidity (non condensing)	%RH 20 - 90%RH	
Storage Humidity (non condensing)	%RH 10 - 90%RH	
Cooling	- Internal Fan, air intake from input/output terminals	
Withstand Voltage	VAC Input to Ground 2kVAC (1xMoPP), Input to Output 4kVAC (2xMoPP), Output to Ground 1.5kVAC (1xMoPP) for 1 min.	
Isolation Resistance	MΩ >100MΩ at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	- 10 - 55Hz: 19.6m/s <sup>2</sup> (sweep 1 min) X, Y, Z for 1 hour	
Shock	- < 196.1 m/s <sup>2</sup>	
Safety Agency Certifications	- ES60601-1, CSA60601, EN60601-1, CE Mark	
Line Dips	- SEMI-F47 (200VAC input)	
Conducted & Radiated EMI	- EN55011 / EN55032-A, FCC Class A, VCCI-A	
Immunity	- IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, EN60601-1-2	
Weight (Typ)	g 2,000g	g 3,000g
Size (WxHxD)	mm 127 x 63 x 198mm	mm 127 x 63 x 261mm
	In 5 x 2.48 x 7.8"	In 5 x 2.48 x 10.28"
MTBF - Telcordia SR-332 issue 3**	hours 1,834,313	hours 1,222,361
Warranty	yrs Seven Years	

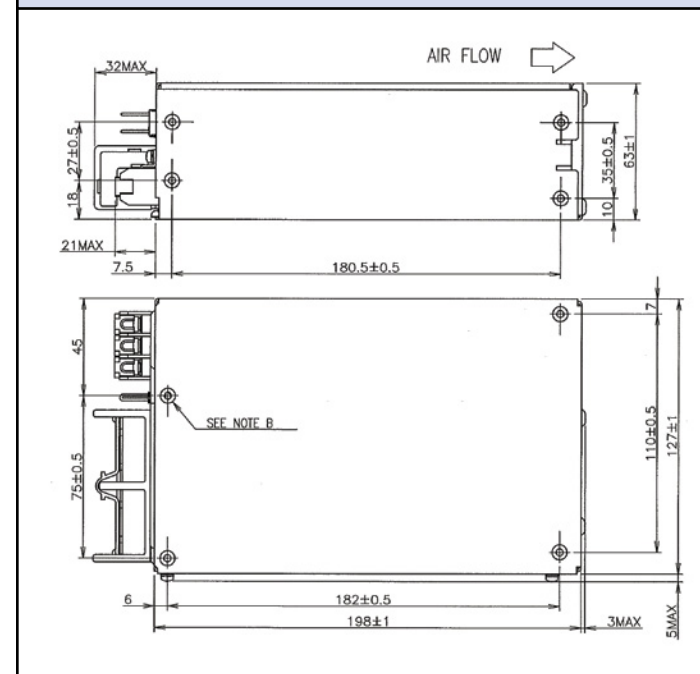
\*Safety certified for AC input only \*\*24V output model, 25°C ambient, full load, 230VAC input  
 (1) Derate linearly to 80% load from 90 to 85VAC input

# TDK-Lambda RWS1000/1500-B/ME Series

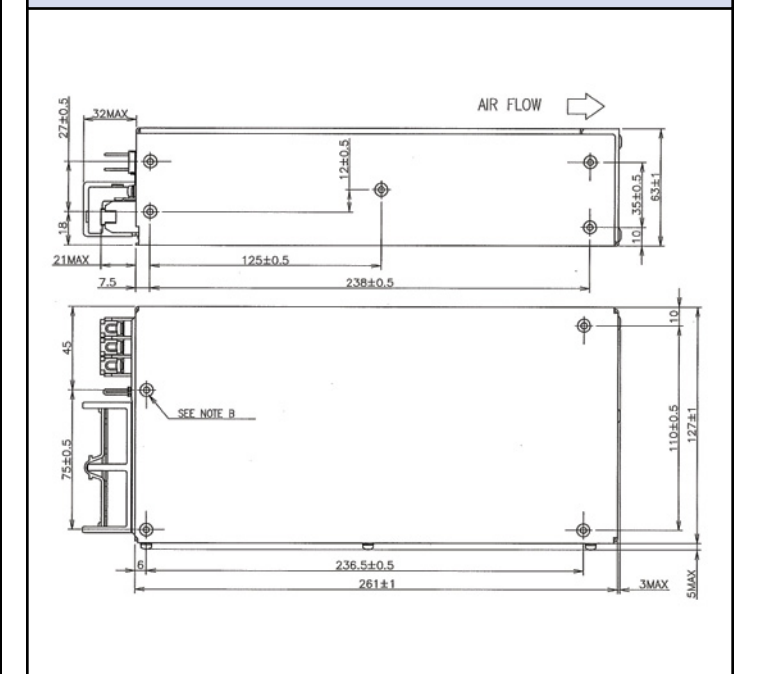
### Output Ratings

Model	Voltage	Adjust Range (V)	Max Current (A)	Max Output Power (w)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
RWS1000B-12/ME	12V	10.2-13.8V	84	1008	96	48	150	82 / 85
RWS1500B-12/ME	12V	10.2-13.8V	125	1500	96	48	150	81 / 85
RWS1000B-15/ME	15V	12.8-17.2V	67	1005	120	60	150	82 / 85
RWS1500B-15/ME	15V	12.8-17.2V	100	1500	120	60	150	82 / 85
RWS1000B-24/ME	24V	20.4-27.6V	42	1008	144	96	180	85 / 88
RWS1500B-24/ME	24V	20.4-27.6V	63	1512	144	96	180	85 / 88
RWS1000B-36/ME	36V	30.6-41.4	28	1008	216	144	250	85 / 88
RWS1500B-36/ME	36V	30.6-41.4	42	1512	216	144	250	85 / 88
RWS1000B-48/ME	48V	40.8-52.8	21	1008	288	192	300	85 / 88
RWS1500B-48/ME	48V	40.8-52.8	32	1536	288	192	300	85 / 88

### Outline Drawing RWS 1000B



### Outline Drawing RWS 1500B



### Options (Contact Sales for availability)

Suffix	Description
/CO2	Double Sided Board Coating
/FO	Parallel Operation, DC Good and Fan Alarm Signals
/R	Remote On/Off
/RF	Reverse Fan (Air exits over input/output terminals)
/RFO	Remote On/Off, Parallel Operation, DC Good and Fan Alarm Signals

For Additional Information, please visit [us.tdk-lambda.com/lp/products/rwsb-series.htm](http://us.tdk-lambda.com/lp/products/rwsb-series.htm)



**1500W Medical and Industrial Power Supplies**

**Features**

- ◆ Low Audible Noise (<45dBA)
- ◆ EN55011/55032-B EMI
- ◆ Enclosed Construction
- ◆ Compact Size
- ◆ Medical and Industrial Certifications
- ◆ 7 Year Warranty



**Key Market Segments & Applications**



Specifications		
Model	CUS1500M	
AC Input Voltage range (1)	VAC	85 - 265VAC (47 - 63Hz)
DC Input Voltage range*	VDC	120 - 340VDC*
Inrush Current (100 / 200VAC)	A	60 / 60A
Power Factor (100 / 200VAC)	-	Meets EN61000-3-2 (0.98 / 0.95)
Input Current (115/230VAC) (Typ)	A	16 / 8A
Temperature Coefficient	%/°C	<0.02%/°C
Regulation	-	See Model Selector
Overcurrent Protection	-	>105%, Constant Current Style. After 5s unit will shutdown
Overvoltage Protection	V	125-150% (115-125% for 48V), Cycle AC line to reset
Hold Up Time (Typ at 100% load)	ms	20ms
Leakage Current (max)	mA	<0.3mA
Standby Voltage	A	5V 1A (always on)
Remote Sense	-	Yes
Remote On/Off	-	Yes. Apply external or Standby voltage to enable output voltage
DC Good, Fan Alarm	-	Open collector signal, high on fail
Parallel Operation	-	Yes, up to 5 units
Series Operation	-	Yes
Operating Temperature	°C	-20 to +60°C, derate linearly to 60% load from 50 to 60°C
Storage Temperature	°C	-30 to +75°C
Operating Humidity (non condensing)	%RH	20 - 90%RH
Storage Humidity (non condensing)	%RH	10 - 90%RH
Cooling	-	Internal variable speed fan, air intake from front. <45dBA noise
Withstand Voltage	VAC	Input to Ground 2kVAC (1xMoPP), Input to Output 4kVAC (2xMoPP), Output to Ground 1.5kVAC (1xMoPP) for 1 min.
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> (sweep 1 min) X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup>
Safety Agency Certifications	-	IEC/ES/EN/CSA60601-1, IEC/UL/EN/CSA60950-1, IEC/UL/EN62368-1 (in progress), EN62477-1 (OVC III), CE Mark
Line Dips	-	SEMI-F47 (200VAC input)
Conducted & Radiated EMI	-	EN55011 / EN55032-B, FCC Class B, VCCI-B
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11, IEC61000-6-2, IEC60601-1-2 Ed.4
Weight (Typ)	g	3,000g
Size (WxHxD)	mm/In	127 x 63 x 261mm / 5 x 2.48 x 10.28"
MTBF - Telcordia SR-332 issue 3**	Hours	769,670 hours
Warranty	yrs	Seven Years

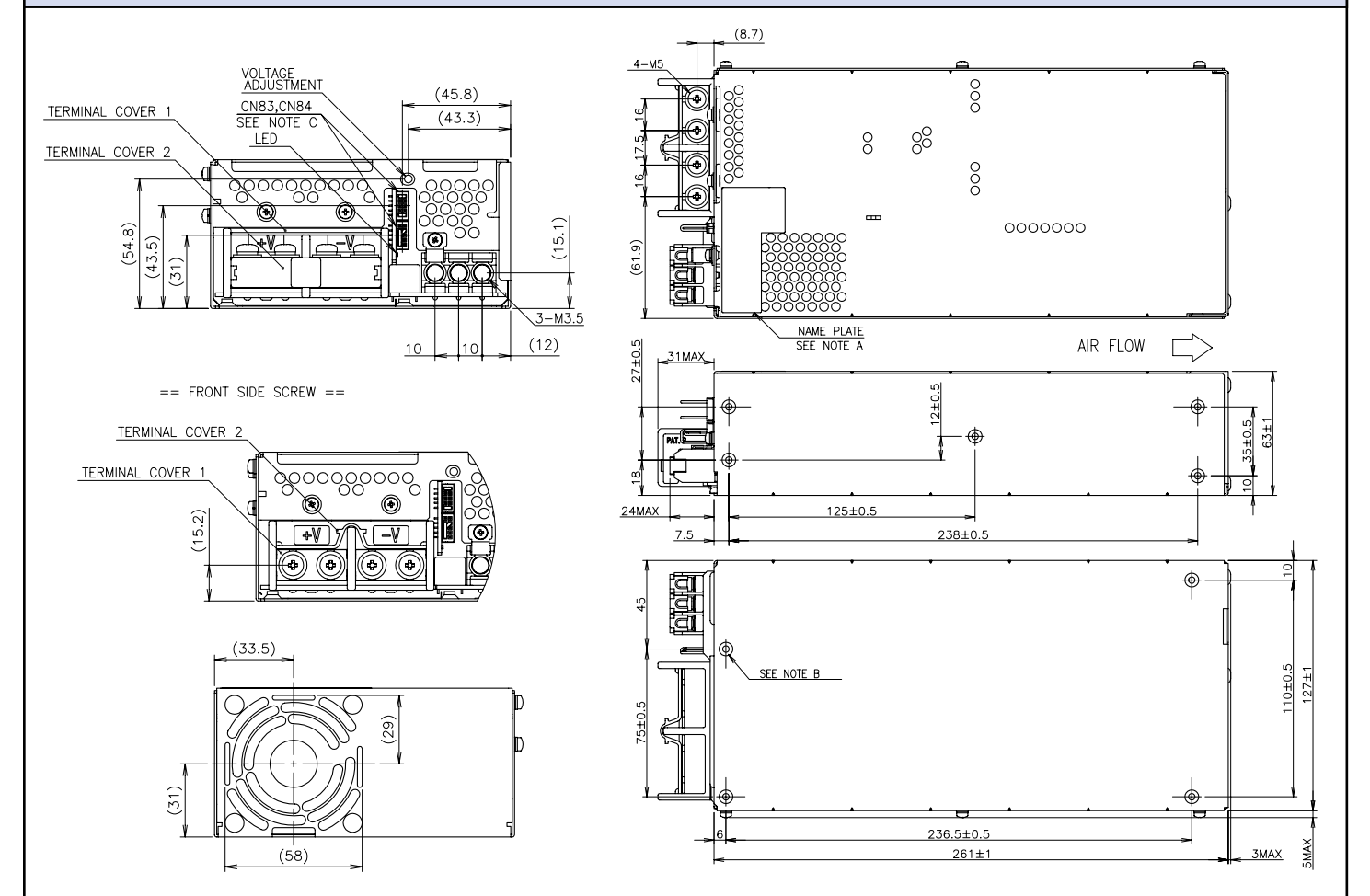
\*Safety certified for AC input only \*\*24V output model, 25°C ambient, full load, 230VAC input

(1) Derate linearly to 80% load from 90 to 85VAC input

**Output Ratings**

Model	Voltage (V)	Adjust Range (V)	Max Current (A)	Max Output Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % 115/230VAC
CUS1500M-12	12	10.2 - 14.4	125	1500	96	48	150	82 / 85
CUS1500M-15	15	12.8 - 18	100	1500	120	60	150	82 / 85
CUS1500M-24	24	20.4 - 28.8	63	1512	144	96	180	85 / 88
CUS1500M-36	36	30.6 - 43.2	42	1512	216	144	250	85 / 88
CUS1500M-48	48	40.8 - 52.8	32	1536	288	192	300	85 / 88

**Outline Drawing**



**Options**

Suffix	Description
/SF	Single fuse (Line input)
/RF (Contact factory)	Reverse Fan (Air exits over input/output terminals)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cus-m-series](http://us.tdk-lambda.com/lp/products/cus-m-series)



**1600W 1U Industrial Power Supplies**

**Features**

- ◆ 1U High
- ◆ Internal ORing FETs & Current Share
- ◆ High Efficiency
- ◆ I<sup>2</sup>C, PMBus Communication Option

**Key Market Segments & Applications**



**Specifications**

Model		RFE1600
Input Voltage Range	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating(2)
Input Current (Max) 115/230VAC	A	11.6 / 8.1A
Inrush Current	A	<35A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 115% (Programmable)
Overvoltage Protection	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off(1)
Overtemperature Protection	-	Shutdown with automatic reset. Warning signal provided(1)
Hold up time	ms	>10ms, 100/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA, 100 / 230VAC, 60Hz
Remote Sense Compensation	-	12V: 0.25V/wire; 24V: 0.5/wire; 32V: 0.75V/wire; 48V: 1V/wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Yes, inhibit & enable
Parallel Operation	-	Yes, single wire current share, 5% accuracy of max current, up to 10 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust	-	By either external 0 - 5V signal or 1k potentiometer(1)
I <sup>2</sup> C Interface	-	Isolated from output, Add suffix /S, PMBus compatible(1)
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temperature	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 2kVAC, Output to Ground: RFE1600-12, -24V 500VAC, RFE1600-48 2250VDC 1 min, (POE)
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	MIL-810F, method 514.5
Shock (Basic transportation)	G	30G
Safety Agency Certifications	-	UL60950-1, EN60950-1 (2nd Edition), CE Mark
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv2), -5 (lv3,4), -6 (lv2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 3.35 x 1.61 x 12.6
Weight	g	1550
Warranty	yrs	Three

**Notes**

- (1) See installation manual for detailed specifications & test methods
- (2) Derate linearly 1%/V from 100VAC to 85VAC input

**Model Selector**

Model	Output Voltage	Adjust. Range(1)	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current(2) (100<Vin<170VAC)	Max Power(2) (100<Vin<170VAC)
RFE1600-12	12V	9.6 - 13.2V	133A	1596W	100A	1200W
RFE1600-12/S	12V	9.6 - 13.2V	133A	1596W	100A	1200W
RFE1600-24	24V	19.2 - 29V	67A	1608W	50A	1200W
RFE1600-24/S	24V	19.2 - 29V	67A	1608W	50A	1200W
RFE1600-32	32V	25.6 - 38.4V	47A	1504W	37.5A	1200W
RFE1600-32/S	32V	25.6 - 38.4V	47A	1504W	37.5A	1200W
RFE1600-48	48V	38.4 - 58V	33A	1584W	25A	1200W
RFE1600-48/S	48V	38.4 - 58V	33A	1584W	25A	1200W

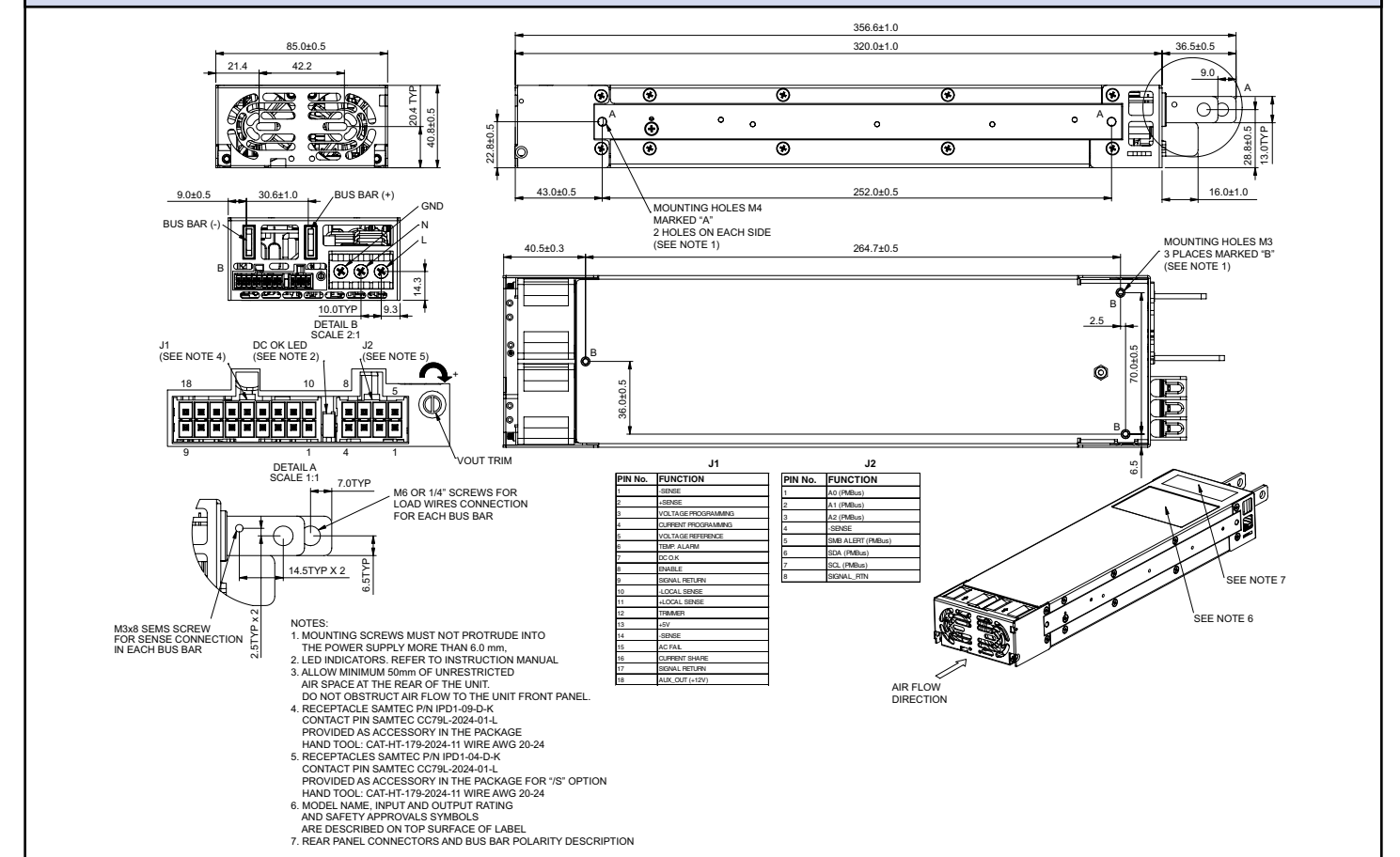
  

Model	Load Reg	Line Reg	Ripple & Noise	Effic. (3)	I <sup>2</sup> C
RFE1600-12	60mV	30mV	240mV	87 / 90%	-
RFE1600-12/S	60mV	30mV	240mV	87 / 90%	Yes
RFE1600-24	120mV	60mV	240mV	88 / 90%	-
RFE1600-24/S	120mV	60mV	240mV	88 / 90%	Yes
RFE1600-32	160mV	80mV	320mV	88 / 90%	-
RFE1600-32/S	160mV	80mV	320mV	88 / 90%	Yes
RFE1600-48	240mV	120mV	480mV	89 / 92%	-
RFE1600-48/S	240mV	120mV	480mV	89 / 92%	Yes

**Notes:**

(3) At 75% load, 115 / 230VAC input

**Outline Drawing**



**Other Related Products**

FPS1000	1U 1000W (3 per rack)
HWS1500	1500W Limited lifetime warranty
HFE1600	1U 1600W (5 per rack)
HFE2500	1U 2500W (4 per rack)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/rfe-series.htm](http://us.tdk-lambda.com/lp/products/rfe-series.htm)



**1800W 3ph Industrial Power Supplies**

**Features**

- ◆ Limited Lifetime Warranty
- ◆ 208VAC Three Phase Input
- ◆ High Efficiency
- ◆ SEMI F47 Compliant
- ◆ Compact Size



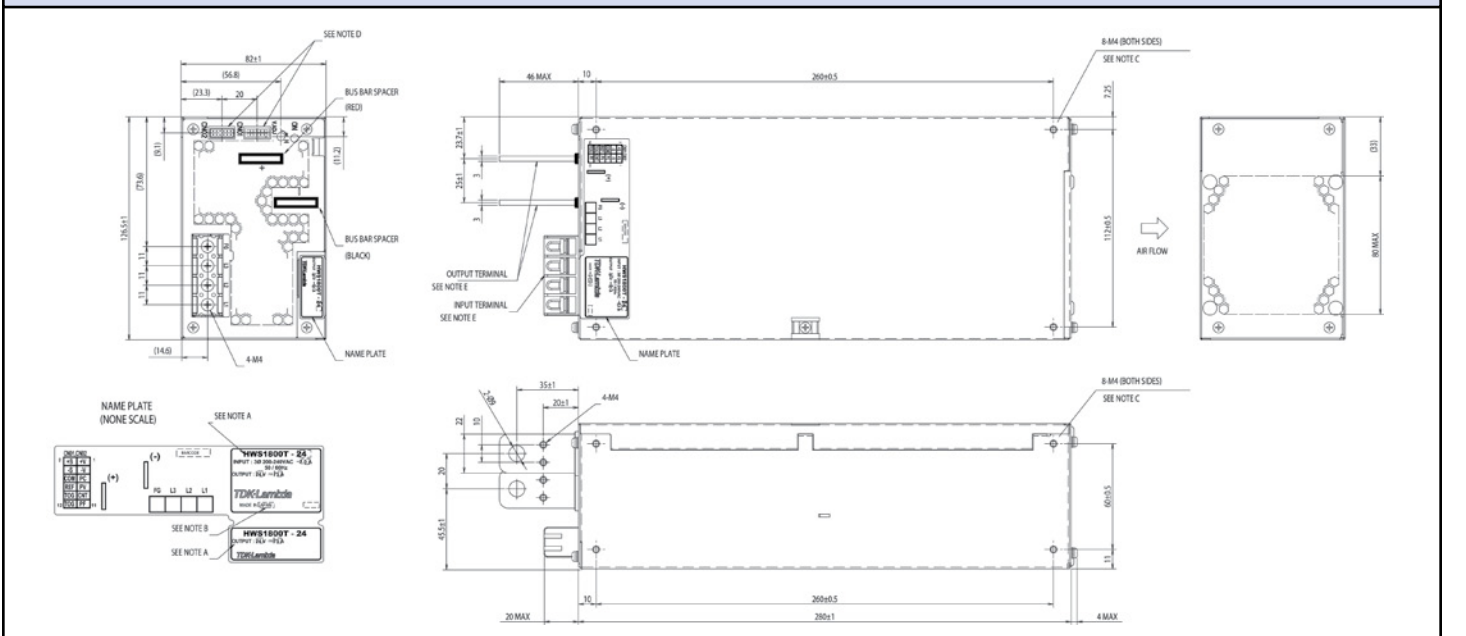
**Key Market Segments & Applications**



Specifications		HWS1800
Model		HWS1800
Input Voltage Range	-	208VAC, Three phase 170 - 265VAC (47 - 63Hz)
Input Current (Typical)	A	3.3V: 4.5A, 5V to 15V: 6A, 24 to 60V: 7A
Inrush Current (200VAC)	A	40A
Power Factor	-	Typically 0.94
Temperature Coefficient	-	<0.02%/°C
Overcurrent Protection	-	>105% of maximum / peak current rating
Overvoltage Protection	V	See table on page 2. Cycle input to reset or use remote on/off function
Hold Up Time (Typ)	ms	3.3V to 15V: 20ms, 24 to 60V: 18ms at 200VAC
Leakage Current (max)	mA	<2.6mA at 240VAC 60Hz
Remote Sense	-	Yes
Indicator	-	Green LED = ON
Remote on/off	-	Yes
Parallel operation	-	Single wire connection
DC Good	-	Yes
Remote Adjust (PV)	-	External voltage adjusts output voltage. See Instruction Manual
Operating Temperature	°C	-10°C to +71°C, see output derating curves, -20°C start up
Storage Temperature	°C	-30 to +85°C
Humidity (non condensing)	-	Operating: 10 - 90%RH, Non operating 10 - 95%RH
Cooling	-	Internal fan
Withstand Voltage	-	I/P to Grnd 2kVAC, I/P to O/P 3kVAC, O/P to Grnd 500VAC (1), O/P to CNT 100VAC for 1 min
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour
Shock (In package)	-	< 196.1 m/s <sup>2</sup>
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178
Line Dip	-	Complies with SEMI F47
Conducted & Radiated EMI	-	EN55011 / EN55022-A, FCC-A, VCCI-A
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8
Weight (Typ)	g	3800
Size (WxHxD)	in	4.98 x 3.23 x 11"
Warranty	yrs	Limited lifetime warranty (See Lambda's terms & conditions)

Notes:  
(1) HWS1800T-60V: 651VAC

**Outline Drawing**

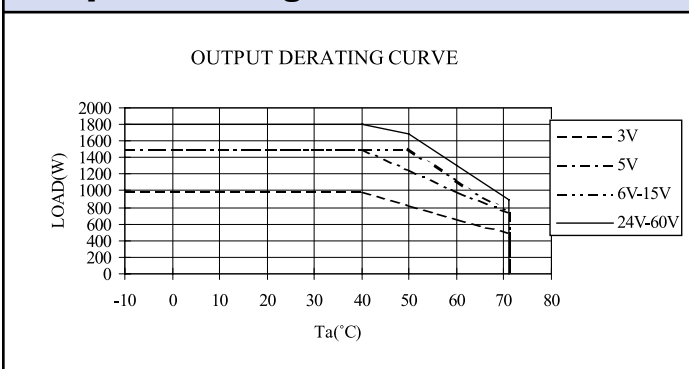


**Output Ratings**

Model	Voltage V	Adjust Range V	Max Curr. A	Peak Curr. A(2)	Max Power W	Peak Power W2	Load Reg mV	Line Reg mV(3)	Ripple Noise mV	Overvoltage V	Efficiency (%)
HWS1800T-3	3.3	2.64 - 3.96	300	-	990	-	60	36	120	4.12 - 4.62	75
HWS1800T-5	5	4 - 6	300	-	1500	-	60	36	120	6.25 - 7.0	81
HWS1800T-6	6	4.8 - 7.2	250	300	1500	1800	60	40	150	7.5 - 8.4	82
HWS1800T-7	7.5	6 - 9	200	240	1500	1800	60	40	150	9.37 - 10.5	84
HWS1800T-12	12	9.6 - 14.4	125	150	1500	1800	72	48	200	15 - 17.4	84
HWS1800T-15	15	12 - 18	100	120	1500	1800	90	60	200	18.7 - 21.8	84
HWS1800T-24	24	19.2 - 28.8	75	105	1800	2520	144	96	250	30 - 34.8	88
HWS1800T-36	36	28.8 - 43.2	50	70	1800	2520	216	144	250	45 - 49.7	88
HWS1800T-48	48	38.4 - 52.8	37.5	52.5	1800	2520	288	192	300	55.2 - 60	90
HWS1800T-60	60	48 - 66	30	42	1800	2520	360	240	400	69 - 75	90

Notes  
(2) 10s maximum on time with 35% duty cycle  
(3) 180 - 265VAC

**Output Derating Curves**



**Other Industrial Products**

HWS	15W to 1500W single output, single phase
LZSA	500W to 1500W single output
SWS	50W to 1000W, low cost
DPP, DLP & DSP	10W to 960W DIN Rail mount

For Additional Information, please visit [us.tdk-lambda.com/lp/products/hws-series.htm](http://us.tdk-lambda.com/lp/products/hws-series.htm)



**2500W 1U Industrial Power Supplies**

**Features**

- ◆ 1U High
- ◆ Internal ORing FETs & Current Share
- ◆ High Efficiency
- ◆ I<sup>2</sup>C, PMBus Communication Option



**Key Market Segments & Applications**



**Specifications**

Model		RFE2500
Input Voltage Range	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating <sup>(2)</sup>
Input Current (Max) 115/230VAC	A	15 / 12A
Inrush Current	A	<50A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	115VAC: >110%; 230VAC: 105 - 120%
Overvoltage Protection	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off <sup>(1)</sup>
Overtemperature Protection	-	Shutdown with automatic reset. Warning signal provided <sup>(1)</sup>
Hold up time	ms	>10ms, 100/230VAC Input, 80% loading
Leakage Current	mA	< 0.8 / 1.6mA, 115 / 230VAC, 60Hz
Remote Sense Compensation	-	12V: 0.25V/wire; 24V: 0.5V/wire; 48V: 1V/wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Yes, inhibit & enable
Parallel Operation	-	Yes, single wire current share, 5% accuracy of max current, up to 8 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust	-	By either external 0 - 5V signal or 1k potentiometer <sup>(1)</sup>
I <sup>2</sup> C Interface	-	Isolated from output, Add suffix /S, PMBus compatible <sup>(1)</sup>
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temperature	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector
Withstand Voltage	-	Input to Output 3kVAC, Input to Ground 2kVAC, Output to Ground: RFE2500-12, -24V 500VAC, RFE2500-48 2250VDC 1 min, (POE)
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC61068-2-64 (Basic transportation)
Shock (Basic transportation)	-	Meets IEC61068-2-27 (Basic transportation) 20G
Safety Agency Certifications	-	UL60950-1, EN60950-1 (2nd Edition), CE Mark
Conducted and Radiated EMI	-	EN55022 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv2), -5 (lv3,4), -6 (lv2), -8 (lv 4), -11
Size (W x H x D) (Excluding busbars)	in	4.21 x 1.61 x 13.6"
	mm	107 x 41 x 345mm
Weight	g	2500
Warranty	yrs	Three Years

**Notes**

- (1) See installation manual for detailed specifications & test methods
- (2) Derate linearly 1.3%/VAC from 100VAC to 85VAC input

**Model Selector**

Model	Output Voltage	Adjust. Range <sup>(1)</sup>	Max Current (Vin>180VAC) <sup>(2)</sup>	Max Power (Vin>180VAC) <sup>(2)</sup>	Max Current (100<Vin<170VAC) <sup>(2)</sup>	Max Power (100<Vin<170VAC) <sup>(2)</sup>
RFE2500-12	12V	9.6 - 13.2V	200A	2400W	125A	1500W
RFE2500-12/S	12V	9.6 - 13.2V	200A	2400W	125A	1500W
RFE2500-24	24V	19.2 - 29V	96A	2304W	62.5A	1500W
RFE2500-24/S	24V	19.2 - 29V	96A	2304W	62.5A	1500W
RFE2500-48	48V	38.4 - 58V	52A	2496W	31.25A	1500W
RFE2500-48/S	48V	38.4 - 58V	52A	2496W	31.25A	1500W

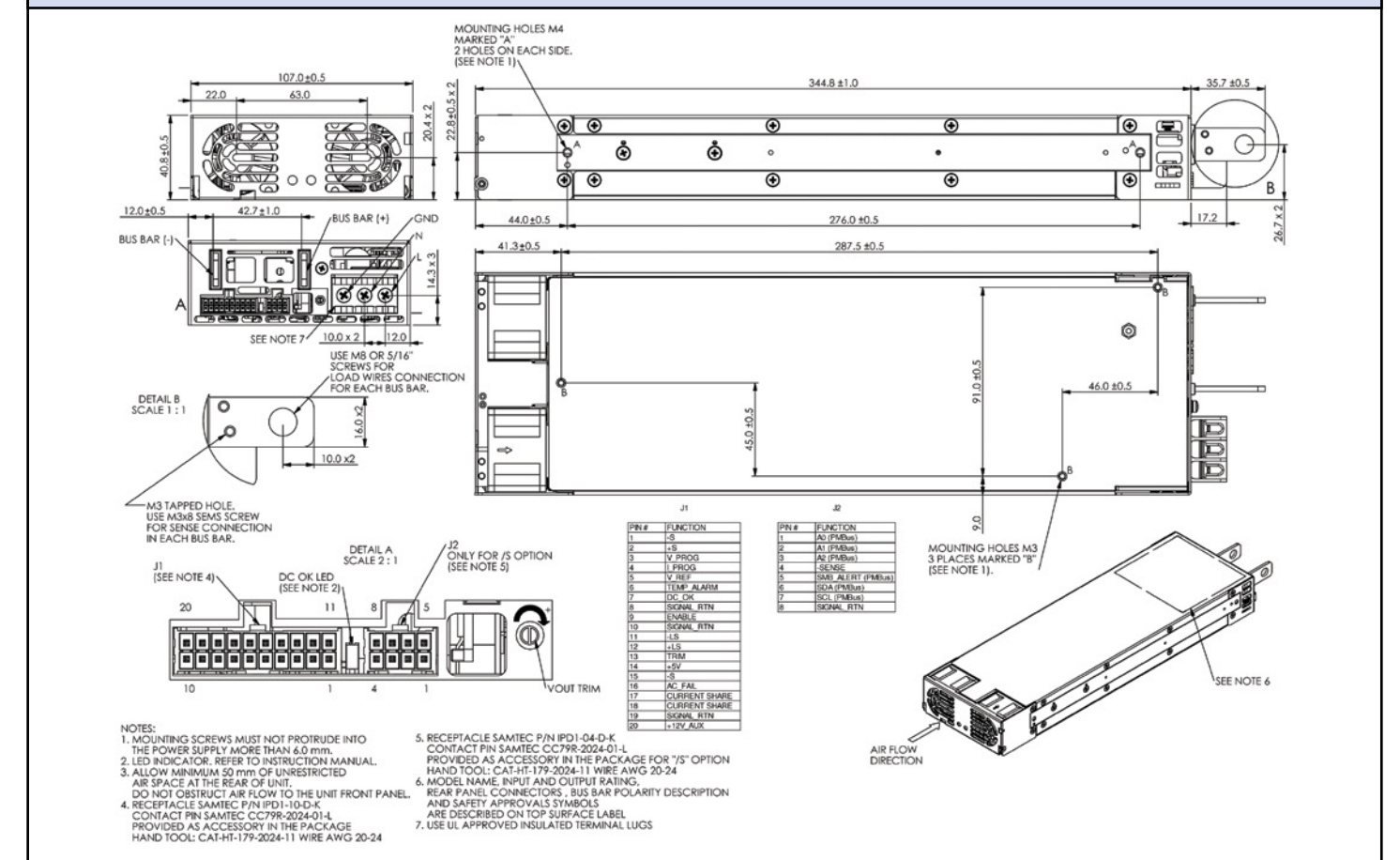
  

Model	Load Reg	Line Reg	Ripple & Noise	Efficiency <sup>(3)</sup>	I <sup>2</sup> C
RFE2500-12	60mV	30mV	240mV	90 / 92%	-
RFE2500-12/S	60mV	30mV	240mV	90 / 92%	Yes
RFE2500-24	120mV	60mV	240mV	90 / 92%	-
RFE2500-24/S	120mV	60mV	240mV	90 / 92%	Yes
RFE2500-48	240mV	120mV	480mV	91 / 93%	-
RFE2500-48/S	240mV	120mV	480mV	91 / 93%	Yes

**Notes:**

(3) At 75% load, 115 / 230VAC input

**Outline Drawing**



**Other Related Products**

RFE1000-1600	1U 1000W and 1600W
FPS1000	1U 1000W (3 per rack)
HWS1500	1500W Limited lifetime warranty
HFE1600	1U 1600W (5 per rack)
HFE2500	1U 2500W (4 per rack)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/rfe-series.htm](http://us.tdk-lambda.com/lp/products/rfe-series.htm)





**3200W 3 Phase Input Industrial Power Supplies**

**Features**

- ◆ 400/440/480 VAC (Nominal) 3 Phase Delta or Wye
- ◆ Fully Regulated, Wide Range Adjustable Output
- ◆ Voltage and Current Programming
- ◆ -40°C (start up) to +70°C operation
- ◆ >92% Efficiency
- ◆ PMBus™ Communication
- ◆ Built in ORing FETs & Active I share for parallel operation
- ◆ Fully Featured

**Key Market Segments & Applications**



Specifications		TPS3000-24	TPS3000-48
Model		TPS3000-24	TPS3000-48
Input Voltage (47-63Hz)	VAC	350 - 528VAC, Delta or Wye 3 phase	
Input Current	A	6A per phase max, steady state	
Inrush Current	A	<15A per phase (excluding initial spike charging EMI capacitors lasting <2ms)	
Power Factor Correction	-	0.93 typical	
Efficiency (1)	%	92.5%	92.5%
Ripple & Noise (Pk-Pk) (max) (2)	mV	130mV	260mV
Line Regulation	%	<0.25%	
Load Regulation	%	<0.5%	
Overcurrent Protection	-	Adjustable (70-105% of rated current)	
Overvoltage Protection	V	115% of setpoint (tracking)	
Thermal Protection	-	Internal thermostat. Automatic reset	
Hold Up Time	ms	>10ms at 80% of rated current, nominal input/output voltage	
Remote Sense	-	Compensates for a total of 1V cable drop	
Dropped Phase (2)	-	Open collector signal; off during normal operation, strobing during dropped phase state	
Remote On / Off	-	Selectable logic - Enable or Inhibit	
AC Fail Signal	-	Open Collector, ON when AC is above 340VAC and unit is enabled	
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)	
Remote Adjust	-	0 - 5V adjusts output from V max to V min	
Parallel Connection	-	Single wire current share, up to 8 units. Built in ORing FET	
Standby Voltage	-	11.2 - 12.5V, 0.3A	
Operating Temperature	°C	-40 to +70°C, see derating curve (20 min warm up needed for <-10°C)	
Storage Temperature	°C	-40 to +85°C	
Temperature Coefficient	%/°C	0.02%/°C	
Humidity (non condensing)	%RH	10 - 90%RH	
Cooling	-	Internal variable speed fan	
Withstand Voltage	VAC	Input - Ground 2,000VAC, Input - Output 3,000VAC, Output - Ground 500VAC	
Isolation Resistance	MΩ	>100MΩ (25deg, 70%RH)	
Vibration	-	Designed to meet MIL-STD-810F, Method 514.5, Proc I, Category 4, 10	
Shock	-	Designed to meet MIL-STD-810F, Method 516.5, Procedure I, IV & VI	
Safety Agency Certifications	-	UL/CSA60950-1, EN60950-1, CE mark for LVD and RoHS2	
Voltage Dips	-	SEMI F47-0706	
Leakage Current	mA	<3mA	
Conducted & Radiated Emissions	-	EN55022 Class A, FCC part 15 Class-A	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Altitude	m	4,000m	
Weight	kg	3.5	
Size (W x H x D)	mm	107 x 84.4 x 324mm (excluding output busbars)	
Warranty	yrs	Three Years	

(1) Typical, 75-100% at rated current (2) Consult Installation Manual for detailed specifications, test methods and application notes

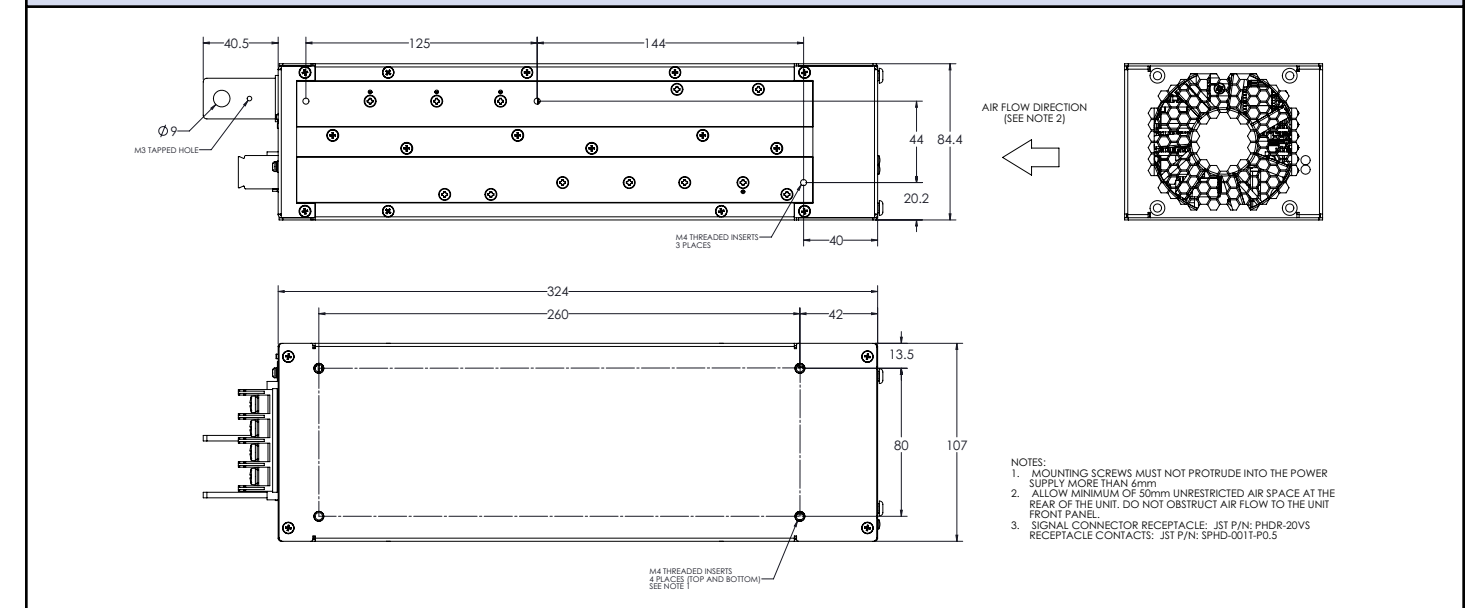
**Specifications**

Model	Nominal Voltage (V)	Adjust. Range (V) (4)	Rated Current (A)	Maximum (3) Current (A)	Rated Power (W)	Maximum (3) Power (W)
TPS3000-24	24	19.2 - 28.5	125	133.3	3000	3200
TPS3000-48	48	38.4 - 56.5	66.7	66.7	3200	3200

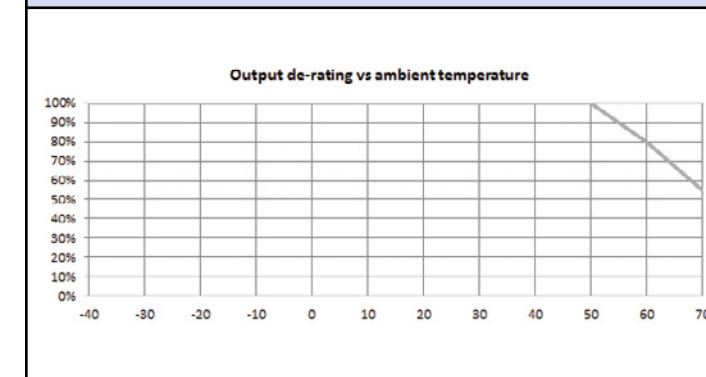
(3) Rating at nominal output voltage only.

(4) A minimum load of 0.5A is required to maintain regulation and ripple spec throughout the output voltage adjustment range.

**Outline Drawing**



**Derating Curve**



**Recommended Filter**

RTMN-5010



<http://us.tdk-lambda.com/lp/products/r-series.htm>

For Additional Information, please visit [us.tdk-lambda.com/lp/products/tps-series.htm](http://us.tdk-lambda.com/lp/products/tps-series.htm)



**2000-4080W 3Φ Input Industrial Power Supplies**

**Features**

- ◆ 400/440/480 VAC (Nominal) 3 Phase Delta or Wye
- ◆ Constant Voltage & Constant Current modes, Fully Regulated
- ◆ Wide Range Voltage and Current Programming
- ◆ -40°C (start up) to +70°C operation
- ◆ Up to 93% Efficiency
- ◆ PMBus™ Communication
- ◆ Built in ORing FETs & Active I Share for parallel operation
- ◆ MIL-STD-461F/G EMC. MIL-STD-810F Vibration / Shock



**Key Market Segments & Applications**



Specifications		TPS4000-12	TPS4000-24	TPS4000-48
Input Voltage (47-63Hz)	VAC	350 - 528VAC, Delta (or Wye) 3 phase		
Input Current	A	8A per phase max, steady state		
Inrush Current	A	<25A per phase (excluding initial spike charging EMI capacitors lasting <2ms)		
Power Factor Correction	-	0.92 typical		
Efficiency (1)	%	TBD	93%	93%
Ripple & Noise (Pk-Pk) (max) (2)	mV	240mV	240mV	480mV
Line Regulation	%	<0.25%		
Load Regulation	%	<0.5%		
Overcurrent Protection	-	Adjustable (70-105% of maximum rated current)		
Overvoltage Protection	V	115% of setpoint (tracking)		
Thermal Protection	-	Internal thermostat. Automatic reset		
Hold Up Time	ms	>10ms at 80% of rated current, nominal input/output voltage		
Remote Sense	-	Compensates for a total of 1V cable drop		
Dropped Phase (2)	-	Open collector signal; off during normal operation, active low during dropped phase state		
Remote On / Off	-	Selectable logic - enable or inhibit		
AC Fail Signal	-	Open Collector, ON when AC input is above 340VAC and unit is enabled		
DC Good Signal	-	Open Collector, ON when output is above 90% of setpoint (tracking)		
Remote Adjust	-	0 - 5V adjusts output from 120% to 80% of nominal		
Parallel Connection (2)	-	Single wire current share, up to 8 units. Built in ORing FETs		
Standby Voltage	-	11.2 - 12.5V, 0.3A		
Operating Temperature	°C	-40 to +70°C, see derating curve (at -40°C, a 10 min. warm up at 80% load required to meet regulation)		
Storage Temperature	°C	-40 to +85°C		
Temperature Coefficient	%/°C	0.02%/°C		
Humidity (non condensing)	%RH	10 - 90%RH		
Cooling	-	Internal variable speed fan		
Withstand Voltage	VAC	Input - Ground 2,000VAC, Input - Output 3,000VAC, Output - Ground 500VDC		
Isolation Resistance	MΩ	Isolation Resistance Input to Output >100MΩ (25deg, 70%RH)		
Vibration	-	Designed to meet MIL-STD-810F, Method 514.5, Proc I, Category 4, 10		
Shock	-	Designed to meet MIL-STD-810F, Method 516.5, Procedure I, IV & VI		
Safety Agency Certifications	-	UL/CSA60950-1, EN60950-1, CE mark for LVD and RoHS2		
Voltage Dips	-	SEMI F47-0706 at 480VAC nominal		
Leakage Current	mA	<2mA		
Conducted & Radiated Emissions	-	EN55032 Class A, FCC part 15 Class A (when inside suitable enclosure) MIL-STD-461F/G RE102 (Navy Ships Below Deck)		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11 MIL-STD-461F/G CS101, CS114 (Army Ground), CS115, CS116		
Altitude	m	4,000m (no additional derating)		
Weight	kg	4.0		
Size (W x H x D)	mm	107 x 85 x 335mm (excluding output busbars)		
Warranty	yrs	Three Years		

(1) Typical, 75-100% at rated current (2) Consult Installation Manual for detailed specifications, test methods and application notes

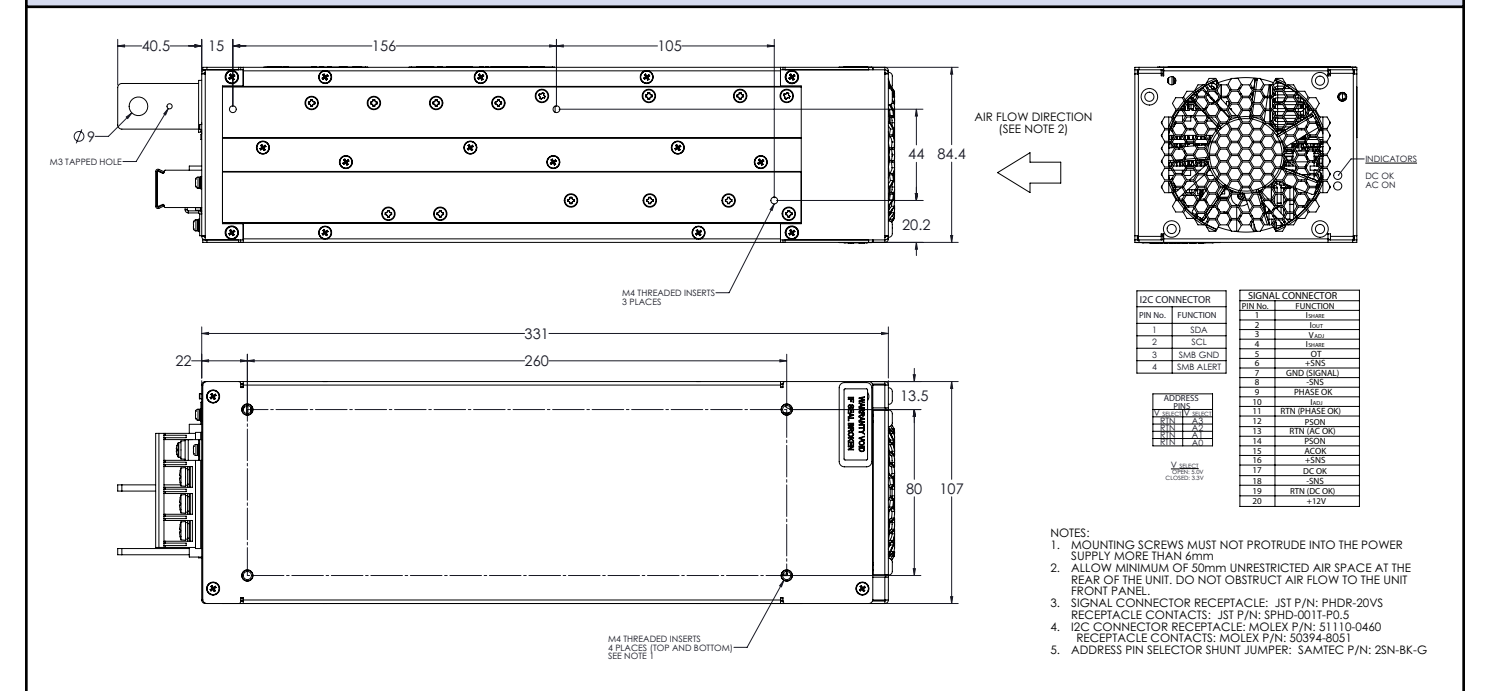
**Specifications**

Model	Nominal Voltage (V)	Adjust. Range (V) (4)	Rated Current (A)	Maximum (3) Current (A)	Rated (3) Power (W)	Maximum Power (W)
TPS4000-12	12	4.0 - 16	166	170	2000	2720
TPS4000-24	24	4.0 - 29	166	170	4000	4080
TPS4000-48	48	8.0 - 58	83	85	4000	4080

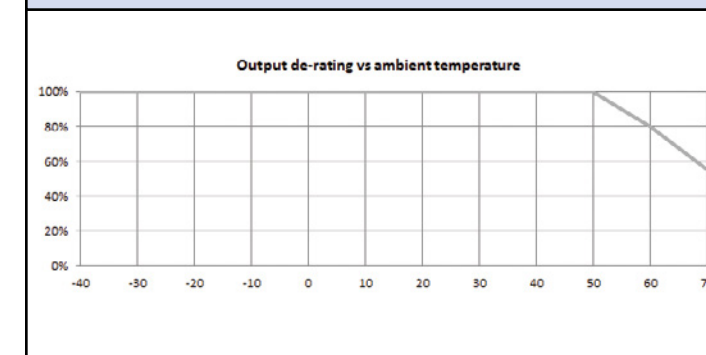
(3) Rating at nominal output only

(4) Minimum 0.5A load required to maintain regulation and ripple specs. Consult manual for <80% output voltage adjustment.

**Outline Drawing**



**Derating Curve**



**Special Application Filters, Consult Manual**

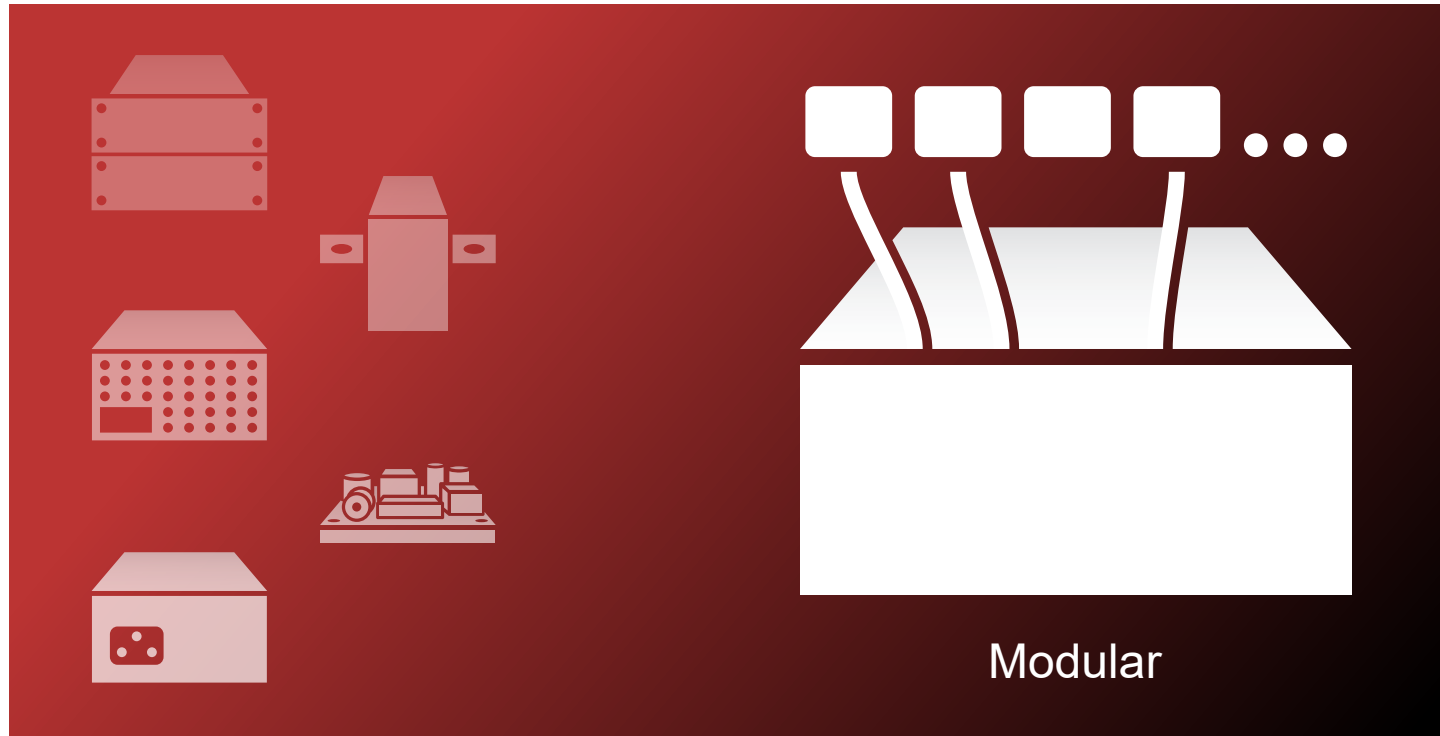
RTMN-5010

<http://us.tdk-lambda.com/lp/products/r-series.htm>

For Additional Information, please visit [us.tdk-lambda.com/lp/products/tps-series.htm](http://us.tdk-lambda.com/lp/products/tps-series.htm)

**PRELIMINARY**

 **AC-DC Power Supplies**



**Applications**

Many but especially:

- ◆ Equipment needing several different or uncommon output voltages
- ◆ Systems with different output voltage requirements in same package style

**Features**

- ◆ 350W to 1500W output power
- ◆ 1 to 16 separate output voltages
- ◆ Single-phase, wide-range input
- ◆ Broad range of output voltages from 0.5V to 62VDC
- ◆ Signal options on primary and secondary side
- ◆ Filter options with low leakage current for medical applications
- ◆ Cooling with integrated fans or external airflow (customer air)
- ◆ Safety approvals for international use
- ◆ Fast time to market
- ◆ Easy to configure with Quick Product Finder on TDK-Lambda website
- ◆ Combining outputs in parallel (for increased current or N+1 redundancy) and series (for increased output voltage) is possible with many of the product ranges, contact technical support for details

Wattage	Series	Page
350-1150W	NV350/700	62
450-900W	Vega	64
550-900W	Vega-Lite	66
600W	CM4	68
700-1500W	QM	70

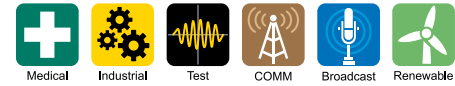
Listed by Wattage

**350W-1150W Modular Power Supplies**

**Features**

- ◆ 1U Form Factor
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ Up to 8 Outputs (6 for the NV350)
- ◆ No Minimum Loads
- ◆ Medical Certifications
- ◆ Peak power rating of up to 1450W

**Key Market Segments & Applications**



**Specifications**

Model		NV3	NV7
Output Power	W	350W (660W >180VAC input)	700W (1150W >150VAC input)
Peak Power (Up to 10s)	W	520W (740W >180VAC input)	850W (1450W >150VAC input)
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)	
Inrush Current (25°C, Cold Start)	A	<15	<40
Power Factor Harmonics	-	EN61000-3-2 Compliant	
Line Regulation	-	< 0.1% for 90-264VAC input change	
Load Regulation (0-100% change)	-	B, BH Modules: < 1%, DB modules output 2: <2%, DA Modules: <3%	
Cross Regulation	-	< 0.1% for 100% load change on any output, (DA module CH1<0.2%, CH2<3%)	
Ripple & Noise	mV	1% or 50mV, whichever is greater	
Efficiency	-	Up to 90%, configuration dependant	
Minimum Load	A	None	
Overcurrent Protection	-	110 - 150%, hiccup mode (Primary limited)	
Overvoltage Protection	V	Yes	
Overtemperature Protection	-	Yes, recycle AC to reset	
Hold Up Time (Typ at 90VAC Input)	ms	>16ms (12ms for NV700 with >700W output power)	
Leakage Current (1)	µA	130µA 120VAC, 60Hz, 260µA 240VAC 60Hz	
Remote Sense	-	Standard on single output modules and output 1 on DB module only	
Module Good	-	Open collector, on indicates output is good (N/A on DA modules)	
Module Inhibit	-	TTL logic level high inhibits the module (both outputs on DB outputs)(2)	
AC Fail (Specify as option)	-	High on fail	
Operating Temperature	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C(3)	
Storage Temperature	-	-40 to +85°C	
Humidity (non condensing)	-	5 - 95% RH	
Cooling	-	Internal fan or 1m/s with system supplied air (NV3 only)	
Isolation	-	Input to Output 4.3kVAC, 5.7kVDC(5)(7), (2 x MOPPs (3rd edition 60601)), Input to Output 4.3kVDC(6), (2 x MOOPs (3rd edition 60601)), Input to Ground 2.3kVDC, Output to Ground 200VDC(8)	
Vibration (non operating)	-	2G, 10-500Hz (sweep & endurance at resonance) in all 3 planes	
Shock	-	30G per IEC68-2-27	
Safety Agency Certifications	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1; IEC/EN 61010-1; CE Mark	
Immunity	-	EN50082-2: EN61000-4-2, -3, -4, -5, -6, -8, -11	
Conducted Emissions and Flicker	-	EN55011, EN55022 Class B (per CISPR.22), EN61000-3-3	
Radiated Emissions	-	EN55011, EN55022 Class B (per CISPR.22)(4)	
Weight (Typ)	g	800	1160
Size	in	1.6 x 3.75 x 10.8"	
Warranty	yrs	Three Years	

(1) Worse case: <300µA 264VAC, 63Hz (normal condition, <500µA single fault condition)  
 (2) Output 2 remote on/off inhibits just Output 2 of DB module  
 (3) -20°C cold start, derate from 45C for NV7 when input voltage < 100VAC  
 (4) See application note for Class B

(5) C, CC, CM modules only  
 (6) Units with any other module or primary option fitted  
 (7) Type tested to 4kVAC (equivalent to 5.7VDC), production tested to 4.3 kVDC  
 (8) CM modules are rated 500VAC output to ground.

**1. Configuration Guide**

You can create your own NV350 or NV700 configuration online at [www.nv-power.com](http://www.nv-power.com). This method checks your configuration and offers the optimum solution. Alternatively, you can do this manually by using the guide below. Calculate total output power to ensure power requirements within 350W or 1150W, then select required Cooling, Connection and Controls/Signals from the following tables:

Output Power	NV3 NV7	350W / 660W 250W with reverse air 700W / 1150W	<b>NV3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>EN5V</b>
Cooling	S R C V	Standard air - forward Reverse air <sup>1</sup> Customer air - no fan <sup>1</sup> Variable speed fan (Std on NV700)					
Input Connection	S I	Screw IEC320 <sup>2</sup>					
Primary Option2	ES5V ES12V IS5V IS12V EN5V EN12V IN5V IN12V	AC good, PSU enable, 5V/2A standby AC good, PSU enable, 12V/1A standby AC good, PSU inhibit, 5V/2A standby AC good, PSU inhibit, 12V/1A standby AC good, PSU enable, 5V/2A standby, global module good AC good, PSU enable, 12V/1A standby, global module good AC good, PSU inhibit, 5V/2A standby, global module good AC good, PSU inhibit, 12V/1A standby, global module good					

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales  
 2 - Not with customer air cooling

3 - The Primary Option uses 1 slot  
 4 - Not with NV7

**2. Output Section**

Select Output Modules from the Module Tables below ensuring that no more that 6 slots (NV-350) or 8 slots (NV-700) in total are used. Forward air cooling, Screw input terminals, 300µA Leakage, ac good, PSU enable and 5V/2A aux supply

Example - if you require 5.2V 40A :-  
 a) Select B as closest match for voltage & current and prefix with voltage eg 5.2B  
 b) Repeat for other outputs.

Output 1 = 5.2V / 40A  
 Output 2 = 12V / 13A with screw terminals  
 Output 3 = 15V / 4A with screw terminals  
 Max 350W continuous output power

This will create a complete product description eg **NV3SSSE5V 5.2B 12/15DB** which represents a three output NV350 with

Contact Lambda to validate configuration or visit the NV webpage to validate part number. ([www.nv-power.com](http://www.nv-power.com))

**Single Output Modules**

Voltage Range	Curr.	Peak Curr.	#/slots	Mod. Code
3.2V - 3.6V	40A	-	2	B
4.75 - 5.5V	40A <sup>(1)</sup>	-	2	B
7 - 9V	22.5A <sup>(6)</sup>	-	2	B
12 - 15.5V	20A <sup>(2)</sup>	-	2	BH
24 - 28V	10A <sup>(3)</sup>	-	2	BH
12 - 13.2V	37.5A <sup>(7)</sup>	50A <sup>(7)</sup>	3	C
15 - 16.5V	30A <sup>(7)</sup>	37.5A <sup>(7)</sup>	3	C
24 - 26.4V	18.75A <sup>(7)</sup>	25A <sup>(7)</sup>	3	C
27 - 32V	16.6A <sup>(7)</sup>	19.7A <sup>(7)</sup>	3	C
24 - 26.4V	18.75A <sup>(7)</sup>	25A <sup>(7)</sup>	3	CM
48 - 52.8V	18.75A	25A	6	CC
54 - 64V	16.6A	19.7A	6	CC

(1) NV3: 5.2-5.5V, derate linearly from 40A to 36A  
 NV7: 5-5.5V, derate linearly from 40A to 36A  
 (2) NV3: 13.2-15.5V, derate linearly from 20A to 16.5A  
 NV7: 12.5-15.5V, derate linearly from 20A to 15.5A  
 (3) NV3: 25.7-28V, derate linearly from 10A to 8.5A  
 NV7: 24-28V, derate linearly from 10A to 8.5A  
 (4) 12.5-15V, derate linearly from 13A to 10A  
 (5) 25-28V, derate linearly from 7A to 6A  
 (6) 8-9V derate linearly from 22.5A to 20A  
 (7) NV3: 400W max (to be confirmed)  
 NV7: 450W average, 600W peak for 10s  
 (8) One DA module per power supply  
 (9) For NV3: Limited by total output power

**Dual Output Module (Common 0V)(1 Slot)(8)**

Output 1	Output 2	Module Code
+12V 3A	-12V 1A	DA

**Dual Output Modules (2 Slots each)**

Module Code = DB				
Output 1		Output 2		
Voltage Range	Current	Voltage Range	Current	Max Power
3.2 - 3.6V	25A	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
4.75 - 5.5V	25A	24 - 32V	2A	50W
		3.3 - 5.5V	10A	55W
12 - 15V	13A <sup>(4)</sup>	7 - 15V	5A	60W
		24 - 32V	2A	50W
24 - 28V	7A <sup>(5)</sup>	3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W
		3.3 - 5.5V	10A	55W
		7 - 15V	5A	60W
		24 - 32V	2A	50W

For Additional Information, please visit [us.tdk-lambda.com/lp/products/nv-series.htm](http://us.tdk-lambda.com/lp/products/nv-series.htm)



## 450-900W Multiple Output Modular Power Supply

### Features

- ◆ 1-10 Wide Range Outputs With Adjustment
- ◆ Forward/Reverse/Low Noise/System Air Cooling
- ◆ Output Voltages From 0.5V - 62V
- ◆ 48VDC Input Option
- ◆ Medical Approval Options
- ◆ MIL-STD-810 Shock and Vibration
- ◆ PFC compliant to EN61000-3-2
- ◆ Safety Agency Approvals EN, cULus, BSI, CE



### Key Market Segments & Applications



### Specifications

Model	VEGA 450	VEGA 650	VEGA 900	
Input Voltage Range (47-440Hz with reduced PFC)	-	90 - 264VAC 47-63Hz <sup>(1)</sup> or 34-75VDC	90-264VAC 47-63Hz <sup>(1)</sup>	150-264VAC 47-63Hz
Input Current (Typ. at 90VAC)	A	7.7A	11A	9.2A at 150VAC
Efficiency (Typ.)	%	75% at 230VAC (or 48VDC) and full load, configuration dependent		
Nominal Output Voltages	VDC	0.5 - 62 (See configuration guide)		
Output Voltage Adjustment	-	Wide range, via potentiometer or remote adjust pin, module dependent		
Minimum Load	A	0A		
Max Output Power	W	450 <sup>(2)</sup>	650	900
Max Ripple & Noise (pk-pk)	mV	<1% (or 50mV which ever is greater) using EIAJ test method & 20MHz bandwidth		
Regulation (load, line, cross)	%	Less than 0.5%		
Hold Up Time	ms	16ms min at 90VAC (150VAC for 900W, 10ms for 450WDC input)		
Over Voltage Protection	%	120 - 150% (See website for more details)		
Overload/Short Circuit	%	105-125%, constant current characteristic, 150% max short circuit current.		
Remote ON/OFF Control	-	A TTL compatible signal will turn ON/OFF all output modules (optional)		
Remote Sense	V	Compensates for total of 0.75V total line drop (optional on dual output modules)		
Isolation	(3)	Input-Output 4.3kVDC <sup>(3)</sup> ; (2 x MOPPs (3rd edition 60601)), Input-Ground 2.3kVDC; Output-Ground 200VDC		
Conducted EMI	-	EN55022 Class B, (as per CISPR .22), Class A for 48V input		
Radiated EMI	-	EN55022 Class B, (as per CISPR .22)		
Operating Temperature	°C	0°C to 50°C, derate ea. output @ 2.5%/°C from 50°C to 65°C. <sup>(4)</sup> Consult factory for 70°C operation. -20°C startup requires a 30 min. warm-up period.		
Cooling	-	Forced Air Cooled		
Dynamic Load Response	-	<6% or 300mV of set voltage for 50% load change (above 25% load), recovery to within 1% of nominal within 500 μs		
Safety Agency Approvals (601-1 not available on 48V input)	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, CE Mark		
Vibration	G	MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9 2G, 10-200Hz sweep for 1hr to search for resonant. 6G random, 6-Axis to IEC68-2-64		
Shock	G	MIL-STD-810F, Method 516.5, Pro I, IV, VI; 20G per IEC68-2-27		
Switching Frequency	kHz	200		
Weight (Typ.)	lbs	3.0 lbs. + 0.25 lbs. / used slot; maximum # of slots =5		
Size (L×W×H)	in(mm)	10.6" x 5" x 2.5" (268.4mm x 127mm x 63.5mm)		
Warranty	yrs	3 Years		

Consult datasheet and application notes for detailed specifications and test methods.

- (1) Will operate with 130-330VDC, CE Mark safety approval only applies.  
 (2) DC Input <44V input 370W  
 (3) 4kVAC Type tested (non-production test). Refer to CB Report  
 (4) 450WDC 1.5%/°C

### Configuring Guide

Choose your options for boxes A through E. Select output voltage, single or dual output module code from the tables below, and options (if required) A maximum of 5 module slots may be used. List actual output voltages required to have them pre-set by the factory.

Choose the following power supply options.

**Primary Options**  
(Leave empty if not required)

F AC Fail, Global/fan Inhibit, 5V/100mA standby  
 FV AC Fail, Global/fan Inhibit, 5V/300mA standby  
 xFW<sup>(3)</sup> AC Fail, Global/fan Inhibit, 5-15V/1A standby  
 E AC Fail, Global/fan Enable, 5V/100mA standby  
 EV AC Fail, Global/fan Enable, 5V/300mA standby  
 xEW<sup>(3)</sup> AC Fail, Global/fan Enable, 5-15V/1A standby  
 (5) Specify value of x from 5-15V.  
 (Increase leakage current by 90μA.).

**Input Filter Choice\***

	120VAC, 60Hz	240VAC, 60Hz	264VAC, 63Hz (9)
S	564μA	1270μA	1.5mA
M	244μA	550μA	650μA
L	109μA	246μA	290μA
R	66μA	148μA	175μA
T	23μA	51μA	60μA

**Input Connection**

F Fast on terminals (7)  
 S Screw terminals  
 I Switched IEC 320 Connector (7)

**Cooling**

F Standard forward air fan  
 Q Quiet fan, forward air (7)  
 R Standard reverse air fan (6)  
 P Quiet fan, reverse air (6) (7)  
 C\*\* Customer air (30 CFM req'd)

**Output Power**

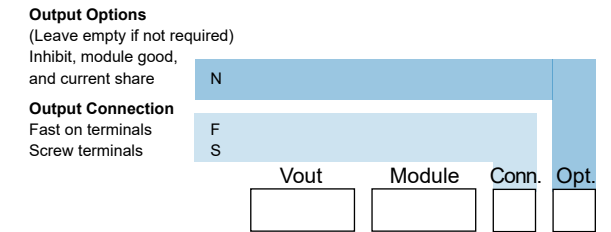
0 450W DC Input  
 4 450W  
 6 650W  
 9 900W

- \* Max Leakage calculated at 264VAC, 63Hz. Note: Contact Lambda Technical Support for non-standard leakage options emissions compliance.  
 \*\* Thermocoupled evaluation unit recommended. Consult sales office.  
 (6) Not available on 900W Model (7) Not available on 450WDC Model  
 (8) Only available on 900W Model (9) Type testing result

### Model Selector

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
<b>Single Output</b>							
B1L	1.8-3.8V	20A	1	E4	14-19.9V	30A	2
C1	1.8-4.1V	35A	1	E3H	14-15V	36A	2
C1Y	1.8-4.1V	40A	1	C4	16.2-21.5V	14A	1
D1L	1.8-3.8V	50A	1.5	CC3	18.2-32.4V	18A	2
E1	1.8-3.8V	60A	2	E5L	20-24V	27A	2
F1 <sup>(6)</sup>	1.8-3.8V	80A	2	B5	21.6-31V	6A	1
Z2	1.8-3.8V	95A	3	C5	21.6-31V	10A	1
Z3	1.8-3.8V	114A	4	D5	21-28V	15A	1.5
B1H	3.9-5.5V	20A	1	E5H	24-28V	25A	2
L1	4.2-5.5V	35A	1	Z19 <sup>(8)</sup>	24-28V	36A	3.5
D2	3.8-9V	45A	1.5	HH5/3	25.3-44.2V	5A	1
D1H	3.9-5.5V	50A	1.5	DD4	28-43V	18A	3
E2	3.8-8V	60A	2	EE4 <sup>(8)</sup>	28-38	22.5	4
Z18	4.2-5.5V	66A	2	HH5/4	32.5-53V	4.5A	1
F2 <sup>(6)</sup>	3.8-8V	75A	2	BB4	32.6-43V	10A	2
Z4	3.9-5.5V	95A	3	EE5L <sup>(8)</sup>	40-48	18	4
Z6	3.9-5.5V	104A	3.5	CE5B4	43-48V	10A	2
B2	5-9V	25A	1	EE5H <sup>(8)</sup>	48-56	18	4
B3	9.1-16.2V	12A	1	CC5	48.1-62V	10A	2
C3	9.1-16.2V	18A	1	DD5	42-56V	15A	3
D3	8-16.5V	24A	1.5	<b>Wide Range Programmable*</b>			
E3L	8-13.9V	40A	2	W2 <sup>(6)</sup>	1-7.5V	30A	1
Z7	8-16.5V	45A	3	W5	0.5-32V	8.5A	1
EE2	7.6-16V	45A	4	* Refer to Vega Datasheet			
D4	14-21.5V	18A	1.5				

### Single Output Module Selection †

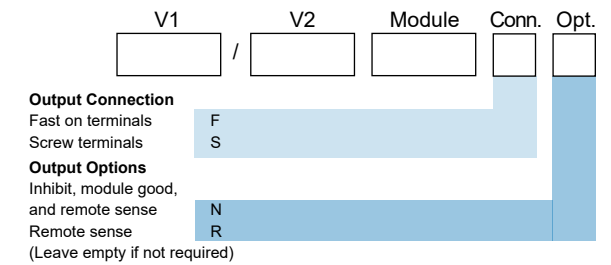


Example

12B3SN: 12V @ 12A single output module, screw terminal outputs, inhibit option

† Remote sense is standard on single output modules, optional on duals.

### Dual Output Module Selection



Example

3.3/12H1L/3FR: 3.3V @ 12A and 12V @ 6A output, fast on output terminals and remote sense option.

### Full Description Example:

V4F5SSFV 5L1S 3.3E1SN 15/15H3/3SR

450W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 300mA aux. supply option with the following outputs:

- 5V @ 35A Screw terminal connections with remote sense standard  
 3.3V @ 60A Screw terminal connection with output inhibit, module good, and current share options, remote sense standard  
 15V @ 10A Screw terminal connection with remote sense option (1st half of dual)  
 15V @ 6A Screw terminal connection with remote sense option (2nd half of dual)  
 Note the module descriptions are to be used as listed in the module tables.

### Model Selector

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
<b>Dual Output</b>					
H1L/1L	1.8V - 3.8V	12A	1.8V - 3.8V	8A	1
H1L/1H	1.8V - 3.8V	12A	3.9V - 5.5V	8A	1
H1L/2	1.8V - 3.8V	12A	5.6V - 9V	6A	1
H1L/3	1.8V - 3.8V	12A	9.1V - 16.2V	6A	1
H1L/4	1.8V - 3.8V	12A	16.3V - 25V	4.5A	1
H1H/1L	3.9V - 5.5V	12A	1.8V - 3.8V	8A	1
H1H/1H	3.9V - 5.5V	12A	3.9V - 5.5V	8A	1
H1H/2	3.9V - 5.5V	12A	5.6V - 9V	6A	1
H1H/3	3.9V - 5.5V	12A	9.1V - 16.2V	6A	1
H1H/4	3.9V - 5.5V	12A	16.3V - 25V	4.5A	1
H2/1L	5.6V - 9V	10A	1.8V - 3.8V	8A	1
H2/1H	5.6V - 9V	10A	3.9V - 5.5V	8A	1
H2/2	5.6V - 9V	10A	5.6V - 9V	6A	1
H2/3	5.6V - 9V	10A	9.1V - 16.2V	6A	1
H2/4	5.6V - 9V	10A	16.3V - 25V	4.5A	1
H3/1L	9.1V - 16.2V	10A	1.8V - 3.8V	8A	1
H3/1H	9.1V - 16.2V	10A	3.9V - 5.5V	8A	1
H3/2	9.1V - 16.2V	10A	5.6V - 9V	6A	1
H3/3	9.1V - 16.2V	10A	9.1V - 16.2V	6A	1
H3/4	9.1V - 16.2V	10A	16.3V - 25V	4.5A	1
H5/1L	16.2V - 28V	5A	1.8V - 3.8V	8A	1
H5/1H	16.2V - 28V	5A	3.9V - 5.5V	8A	1
H5/2	16.2V - 28V	5A	5.6V - 9V	6A	1
H5/3	16.2V - 28V	5A	9.1V - 16.2V	6A	1
H5/4	16.2V - 28V	5A	16.3V - 25V	4.5A	1

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/vega-series.htm](http://us.tdk-lambda.com/lp/products/vega-series.htm)



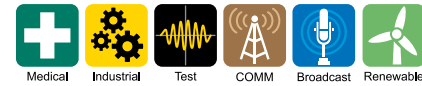
**550-900W Multiple Output Modular Power Supply**

**Features**

- ◆ Suitable for higher volume applications
- ◆ 1-10 Wide Range Outputs With Adjustment
- ◆ Output Voltages From 1.8 - 56V
- ◆ Medical Approval Options
- ◆ MIL-STD-810 Shock and Vibration
- ◆ PFC compliant to EN61000-3-2
- ◆ Safety Agency Approvals EN, cULus, BSI, CE



**Key Market Segments & Applications**



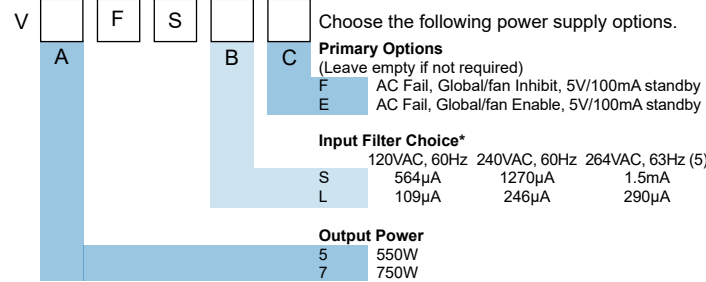
Specifications		
Model	VEGA Lite 550	VEGA Lite 750
Input Voltage Range (1)	-	85-264VAC 47-63Hz(2)
Efficiency (Typ.)	%	75% at 230VAC and full load, configuration dependent
Nominal Output Voltages	VDC	1.8 - 56V (See page 2)
Output Voltage Adjustment	-	Wide range, via potentiometer or remote adjust pin, module dependent
Minimum Load	A	0A
Max Output Power (3)	W	700(3)
Max Ripple & Noise (pk-pk)	mV	<1% (or 50mV which ever is greater) using EIAJ test method & 20MHz bandwidth
Regulation (load, line, cross)	%	Less than 0.5%
Hold Up Time	ms	16ms min at 100VAC and full load
Over Voltage Protection	%	120% - 150% (See website for more details)
Overload/Short Circuit	%	105-125%, constant current characteristic, 150% max short circuit current
Remote ON/OFF Control	-	A TTL compatible signal will turn ON/OFF all output modules (optional)
Remote Sense	V	Compensates for total of 0.75 volts total line drop (optional on dual output modules)
Isolation (4)	-	Input-Output 4.3kVDC(4); (2 x MOPPs (3rd edition 60601)); Input-Ground 2.3kVDC; Output-Ground 200VDC
Conducted EMI	-	EN55022 Class B, (as per CISPR .22)
Radiated EMI	-	EN55022 Class B, (as per CISPR .22)
Operating Temperature	°C	0°C to 50°C, derate ea. output @ 2.5%/°C from 50°C to 65°C. Consult factory for 70°C operation. -20°C startup requires a 30 min. warm-up period.
Cooling	-	Internal fan
Dynamic Load Response	-	<6% or 300mV of set voltage for 50% load change (above 25% load), recovery to within 1% of nominal within 500 microseconds.
Safety Agency Approvals	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, CE Mark
Vibration	G	MIL-STD-810E, Method 514.4, Pro I, Cat 1, 9 2G, 10-200Hz sweep for 1hr to search for resonant. 6G random, 6-Axis to IEC68-2-64
Shock	G	MIL-STD-810F, Method 516.5, Pro I, IV, VI; 20G per IEC68-2-27
Switching Frequency	kHz	200
Weight (Typ.)	lbs	3.0 lbs. + 0.25 lbs. / used slot; maximum # of slots =5
Size (L×W×H)	in(mm)	10.6" x 5" x 2.5" (268.4mm x 127mm x 63.5mm)
Warranty	yrs	3 Years

Consult datasheet and application notes for detailed specifications and test methods.

- (1) 440Hz with reduced PFC, consult factory
- (2) Will operate with 130-330VDC, CE Mark safety approval only applies.
- (3) See input derating curves
- (4) 4kVAC type tested (non-production test). Refer to CB report

**Configuring Guide**

Choose your options for boxes A through C. Select output voltage, single or dual output module code from the tables below, and options (if required) A maximum of 5 module slots may be used. List actual output voltages required to have them pre-set by the factory.



\* Max Leakage calculated at 264VAC, 63Hz. Note: Contact Lambda Technical Support for non-standard leakage options emissions compliance. (5) Type testing result

**Vega Output Modules**

Module	V Range	Amp	Slots	Module	V Range	Amp	Slots
<b>Single Output</b>							
C1S	1.8-3.4V	35A	1	D4S	14-18V	18A	1.5
D1LS	1.8-3.4V	50A	1.5	E4S	14-19V	30A	2
E1S	1.8-3.4V	60A	2	C4S	16.3-18V	14A	1
L1S	4.2-5.1V	35A	1	C5S	21.6-30V	10A	1
D2S	3.8-7.5V	45A	1.5	D5S	21-28V	15A	1.5
D1HS	3.9-5.1V	50A	1.5	E5HS	24-28V	25A	2
E2S	3.8-7.5V	60A	2	HH5/4S	32.5-48V	4.5A	1
B2S	5-8V	25A	1	BB4S	32.6-40V	10A	2
C3S	9.1-15V	18A	1	C5B4S	43-48V	10A	2
D3S	8-15V	24A	1.5	DD5S	42-56V	15A	3
E3LS	8-12.5V	40A	2				

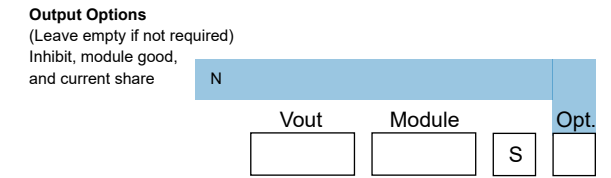
**Vega Output Modules**

Module	V1 Min - V1 Max	V1 Amp	V2 Min - V2 Max	V2 Amp	Slots
<b>Dual Output</b>					
H1H/1LS	3.9V - 5.1V	12A	1.8V - 3.4V	8A	1
H1H/3S	3.9V - 5.1V	12A	9.1V - 15.5V	6A	1
H3/1HS	9.1V - 15.5V	10A	3.9V - 5.1V	8A	1
H3/3S	9.1V - 15.5V	10A	9.1V - 15.5V	6A	1
H5/1HS	16.2V - 28V	5A	3.9V - 5.1V	8A	1
H5/3S	16.2V - 28V	5A	9.1V - 15.5V	6A	1
H5/4S	16.2V - 28V	5A	16.3V - 24V	4.5A	1

For Additional Information, please visit [us.tdk-lambda.com/lp/products/vega-series.htm](http://us.tdk-lambda.com/lp/products/vega-series.htm)



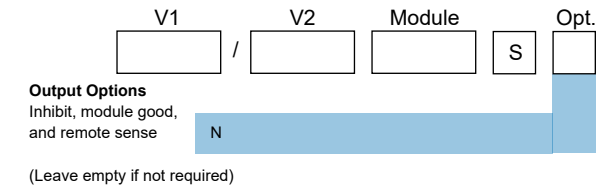
**Single Output Module Selection †**



Example  
12C3SN: 12V @ 18A single output module, with inhibit, module good, and current share option.

† Remote sense is standard on single output modules, optional on duals.

**Dual Output Module Selection**

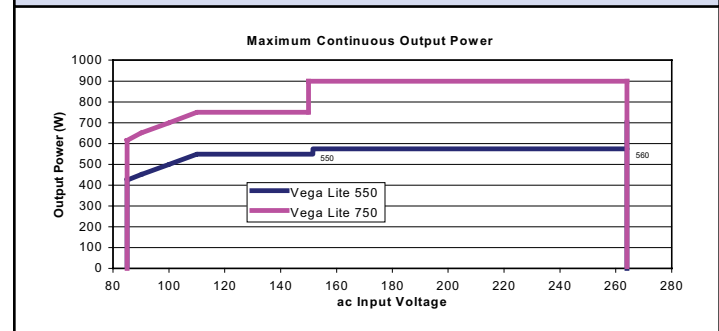


Example  
12/12H3/3SN: 12V @ 10A and 12V @ 6A, dual output module with inhibit, module good, and remote sense option.

**Full Description Example:**  
V5FSSF 5L1SN 12/12H3/3S 24C5S

550W power supply with standard forward air fan, screw terminal input connections, 1.5mA leakage input filter, AC fail with Global/fan inhibit & 5V @ 100mA aux. supply option with the following outputs:  
5V @ 35A With O/P inhibit, module good & current share options  
12V @ 10A  
12V @ 6A  
24V @ 10A  
Note the module descriptions are to be used as listed in the module tables.

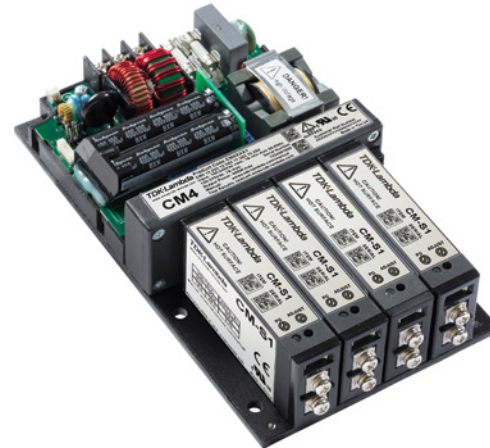
**Derating Curve**



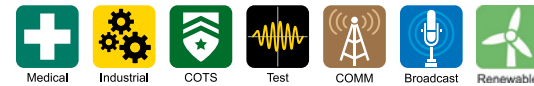
**600W Conduction cooled modular power supplies**

**Features**

- ◆ Conduction cooled
- ◆ Wide output adjustment
- ◆ Compact 4" x 7" Footprint
- ◆ 5 year warranty
- ◆ MIL-STD-461F, -704F Immunity



**Key Market Segments & Applications**

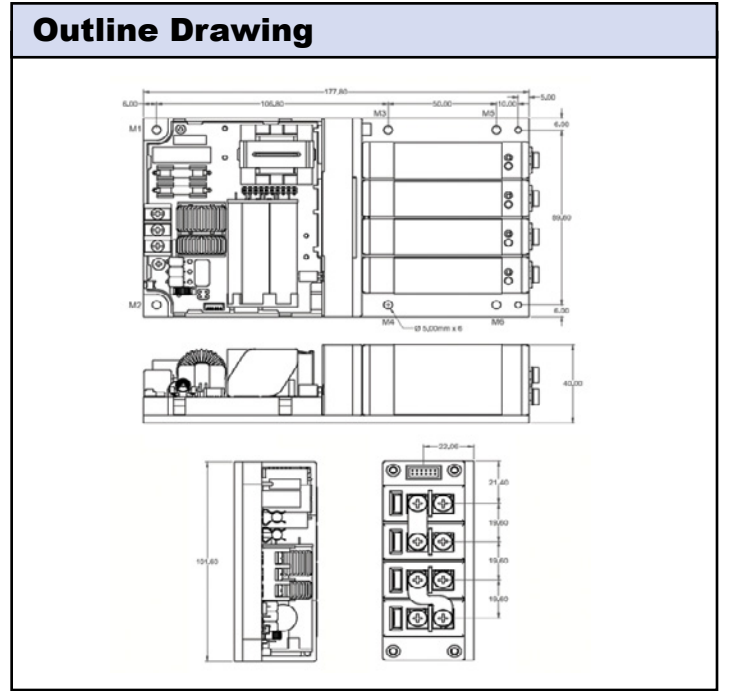


Specifications		CM4	
Model		425W	600W (750W for 5s)
Output power (1)(2)	W	425W	600W (750W for 5s)
Input Voltage Range (1)(2)	VAC	85 - 264VAC	120 - 264VAC
Input Frequency Range	Hz	47 - 63Hz (Contact factory for operation on 400Hz)	
Input Current (Typical)	A	6A at 120VAC input, 600W load	
Inrush Current	A	<20A at 25°C and 264Vac (cold start)	
Leakage Current	µA	200µA maximum at 264Vac 63Hz	
Power Factor Correction	-	Meets EN61000-3-2, PF 0.99 (typ)	
Efficiency	-	Up to 90%, configuration dependent	
Temperature Coefficient	%/°C	±0.02%/°C	
Output Voltage Setting Accuracy	-	±0.5% of factory set voltage	
Line regulation	-	±0.1% of Vnom for an 85-264Vac input change	
Cross regulation	-	±0.2% of Vnom	
Ripple and Noise	%	1% pk-pk of Vnom, using 20MHz bandwidth	
Overcurrent Protection	-	105 - 125%, hiccup style in short circuit	
Overvoltage Protection	-	Output dependant, see website. Shuts converter down, cycle AC to reset <sup>(1)</sup>	
Overtemperature Protection	-	All outputs are turned off. After unit cools down, recycle AC or toggle global remote on/off	
Hold up time	ms	Typically 20ms	
Turn on Time	s	2s typical, 3s maximum	
Remote Sense Compensation	-	All modules	
Remote On/Off	-	Module & Converter inhibit <sup>(1)</sup>	
AC Fail Signal	-	Converter option dependent <sup>(1)</sup>	
DC Good Signal	-	Individual signal on each output module and a global signal monitoring all outputs	
Minimum load	-	None	
Other signals and programming	-	Over current limit control, remote voltage programming, output current monitor, temperature sense, current share	
Standby Voltage	-	5V 1A	
Operating Temperature (Conduction cooled). See user manual	°C	Ambient: -40°C to +70°C, derate linearly to 50% load from 50 to 70°C Baseplate: -40°C to +105°C, derate linearly to 50% load from 85 to 105°C	
Storage Temperature	°C	-40 to +70°C	
Humidity (Non condensing)	%RH	5 - 95%RH	
Cooling	-	Conduction, convection or forced air <sup>(1)</sup>	
Withstand Voltage	-	Input to Output: 4kVAC, (2xMoPP), Input to Ground: 1.5kVAC (1xMoPP), Output to Ground & Output to Output: 500VDC	
Vibration	-	Conforms to EN60068-2-6, IEC60068-2-64, MIL-STD-810G Method 516, Pro 1, Cat 4, 7, 24	
Shock	-	EN 60068-2-27, 30g 18ms operating, MIL-STD-810G: Method 516.6, Procedure IV	
Safety Agency Certifications	-	UL/CSA/EN UL 60950-1, UL/CSA/EN 60601-1, ANSI/AAMI ES60601-1 & CE Mark	
Altitude	m	Operational: 3,000m, storage: 5,000m	
Emissions <sup>(1)</sup>	-	EN55011/32 Class B radiated and conducted,	
Immunity <sup>(1)</sup>	-	IEC61000-4-2, -3, -4, -6, 8, -11. MIL-STD-461F, EN60601-1-2 (4th Ed)	
Size (W x D x H)	in	4 x 7 x 1.61"	
	mm	101.6 x 177.8 x 41 mm	
Weight	g	650g + 100g for each slot used	
Warranty	Yrs	Five Years	

Notes  
 (1) See website for detailed specifications (2) Converter and module power must be de-rated by 2.5% for every 3 volts below 120VAC, down to a minimum of 85VAC

Output Ratings				
Module	S1	S2	S3	S4
Vnom	5V	12V	24V	48V
Load regulation (0-100% change)	±50mV	±100mV	±150mV	±300mV
Over voltage protection (typical)	9.5V	18V	36V	66V
Module	Y1 / HA	Y2 / HB	Y3	Y4
Vnom	10V	24V	48V	96V
Load regulation (0-100% change)	±100mV	±200mV	±300mV	±600mV
Over voltage protection (typical)	19V	36V	72V	132V
Module	YA	YB	YC	YD
Vnom	15V	36V	72V	144V
Load regulation (0-100% change)	±150mV	±300mV	±450mV	±900mV
Over voltage protection (typical)	28.5V	54V	108V	198V
Module	YN	YP	YQ	YR
Vnom	20V	48V	96V	192V
Load regulation (0-100% change)	±200mV	±400mV	±600mV	±1200mV
Over voltage protection (typical)	38V	72V	144V	264V
Module	Z1 / ZA / ZN	Z2 / ZB / ZP	ZC / ZQ	ZD / ZR
Vnom	5V	12V	24V	48V
Load regulation (0-100% change)	±50mV	±100mV	±150mV	±300mV
Over voltage protection (typical)	9.5V	18V	36V	66V

Output Ratings							
Module Name	Slots Used	Output Voltage			Max Output (A)	Max Output Power (W)	Max Peak Power (W) (5s)
		Min	Vnominal	Max			
S1	1	1.5V	5V	7.5V	25A	125W	187.5W
Z1	2	1.5V	5V	7.5V	50A	250W	375W
ZA	3	1.5V	5V	7.5V	75A	375W	562.5W
ZN	4	1.5V	5V	7.5V	100A	500W	750W
Y1	2	3V	10V	15V	25A	250W	375W
HA	4	3V	10V	15V	50A	500W	750W
S2	1	4.5V	12V	15V	15A	150W	225W
Z2	2	4.5V	12V	15V	30A	300W	450W
YA	3	4.5V	15V	22.5V	25A	375W	562.5W
ZB	3	4.5V	12V	15V	45A	450W	675W
ZP	4	4.5V	12V	15V	60A	600W	750W
YN	4	6V	20V	30V	25A	500W	750W
S3	1	9V	24V	30V	7.5A	150W	225W
Y2	2	9V	24V	30V	15A	300W	450W
ZC	3	9V	24V	30V	22.5A	450W	675W
HB	4	9V	24V	30V	30A	600W	750W
ZQ	4	9V	24V	30V	30A	600W	750W
YB	3	13.5V	36V	45V	15A	450W	675W
S4	1	18V	48V	58V	3.75A	150W	217.5W
Y3	2	18V	48V	60V	7.5A	300W	450W
ZD	3	18V	48V	58V	11.25A	450W	652.5W
ZR	4	18V	48V	58V	15A	600W	750W
YP	4	18V	48V	60V	15A	600W	750W
YC	3	27V	72V	90V	7.5A	450W	675W
Y4	2	36V	96V	116V	3.75A	300W	435W
YQ	4	36V	96V	120V	7.5A	600W	750W
YD	3	54V	144V	174V	3.75A	450W	652.5W
YR	4	72V	192V	232V	3.75A	600W	750W



For Additional Information, please visit [us.tdk-lambda.com/lp/products/cm-series.htm](http://us.tdk-lambda.com/lp/products/cm-series.htm)

**Part Number Configuration**

Use "0" for unused slots

CM4 5S1 12S2 24S3 48S4 0 0 0 Factory Use

Slot 1 - Module & Voltage Slot 2 - Module & Voltage Slot 3 - Module & Voltage Slot 4 - Module & Voltage

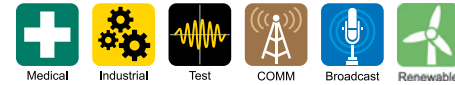
Contact TDK-Lambda for special configuration requirements. The factory may allocate a 3 digit suffix to identify such requirements.

## 700-1500W Multiple Output Modular Power Supplies

### Features

- ◆ Full Medical Isolation (MOPP)
- ◆ Low Speed, Low Audible Noise Fan
- ◆ Up to 18 Outputs
- ◆ Industry Leading Flexibility
- ◆ 7 Year Warranty
- ◆ Suitable for B and BF Rated Equipment
- ◆ PMBus™ Communication Option

### Key Market Segments & Applications



Specifications					
Model		QM5	QM5H	QM7	QM8
Input Voltage Range	VAC	700W output: 90-264VAC 800W output: 180-264VAC	700W output: 90-264VAC 1200W output: 180-264VAC	1200W output: 90-264VAC 1500W output: 150-264VAC	1200W output: 90-264VAC 1500W output: 150-264VAC
Input Frequency Range	Hz	47 - 63Hz (440Hz with reduced PFC)			
Inrush Current	A	<40A at 25°C and 264Vac (cold start)		<45A at 25°C and 264Vac (cold start)	
Input Current (Max) 90/150VAC	A	9A / 6.2A	9A / 9.25A	15.7A / 11.8A	15.7A / 11.8A
Touch Current	µA	<100µA (with 4 or fewer modules) (1)			
Power Factor Correction	-	> 0.95 (at 100% load), Meets EN61000-3-2			
Efficiency	-	up to 91% , 240VAC & above 50% rated power, configuration dependent			
Overcurrent Protection	-	Hiccup/constant current style - Module dependent (1)			
Overvoltage Protection	-	Latching. Output shut down, cycle AC to reset (1)			
Overtemperature Protection	-	Converter: auto restart (fan off); Modules: individually protected			
Hold up time	ms	700W output: >16ms; 1200W output: >10ms		1200W output: >20ms; 1500W output: >16ms	
Leakage Current (maximum)	µA	L option: 300µA; R option: 150µA (264VAC, 63Hz)			
Remote Sense Compensation	-	Module dependent (1)			
Remote On/Off	-	Module & Converter option dependent (1)			
AC Fail Signal	-	Available with all Signal Option Types			
DC Good Signal	-	Open collector, standard on all output modules			
Remote on/off	-	Converter: Inhibit or Enable (Signal Option Type dependent). Modules: Inhibit.			
PMBus™ Interface	-	Power supply on/off, fan speed/warning, temperature read back/warning, run time and manufacturing data			
Standby Output	-	5V/250mA / 5V/2A / 12V/1A (Standby Option Type dependent)			
Operating Temperature	°C	-20 to +70°C, derate linearly to 50% load from 50 to 70°C; -40°C start up.			
Storage Temperature	°C	-40°C to +70°C (max 12 months)			
Humidity (Non condensing)	%RH	5 - 95%RH			
Cooling	-	One variable, low speed internal fan		Two variable, low speed internal fans	
Audible Noise	dBA	QM5F: 40.3 dBA @ 25°C / 54.9 dBA @ 50°C QM5I: 36.9 dBA @ 25°C / 51 dBA @ 50°C, per BS ISO 3744:2010		43.6 dBA @ 25°C / 57.3 dBA @ 50°C per BS ISO 3744:2010	
Withstand Voltage	-	Input to Output: 4kVAC (production tested to 4.3kVDC) (2xMoPP), Input to Ground: 1.5kVAC (1xMoPP), Output to Ground: 1.5kVAC (1xMoPP), Output to Output: 200VDC			
Vibration	-	Conforms to EN60068-2-6, IEC68-2-6, MIL-STD-810G, Method 514.6, Pro I			
Shock	-	Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987, MIL-STD-810G, Method 516.6, Pro I, IV			
Safety Agency Certifications	-	IEC/UL/CSA/EN 60950-1, IEC/UL/CSA/EN 60601-1, ANSI/AAMI ES60601-1 & CE Mark. IEC/EN61010 included in 60950 report			
Altitude	m	5,000m			
Emissions	-	EN61000-6-3:2007, EN60601-1-2:2015 4th Edition, EN55011B, EN55032B, Class B radiated & conducted			
Immunity	-	EN61000-6-2:2005, EN60601-1-2:2015			
Size (W x H x D)	in mm	5 x 2.5 x 10.6" 127 x 63.3 x 270mm	5 x 2.5 x 10.6" 127 x 63.3 x 270mm	6.9 x 2.5 x 10.6" 176 x 63.3 x 270mm	7.9 x 2.5 x 10.6" 200 x 63.3 x 270mm
Weight	g	See Application Notes			
Warranty	yrs	Seven Years			

(1) See website for detailed specifications

Single Output Modules						
Module	V1 Voltage			Slots Used	V2	
	Range	Current	Power		Range	Power
DM	2.8 - 3.8V	10A	35W	1		
SB	3.3 - 3.63V	37A	122W	1		
DM	4.25 - 5.75V	10A	50W	1		
SB	5 - 5.5V	30A	150W	1		
SC	5 - 5.5V	60A	300W	2		
ZD	5 - 5.3V	80A	400W	3		
ZF	5 - 5.3V	110A	550W	4		
YC	6.6 - 7.48V	37A	276W	2		
YC	10 - 11V	30A	300W	2		
YF	10 - 11V	60A	600W	4		
DM	11.9 - 16.1V	10A	120W	1		
SB	12 - 13.2V	25A	300W	1		
SC	12 - 13.2V	50A	600W	2		
ZD	12 - 12.8V	65A	780W	3		
ZF	12 - 12.8V	90A	1080W	4		
SB	15 - 16.5V	20A	300W	1		
ZC	15 - 16V	36A	510W	2		
SB	18 - 19.8V	16.7A	300W	1		
ZC	18 - 19.2V	30A	540W	2		
YB	20.4 - 27.6V	9.8A	200W	1		
DM	20.8 - 28.2V	5A	120W	1		
SB	24 - 26.4V	12.5A	300W	1		
SC	24 - 26.4V	25A	600W	2		
ZD	24 - 25.6V	30A	720W	3		
YF	24 - 26.4V	50A	1200W	4		
YB	27.6 - 34.5V	7.25A	200W	1		
SB	28 - 30.8V	10.7A	300W	1		
ZC	28 - 30V	19.3A	504W	2		
YC	30 - 33V	20A	600W	2		
YC	36 - 39.6V	16.6A	600W	2		
YB	40.8 - 55.2V	4.9A	200W	1		
YC	48 - 52.8V	12.5A	600W	2		
YF	48 - 52.8V	25A	1200W	4		
SB	48 - 52.8V	6.25A	300W	1		
SC	48 - 52.8V	12.5A	600W	2		
ZD	48 - 51.2V	15A	720W	3		
YB	55.2 - 62V	3.62A	200W	1		
YC	56 - 61.6V	10.7A	600W	2		
YF	72 - 79.2V	16.6A	1200W	4		
YC	96 - 105.6V	6.25A	600W	2		
YF	96 - 105.6V	12.5A	1200W	4		

Dual Output Modules (all single slot)						
Maximum module power 200W (Total power from channel 1 + Channel 2)						
Module	V1 Voltage		V1 Current	V1 Power	V2 Voltage	
	Range	Current			Range	Current
DH	10.2 (1) - 13.8V	10A	120W	10.2 - 13.8V	10A	120W
DH	10.2 (1) - 13.8V	10A	120W	12.75 - 17.25V	8A	120W
DH	10.2 (1) - 13.8V	10A	120W	20.4 - 27.6V	5A	120W
DM	11.9 - 16.1V	10A	120W	2.8 - 3.8V	10A	35W
DM	11.9 - 16.1V	10A	120W	4.25 - 5.75V	10A	50W
DM	11.9 - 16.1V	10A	120W	11.9 - 16.1V	8.3A	100W
DM	11.9 - 16.1V	10A	120W	23.5 - 24.5V	4.16A	100W
DH	12.75 (2) - 17.25V	8A	120W	12.75 - 17.25V	8A	120W
DH	12.75 (2) - 17.25V	8A	120W	20.4 - 27.6V	5A	120W
DH	20.4 (3) - 27.6V	5A	120W	20.4 - 27.6V	5A	120W
DM	20.8 - 28.2V	5A	120W	2.8 - 3.8V	10A	35W
DM	20.8 - 28.2V	5A	120W	4.25 - 5.75V	10A	50W
DM	21.6 - 28.2V	5A	120W	23.5 - 24.5V	4.16A	100W
DH	23 (4) - 31V	4.4A	120W	23 - 31V	4.3A	120W


Note: For DH module voltages below 10.8V(1), 13.5V(2), 21.6V(3), and 24.4V(4), a minimum load of 1W must be applied to channel 1. See long form datasheet for max capacitive load ratings.

Standby / Signals Options							
Option Type	Standby 1			Standby 2			PSU on/off
	Voltage	Max Current	Power	Voltage	Max Current	Power	
E5L	5V	250mA	1.25W	Not available			Enable
E5H	5V	250mA	1.25W	5V	2A	10W	Enable
E12H	5V	250mA	1.25W	12V	1A	12W	Enable
T5L	5V	250mA	1.25W	Not available			Inhibit
T5H	5V	250mA	1.25W	5V	2A	10W	Inhibit
T12H	5V	250mA	1.25W	12V	1A	12W	Inhibit
P5H	Not available			5V	2A	10W	*

\*see PMBus™ App Note

### Output Module Signals

See Long Form datasheet output module specifications for Module Good, Module Inhibit, Remote Sense availability.

For Additional Information, please visit [us.tdk-lambda.com/lp/products/qm-series.htm](http://us.tdk-lambda.com/lp/products/qm-series.htm) 

The extensive range of output modules and options make it possible to achieve almost any combination of Volts and Amps. Create your own QM configuration online at <https://config.emea.tdk-lambda.com>. This method checks your configuration and offers the optimum solution.



### Converter / Output Module Configurations

**Converter Configurations**

<b>Converter</b>	<b>QM5</b>	5 slots wide 700W low line, 800W high line
	<b>QM5H</b>	5 slots wide 700W low line, 1200W high line
	<b>QM7</b>	7 slots wide 1200W low line, 1500W high line
	<b>QM8</b>	8 slots wide 1200W low line, 1500W high line

**Standby/Signals**

blank	none
E5L	5V / 250mA, Enable
E5H	5V / 2A, 5V / 250mA, Enable
E12H	12V / 1A, 5V / 250mA, Enable
T5L	5V / 250mA, Inhibit
T5H	5V / 2A, 5V / 250mA, Inhibit
T12H	12V / 1A, 5V / 250mA, Inhibit
P5H	5V / 2A, see PMBus™ app note

See Long Form datasheet for Standby / Signals specifications

**Leakage Current**  
(max leakage current at 264 VAC, 63Hz)

L	300µA
R	150µA (contact sales for details)

**Cooling**

F	Variable speed Forward air - standard
R	Reverse air (contact sales for details)
C	Customer air - no fan

**Input Connection**

S	Screw
I	IEC320 (QM5/QM5H only)

**Input fuse**

D	Dual AC fuses
E	Single AC fuse in Live line (contact sales for details)

**Single Output Module Configurations**

V1 SB S

Required output voltage → Module type → Output connection S Screw terminal

**Dual Output Module Configurations**

V1 / V2 DM S

Output 1 required voltage (enter 0 if not required) → Output 2 required voltage (enter 0 if not required) → Module type → Output connection S Screw terminal

### QM5 Outline Drawing with Factory Fitted Fan ('F' or 'R' type cooling)

4 OFF SIDE FIXINGS ARE SECONDARY FIXINGS AND SHOULD BE USED IN CONJUNCTION WITH OTHER FIXINGS / SUPPORTS

TERMINAL COVER REMOVED

PRESS BOTH TABS THEN LEVER FORWARD TO REMOVE. REVERSE TO RE-FIT

ACCESS TO SCREW TERMINALS BY REMOVING COVER

Units with factory fitted fan ('F' or 'R' type cooling)

### QM7 Outline Drawing with Factory Fitted Fan ('F' or 'R' type cooling)

TERMINAL COVER REMOVED

PRESS BOTH TABS THEN LEVER FORWARD TO REMOVE. REVERSE TO RE-FIT

ACCESS TO SCREW TERMINALS BY REMOVING COVER

### QM8 Outline Drawing with Factory Fitted Fan ('F' or 'R' type cooling)

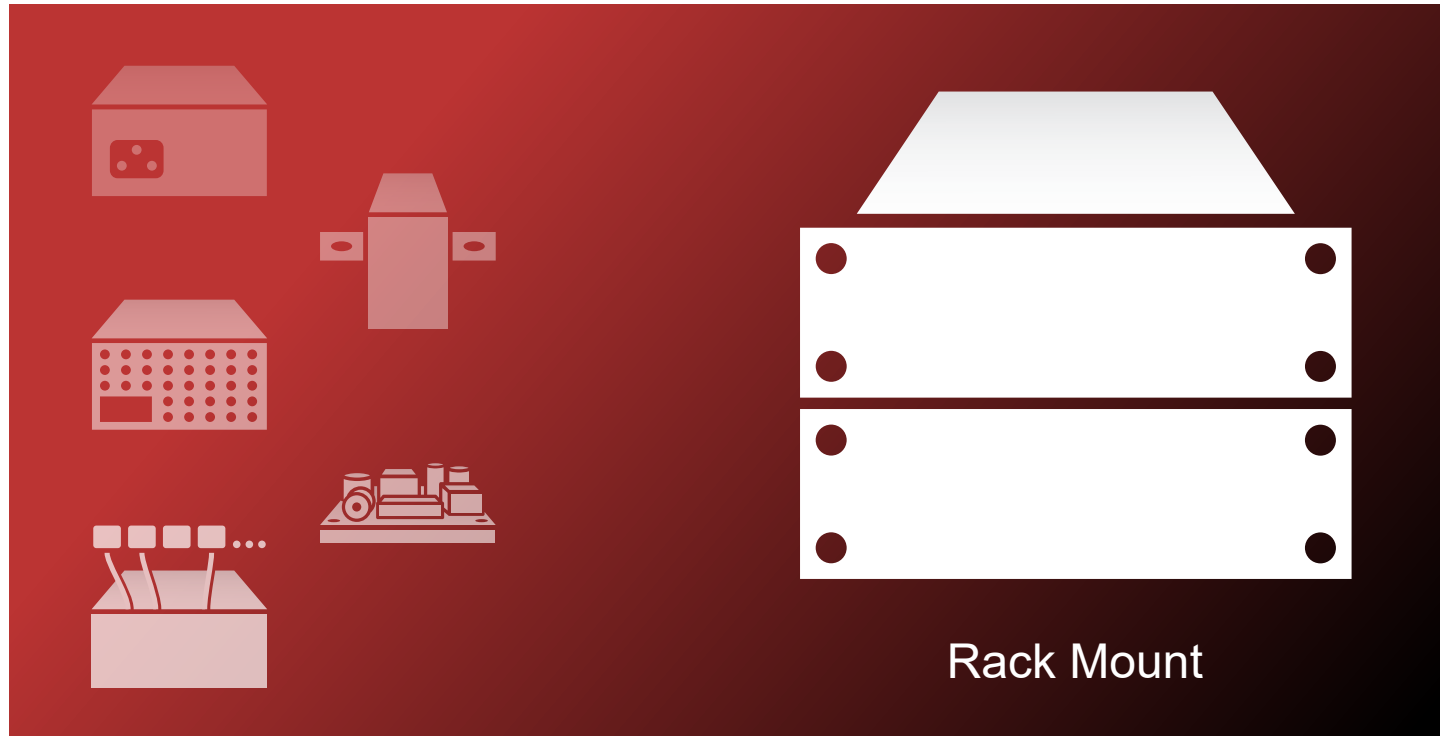
TERMINAL COVER REMOVED

PRESS BOTH TABS THEN LEVER FORWARD TO REMOVE. REVERSE TO RE-FIT.

ACCESS TO SCREW TERMINALS BY REMOVING COVER

Standard airflow  
Reverse airflow

 **AC-DC Power Supplies**



**Applications**

- ◆ High reliability applications with n+1 redundancy
- ◆ High power applications for cabinet mounting
- ◆ Broadcast, RF-amplifiers, Telecoms

**Features**

- ◆ 19" rack with hot-swap power modules – up to 10kW in 1U
- ◆ Modules have integrated ORing MOSFETs for redundant operation
- ◆ Individual IEC connectors or terminal blocks for mains input
- ◆ Parallel operation between racks with active current sharing for higher output power levels
- ◆ 12V, 24V, 32V and 48V supplies for bus-voltages in distributed power architecture and other applications

Wattage	Series	Page
1600W	HFE1600	76
2500W	HFE2500	78

Also see:

200-800W	Z+	220
200-800W	Z+ HV	222

Listed by Wattage

**1600W 1U Front End Power Supplies**

**Features**

- ◆ 1U rackmount containing up to 5 units
- ◆ Internal ORing MOSFET & Current Share
- ◆ High Efficiency
- ◆ Up to 7600W in 1U rack
- ◆ Full array of signals available
- ◆ PMBus™(I<sup>2</sup>C) and LAN options



**Key Market Segments & Applications**



Specifications		
Model		
Input Voltage Range (2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 115/230VAC	A	14.2 / 8.1A
Inrush Current	A	<35A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 120%
Overvoltage Protection (1)	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off
Overtemperature Protection (1)	-	Shutdown with automatic reset. Warning signal provided
Hold up time	ms	>10ms, 115/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA 100/230VAC, 60Hz
Remote Sense Compensation	-	HFE1600-12: 0.25V/wire, HFE1600-24: 0.5V/wire, HFE1600-32: 0.75V/wire, HFE1600-48: 1.0V/wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Unit ON: 0 - 0.6V or short, OFF: 2 - 15V or open circuit
Parallel Operation (1)	-	Yes, single wire current share, up to 90% accuracy (load dependant), up to 10 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust (1)	-	By either external 0 - 5V signal or 1k potentiometer
I <sup>2</sup> C Interface (1)	-	Isolated from output, Add suffix /S, PMBus compatible
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temp. (-TB Rack)	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Operating Temp. (-IEC320 Rack)	°C	-10 to +60°C, derate 2%/°C from 50 to 60°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector (3)
Withstand Voltage	-	I/P to O/P 3kVAC, I/P to GND 2kVAC, O/P to GND: HFE1600-12,-24V 500VAC, HFE1600-48 2250VDC 1 min, (POE)
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC60068-2-64
Shock (Basic transportation)	-	Meets IEC60068-2-27
Safety Agency Certifications	-	UL60950-1, EN60950-1, CE Mark
Line Dip	-	Complies with SEMI F47 (200VAC line only)
Conducted and Radiated EMI	-	EN55032 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv2), -5 (lv3,4), -6 (lv2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 3.35 x 1.61 x 11.8", Rack: 17.5 x 1.72 x 14.4"
Weight	g	Power Supply: 1550g, Rack: 4800g
Warranty	yrs	Three Years

(1) See installation manual for detailed specifications & test methods  
 (2) Derate output power linearly 1%/V from 100VAC to 85VAC input  
 (3) Reverse air - contact factory

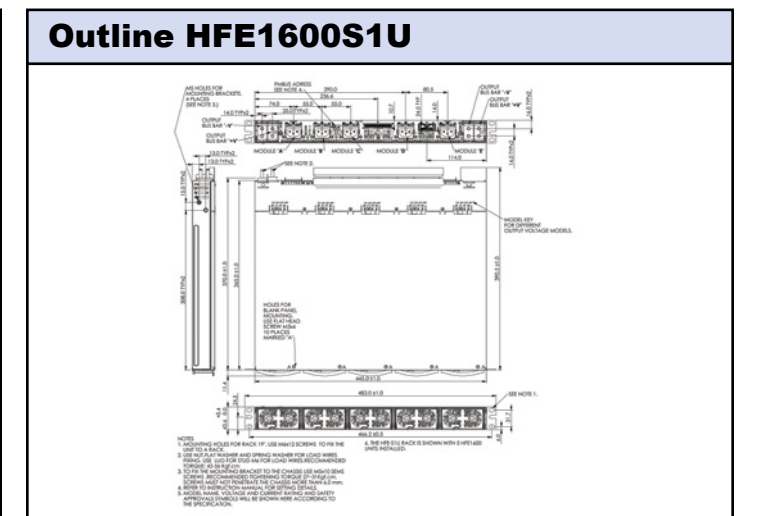
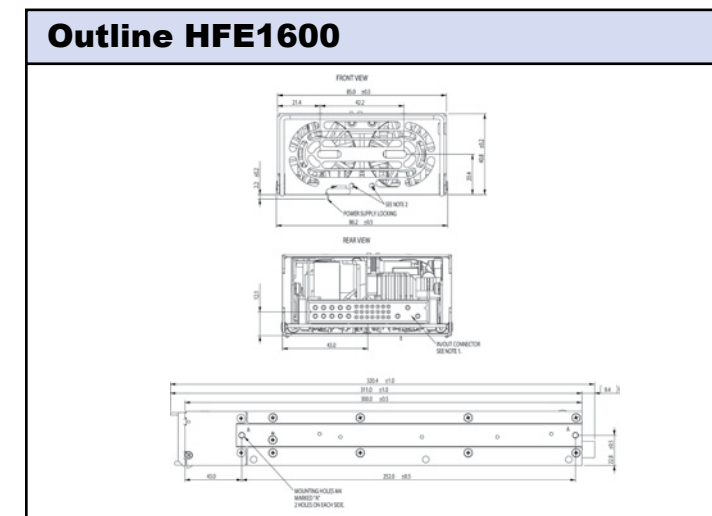
Model Selector						
Model	Output Voltage	Adjust Range <sup>(1)</sup>	Max Current (Vin>170VAC)	Max Power (Vin>170VAC)	Max Current (100<Vin<170VAC) <sup>(2)</sup>	Max Power (100<Vin<170VAC) <sup>(2)</sup>
HFE1600-12	12V	9.6 - 13.2V	133A	1596W	100A	1200W
HFE1600-12/S	12V	9.6 - 13.2V	133A	1596W	100A	1200W
HFE1600-24	24V	19.2 - 29V	67A	1608W	50A	1200W
HFE1600-24/S	24V	19.2 - 29V	67A	1608W	50A	1200W
HFE1600-32	32V	25.6 - 38.4V	47A	1500W	37.5A	1200W
HFE1600-32/S	32V	25.6 - 38.4V	47A	1500W	37.5A	1200W
HFE1600-48	48V	38.4 - 58V	33A	1584W	25A	1200W
HFE1600-48/S	48V	38.4 - 58V	33A	1584W	25A	1200W

Model	Load Reg	Line Reg	Ripple & Noise <sup>(1)</sup>	Efficiency (%) <sup>(4)</sup>	PMBus/I <sup>2</sup> C
HFE1600-12	60mV	30mV	240mV	87 / 90%	-
HFE1600-12/S	60mV	30mV	240mV	87 / 90%	Yes
HFE1600-24	120mV	60mV	240mV	88 / 90%	-
HFE1600-24/S	120mV	60mV	240mV	88 / 90%	Yes
HFE1600-32	160mV	80mV	320mV	88 / 90%	-
HFE1600-32/S	160mV	80mV	320mV	88 / 90%	Yes
HFE1600-48	240mV	120mV	480mV	89 / 92%	-
HFE1600-48/S	240mV	120mV	480mV	89 / 92%	Yes

(4) At 75% load, 115 / 230VAC input

Accessories		
Model	Description	Maximum Rack Current
HFE1600-S1U	Five slot 19" rack, IEC320-C16 input connectors (5)	266A each side (532A total)
HFE1600-S1U-TB	Five slot 19" rack, Terminal Block input connectors (5)	266A each side (532A total)
HFE1600/BP	One slot blanking panel, four provided with each rack	-
HFE/C15U	AC Power cord, 2.0m long, one per power supply required	-
HFE1600-D1U	Four slot (two isolated pairs), dual output 19" rack, IEC320 input	266A each side (532A total)
HFE1600-D1U-TB	Four slot (two isolated pairs), dual output 19" rack, terminal block input	266A each side (532A total)
HFE1600-LAN	Plug in LAN module. Takes up one rack slot. For use with /S models only.	-



For Additional Information, please visit [us.tdk-lambda.com/lp/products/hfe-series.htm](http://us.tdk-lambda.com/lp/products/hfe-series.htm)



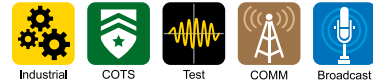
## 2500W 1U Front End Power Supplies

### Features

- ◆ 1U rackmount containing up to 4 units
- ◆ Internal ORing MOSFET & Current Share
- ◆ High Efficiency
- ◆ Up to 9,500W in 1U rack
- ◆ PMBus™(I<sup>2</sup>C) and LAN options



### Key Market Segments & Applications



(HFE2500-48 model)

Specifications		
Model		
Input Voltage Range (2)	VAC	85 - 265VAC, 47 - 63Hz. See model selector for power derating
Input Current (Max) 100/230VAC	A	15 / 12A
Inrush Current	A	<50A
Power Factor Correction	-	Meets EN61000-3-2, PF > 0.98 at full load
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	%	105 - 115%
Overvoltage Protection (1)	%	110% (Tracking). Cycle AC to reset or utilize Remote On/Off
Overtemperature Protection (1)	-	Shutdown with automatic reset. Warning signal provided
Hold-up time	ms	>10ms, 115/230VAC Input, 80% loading
Leakage Current	mA	< 0.75 / 1.5mA, 100 / 230VAC, 60Hz
Remote Sense Compensation	-	HFE2500-12: 0.25V / Wire, HFE2500-24: 0.5V / Wire, HFE2500-48: 1V / Wire
Indicators	-	AC OK: Green LED, DC OK / Fail: Green / Red LED
Remote On/Off	-	Unit ON: 0 - 0.6V or short, OFF: 2 - 15V or open circuit
Parallel Operation (1)	-	Yes, single wire current share, up to 95% accuracy (load dependant), up to 8 units
AC Fail Signal	-	Open Collector, ON when AC is within 85 - 270VAC
DC Good Signal	-	Open Collector, ON when output is above 85 to 95% of setpoint (tracking)
Remote Adjust (1)	-	By either external 0 - 5V signal or 1k potentiometer
I <sup>2</sup> C Interface (1)	-	Isolated from output, Add suffix /S, PMBus compatible
Auxiliary Output	-	11.2 - 12.5V, 0.5A, 240mV ripple and noise
Operating Temperature	°C	-10 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C
Storage Temperature	°C	-30 to +85°C
Humidity (Non condensing)	%RH	Operating: 10 - 90%RH, Storage: 10 - 95%RH
Cooling	-	Two variable speed internal fans, airflow exits across input/output connector (3)
Withstand Voltage	-	I/P to O/P 3kVAC, I/P to GND 2kVAC, O/P to GND: HFE2500-12, -24V 500VAC, HFE2500-48 2250 VDC 1min, (POE)
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (Basic transportation)	-	Meets IEC60068-2-64
Shock (Basic transportation)	-	Meets IEC60068-2-27
Safety Agency Certifications	-	UL60950-1, EN60950-1, CE Mark
Conducted and Radiated EMI	-	EN55032 & FCC part 15; Conducted class B, Radiated class A
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv 2), -4 (lv 2), -5 (lv 3,4), -6 (lv 2), -8 (lv 4), -11
Size (W x H x D)	in	Power Supply: 4.21 x 1.61 x 12.8", Rack: 17.5 x 1.72 x 15.8"
Weight	g	Power Supply: 2100g, Rack: 5000g
Warranty	yrs	Three Years

(1) See installation manual for detailed specifications & test methods

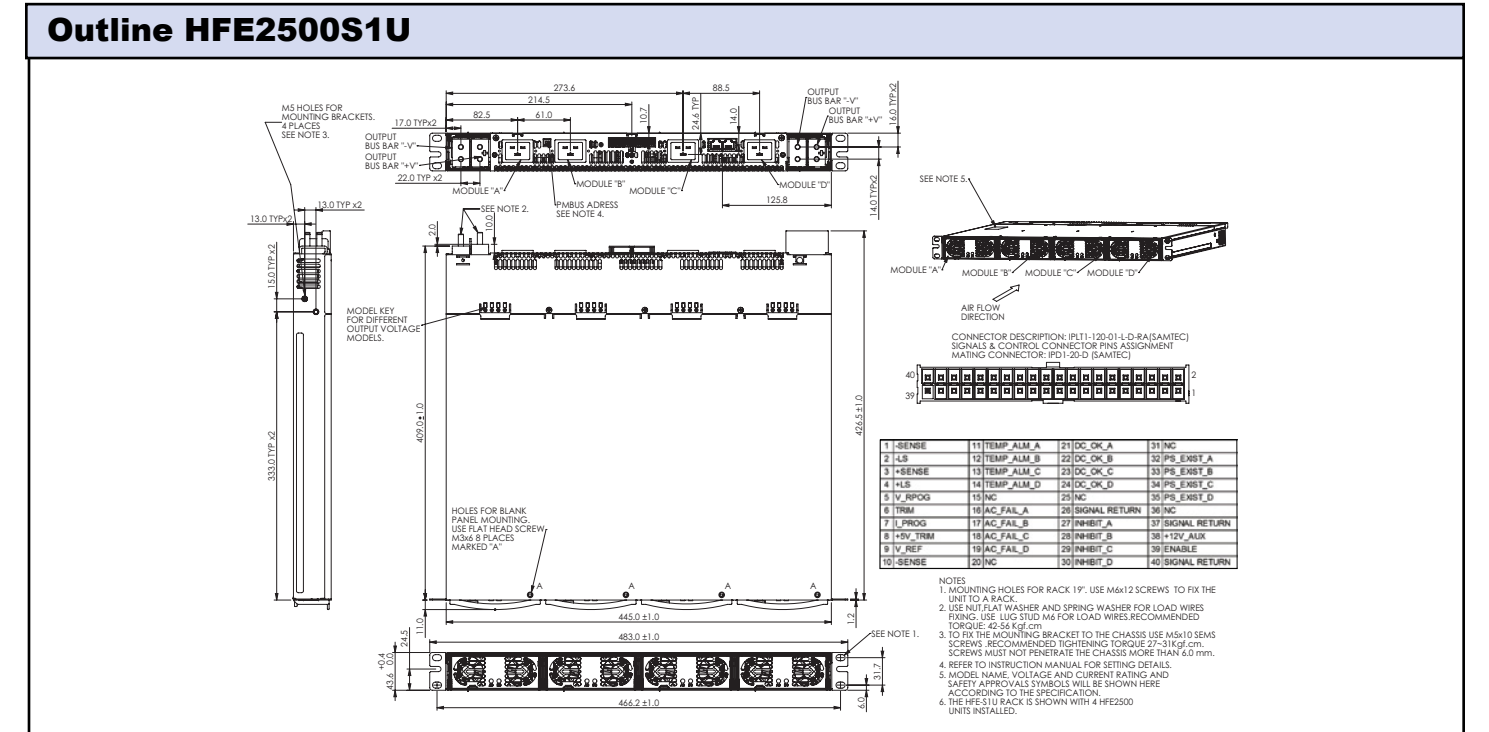
(2) Derate linearly 1.3%/V from 100VAC to 85VAC input

(3) Reverse air - contact factory

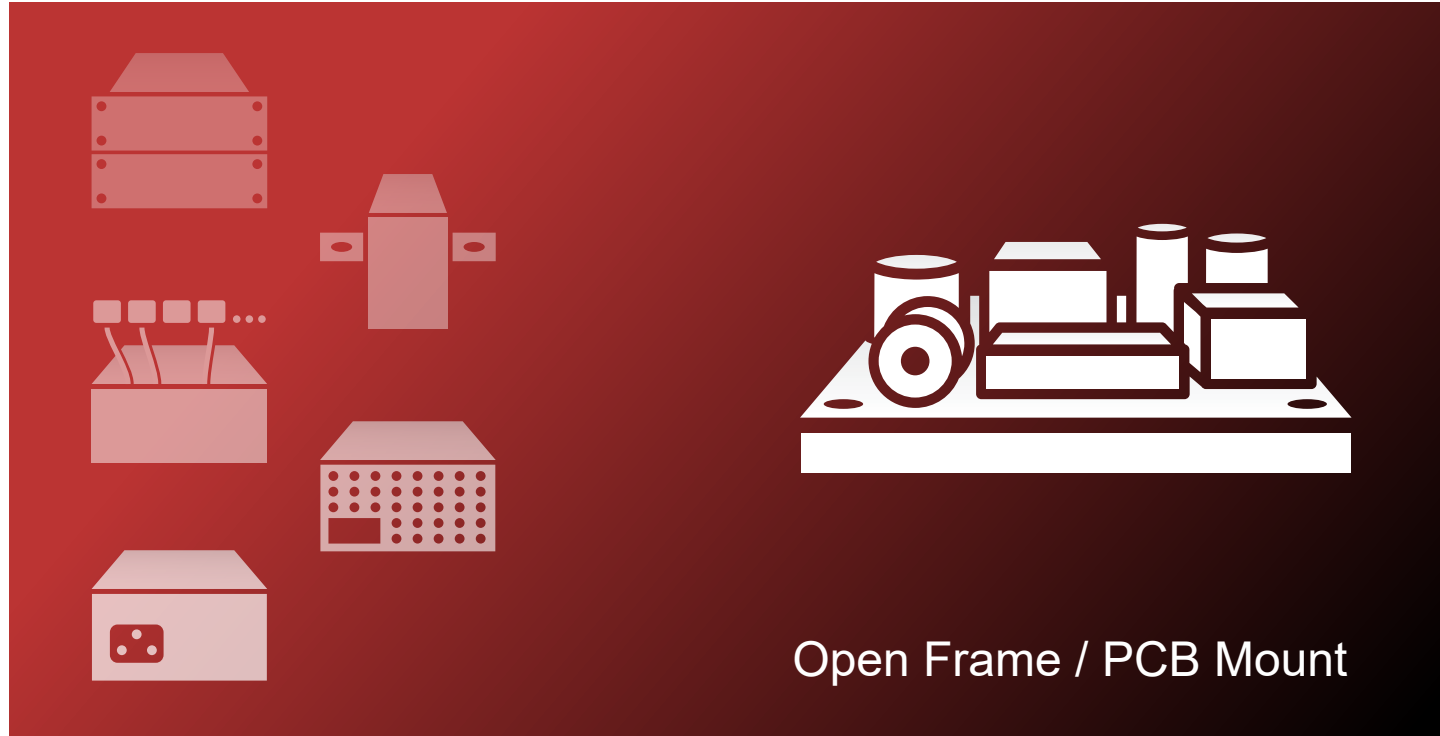
Model Selector						
Model	Output Voltage	Adjust Range <sup>(1)</sup>	Max Current (Vin>180VAC)	Max Power (Vin>180VAC)	Max Current (100<Vin<132VAC) <sup>(2)</sup>	Max Power (100<Vin<132VAC) <sup>(2)</sup>
HFE2500-12	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-12/S	12V	9.6 - 13.2V	200A	2400W	125A	1500W
HFE2500-24	24V	19.2 - 29V	104A	2496W	62.5A	1500W
HFE2500-24/S	24V	19.2 - 29V	104A	2496W	62.5A	1500W
HFE2500-48	48V	38.4 - 58V	52A	2496W	31.25A	1500W
HFE2500-48/S	48V	38.4 - 58V	52A	2496W	31.25A	1500W
Model	Load Reg	Line Reg	Ripple & Noise <sup>(1)</sup>	Efficiency (%) <sup>(4)</sup>	PMBus/I <sup>2</sup> C	
HFE2500-12	60mV	30mV	240mV	90 / 92%	-	
HFE2500-12/S	60mV	30mV	240mV	90 / 92%	Yes	
HFE2500-24	120mV	60mV	240mV	90 / 92%	-	
HFE2500-24/S	120mV	60mV	240mV	90 / 92%	Yes	
HFE2500-48	240mV	120mV	480mV	91 / 93%	-	
HFE2500-48/S	240mV	120mV	480mV	91 / 93%	Yes	

(4) At 75% load, 100 / 230VAC input

Accessories		
Model	Description	Maximum Rack Current
HFE2500-S1U	Four slot 19" rack, IEC320-C20 input connector	320A each side (640A total)
HFE2500-S1U-TB	Four slot 19" rack, Terminal Block input connector	320A each side (640A total)
HFE2500/BP	One slot blanking panel, two provided with each rack	-
HFE2500-LAN	Plug in LAN module. Takes up one rack slot. For use with /S models only.	-



 **AC-DC Power Supplies**



Open Frame / PCB Mount

**Applications**

**Power Modules**

- ◆ Distributed power architectures
- ◆ Customized designs with specific dimensions
- ◆ Low power applications

**Features**

- ◆ 5 to 1000W output power
- ◆ Single-phase wide range input 85 – 265VAC
- ◆ Flexibility for different cooling concepts

Wattage	Series	Page
2-4W	KAS	82
4-15W	KPSA	84
5-25W	KWSA	86
10-30W	ZWS10-30B	88
15-40W	KM	90
15-60W	KMS-A	92
30-60W	CUS30/60M	94
33-150W	ZWS50-150BAF	96
35W	CUT35	98
75W	CUT75	100
100W	CUS100ME	102
150W	CUS150M	104
175-200W	NV175	106
200-250W	CUS200M	108
240W	ZWS240RC-24	110
300-1000W	PFE300SA-1000F	112
300W	ZWS300BAF	114
500W	PFH500F	116

Listed by Wattage

**2-4W Wide AC-DC Input PCB-Mount Power Supplies**

**Features**

- ◆ 90 - 305VAC Input Voltage
- ◆ Class II (No ground needed)
- ◆ Wide Temperature Range (-40 to +80°C)
- ◆ Low off-load Power Draw
- ◆ High Efficiency



**Key Market Segments & Applications**



Specifications			
Model		KAS2	KAS4
Input Voltage Range	-	90-305VAC 47-63Hz or 120-430VDC*	90-305VAC 47-440Hz or 120-430VDC*
Inrush Current Limiting (115 / 230VAC) (1)	A	30 / 50A	15 / 25A
Input Current (115 / 230VAC)	mA	75 / 55mA	110 / 70mA
Off-load Power Draw	W	<0.3W	
Recommended External Fuse	-	3.15 A slow blow type	
Temperature Coefficient	-	±0.02%/°C	
Voltage Set Accuracy	%	±6%	±2%
Minimum Load	-	None	
Overcurrent Protection	-	Hiccup mode, automatic recovery	
Overvoltage Protection	%	No	
Hold-up Time (115 / 230VAC)	ms	>15ms	
Leakage Current (Touch)	mA	<0.25mA at <240VAC	
Operating Temperature	-	-40°C to +80°C, derate linearly to 40% load from 60°C to 80°C	-40°C to +70°C, derate linearly to 40% load from 50°C to 70°C (2)
Storage Temperature	-	-40°C to +85°C	
Humidity	%RH	10% to 95% RH (non-condensing)	
Cooling	-	Convection	
Withstand Voltage	VAC	Input to output: 3kVAC	
Immunity	-	EN55024 (With external varistor L-N rated at 350Vrms maximum, 920V clamp, 0.6W minimum)	
Safety Agency Certification	-	UL/CSA/IEC/EN 60950-1, IEC/EN60335-1 (Designed to meet), CE Mark	
Conducted and Radiated EMI	-	EN55032 Class B	
Weight	g	19.9g	26g
Size (LxWxH)	in (mm)	1.12 x 1.02 x 0.67" 28.5 x 25.8 x 17.0 mm	1.46 x 1.08 x 0.69" 37.0 x 27.5 x 17.5 mm
Mounting & Case	-	PC board mountable. Resin case (UL 94V-0)	
MTBF (MIL-HDBK-217F)	hrs	>450,000 hours	
Warranty	yrs	3 years	

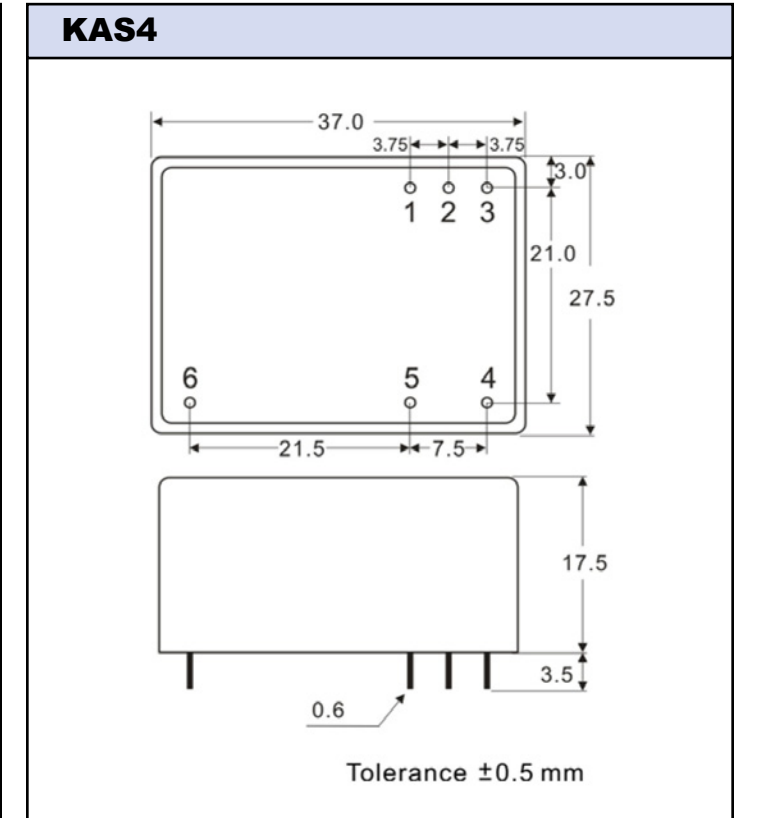
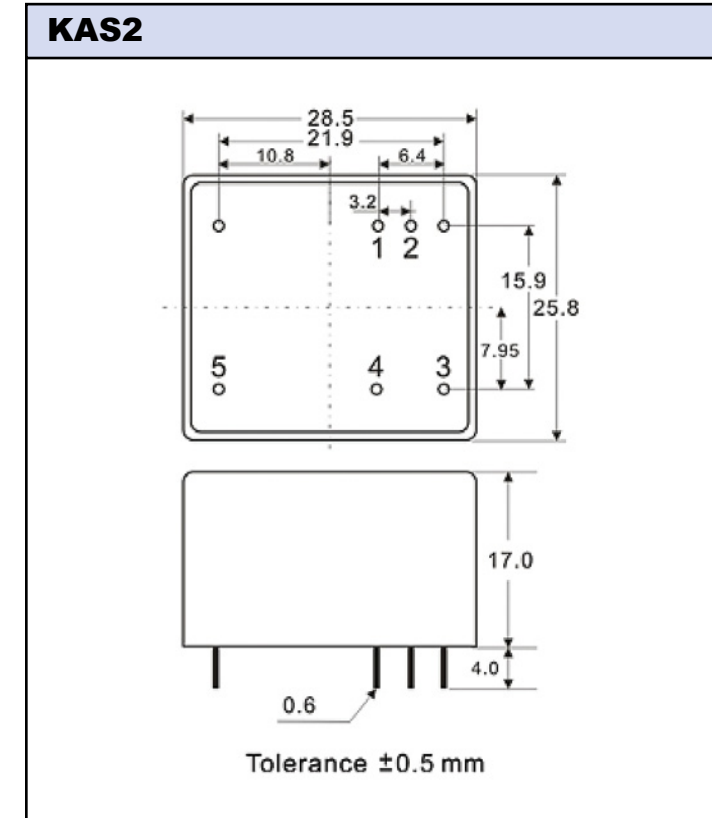
Notes \* Safety certified for AC input, 47-63Hz only

- (1) Cold start, 25°C ambient. Requires 10Ω 5A external NTC thermistor
- (2) Model dependent, see installation manual for details

**Model Selector**

Model	Output Voltage (V)	Maximum Current (A)	Maximum Power (W)	Output Ripple & Noise (mV)	Line Regulation (mV)	Load Regulation (typ) (3)	Efficiency (%)	Maximum Capacitive Load (µF)
KAS2-3P3	V1 3.3V	0.6A	2W	300mV	±165mV	±198mV	66%	7000
KAS4-3P3	V1 3.3V	1.2A	4W	250mV	±16.5mV	±49.5mV	68%	5000
KAS2-5	V1 5V	0.4A	2W	300mV	±250mV	±300mV	70%	4000
KAS4-5	V1 5V	0.8A	4W	250mV	±25mV	±75mV	72%	4200
KAS4-8	V1 8V	0.5A	4W	200mV	±40mV	±120mV	74%	1470
KAS2-9	V1 9V	0.22A	2W	300mV	±450mV	±540mV	73%	1200
KAS4-9	V1 9V	0.444A	4W	200mV	±45mV	±135mV	75%	1330
KAS2-12	V1 12V	0.167A	2W	300mV	±600mV	±720mV	73%	500
KAS4-12	V1 12V	0.333A	4W	150mV	±24mV	±60mV	76%	680
KAS4-14	V1 14V	0.286A	4W	150mV	±28mV	±70mV	76%	470
KAS2-15	V1 15V	0.133A	2W	300mV	±750mV	±900mV	73%	350
KAS4-15	V1 15V	0.267A	4W	100mV	±30mV	±75mV	76%	330
KAS2-24	V1 24V	0.083A	2W	300mV	±1200mV	±1440mV	75%	110
KAS4-24	V1 24V	0.167A	4W	100mV	±48mV	±120mV	77%	120

Notes: (3) KAS2 10-100% load change



PIN #	KAS2	KAS4
1	+Vout	+Vout
2	-Vout	-Vout
3	Neutral	Not connected
4	Line	Line
5	Not connected	Neutral
6	-	Not connected

For Additional Information, please visit [us.tdk-lambda.com/lp/products/kas-series.htm](http://us.tdk-lambda.com/lp/products/kas-series.htm)



## 4-15W AC-DC Board Mount Power Supplies

### Features

- ◆ Low profile
- ◆ Smaller footprint
- ◆ PC board Mountable
- ◆ Low Cost
- ◆ UL Class II Approved
- ◆ Wide input range
- ◆ No external components needed



### Key Market Segments & Applications



Specifications		KPSA-5	KPSA-10	KPSA-15
Input Voltage range	-	85 - 264VAC (47 - 63Hz) or 110 - 370VDC*		
Inrush Current	A	30A at 240VAC, cold start at 25°C		
Input Current (115/230VAC)	A	0.13 / 0.07	0.27 / 0.13	0.4 / 0.2
Leakage Current	mA	0.25mA maximum		
Temperature Coefficient	-	±0.05%/°C		
Voltage Accuracy	-	±1%		
Minimum Load	A	None		
Load Regulation	-	±1% (10% to 100% load)		
Line Regulation	-	±0.5% (100-240VAC line change)		
Ripple & Noise (1)	mV	1% or 50mV whichever is greater		
Short Circuit Protection	-	Continuous - hiccup mode		
Overvoltage Protection	V	130-150%, Zener clamp		
Efficiency (typical)	%	72%	75%	75%
Hold Up Time (Typ@115VAC input)	ms	14ms at full load		
LED Indicator	-	Green LED = OK		
Operating Temperature (2)	°C	Convection cooling: 0 to +70°C, derating linearly to 25% load from 40 to 70°C		
Storage Temperature	°C	-20 to +85°C		
Humidity (non condensing)	-	10 - 95% RH		
Cooling	-	Convection or forced air		
Withstand Voltage	-	Input to Output 3kVAC		
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock	-	< 196.1 m/s <sup>2</sup> (20G)		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, Class II, CE Mark		
Conducted & Radiated EMI	-	EN55022-B, FCC Class B		
Immunity	-	EN61000-4 -2, -3, -4, -5, -6		
Weight (Typ)	g(oz)	29g (1oz)	60g (2oz)	80g (2.8oz)
Size (WxLxH; H above pcb)	in.	1.28 x 2.17 x 0.83	1.55 x 2.40 x 0.9	1.77 x 2.75 x 0.79
Warranty	yr	One Year		

\*Safety certified for AC input only.

Notes:

- (1) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW
- (2) 20CFM forced air ratings:  
 KPSA5: 0 - 70°C full load  
 KPSA10: 0 - 70°C full load (3.3V & 5V models derate linearly to 80% load from 50 to 70°C)  
 KPSA15: 0 - 70°C derate linearly to 80% load from 50 to 70°C

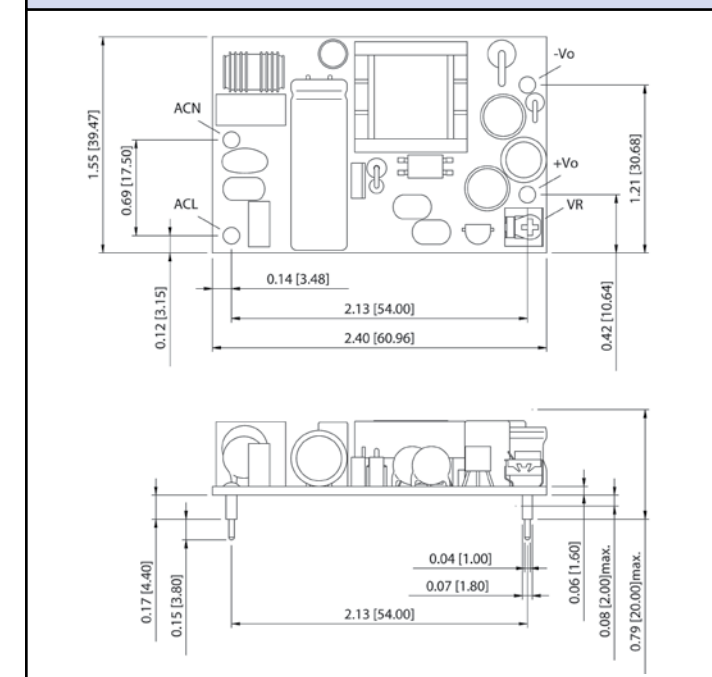
### Model Selector (other voltages available)

Model	Output Voltage (V)	Maximum Output (A)	Peak Load (A)(3)	Output Pwr (W)
KPSA5-3R3	3.3	1.25	-	4.1
KPSA5-5	5	1.0	-	5.0
KPSA5-12	12	0.42	-	5.0
KPSA5-15	15	0.33	-	5.0
KPSA5-24	24	0.23	-	5.5
KPSA10-3R3	3.3	2.5	3.8	8.3
KPSA10-5	5	2.0	2.8	10.0
KPSA10-12	12	0.84	1.2	10.1
KPSA10-15	15	0.67	1.0	10.1
KPSA10-24	24	0.42	0.65	10.1
KPSA15-3R3	3.3	3.0	4.5	9.9
KPSA15-5	5	3.0	4.0	15.0
KPSA15-12	12	1.25	1.8	15.0
KPSA15-15	15	1.0	1.5	15.0
KPSA15-24	24	0.63	0.95	15.1

Notes

(3) Average not to exceed max power, <30s, 10% duty cycle

### KPSA10 Outline Drawing



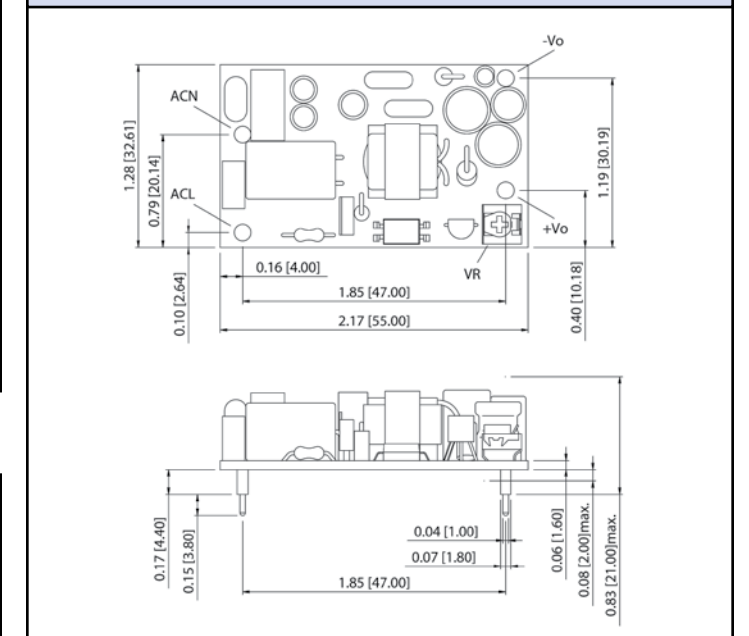
### Other Industrial Products

ZPSA	20W to 60W
KM	15 to 40W pcb mount medical
ZWS	5 to 240W, single output

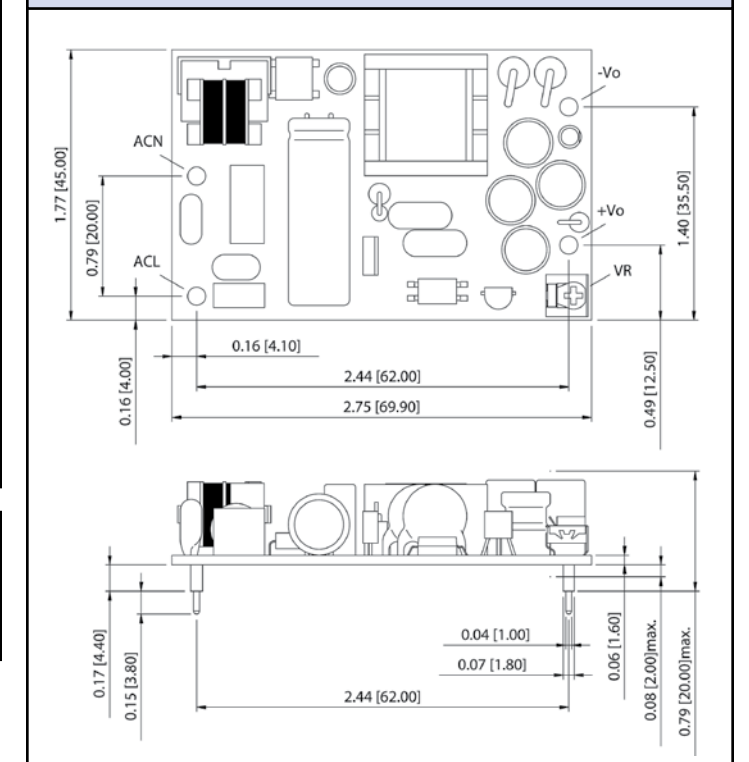
For Additional Information, please visit [us.tdk-lambda.com/lp/products/kps-series.htm](http://us.tdk-lambda.com/lp/products/kps-series.htm)



### KPSA5 Outline Drawing



### KPSA15 Outline Drawing



**Single Output 5W to 25W AC-DC PCB-Mount Power Supplies**

**Features**

- ◆ Wide Temperature Range -40 (start up) to +85°C
- ◆ <0.5W Off-Load Power Draw
- ◆ Efficiencies up to 88%
- ◆ Compact Sizes
- ◆ Class II, No Ground Connection



**Key Market Segments & Applications**



Specifications		KWS5A	KWS10A	KWS15A	KWS25A
AC Input Voltage	VAC	85 - 265VAC(1)			
Input Frequency	Hz	47 - 440Hz			
DC Input Voltage	VDC	120 - 370VDC (No safety certification)			
Inrush Current (cold start)	A	15A at 100VAC, 30A at 200VAC			
Power Factor	-	Meets EN61000-3-2			
Input Current (100/200VAC)	A	0.13 / 0.07A	0.25 / 0.13A	0.33 / 0.24A	0.56 / 0.34A
Output Voltage Accuracy	%	±5%			
Off-load Power Draw	W	<0.5W			
Temperature Coefficient	%/°C	<0.02%/°C			
Overcurrent Protection	-	>103% of rated current			
Overvoltage Protection	V	5V: 5.75 - 7V, 12V: 13.8 - 18.3V, 15V: 17.25 - 22.4V, 24V: 27.6 - 34V			
Hold Up Time (100 / 200V input)	ms	15 / 45ms	10 / 30ms		
Leakage Current	mA	<0.25mA at 265VAC, 60Hz			
Operating Temperature (2)	°C	-40°C start-up; -10 to +85°C. Derate linearly to 10% load from +55 to +85°C (2)			
Storage Temperature	°C	-40 to +85°C			
Humidity (non condensing)	%RH	30 - 90%RH Operating, 20 - 95%RH Storage			
Cooling	-	Convection Cooled			
Withstand Voltage	VAC	Input to Output 3kVAC			
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Input to Output 500VDC			
Vibration (non operating)	-	10 - 55Hz: 1.65mm p-p (Max 10G) sweep for 1 min X, Y, Z for 1 hour			
Shock	-	< 50G for 11 ±5ms on (X,Y,Z) each axis 3 times			
Immunity	-	IEC61000-4-2, -3, -4, -5, -6, -8, -11; IEC61000-6-2			
Safety Agency Certifications	-	EN60950-1, UL/CSA60950-1, CE Mark LVD & RoHS2			
Conducted & Radiated EMI	-	EN55011-A, EN55022-A, FCC Class A (Requires external X capacitor to meet -B)			
Weight (Typ)	g	35	35	60	85
Size (LxWxH)	mm	38.1 x 25.4 x 21.5mm		50.8 x 25.4 x 24mm	63.5 x 25.4 x 29mm
MTBF - Telcordia SR-332 issue 3*	Hours	14,416,059	7,784,121	8,202,502	5,747,627
Warranty	Yrs	Three Years			

**Notes:**

\* 24V output model, 25°C ambient, full load, 230VAC input

- (1) Derate to 80% load from 100 to 85VAC input (KWS5A 90% load from 90 to 85VAC)
- (2) KWS10A-5, KWS15A-5, KWS25A-5: Derate linearly to 10% load from +45 to +85°C

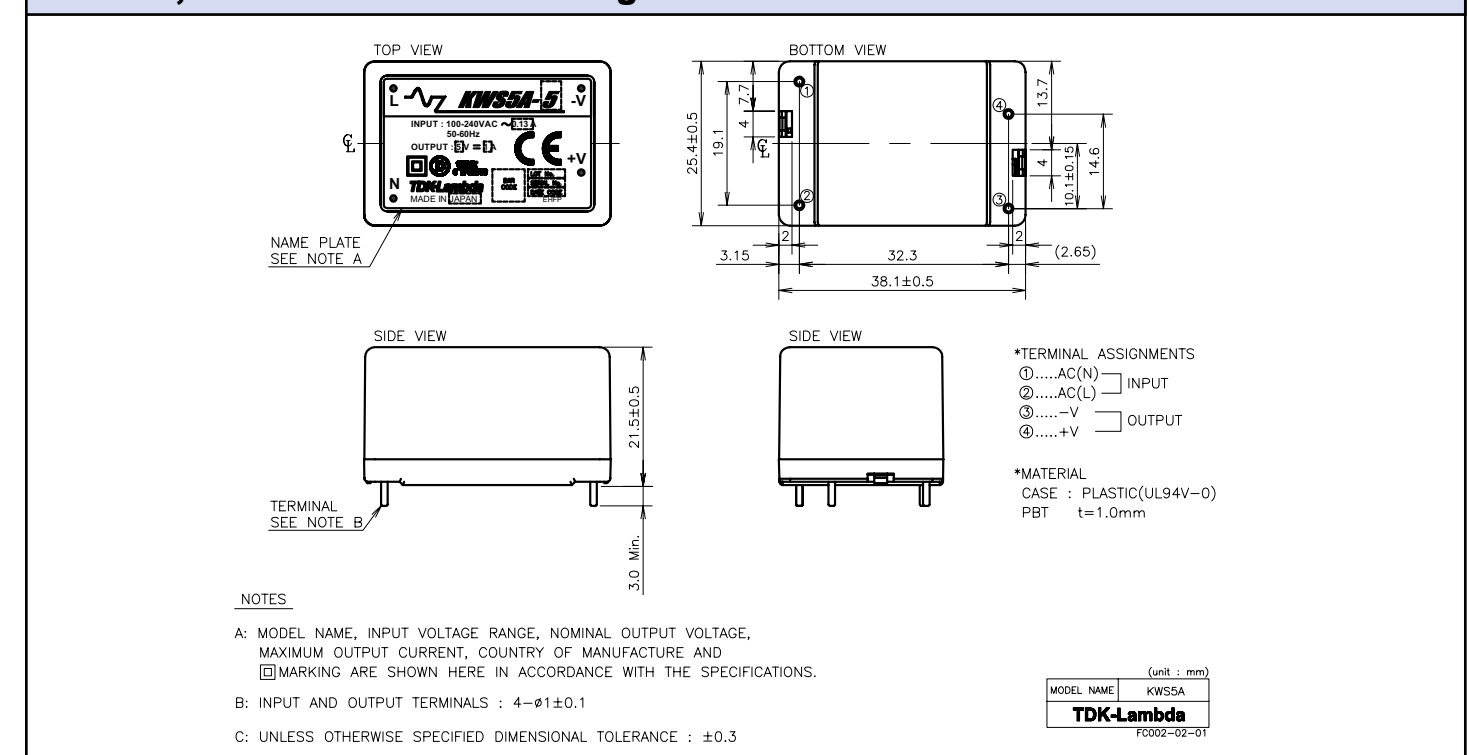
**Model Selector**

Model	Voltage (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % <sup>(3)</sup>
KWS5A-5	5	1.0	5.0	40	20	200	76 / 74
KWS10A-5	5	2.0	10.0	40	20	200	76 / 77
KWS15A-5	5	3.0	15.0	40	20	200	77 / 78
KWS25A-5	5	5.0	25.0	40	20	200	81 / 82
KWS5A-12	12	0.45	5.4	96	48	240	78 / 75
KWS10A-12	12	0.9	10.8	96	48	240	80 / 81
KWS15A-12	12	1.3	15.6	96	48	240	81 / 83
KWS25A-12	12	2.2	26.4	96	48	240	84 / 86
KWS5A-15	15	0.35	5.3	120	60	240	79 / 75
KWS10A-15	15	0.7	10.5	120	60	240	81 / 82
KWS15A-15	15	1.0	15.0	120	60	240	82 / 84
KWS25A-15	15	1.7	25.5	120	60	240	85 / 87
KWS5A-24	24	0.22	5.3	150	96	240	80 / 77
KWS10A-24	24	0.5	12.0	150	96	240	82 / 84
KWS15A-24	24	0.7	16.8	150	96	240	82 / 85
KWS25A-24	24	1.1	26.4	150	96	240	86 / 88

**Notes:**

(3) 115 / 230VAC input. Full load

**KWS5A, KWS10A Outline Drawing**



**Similar Models**

KM	15 & 40W, single, dual and triple outputs, medical & ITE
KPSA	5, 10 & 15W, single output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/kwsa-series.htm](http://us.tdk-lambda.com/lp/products/kwsa-series.htm)

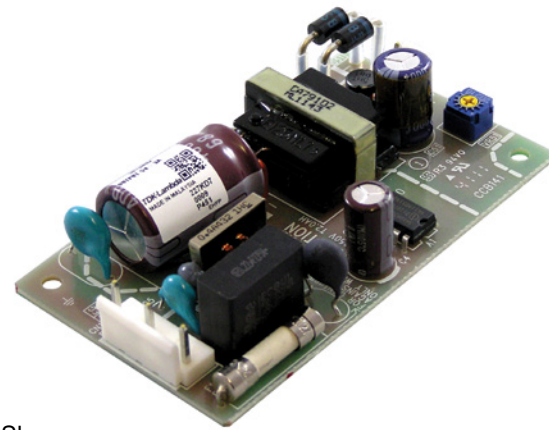




**10-30W Single Output, High Reliability Power Supplies**

**Features**

- ◆ Universal Input (85 - 265VAC)
- ◆ 5 year warranty
- ◆ Small Size
- ◆ <0.5W off load power draw
- ◆ 10 year E-cap lifetime



ZWS15B Shown



**Key Market Segments & Applications**



Specifications		ZWS10B	ZWS15B	ZWS30B
Input Voltage range (1)	V	85 - 265VAC (47 - 63Hz), 120 - 370VDC*		
Input Current (100 / 200VAC)	A	0.25 / 0.13A	0.34 / 0.17A	0.65 / 0.35A
Inrush Current (100 / 200VAC)	A	15 / 30A		
No Load Power Draw	W	Typically 0.2W at 100/200VAC, 0.5W maximum		
Leakage Current (100 / 200VAC)	mA	< 150uA / 300uA		
Temperature Coefficient	°C	<0.02%/°C		
Overcurrent Protection	%	> 105% of maximum current rating		
Hold Up Time (Typ) @ 100VAC	ms	20ms		
Operating Temperature Convection Cooled	°C	ZWS10B: -10 to +70°C, derate linearly to 20% load from 50 to 70°C ZWS15B: -10 to +70°C, derate linearly to 40% load from 50 to 70°C ZWS30B: -10 to +70°C, derate linearly to 20% load from 50 to 70°C		
Operating Temperature Forced Air Cooled (0.7m/s)	°C	-10 to +70°C, derate linearly to 70% load from 60 to 70°C		
Storage Temperature	°C	-30 to +75°C		
E-cap Lifetime	-	10 year E-cap lifetime (80% load, 24 hours per day, 50°C ambient)		
Humidity (non condensing)	%RH	Operating 30 - 90%RH, Storage 10 - 90%RH		
Cooling	-	Convection or forced air		
Withstand Voltage	VAC	Input to Ground 2kVAC (10mA), Input to Output 3kVAC (10mA) Output to Ground 500VAC (20mA) for 1 minute		
Isolation Resistance	M	>100M at 25°C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	Hz	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant. X, Y, Z for 1 hour each		
Shock	m/s <sup>2</sup>	< 196m/s <sup>2</sup>		
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark		
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B		
Immunity	-	IEC61000-4-2 (lv 4), -3 (lvl 3), -4 (lvl 4), -5 (lvl 4), -6 (lvl 3), -8 (lvl 4), -11		
Weight (Typ)	g	45g	55g	105g
Size (WxHxD)	mm	50 x 22 x 73.5mm	50 x 22 x 87.5mm	50 x 26.5 x 105mm
Warranty	yrs	Five Years		

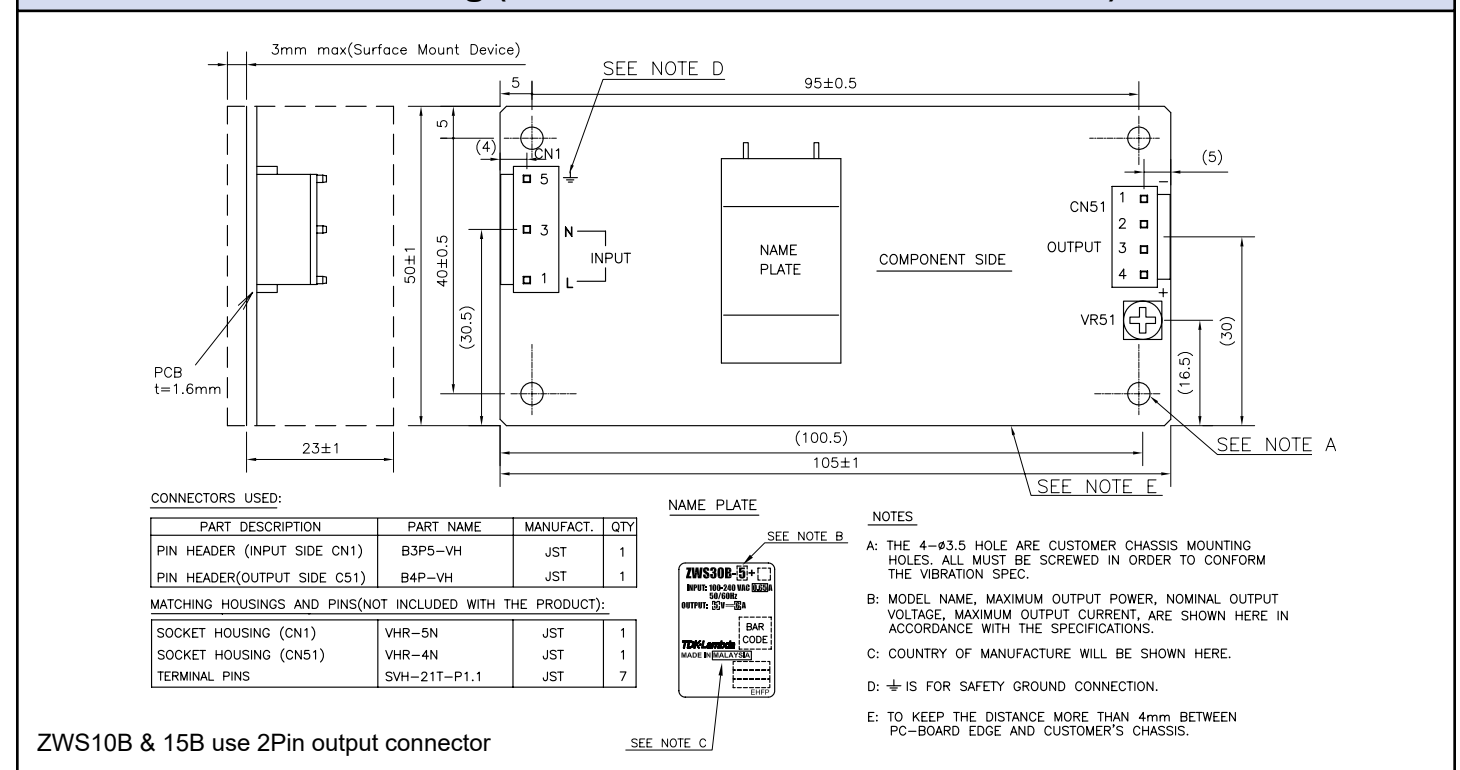
Notes:  
(1) Derate linearly to 90% load from 90VAC to 85VAC input  
Refer to detailed specifications and application notes on web page

\*Safety certified for AC input only

**Model Selector**

Model	Voltage	Adjust Range	Max Current A	Load Reg mV	Line Reg mV	Ripple Noise mV	Efficiency %	OVP V
ZWS10B-3	3.3V	2.97-3.63	2	40	20	120	70 / 70	4 - 5.25
ZWS15B-3	3.3V	2.97-3.63	3	40	20	120	70 / 71	4 - 5.25
ZWS30B-3	3.3V	2.97-3.63	6	40	20	120	75 / 77	4 - 5.25
ZWS10B-5	5V	4.5-5.5	2	40	20	120	77 / 78	5.75 - 7
ZWS15B-5	5V	4.5-5.5	3	40	20	120	76 / 78	5.75 - 7
ZWS30B-5	5V	4.5-5.5	6	96	48	120	80 / 82	5.75 - 7
ZWS10B-12	12V	10.8-13.2	0.9	96	48	150	82 / 83	13.8 - 16.2
ZWS15B-12	12V	10.8-13.2	1.3	96	48	150	80 / 83	13.8 - 16.2
ZWS30B-12	12V	10.8-13.2	2.5	120	60	150	84 / 86	13.8 - 16.2
ZWS10B-15	15V	13.5-16.5	0.7	120	60	150	83 / 84	17.3 - 20.3
ZWS15B-15	15V	13.5-16.5	1	120	60	150	81 / 84	17.3 - 20.3
ZWS30B-15	15V	13.5-16.5	2	120	60	150	85 / 87	17.3 - 20.3
ZWS10B-24	24V	21.6-26.4	0.5	150	96	150	84 / 85	27.6 - 32.4
ZWS15B-24	24V	21.6-26.4	0.7	150	96	150	82 / 85	27.6 - 32.4
ZWS30B-24	24V	21.6-26.4	1.3	150	96	150	86 / 88	27.6 - 32.4

**ZWS30-B Outline Drawing (see website for ZWS10B & 15B outlines)**



**Other Industrial Products**

ZWS-BAF	50W to 150W Active PFC
ZWD/ZWQ	100W to 440W Single & multiple output
NV175	175W, 1-4 outputs 3 x 5"
HWS	15W to 1800W Single output enclosed

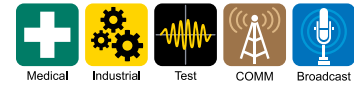
For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/zws-b-series.htm](http://us.tdk-lambda.com/lp/products/zws-b-series.htm)

**15-40W Medical AC-DC PCB-Mount Power Supplies**

**Features**

- ◆ Small size and lightweight
- ◆ PC Board Mountable
- ◆ Wide Range Input
- ◆ Medical Safety Certifications (4kVAC Input - Output)
- ◆ Class II (No ground needed)
- ◆ High efficiency

**Key Market Segments & Applications**



Specifications								
Model		KMS15	KMD15	KMT15	KMS40	KMD40	KMT40	
Input Voltage Range	-	90-264VAC 47-440Hz or 100-375VDC*						
Inrush Current Limiting	A	10 / 20A, cold start, 25°C ambient (115 / 230VAC)						
Input Current (115 / 230VAC)	mA	292 / 188mA			860 / 460mA			
Recommended External Fuse	-	2A slow blow type			3.15A slow blow type			
Temperature Coefficient	-	±0.01%/°C						
Ripple and Noise (pk-pk)	mV	50mV or 1%, whichever is greater						
Overcurrent Protection	-	> 105%, hiccup mode, automatic recovery						
Overvoltage Protection	%	Yes, Zener diode clamp						
Hold-up Time (typical)	ms	20ms			18ms			
Enclosure Leakage (240VAC 63Hz)	mA	0.055 max			0.08 max			
Enclosure Leakage (264VAC 63Hz)		0.06 max			0.085 max			
Operating Temperature	°C	-25°C to 70°C, derate linearly to 50%(1) load from 50°C to 70°C. Max case temperature 95°C						
Storage Temperature	°C	-40°C to 100°C						
Humidity	%RH	20% to 95% RH (non-condensing)						
Cooling	-	Convection, over temperature protected ~100°C case temperature						
Withstand Voltage	VAC	Input to output: 4kVAC (Reinforced) (2 x MOPPS 3rd Edition)						
Immunity	-	EN60601-1-2						
Safety Agency Certification	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN60950-1, CE Mark						
Conducted EMI	-	EN55011, EN55022 Class B			EN55011, EN55022 Class A			
Switching Frequency	kHz	132kHz						
Weight	g	120			280			
Size (LxWxH)	in	2.52 x 1.79 x 0.92"			3.5 x 2.5 x 1.06"			
Mounting & Case	-	PC board mountable. Plastic resin fiberglass case (UL 94V-0)						
MTBF	hrs	200,000 to 400,000 hours, model dependent						
Warranty	yrs	2 years						

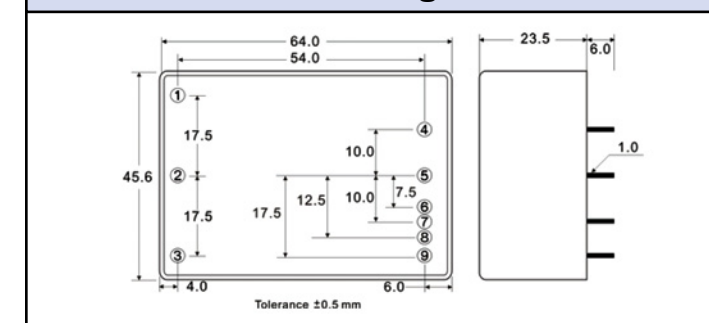
(1) KM15 derates linearly to 40% load

\*Safety certified for AC input only

**Output Ratings**

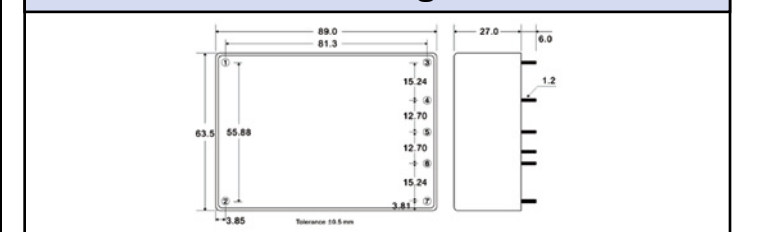
Model	Output Voltage (V)	Minimum Current (A)	Maximum Current (A)	Power (W)	Output Set Accuracy (%)	Line Regulation (%)	Load Regulation (1) (%)	Cross Regulation (%)	Efficiency (%)
<b>Single Output</b>									
KMS15-3P3	V1 3.3V	0A	3.00A	9.9W	±2%	0.5%	1%	-	74%
KMS40-3P3	V1 3.3V	80mA	8.00A	26.4W	±2%	0.5%	1%	-	75%
KMS15-5	V1 5V	0A	3.00A	15W	±2%	0.5%	1%	-	78%
KMS40-5	V1 5V	80mA	8.00A	40W	±2%	0.5%	1%	-	79%
KMS15-9	V1 9V	0A	1.67A	15W	±2%	0.5%	1%	-	79%
KMS40-9	V1 9V	44mA	4.44A	40W	±2%	0.5%	1%	-	82%
KMS15-12	V1 12V	0A	1.25A	15W	±2%	0.5%	1%	-	81%
KMS40-12	V1 12V	33mA	3.33A	40W	±2%	0.5%	1%	-	83%
KMS15-15	V1 15V	0A	1.00A	15W	±2%	0.5%	1%	-	81%
KMS40-15	V1 15V	26.7mA	2.67A	40W	±2%	0.5%	1%	-	83%
KMS15-24	V1 24V	0A	0.62A	15W	±2%	0.5%	1%	-	83%
KMS40-24	V1 24V	16.7mA	1.67A	40W	±2%	0.5%	1%	-	83%
<b>Dual Output</b>									
KMD15-55	V1 +5V	150mA	1.5A	15W	±2%	0.5%	1%	5%	78%
	V2 -5V	150mA	1.5A						
KMD40-55	V1 +5V	400mA	4A	40W	±2%	0.5%	1%	5%	79%
	V2 -5V	400mA	4A						
KMD40-512	V1 5V(2)	1250mA	5A	40W	±3%	0.5%	2%	1%	80%
	V2 12V(2)	312mA	1.25A						
KMD40-524	V1 5V(2)	1250mA	5A	40W	±3%	0.5%	2%	1%	80%
	V2 24V(2)	156mA	0.625A						
KMD15-1212	V1 +12V	62.5mA	0.625A	15W	±2%	0.5%	1%	3%	80%
	V2 -12V	62.5mA	0.625A						
KMD40-1212	V1 +12V	166mA	1.66A	40W	±2%	0.5%	1%	5%	83%
	V2 -12V	166mA	1.66A						
KMD15-1515	V1 +15V	50mA	0.5A	15W	±2%	0.5%	1%	3%	81%
	V2 -15V	50mA	0.5A						
KMD40-1515	V1 +15V	133mA	1.33A	40W	±2%	0.5%	1%	5%	81%
	V2 -15V	133mA	1.33A						
<b>Triple Output</b>									
KMT15-51212	V1 5V(3)	500mA	2A	15W	±2%	0.5%	1%	1%	78%
	V2 +12V	50mA	0.2A						
	V3 -12V	50mA	0.2A						
KMT40-51212	V1 5V(3)	1250mA	5A	40W	±3%	0.5%	3%	3%	80%
	V2 +12V	150mA	0.6A						
	V3 -12V	150mA	0.6A						
KMT15-51515	V1 5V(3)	500mA	2A	15W	±2%	0.5%	1%	1%	78%
	V2 +15V	37.5mA	0.15A						
	V3 -15V	37.5mA	0.15A						
KMT40-51515	V1 5V(3)	1250mA	5A	40W	±3%	0.5%	3%	3%	80%
	V2 +15V	125mA	0.5A						
	V3 -15V	125mA	0.5A						

**KM15 Outline Drawings**



- (1) Symmetrical loading, from minimum to maximum load
- (2) Output V1 is isolated from output V2
- (3) Output V1 is isolated from outputs V2 & V3

**KM40 Outline Drawings**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/km-series.htm](http://us.tdk-lambda.com/lp/products/km-series.htm)



**15-60W Medical AC-DC PCB-Mount Power Supplies**

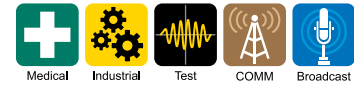
**Features**

- ◆ Medical Safety Certifications (4kVAC Input - Output)
- ◆ Class II (No ground needed)
- ◆ Wide Temperature Range (-40 to +80°C)
- ◆ Low off-load Power Draw
- ◆ Smaller size than KMS
- ◆ High Efficiency



Photo (KMS60A shown)

**Key Market Segments & Applications**



Specifications				
Model		KMS15A	KMS30A	KMS60A
Input Voltage Range (1)	-	90-264VAC 47-440Hz* or 120-370VDC*		
Inrush Current Limiting (115 / 230VAC) (2)	A	20 / 40A	30 / 60A	55 / 95A
Input Current (115 / 230VAC)	mA	385 / 250mA	650 / 400mA	1500 / 1000mA
Off-load Power Draw	W	<0.1W	<0.15W	<0.3W
Recommended External Fuse	-	3.15 A slow blow type		
Temperature Coefficient	-	±0.05%/°C		
Voltage Set Accuracy	%	±2%		
Minimum Load	-	None		
Overcurrent Protection	-	Hiccup mode, automatic recovery		
Overvoltage Protection	%	Yes, Zener diode clamp		
Hold-up Time (115 / 230VAC)	ms	15 / 56ms (typ)	>10ms	
Leakage Current (Touch)	mA	<0.1mA at 264VAC		
Series Operation	-	Yes. Use diodes connected across each output		
Operating Temperature (3)	-	-40°C to +80°C, derate linearly to 30% load from 50°C to 80°C		
Maximum Case Temperature	°C	90°C (83°C <115VAC)	85°C (78°C <115VAC)	80°C (73°C <115VAC)
Storage Temperature	-	-40°C to +90°C		
Humidity	%RH	10% to 95% RH (non-condensing)		
Cooling	-	Convection		
Withstand Voltage	VAC	Input to output: 4kVAC, 2 x MOPPs		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11		
Altitude	m	5000m		
Safety Agency Certification	-	UL/CSA/IEC/EN 60950-1, ANSI/AAMI ES60601-1, IEC/EN 60601-1 (2xMOPPs)		
Conducted and Radiated EMI	-	EN55011 Class B		
Weight	g	59g	130g	280g
Size (LxWxH)	in (mm)	2.07 x 1.08 x 0.93"	2.52 x 1.77 x 0.93"	3.5 x 2.5 x 1.06"
Mounting & Case	-	PC board mountable. Resin case (UL 94V-0)		
MTBF	hrs	200,000 to 400,000 hours, model dependant		
Warranty	yrs	3 years		

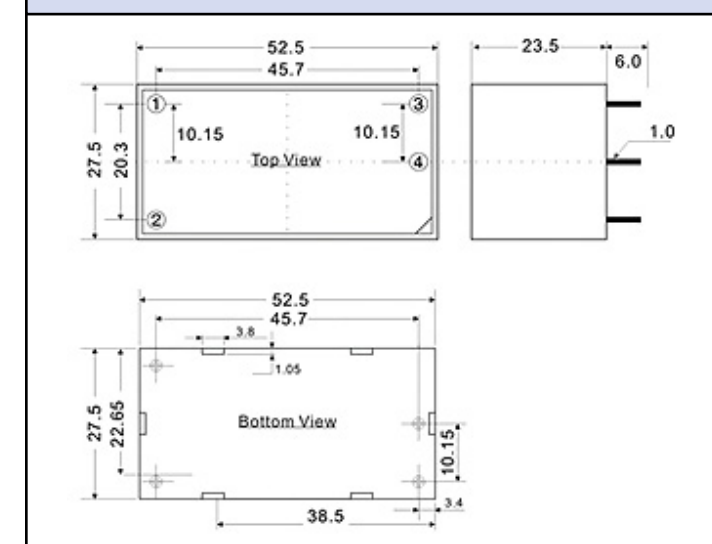
(1) Derate linearly to 80% load below 110VAC (100VAC for KMS15A)  
 (2) Cold start, 25°C ambient  
 (3) Derate linearly to 80% load below -30°C

\* Safety certified for AC input, 47-63Hz only

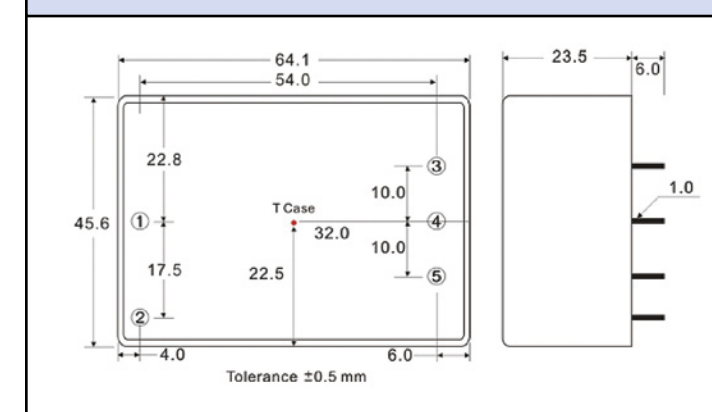
**Model Selector**

Model	Output Voltage (V)	Maximum Current (A)	Power (W)	Output Ripple & Noise (mV)	Line Regulation (mV)	Load Regulation (mV)	Efficiency (%)	Maximum Capacitive Load (µF)
KMS15A-5	5V	3A	15W	120mV	±25mV	±50mV	79%	7000
KMS30A-5	5V	5A	25W	100mV	±25mV	±50mV	84%	6800
KMS60A-5	5.1V	10A	51W	100mV	±25mV	±75mV	86%	10000
KMS15A-9	9V	1.666A	15W	120mV	±45mV	±90mV	80%	5000
KMS60A-9	9V	6.666A	60W	100mV	±45mV	±135mV	87%	5000
KMS15A-12	12V	1.25	15W	120mV	±60mV	±120mV	84%	1500
KMS30A-12	12V	2.5A	30W	150mV	±60mV	±120mV	89%	1600
KMS60A-12	12V	5A	60W	120mV	±60mV	±120mV	88%	5000
KMS15A-15	15V	1A	15W	150mV	±75mV	±150mV	84%	1000
KMS30A-15	15V	2A	30W	150mV	±75mV	±150mV	86%	1200
KMS60A-15	15V	4A	60W	150mV	±75mV	±150mV	86%	4000
KMS15A-24	24V	0.625	15W	240mV	±120mV	±240mV	85%	470
KMS30A-24	24V	1.25A	30W	240mV	±120mV	±240mV	86%	470
KMS60A-24	24V	2.5A	60W	240mV	±120mV	±240mV	87%	2000

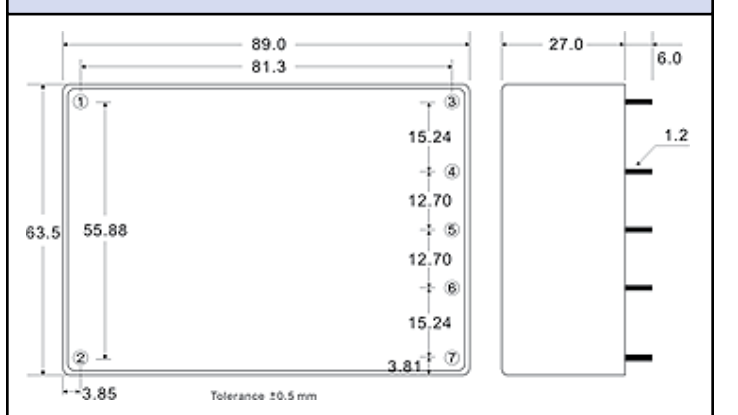
**KMSA15**



**KMSA30**



**KMSA60**



**Pinout**

PIN #	KMS15A	KMS30A	KMS60A
1	AC (L)	AC (N)	AC (L)
2	AC (N)	AC (L)	AC (N)
3	+Vout	-Vout	+Vout
4	-Vout	No pin	No pin
5		+Vout	-Vout
6			No pin
7			No pin

For Additional Information, please visit [us.tdk-lambda.com/lp/products/km-series.htm](http://us.tdk-lambda.com/lp/products/km-series.htm)

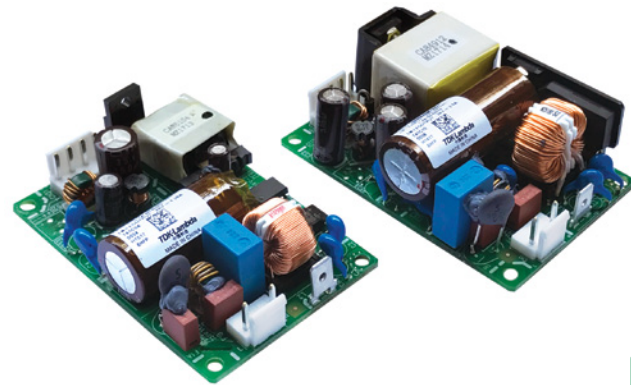


# TDK-Lambda CUS30M & CUS60M Series

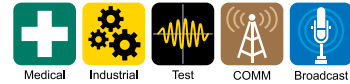
## Single Output 30 to 60W Medical & ITE Power Supplies

### Features

- ◆ High Efficiency, up to 90%
- ◆ Industry Standard 2" x 3" Footprint
- ◆ Convection Cooled
- ◆ Class I and II Operation
- ◆ Suitable for B and BF rated equipment



### Key Market Segments & Applications



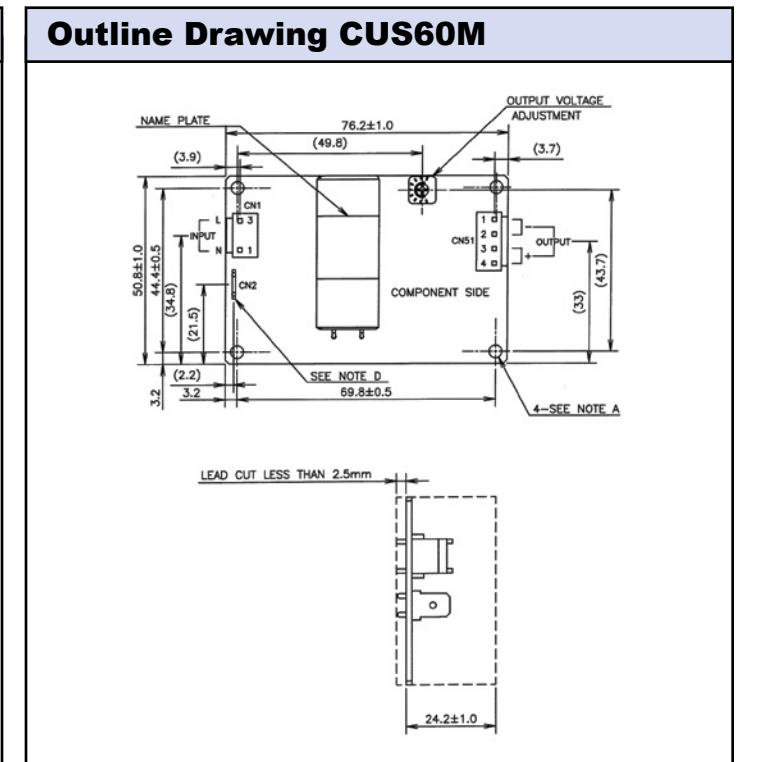
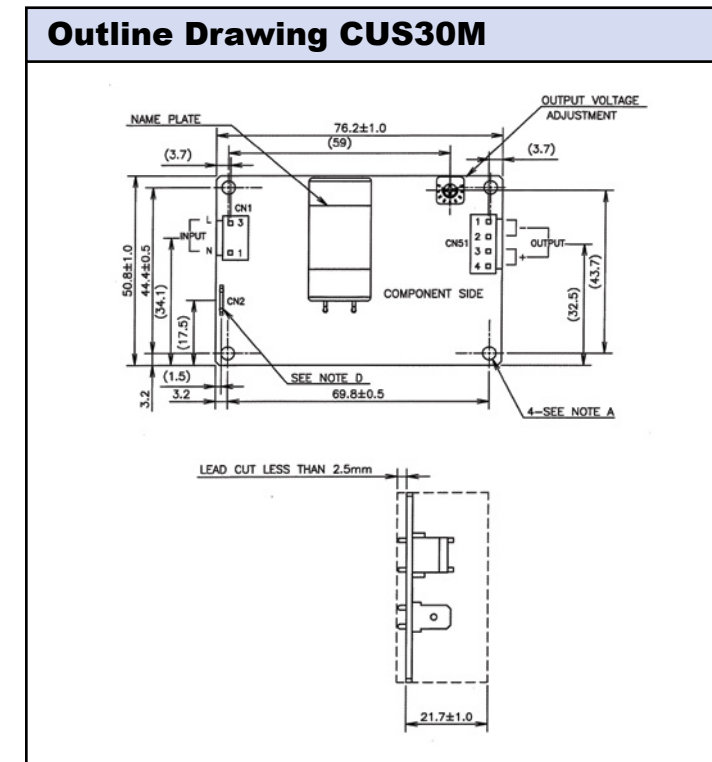
Specifications		CUS30M	CUS60M
AC Input Voltage	VAC	85 - 265VAC(1)	
Input Frequency	Hz	47 - 63Hz	
Inrush Current (cold start)	A	30A at 115VAC, 60A at 230VAC	
Power Factor	-	Meets EN61000-3-2	
Input Current (115/230VAC)	A	0.6 / 0.4	5V: 0.7 / 0.5, 12-48V: 1.2 / 0.8
Off-load Power Draw	W	<0.3W at 265VAC	<0.5W at 265VAC
Temperature Coefficient	%/°C	<0.02%/°C	
Output Voltage Adjustment	-	Fixed as standard. Use /ADJ suffix for potentiometer ±10% adjustment	
Overcurrent Protection	-	>105% of rated current. Class 2 Limited Power Source (2)	
Overvoltage Protection (3)	V	> 115% of nominal output	> 120% of nominal output
Hold Up Time (Typical) (115/230VAC)	ms	20 / 100	
Leakage Current	mA	<0.25mA at 265VAC, 60Hz	<0.2mA at 265VAC, 60Hz
Touch Current (Maximum)	µA	100µA at 265VAC, 60Hz	60µA at 265VAC, 60Hz
Remote Sense	-	No	
Operating Temperature	°C	-20 to +70°C. (-30°C start up) Derate linearly to 50% load from +50 to +70°C (4)	
Storage Temperature	°C	-40 to +85°C	
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)	
Cooling	-	Convection Cooled	
Withstand Voltage	-	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC (1xMOPP) suitable for B & BF rated equipment	
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour	
Shock	-	< 196.1 m/s <sup>2</sup> , MIL-STD-810F	
Immunity	-	IEC61000-4-2 (lv 4), -3 (lv 3), -4 (lv 3), -5 (lv 3, 4), -6 (lv 3), -8 (lv 4), -11, Criteria A. IEC60601-1-2 Ed4 SEMIF47 (200-240VAC), IEC61000-4-11 (Class 3)	
Line Voltage Dips	-	Criteria A: Vin >120VAC or <70% load, Criteria B: Vin <120VAC and >70% load	
Safety Agency Certifications	-	EN/IEC/UL/ES/CSA60601-1, EN/IEC/UL/CSA60950-1, IEC60335-1, CE Mark	
Altitude	m	5,000m, derate operating ambient by 5°C/1000m above 3,000m	
Conducted & Radiated EMI	-	EN55011-B, EN55032-B, FCC Class B	
Weight (Typ)	g	62	120
Size (LxWxH)	mm(in)	76.2 x 50.8 x 24.2mm (3 x 2 x 0.95")	76.2 x 50.8 x 26.7mm (3 x 2 x 1.05")
Connectors (JST)*	-	Input (CN1): B2P3-VH(LF)(SN) (Mates with VHR-3N housing). Output (CN-51): B4P-VH(LF)(SN) (Mates with VHR-4N)	
Warranty	yrs	Three Years	

- Notes:
- \* See installation manual for terminal pin and hand tool information
  - (1) CUS30M: Derate linearly to 80% load from 115VAC to 85VAC. CUS60M: Derate linearly to 80% load from 100VAC to 85VAC
  - (2) All models except CUS60M-5
  - (3) Cycle AC to reset
  - (4) CUS30M-18, -48 and CUS60M-5, -12: Derate linearly to 50% load from +45 to +70°C

# TDK-Lambda CUS30M & CUS60M Series

Model Selector								
Model	Voltage	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV) <sup>(5)</sup>	Efficiency (typ) % <sup>(6)</sup>	Average Active Efficiency (typ) % <sup>(6)</sup>
CUS60M-5	5V	6.0	30.0	100	20	120	81 / 81	81 / 80
CUS30M-12	12V	2.5	30.0	120	48	120	87 / 88	87 / 87
CUS60M-12	12V	5.0	60.0	120	48	120	87 / 88	87 / 86
CUS60M-15	15V	4.0	60	120	60	150	88 / 89	87 / 87
CUS60M-18	18V	3.25	60.3	144	72	150	88 / 89	87 / 87
CUS30M-24	24V	1.25	30.0	192	96	150	88 / 90	87 / 87
CUS60M-24	24V	2.5	60.0	192	96	150	89 / 90	88 / 87
CUS30M-48	48V	0.63	30.24	384	192	200	88 / 90	88 / 89
CUS60M-48	48V	1.25	60.0	384	192	200	89 / 90	89 / 88

- Notes:
- (5) Ripple level increases at light loading to meet new efficiency standards
  - (6) 115/230VAC



For Additional Information, please visit [us.tdk-lambda.com/lp/products/cus-m-series](http://us.tdk-lambda.com/lp/products/cus-m-series)



**33-150W Single Output, High Reliability AC-DC Power Supplies**

**Features**

- ◆ 33W to 150W
- ◆ Universal Input (85 - 265VAC)
- ◆ Power factor Corrected
- ◆ Convection Cooled
- ◆ 5 year warranty
- ◆ Compact Design

**Key Market Segments & Applications**



Specifications		ZWS50BAF	ZWS75BAF	ZWS100BAF	ZWS150BAF
AC Input Voltage range	-	85-265VAC (47-63Hz)			
DC Input Voltage range	-	120 - 370VDC*			
Input Current (Typical)	A	0.65 / 0.35	0.95 / 0.5	1.3 / 0.65	1.9 / 0.95
Inrush Current	A	14 / 28 25°C ambient, cold start			
Power Factor (Active)	-	Meets EN61000-3-2 (Typically 0.97/0.91)			
Maximum Ripple and Noise	mV	3.3 & 5V: 120mV, 12 to 24V: 150mV, 48V: 200mV			
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection (1)	-	>105% of maximum output current			
Hold Up Time (Typ) at 100VAC	ms	20ms			
Leakage Current	-	0.5mA max, 0.4mA typ at 230VAC			
Remote On / Off	-	None			Optional
Operating Temperature (Convection)	°C	-10 to +70°C, derate linearly to 50% load from 50 to 70°C			
Operating Temperature (Forced Air)	°C	N/A	-10 ~+70°C, derate linearly to 75% load from 60 ~70°C		
Storage Temperature	°C	-30 to +75°C			
Humidity (non condensing)	-	Operating: 30 - 90%RH, storage: 10 - 90%RH			
Withstand Voltage	-	I/P to Gnd 2kVAC (10mA), I/P to O/P 3kVAC (10mA), O/P to Gnd 500VAC (20mA) for 1 min.			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s <sup>2</sup>			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 (OV II), CE Mark			
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC-B, VCCI-B			
Immunity	-	IEC61000-4-2 (lv 2,3), -3 (lv3), -4 (lv 3), -5 (lv 3,4), -6 (lv 3), -8 (lv 4), -11			
Weight (Typ)	g	165	230	290	390
Size (W x H x D)	in	1.97 x 1.02 x 5.2"	1.97 x 1.3 x 5.9"	2.44 x 1.3 x 6.1"	2.95 x 1.46 x 6.3"
Warranty	yrs	Five Years			

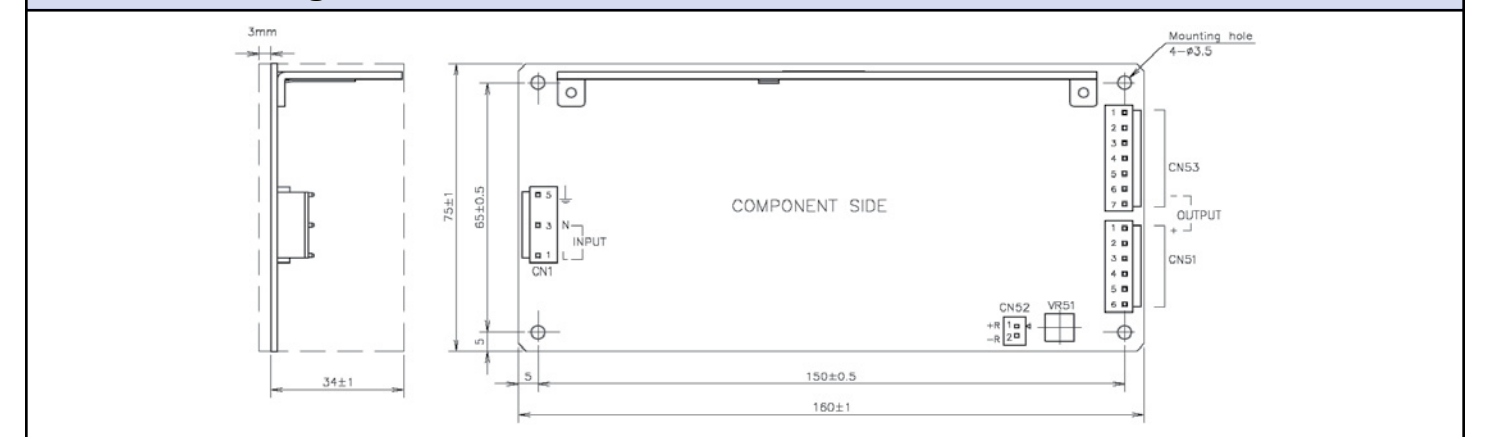
- Notes:
- (1) Avoid prolonged operation in overload
  - (2) 100 / 200VAC Input
  - (3) 60°C: 70% load

\*Safety certified for AC input only

**Model Selector**

Model	Adjust Voltage	Max Range	Current	Efficiency (typ) %	Load Reg (mV)	Line Reg (mV)	OVP (V)
ZWS50BAF-3	3.3V	2.97-3.63V	10A	76 / 78	40	20	3.79-4.95
ZWS75BAF-3	3.3V	2.97-3.63V	15A	76 / 78	40	20	3.79-4.95
ZWS100BAF-3	3.3V	2.97-3.63V	20A	82 / 84	40	20	3.79-4.95
ZWS150BAF-3	3.3V	2.97-3.63V	30A	82 / 84	40	20	3.79-4.95
ZWS50BAF-5	5V	4.5-5.5V	10A	82 / 84	40	20	5.75-7.0
ZWS75BAF-5	5V	4.5-5.5V	15A	82 / 84	40	20	5.75-7.0
ZWS100BAF-5	5V	4.5-5.5V	20A	84 / 86	40	20	5.75-7.0
ZWS150BAF-5	5V	4.5-5.5V	30A	85 / 87	40	20	5.75-7.0
ZWS50BAF-12	12V	10.8-13.2V	4.3A	83 / 85	96	48	13.8-16.2
ZWS75BAF-12	12V	10.8-13.2V	6.3A	83 / 85	96	48	13.8-16.2
ZWS100BAF-12	12V	10.8-13.2V	8.5A	86 / 88	96	48	13.8-16.2
ZWS150BAF-12	12V	10.8-13.2V	12.5A	85 / 88	96	48	13.8-16.2
ZWS50BAF-15	15V	13.5-16.5V	3.5A	83 / 86	120	60	17.3-20.3
ZWS75BAF-15	15V	13.5-16.5V	5A	84 / 86	120	60	17.3-20.3
ZWS100BAF-15	15V	13.5-16.5V	6.7A	86 / 88	120	60	17.3-20.3
ZWS150BAF-15	15V	13.5-16.5V	10A	86 / 89	120	60	17.3-20.3
ZWS50BAF-24	24V	21.6-26.4V	2.1A	84 / 87	150	96	27.6-32.4
ZWS75BAF-24	24V	21.6-26.4V	3.2A	84 / 87	150	96	27.6-32.4
ZWS100BAF-24	24V	21.6-26.4V	4.3A	87 / 89	150	96	27.6-32.4
ZWS150BAF-24	24V	21.6-26.4V	6.3A	88 / 90	150	96	27.6-32.4
ZWS50BAF-48	48V	39.5-52.8V	1.1A	84 / 86	240	192	55.2-64.8
ZWS75BAF-48	48V	39.5-52.8V	1.6A	85 / 88	240	192	55.2-64.8
ZWS100BAF-48	48V	39.5-52.8V	2.1A	88 / 90	240	192	55.2-64.8
ZWS150BAF-48	48V	39.5-52.8V	3.2A	89 / 91	240	192	55.2-64.8

**Outline Drawing ZWS150BAF**



**Other Industrial Products**

HWS	15W to 1800W Single output
ZPSA	20W to 60W Single, Dual & Triple output
NV	175W to 300W Single, Dual, Triple & Quad output
CSS	40W to 150W Single output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/zws-series.htm](http://us.tdk-lambda.com/lp/products/zws-series.htm)



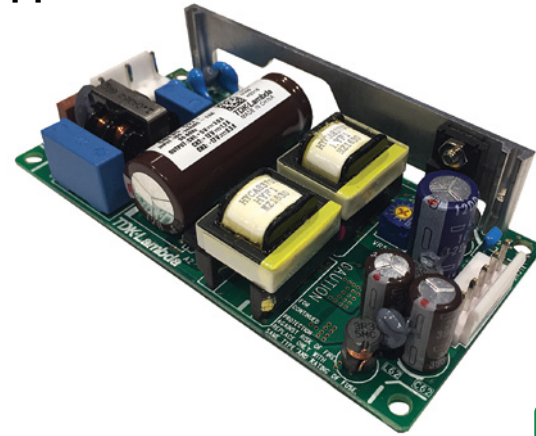
**Options**

Suffix	Description	Notes
-	Open Frame	-
/L	With L bracket case	-
/A	With L bracket & Cover	-
/R	Remote On/Off	Not on ZWS50 or 75BAF
/CO2	Conformal Coating	-

**Dual or Triple Output 35W Low Profile Power Supplies**

**Features**

- ◆ 2 x 4 x 1.06" footprint
- ◆ Output 1 isolated from outputs 2 & 3
- ◆ No minimum loading
- ◆ Medical & ITE Certifications
- ◆ Three year warranty



**Key Market Segments & Applications**

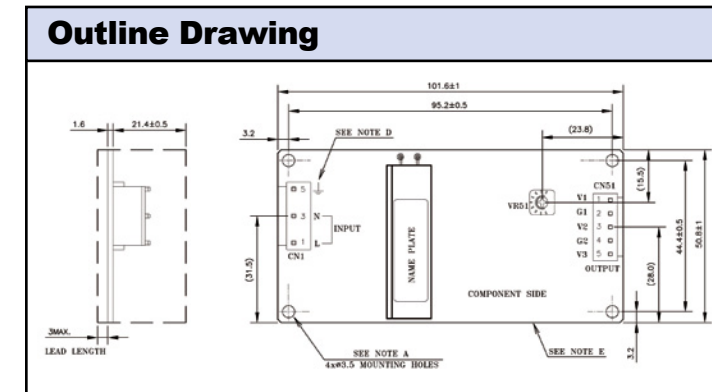


Specifications		
Model	CUT35-522	CUT35-5FF
AC Input Voltage (1)	VAC	85 - 265VAC
Input Frequency	Hz	47 - 63Hz
DC Input Voltage	VDC	88 - 370VDC (No safety certification)
Inrush Current (cold start)	A	13A at 100VAC, 32A at 230VAC
Power Factor	-	Meets EN61000-3-2
Input Current (100 / 200VAC)	A	1 / 0.5
Temperature Coefficient (-20 to +70°C)	-	V1: <0.02%/°C, V2 & 3 <0.03%/°C
Overcurrent Protection	-	> 105%
Overvoltage Protection (2)	V	V1: 5.7-7.0, V2: 13.8 - 16.8V   V1: 5.7-7.0, V2: 17.2 - 21.0V
Efficiency (Typical at 200VAC Input)	%	81%   82%
Hold Up Time (115 / 230V input)	ms	20ms
Leakage Current (265VAC 50Hz)	mA	<0.3mA
Operating Temperature (3)	-	Open Frame & /B:-20 to +70°C. Derate linearly to 70% load from +55 to +70°C Cover:-20 to +60°C. Derate linearly to 70% load from +45 to +60°C
Storage Temperature	-	-30 to +85°C
Operating Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, V1 to V2 / V3 500VAC for 1 min.
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Immunity	-	IEC61000-4-2 (lv 3, 4), -3 (lv3), -4 (lv 4), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11
Safety Agency Certifications	-	UL60950-1, CSA60950-1-07 (cTUVus), EN60950-1, CE Mark ANSI/AAMI ES60601-1, CSA 60601-1 (cTUVus), IEC/EN60601-1 (2 x MOOP) EN55011-B, FCC-B
Conducted & Radiated EMI	-	
Weight (Typ)	g	Open frame: 90, Baseplate: 136, Cover: 175
Size (WxLxH)	in (mm)	Open Frame: 2 x 4 x 1.06" (50.8 x 101.6 x 27) Baseplate: 2.22 x 4.8 x 1.1" (56.5 x 122 x 28) Cover: 2.48 x 4.92 x 1.42" (63.1 x 125 x 36)
Warranty	yrs	Three Years

(1) Derate linearly to 60% load from 100VAC to 85VAC input when ambient is <-10°C  
 (2) Cycle AC to reset  
 (3) See derating curves in installation manual for all mounting orientatons

Model Selector								
Model		Voltage (V)	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)
CUT35-522	V 1	5V	5 - 5.25	3	15	100	50	120
	V2	+12V	Fixed	1.2	20.4	600	240	150
	V3	-12V	Fixed	0.85		600	240	150
CUT35-522	V1	5V	5 - 5.25	3	15	100	50	120
	V2	24V	Fixed	0.85	20.4	750	300	150
(Leave common terminal unconnected)								
CUT35-5FF	V1	5V	5 - 5.25	3	15	100	50	120
	V2	+15V	Fixed	1	19.5	750	300	150
	V3	-15V	Fixed	0.65		750	300	150
CUT35-5FF	V1	5V	5 - 5.25	3	15	100	50	120
	V2	30V	Fixed	0.65	19.5	750	300	150
(Leave common terminal unconnected)								

Note CUT35 can be configured as a dual or single output.



Options	
Suffix	Description
Blank	Open frame with JST connectors
/A	Cover with JST connectors
/B	Baseplate with JST connectors

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cut75-series.htm](http://us.tdk-lambda.com/lp/products/cut75-series.htm)



**75W Dual or Triple Output Low Profile Power Supplies**

**Features**

- ◆ 3 x 5 x 1.06" footprint
- ◆ Output 1 isolated from outputs 2 & 3
- ◆ No minimum loading
- ◆ Convection Cooled
- ◆ Three year warranty



**Key Market Segments & Applications**

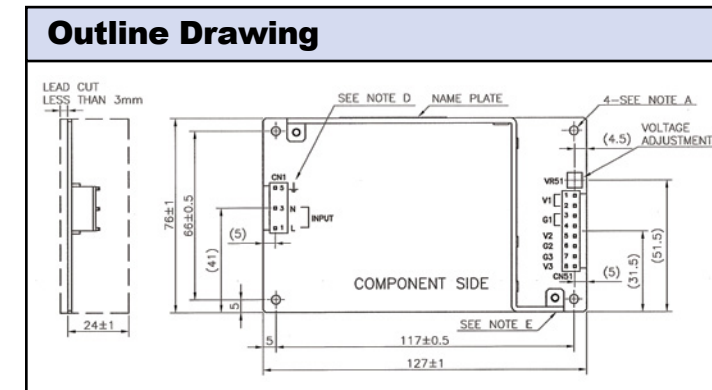


Specifications		
Model	CUT75-522	CUT75-5FF
AC Input Voltage (1)	VAC	85 - 265VAC
Input Frequency	Hz	47 - 63Hz
DC Input Voltage	VDC	120 - 370VDC (No safety certification)
Inrush Current (cold start)	A	18A at 100VAC, 36A at 200VAC
Power Factor	-	Meets EN61000-3-2
Input Current (100 / 200VAC)	A	2 / 1
Temp. Coefficient (-20 to +70°C)	-	V1: <0.02%/°C, V2 & 3 <0.03%/°C
Overcurrent Protection	-	> 105%
Overvoltage Protection (2)	V	V1: 5.7-7.0, V2: 13.8 - 18.8V   V1: 5.7-7.0, V2: 17.2 - 21.0V
Efficiency (Typical)	%	85% at 200VAC input
Hold Up Time (115 / 230V input)	ms	20ms
Leakage Current (265VAC 50Hz)	mA	<0.3mA
Operating Temperature (3)	-	-20 to +70°C. Derate linearly to 60% load from +50 to +70°C
Storage Temperature	-	-30 to +85°C
Op. Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Convection
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, V1 to V2 / V3 500VAC for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Immunity	-	IEC61000-4-2 (lv 3, 4), -3 (lv3), -4 (lv 4), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11
Safety Agency Certifications	-	UL60950-1, CSA60950-1-07 (cTUVus), EN60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011/EN55022-B, FCC--B
Weight (Typ)	g	210 (open frame version)
Size (WxLxH)	in (mm)	3 x 5 x 1.06" (76 x 127 x 27)
Warranty	-	Three Years

- (1) Derate linearly to 60% load from 100VAC to 85VAC input
- (2) Cycle AC to reset
- (3) See derating curves in installation manual for all mounting orientatons

Model Selector								
Model		Voltage (V)	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)
CUT75-522	V 1	5V	5.0 - 5.25	8	40	100	50	120
	V2	+12V	Fixed	3	36	600	240	150
	V3	-12V	Fixed	1		600	240	150
CUT75-522	V1	5V	5.0 - 5.25	8	40	100	50	120
	V2	24V	Fixed	1	24	750	300	150
(Leave common terminal unconnected)								
CUT75-5FF	V1	5V	5.0 - 5.25	8	40	100	50	120
	V2	+15V	Fixed	2.5	37.5	750	300	150
	V3	-15V	Fixed	1		750	300	150
CUT75-5FF	V1	5V	5.0 - 5.25	8	40	100	50	120
	V2	30V	Fixed	1	30	750	300	150
(Leave common terminal unconnected)								

Note: CUT75 can be configured as a dual or triple output.



Options	
Suffix	Description
Blank	Open frame with JST connectors
/A	Cover with JST connectors
/B	Baseplate with JST connectors
/T	Open frame with screw connections
/TA	Cover with screw connections
/TB	Baseplate with screw connections

Preferred Model

Similar Models	
SC40-60	3x5" 40W to 60W 1 to 3 outputs
ZPT	2x4" 40W 1 to 3 outputs
NV175	3x5" 175W, 1 to 4 outputs
ZMS100	2x4" 100W single output

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cut75-series.htm](http://us.tdk-lambda.com/lp/products/cut75-series.htm)

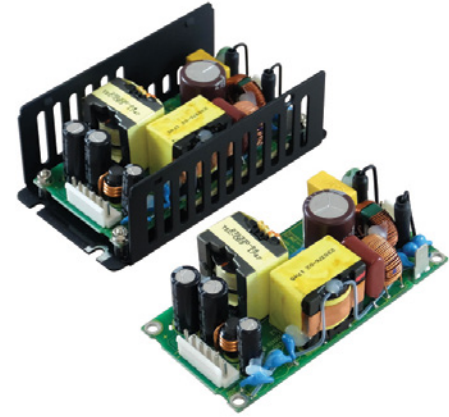
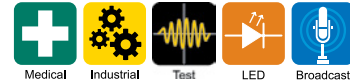


**2 x 4" 100W AC-DC Power Supplies**

**Features**

- ◆ Convection, conduction or forced air cooling
- ◆ 100W Rating at 50°C Ambient
- ◆ 50W Conduction Cooling Rating at 80°C Ambient
- ◆ 75W With 1m/s Airflow at 85°C Ambient
- ◆ ITE & Medical Certifications (2 x MOPP)
- ◆ Suitable for Class I and Class II installations
- ◆ Class B Conducted and Radiated EMI

**Key Market Segments & Applications**



Specifications		CUS100ME
Model		CUS100ME
Input Voltage range		85 - 264VAC (47 - 440Hz <sup>(1)</sup> ). Derate linearly to 90% load from 90 to 85VAC input
Inrush Current (Cold start at 230VAC input)	A	<65A
Input Current (100W load)	A	1.4A at 100VAC input
Hold Up Time (Typ)	ms	>24ms
Harmonic Compliance	-	EN/IEC61000-3-2 Class A. Minimum PF 0.97/0.89 (115/230Vac, 100% load)
Leakage Current	uA	<250uA at 230VAC 63Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	%/°C	±0.02%/°C
No Load Power Draw at 230VAC input	W	<0.5W
Output Adjustment	-	No adjustment
Ripple & Noise	mV (pk-pk)	≤1%
Load Regulation	mV	≤1% (0 - 100% load)
Line Regulation	mV	≤0.5% (85 - 264VAC)
Short Circuit Protection	%	110 - 190%. Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 94%
Active Average Efficiency	%	>87%
Operating Temperature	-	-20°C to +85°C, see derating curves for operation above +50°C <sup>(2)</sup>
Storage Temperature	°C	-40 to +85°C
Operational Altitude	m	5000m
Humidity (non condensing)	%RH	5 - 95%RH
Cooling	-	Convection, conduction (coldplate) or forced air cooling <sup>(2)</sup>
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Isolation Resistance	MΩ	>100MΩ at 25C & 70%RH, Output to Ground 500VDC
Insulation Class	-	Construction suitable for Class I or Class II installation
Vibration (non operating)	-	2G, 10-500Hz for 1 hour
Shock	-	30G, 11ms half sine
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ES60601-1. Designed to meet IEC61010-1. EN60335-1 (3)
Conducted & Radiated EMI	-	EN55011 / EN55032-B (See application notes for conditions)
Immunity	-	EN61000-4-2 (Lvl 4), -3 (Lvl 3), -4 (Lvl 4), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 4) -11 (class 3), EN60601-1-2:2015 (Ed4)
Weight (Typ)	g	Open Frame: 180g; /U: 240g; /A: 255g; /B: 220g
Size (WxLxH)	In (mm)	Open frame version: 2 x 4 x 1.24" (50.8 x 101.6 x 31.5mm)
Warranty	yrs	Five years
Connectors	-	Input: JST B2P3-VH, Output: JST B6P-VH

Note 1: For operation at 400-440Hz and/or DC input please contact Technical Sales

Note 2: See website for full derating curves

Note 3: EN60335-1 Compliant versions available (subject to MOQ). Please contact Technical Sales

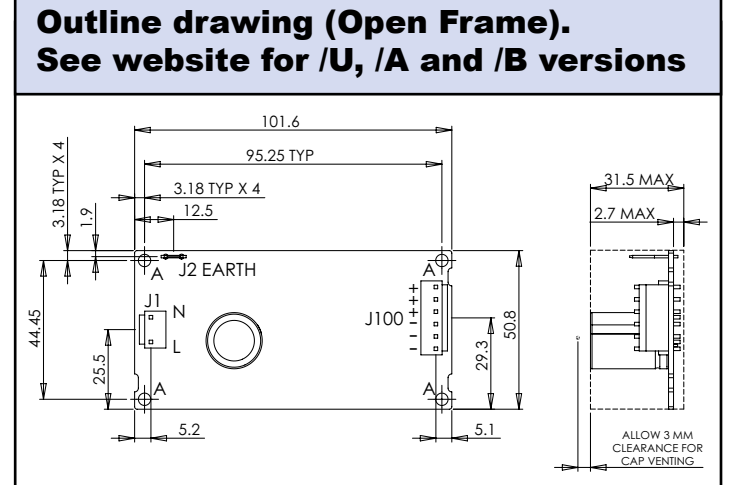
Model Selector			
Model	Nominal Output Voltage (V)	Maximum Current Convection <sup>(2)</sup> (A)	Maximum Power <sup>(2)</sup> (W)
CUS100ME-12	12	8.33	100
CUS100ME-12/U	12	8.33	100
CUS100ME-12/A	12	8.33	100
CUS100ME-12/B	12	8.33	100
CUS100ME-15	15	6.66	100
CUS100ME-15/U	15	6.66	100
CUS100ME-15/A	15	6.66	100
CUS100ME-15/B	15	6.66	100
CUS100ME-18	18	5.55	100
CUS100ME-18/U	18	5.55	100
CUS100ME-18/A	18	5.55	100
CUS100ME-18/B	18	5.55	100
CUS100ME-24	24	4.16	100
CUS100ME-24/U	24	4.16	100
CUS100ME-24/A	24	4.16	100
CUS100ME-24/B	24	4.16	100
CUS100ME-28	28	3.57	100
CUS100ME-28/U	28	3.57	100
CUS100ME-28/A	28	3.57	100
CUS100ME-28/B	28	3.57	100
CUS100ME-36	36	2.77	100
CUS100ME-36/U	36	2.77	100
CUS100ME-36/A	36	2.77	100
CUS100ME-36/B	36	2.77	100
CUS100ME-48	48	2.08	100
CUS100ME-48/U	48	2.08	100
CUS100ME-48/A	48	2.08	100
CUS100ME-48/B	48	2.08	100

Note 2: See website for full derating curves

Non-standard outputs can be requested within the following ranges \* Subject to MOQ, please consult sales

Model:	CUS100ME-12	CUS100ME-15	CUS100ME-18	CUS100ME-24	CUS100ME-28	CUS100ME-36	CUS100ME-48
Voltage range:	12 - 13.2	15 - 16.5	18 - 19.8	24 - 26.4	28 - 30.8	36 - 39.6	48 - 50

Non-standard output versions may be subject to minimum order quantities and variations to specification. For all non-standard output voltage settings please consult Sales.



Style	Cooling	Output Power / Ambient Temperature			
		-20 to 50°C	70°C	80°C	85°C
Open frame	Convection	100W	60W	20W	-
/U or /B	Conduction	100W	100W	50W	-
All versions	1m/s air	100W	100W	83.3W	75W

Options	
Suffix	Description
Blank	Open frame construction, dual input fuses, JST connectors
/U	U channel construction
/A	U channel with cover
/B	Baseplate
/M*	Molex connectors
/E*	Single input fuse in Live line
Examples CUS100ME-24/UEM, CUS100ME-12V5/A (example of model set at 12.5V)	

For Additional Information, please visit <http://www.us.tdk-lambda.com/lp/products/cus-m-series>

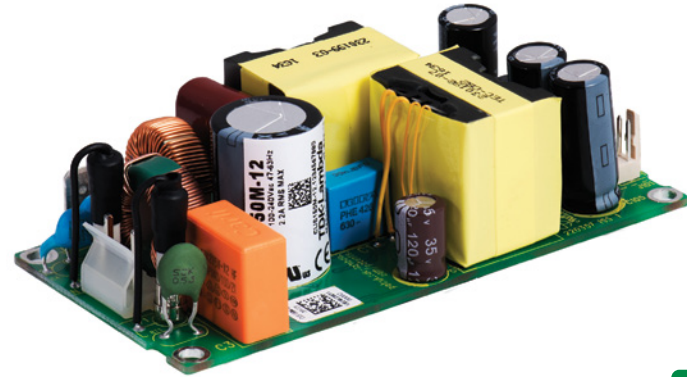




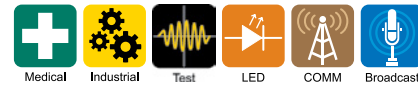
**2 x 4" 150W AC-DC Power Supplies**

**Features**

- ◆ 150W Convection Rating (/U version)
- ◆ ITE & Medical Certifications (2 x MOPP)
- ◆ Class B Conducted and Radiated EMI
- ◆ Suitable for Class I and Class II installations
- ◆ Compact 2 x 4 x 1.24" Footprint
- ◆ Suitable for BF Rated Equipment
- ◆ Operation up to 85°C Ambient



**Key Market Segments & Applications**



Specifications		CUS150M
Model		CUS150M
Input Voltage Range (1)	-	85 - 264VAC (47 - 440Hz (2)). Derate linearly to 90% load from 90 to 85VAC input
Inrush Current (Cold start at 230VAC input)	A	<65A
Input Current (150W load)	A	2.2A at 100VAC input
Hold Up Time (Typ)	ms	>18ms
Harmonic Compliance	-	EN/IEC61000-3-2 Class A, Class C >120W. Minimum PF 0.98/0.92 (115/230Vac, 100% load)
Leakage Current	uA	<250uA at 230VAC 63Hz
Touch Current (enclosure leakage)	uA	<100uA
Temperature Coefficient	%/°C	±0.02%/°C
No Load Power Draw at 230VAC input	W	<0.5W
Output Adjustment	-	No adjustment
Fan Supply	-	10 - 12V (see model selector), 0.5A, +14%/-6% regulation
Ripple & Noise	mV (pk-pk)	<1%
Load Regulation	mV	≤1% (0 - 100% load)
Line Regulation	mV	≤0.5% (90 - 264VAC)
Short Circuit Protection	%	110 - 170%. Hiccup mode, automatic recovery
Overvoltage Protection	V	Latching (unit shutdown), cycle AC input to reset
Efficiency	%	Up to 94%
Active Average Efficiency	%	>91%
Operating Temperature	-	-20 (1) to +85°C, see derating curves on website (70°C maximum for fan version /F)
Storage Temperature	°C	-40 to +85°C (70°C maximum for fan version /F)
Operational Altitude	m	5000m
Humidity (non condensing)	%RH	5 - 95%RH (15 - 90%RH for /F fan version)
Cooling	-	Convection, conduction or forced air cooling (see derating curves on website)
Withstand Voltage	VAC	Input to Ground 1.5kVAC (1xMOPP), Input to Output 4kVAC (2xMOPP), Output to Ground 1.5kVAC (1xMOPP)
Isolation Resistance	MΩ	>100MΩ at 25C & 70%RH, Output to Ground 500VDC
Insulation Class	-	Construction suitable for Class I or Class II installation
Vibration (non operating)	-	2G, 10-500Hz for 1 hour
Shock	-	30G, 11ms half sine
Safety Agency Certifications	-	IEC/EN/UL60950-1 and 60601-1. ES60601-1. Designed to meet IEC61010-1. EN60335-1 compliant models available (1)
Conducted & Radiated EMI Immunity	-	EN55011 / EN55032-B (See application notes for conditions) EN60601-1-2:2015 (Edition 4), EN61000-4-2 (Lvl 4), -3 (Lvl 3), -4 (Lvl 4), -5 (Lvl 3), -6 (Lvl 3), -8 (Lvl 4) -11 (class 3)
Weight (Typ)	g	Open Frame: 185g; /U: 245g; /A: 255g; /B: 220g, /F: 265g
Size (WxLxH)	In (mm)	Open frame version: 2 x 4 x 1.24" (50.8 x 101.6 x 31.5mm)
Warranty	yrs	Five years
Connectors	-	Input: JST B2P3-VH, Output: JST B6P-VH, Fan: Molex 22-04-1021

Note 1: Contact factory regarding option models for -40°C start up, DC input and models compliant to EN60335-1. MOQs may apply.  
Note 2: For operation at 400-440Hz, please contact Technical Support.

**Model Selector**

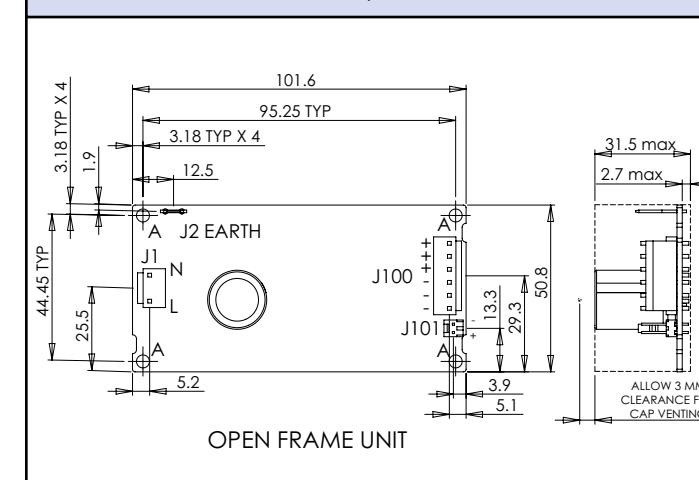
Model	Nominal Output Voltage (V)	Fan Supply Voltage (V)	Maximum <sup>(3)</sup> Current Convection (A)	Maximum Current Forced Air (A)	Maximum <sup>(3)</sup> Power Convection (W)	Maximum Power Forced Air (W)
CUS150M-12 or /B	12	11.6	10	12.5	120	150
CUS150M-12/A or U	12	11.6	12.5	12.5	150	150
CUS150M-12/F	12	11.6	12.5	-	150	-
CUS150M-15 or /B	15	9.8	8	10	120	150
CUS150M-15/A or U	15	9.8	10	10	150	150
CUS150M-15/F	15	9.8	10	-	150	n/a
CUS150M-18 or /B	18	11.6	6.66	8.33	120	150
CUS150M-18/A or U	18	11.6	8.33	8.33	150	150
CUS150M-18/F	18	11.6	8.33	n/a	150	n/a
CUS150M-24 or /B	24	11.6	5	6.25	120	150
CUS150M-24/A or U	24	11.6	6.25	6.25	150	150
CUS150M-24/F	24	11.6	6.25	-	150	-
CUS150M-28 or /B	28	10.8	4.3	5.4	120	150
CUS150M-28/A or U	28	10.8	5.4	5.4	150	150
CUS150M-28/F	28	10.8	5.4	-	150	-
CUS150M-36 or /B	36	11.6	3.33	4.2	120	150
CUS150M-36/A or U	36	11.6	4.2	4.2	150	150
CUS150M-36/F	36	11.6	4.2	-	150	-
CUS150M-48 or /B	48	11.6	2.5	3.12	120	150
CUS150M-48/A or U	48	11.6	3.12	3.12	150	150
CUS150M-48/F	48	11.6	3.12	-	150	-

Note 3: See derating curves on website Non-standard outputs can be requested within the following ranges (excluding the /F version);

Model:	CUS150M-12	CUS150M-15	CUS150M-18	CUS150M-24	CUS150M-28	CUS150M-36	CUS150M-48
Voltage range:	12 - 13.2	15 - 16.5	18 - 19.8	24 - 26.4	28 - 30.8	36 - 39.6	48 - 50

Non-standard output versions may be subject to minimum order quantities and variations to specification. For all non-standard output voltage settings please consult Sales.

**Outline drawing (Open Frame). See website for /U, /A and /F versions**



**Options**

Suffix	Description
Blank	Open frame construction, dual input fuses, JST connectors
/B	Base plate
/U	U channel construction
/A	U channel with cover
/F	U channel with cover construction, top mounted fan
/E*	Single input fuse in Live line
/M*	Molex connectors

**Example:**  
CUS150M-15/UE U channel with cover construction, single input fuse

\* Subject to MOQ, please consult sales

For Additional Information, please visit <http://www.us.tdk-lambda.com/lp/products/cus-m-series>



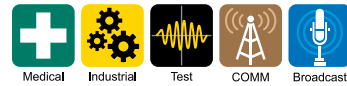
## 175-200W, 3" x 5" Power Supplies

### Features

- ◆ 1-5 Outputs
- ◆ Up to 90% Efficient
- ◆ Active Power Factor Correction
- ◆ Universal Input (90 - 264VAC)
- ◆ No Minimum Loads
- ◆ Medical Approvals (Basic Insulation Input-Output)



### Key Market Segments & Applications



### Specifications

Model		NV175
Input Voltage range	-	90 - 264VAC (47 - 63Hz, 440Hz with reduced PFC)
Inrush Current	A	<40A at 25C and 230VAC input, Cold Start
Power Factor Harmonics	-	EN61000-3-2 Compliant (0.97 typical)
Regulation Total	-	1%; Including Line (for 90-264VAC input change), Load (for 0-100% load change) and Cross (for 0-100% load change on any other output) regulation
Ripple & Noise	mV	1% or 50mV (Which ever is greater)
Efficiency	-	Up to 90%, configuration dependant
Minimum Load	A	None
Overcurrent Protection	-	>105%
Overvoltage Protection	V	CH1 & CH2, 120-130%, Cycle AC line to reset
Overtemperature Protection	-	Yes
Hold Up Time (Typ)	ms	>16ms at 90VAC Input
Leakage Current (max)	µA	123µA 120VAC 60Hz, 257µA 240VAC 60Hz, <300µA 264VAC 63Hz (Type Test results)
Remote Sense	-	On Outputs CH1 & CH2, 0.5V compensation maximum
DC Good	-	CH1 Only, High on Fail (90% of nominal ±5%)
Remote On/Off (Specify N option)	-	-N1 or -N2 option: TTL level high = Off, -N3 or -N4 option: open circuit = Off (except standby)
Operating Temperature (1)(7)	-	0 to +70°C. Derate linearly to 50% load from 50°C to 70°C
Storage Temperature	-	-40 to +85°C
Humidity (non condensing)	-	5 - 95% RH
Cooling	-	Forced air, 2m/s from input to output (Approx 10 CFM)
Isolation (4)	-	Input to Ground 2.3kVDC, Input to Output 4.3kVDC, Output to Ground 200VDC
Vibration (non operating)	-	Conforms to MIL-STD-810E, Method 514.4, Pro I, Cat 1,9; EN60068-2-6, IEC68-2-6
Shock	-	Conforms to MIL-STD-810E/F, Method 516.5, Pro I, IV, VI; EN60068-2-27, EN60068-2-47, IEC68-2-47, IEC68-2-47, JIS C0041-1987
Safety Agency Approvals	-	UL/CSA/IEC/EN 60950-1, UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, IEC/EN 61010-1, CE Mark
Immunity	-	EN61000-6-2:2001, EN61000-4-2, -3, -4, -5, -6, -8, -11
Conducted Emissions and Flicker	-	EN55022 Class B (per CISPR.22), EN61000-3-3
Radiated Emissions (2)	-	EN55022 Class A (per CISPR.22)
Weight (Typ)	g	250g
Size (without cover) (3)	in	3" x 5" x 1.25"; N option version 3.7" x 5" x 1.25"
Warranty	yrs	Three Years

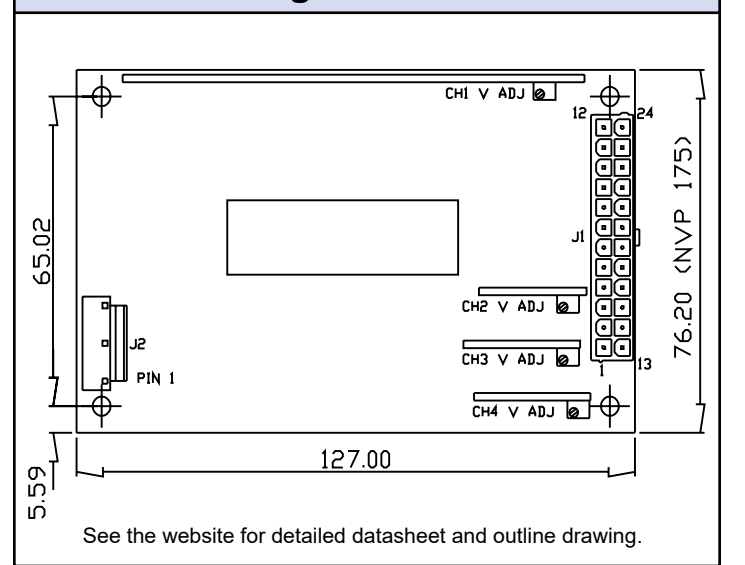
(1) -20°C cold start  
 (2) See application note for Class B  
 (3) Including underside component leads  
 (4) Input-Output: Reinforced IEC60950-1, Basic IEC 60601-1.  
 See NV175-M for reinforced medical insulation

### Stocked Models Quick Selector

Model	CH1 (5)	CH2 (5)	CH3	CH4	CH5 Stand By (6)	Global Option Type
NV1-1T000	12V/15A	-	-	-	-	-
NV1-1G000	24V/7.5A	-	-	-	-	-
NV1-453TT	+5V/25A	+3.3V/15A	+12V/5A	-12V/1A	-	-
NV1-453FF	+5V/25A	+3.3V/15A	+15V/5A	-15V/1A	-	-
NV1-4G5TT	+24V/7.5A	+5V/8A	+12V/5A	-12V/1A	-	-
NV1-4G5FF	+24V/7.5A	+5V/8A	+15V/5A	-15V/1A	-	-
NV1-453TT-N3	+5V/25A	+3.3V/15A	+12V/5A	-12V/1A	5V/2A N3 (ATX)	-
NV1-453FF-N3	+5V/25A	+3.3V/15A	+15V/5A	-15V/1A	5V/2A N3 (ATX)	-
NV1-4G5TT-N3	+24V/7.5A	+5V/8A	+12V/5A	-12V/1A	5V/2A N3 (ATX)	-
NV1-4G5FF-N3	+24V/7.5A	+5V/8A	+15V/5A	-15V/1A	5V/2A N3 (ATX)	-

Notes:  
 (5) Maximum combined current from CH1 + CH2 = 25A  
 5V CH1 models are limited to 175W max. All others 180W, 200Wpk 5 mins  
 (6) CH5 is always on regardless of inhibit status. Peak rated at 2.5A, floating output  
 (7) Convection cooled maximum ratings: CH1: 55W, Ch2: 8.25W, Ch3: 9W, CH4: 3W, 75.25W total. 0°C - 40°C temperature range  
 (8) 12 - 12.5V if 24V CH3 is fitted.  
 (9) 14.5 - 15.5V if 24V CH3 is fitted.  
 (10) 24 - 24.5V if 5V CH2 is fitted.  
 24 - 26V if 24V CH3 is fitted

### Outline Drawing



### Built to Order Model Selector

CH1	CH1(5) Code	Adjust. Range	CH2(5) Code	Adjust. Range	CH3 Code	Adjust. Range	CH4 Code	Adjust. Range			
+5V / 25A	5	5 - 5.5V	+1.8V / 15A +2.7V / 15A +3.3V / 15A No output	1 2 3 0	0.9 - 3.3V 2.5 - 3.3V 2.5 - 3.3V -	-	-12V / 1A -15V / 1A -3.3V / 2A -5V / 2A -12V / 2A -15V / 2A Fan Supply only No output	T F 3H 5H TH FH 0H 0	Fixed Fixed Fixed Fixed Fixed Fixed Fixed -		
+12V / 15A +15V / 12A	T F	12 - 15V (8) 12 - 15V (9)	+5V / 10A No output	5 0	3.3 - 5.5V -	+12V / 5A +15V / 5A +24V / 2.5A No output	T F G 0	12 - 15V 12 - 15V 18 - 24V -	-	-	-
+24V / 7.5A	G	24 - 28V (10)	+5V / 8A No output	5 0	3.3 - 5.5V -	-	-	-	-	-	-

Add "Y" to code for negative polarity output  
 Add "P" to code for positive polarity output

### How to Create a Model Number

NV1-	Enter number of outputs	CH1 Code	CH2 Code	CH3 Code	CH4 Code	Global Option	Case Option
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No Option	Blank	Blank	No Case
AC Fail, Remote On/Off, 5V/2A Standby, CH1 DC Good	N	U	U Chassis
AC Fail, Remote On/Off, 12V/1A Standby, CH1 DC Good	N1	C	U Chassis with Cover
AC Fail, Remote On/Off, 13.5V/1A Standby, CH1 DC Good	N2	F	U Chassis, Cover and Fan*
ATX AC Fail+Remote On/Off, 5V/2A Standby, CH1 DC Good	N3	I	U Chassis, Cover and Fan*
ATX AC Fail+Remote On/Off, 12V/1A Standby, CH1 DC Good	N4	I	and IEC inlet

\* A high output CH4 (3H, 5H, TH, FH) or fan supply 0H must be selected to provide fan option.

### Example

**NV1 3 G 5 0 3HP N C**

Description: Triple output, 24V/7.5A, 5V/8A, 3.3V/2A, Global option N, U Chassis with cover.

### Mating Parts (Molex)

CONN	Housing	Pins
J1	39-01-2245	45750-3112
J2	09-50-8051	08-52-0113

### Other Industrial Products

NV	300 to 700W Medical, 1-6 outputs
SC40/60	40 to 80W single, dual & triple 3x5 footprint
ZWS/ZWSPAF	5 to 240W single output power supplies

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/nv-series.htm](http://us.tdk-lambda.com/lp/products/nv-series.htm)



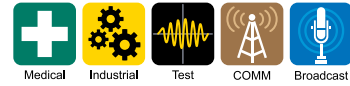
**Single Output 200 to 250W Medical & ITE Power Supplies**

**Features**

- ◆ High Efficiency, up to 94%
- ◆ Industry Standard 3" x 5" Footprint
- ◆ 200W Convection Cooled Rating
- ◆ Suitable for B and BF rated equipment
- ◆ 5V Standby Output



**Key Market Segments & Applications**



Specifications		CUS200M
Model		CUS200M
AC Input Voltage	VAC	85 - 265VAC (1)
Input Frequency	Hz	47 - 63Hz
Inrush Current (cold start)	A	35A at 115VAC, 70A at 230VAC
Power Factor	-	Meets EN61000-3-2 Class A (Typical PF 0.99/0.95) (2)
Input Current (115/230VAC)	A	200W output: 2.2 / 1.1A; 250W output: 3.0 / 1.5A
Off-load Power Draw	W	<0.5W at 230VAC (In standby mode using remote on/off)
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection	-	12V: >17.2A, 18V: > 14.7A, 24V: > 11A, 36V: > 7.4A, 48V: > 5.5A
Overvoltage Protection (3)	V	12V: 13.2 - 16.2V, 18V: 19.8 - 24.3V, 24V: 26.4 - 32.4V, 36V: 39.6 - 48.6V, 48V: 52.8 - 64.8V
Hold Up Time (115 / 230V input)	ms	16ms at 200W output, 12ms at 250W
Leakage Current	mA	<0.3mA at 265VAC, 60Hz
Remote Sense	-	No
Remote On/Off	-	Apply voltage to isolated terminals to shut unit down
Power Good	-	Isolated transistor, On = Good. Gives >5ms warning of AC power loss
Standby Voltage	-	5V 0.6A (convection), 1A (forced air)
Operating Temperature	°C	-20 to +70°C. (-40°C start up) Derate linearly to 50% load from +50 to +70°C (4)
Storage Temperature	°C	-40 to +85°C
Humidity (non condensing)	%RH	10 - 95%RH (Operating & Storage)
Cooling	-	Convection or Forced Air Cooled (1.5m/s across terminals)
Withstand Voltage	-	Input to Ground 2kVAC (1xMOPP), Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC (1xMOPP) suitable for B & BF rated equipment
Isolation Resistance	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz: 19.6m/s <sup>2</sup> constant sweep 1 min X, Y, Z for 1 hour
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Immunity	-	IEC61000-4-2 (lv 2, 3), -3 (lv3), -4 (lv 3), -5 (lv3, 4), -6 (lv 3), -8 (lv 4), -11, EN60601-1-2:2015 (Ed4)
Safety Agency Certifications	-	EN/IEC/UL/ES/CSA 60601-1, EN/IEC/UL/CSA60950-1, CE Mark
Conducted & Radiated EMI	-	EN55011-B, EN55032-B, FCC Class B
Weight (Typ)	g	350
Size (LxWxH)	mm (in)	127 x 76.2 x 34mm (5 x 3 x 1.34")
Warranty	yrs	Three Years

**Notes:**

- (1) Derate linearly to 80% load from 115 to 85VAC input
- (2) 115 / 230VAC input
- (3) Cycle AC to reset
- (4) /A suffix (cover): -20 to +60°C. (-40°C start up) Derate linearly to 50% load from +35 to +60°C

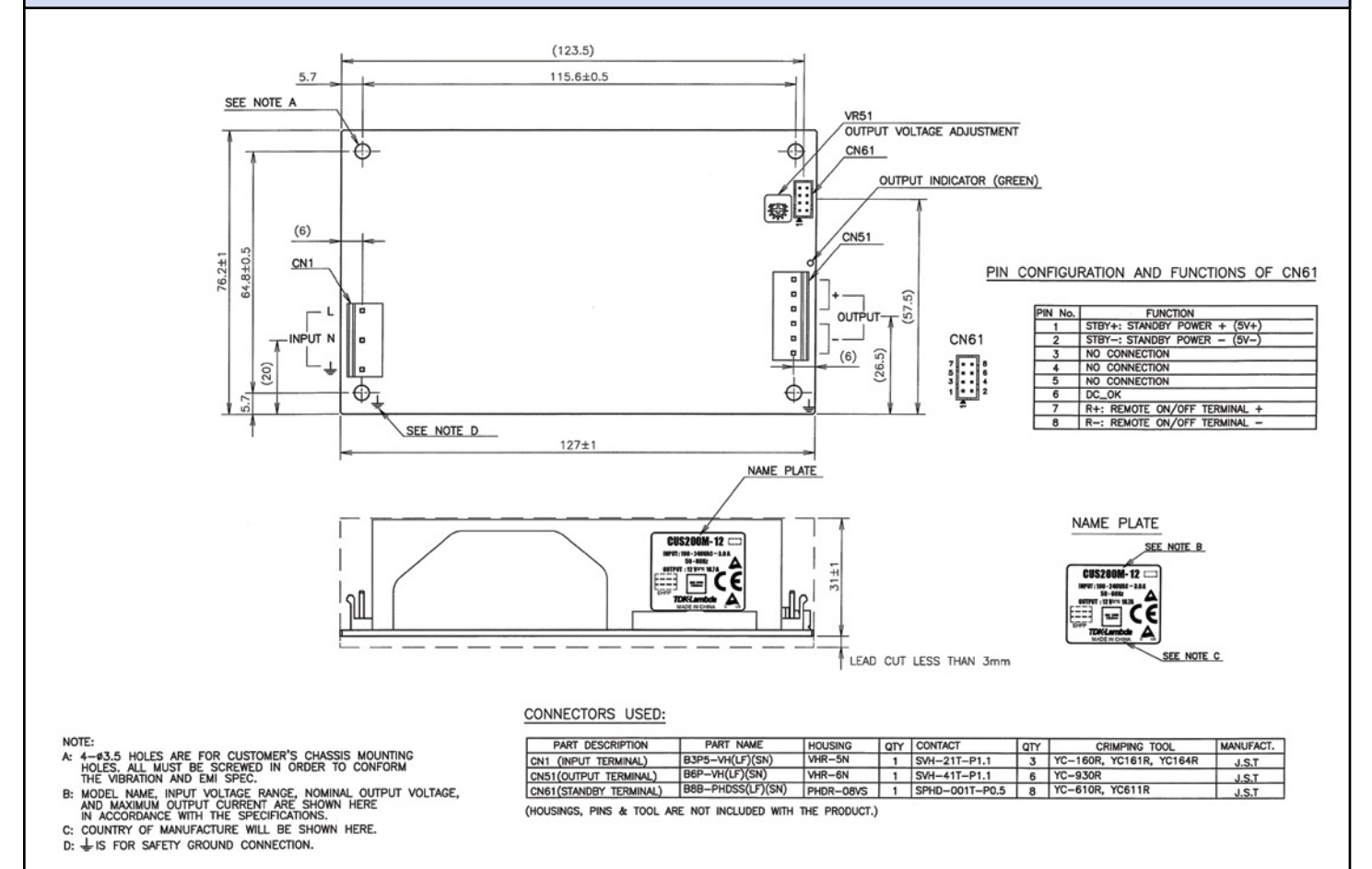
**Model Selector**

Model	Voltage	Adjust Range (V)	Max Current Conv (A)	Max Current Forced Air (A)	Max Power Forced Air (W)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) % (4)
CUS200M-12	12V	11.7 - 12.6	16.7	16.7	200.4	120	60	180	92 / 93
CUS200M-18	18V	17.6 - 18.9	11.2	14.0	252.0	180	90	180	92 / 94
CUS200M-24	24V	23.5 - 25.2	8.4	10.5	252.0	240	120	240	92 / 94
CUS200M-36	36V	35.2 - 37.8	5.5	7.0	252.0	360	180	360	92 / 94
CUS200M-48	48V	47 - 50.4	4.2	5.3	254.4	480	240	480	92 / 94

**Notes:**

- (5) 115 / 230VAC input with convection cooling

**Outline Drawing**



**Options**

Suffix	Description
Blank	Open frame construction
/A	Fitted with a cover

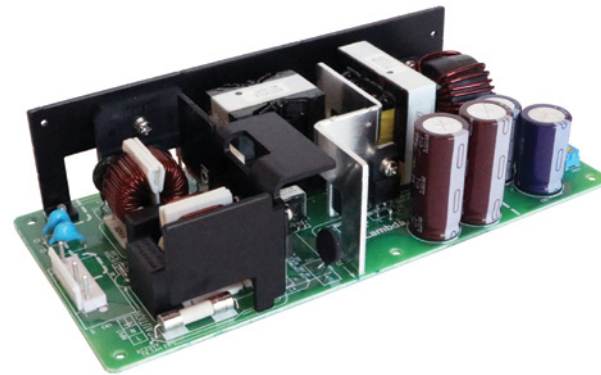
For Additional Information, please visit [us.tdk-lambda.com/lp/products/cus-m-series](http://us.tdk-lambda.com/lp/products/cus-m-series)



**240W 24V Output Power Supply with EN62477-1 OVC III**

**Features**

- ◆ Certified to IEC/EN62477-1 OVC III
- ◆ 12 Year e-cap Lifetime
- ◆ 5 Year Warranty
- ◆ Convection Cooling



**Key Market Segments & Applications**

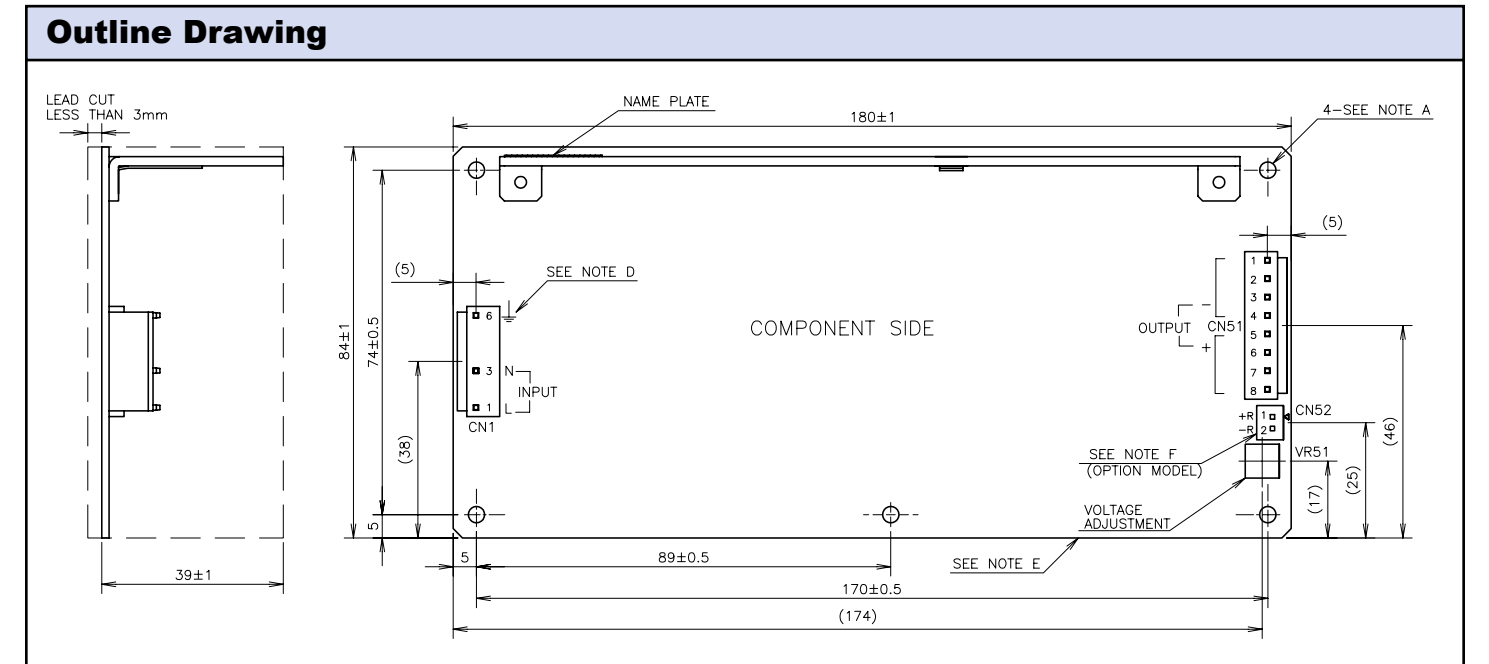


Specifications		Model	ZWS240RC-24
Nominal Output Voltage	V		24V
Maximum Output Current	A		10A
Maximum Output Power	W		240W
Efficiency (typ)	%		87 / 90% (100 / 200VAC)
AC Input Voltage range (1)	-		85 - 265VAC (47 - 63Hz)
Input Current (typical) (2)	A		2.8 / 1.5A
Inrush Current - cold start (2)	A		15 / 30A
PFHC	-		Active Power Factor Correction - Designed to meet EN/IEC61000-3-2
Power Factor (2)	-		0.93 / 0.9
Output Voltage Accuracy	%		±2%
Output Voltage Range	VDC		21.6 - 26.4V
Ripple and Noise (pk-pk)	mV		200mV (0 to +70°C) (Maximum)
Line Regulation	mV		96mV (Maximum)
Load Regulation	mV		150mV (Maximum)
Temperature Coefficient	%/°C		<0.02%/°C
Overcurrent Protection	-		>10.5A
Overvoltage Protection	V		27.6 - 32.4V (Cycle AC to reset)
Hold Up time (Typ) (2)	ms		31ms
Leakage Current (Typ) (3)	mA		0.2 / 0.4mA
Cooling	-		Convection
Operating Temperature (4)	°C		-10°C to +70°C, derate linearly to 30% load from 50°C to 70°C
E-cap lifetime (5)	Years		Up to 12 years; 50°C ambient, 100% full load, 24 hours a day operation
Storage Temperature	°C		-30°C to +75°C
Humidity (non condensing)	%RH		Operating: 30 - 90%RH, Storage: 10 - 90%RH
Withstand Voltage	VAC		I/P to Gnd 2kVAC (10mA), I/P to O/P: 3kVAC (10mA), O/P to Gnd: 500VAC (20mA) for 1min
Isolation Resistance	Ω		>100MΩ at 25°C & 70%RH, Output to Gnd: 500VDC
Vibration (non operating)	-		10 - 55Hz (1 minute sweep), 19.6 m/s <sup>2</sup> constant X, Y, Z 1 hour each
Shock	-		<196.1m/s <sup>2</sup>
Safety Agency Certifications	-		UL60950-1, CSA60950-1, EN60950-1, EN62477-1 (OVC III), CE Mark
Conducted Emission	-		EN55011 / EN55032-B, FCC-B, VCCI-B
Radiated Emission	-		EN55011 / EN55032-A, FCC-A, VCCI-A
Immunity	-		IEC61000-6-2 ; IEC61000-4-2, -3, -4, -5, -6, -8, -11
Weight (Typ)	g		520g
Size (W x H x D)	mm		84 x 42 x 180mm
Warranty	Years		Five Years

**Notes:**

- (1) Derate linearly to 80% load from 90 to 85VAC input
- (2) 100/200VAC, full load
- (3) 100/230VAC

- (4) Refer to Application Notes
- (5) Refer to Reliability Data



For Additional Information, please visit [us.tdk-lambda.com/lp/products/zws-series.htm](http://us.tdk-lambda.com/lp/products/zws-series.htm)



# TDK-Lambda PFE-SA, PFE500-F & PFE1000-FA

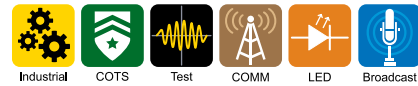
## 300-1008W AC-DC Power Module

### Features

- ◆ Low profile, small size
- ◆ 100°C baseplate temperature
- ◆ High power density
- ◆ High Efficiency
- ◆ Suitable for conduction cooling
- ◆ Power Factor Corrected (PFC)



### Key Market Segments & Applications



### Specifications

Model	PFE300SA PFE500SA	PFE700SA	PFE500F	PFE1000FA	
AC Input	VAC	85 to 265VAC, 47-63Hz (up to 440Hz) (4)			
Input Current (115 / 230VAC)	A	3.2 / 1.6	7.0 / 3.4	6.8 / 3.4	10.8 / 5.3
Model dependant	A	5.2 / 2.5	7.0 / 3.4	100/200VAC	10.8 / 5.3
Inrush Current (115 / 230VAC) (1)	A	23 / 46A peak			
Power Factor	-	0.95 minimum, meets EN61000-3-2			
Output Voltage Setpoint Accuracy	-	±2%	±1V	±2%	±2%
Ripple and Noise (1)	-	1%	4V	1%	1%
Over Current Protection	%	105 - 140% (Automatic Recovery)			
Over Voltage Protection	-	125 - 145%	60 - 69.6V	125 - 145%	125 - 145%
Series Operation	-	Yes			
Parallel Operation	-	No	Yes (Droop mode)	Yes (Single wire)	Yes (Single wire)
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present			
Auxiliary Supply	-	None	None	10 - 14V, 20mA	10 - 14V, 20mA
Remote On/Off (Opto isolated)	-	None	None	High = On	High = On
Overtemperature Protection	-	Yes			
Operating Baseplate Temp.	°C	-40 to +100°C (2)			
Storage Temperature	°C	-40 to +100°C			
Humidity (non condensing)	-	Operating: 20 - 95%RH, Non Operating: 10 - 95%RH			
Cooling	-	Conduction			
Withstand Voltage (1 min) (3)	-	Input to Output 3kVAC, Input to Baseplate 2.5kVAC, Output to Baseplate 1.5kVDC			
Isolation Resistance	-	Output to baseplate: 100M Ohm at 500VDC, 25°C ambient, 70%RH			
Vibration (non operating)	-	10-55Hz (1 min sweep), constant amplitude 0.825mm (max 49m/s <sup>2</sup> ), X, Y, Z 1 hour each			
Shock	-	196.1m/s <sup>2</sup>			
Safety Certifications	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE mark (LVD)			
Weight	g	200	300	420	
Size (WxHxL)	mm	61 x 12.7 x 116.8mm	70 x 12.7 x 122mm	100 x 13.4 x 160mm	
	in	2.4 x 0.5 x 4.6"	2.76 x 0.5 x 4.8"	3.94 x 0.53 x 6.3"	
Warranty	yrs	5 years	2 years	5 years	

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)

- 1) External components are required, consult Application Notes
- 2) PFE500SA-12, PFE500F-12: -40 to 85°C. See instruction manuals for derating curves  
PFE1000FA, PFE1000F48 & PFE1000FA48: -40 to 85°C below 170VAC input voltage.  
See instruction manuals for derating curves
- 3) PFE500F, PFE1000FA: 500VDC Output to baseplate
- 4) Reduced PFC above 63Hz. Contact technical support for 440Hz operation.

# TDK-Lambda PFE-SA, PFE500-F & PFE1000-FA

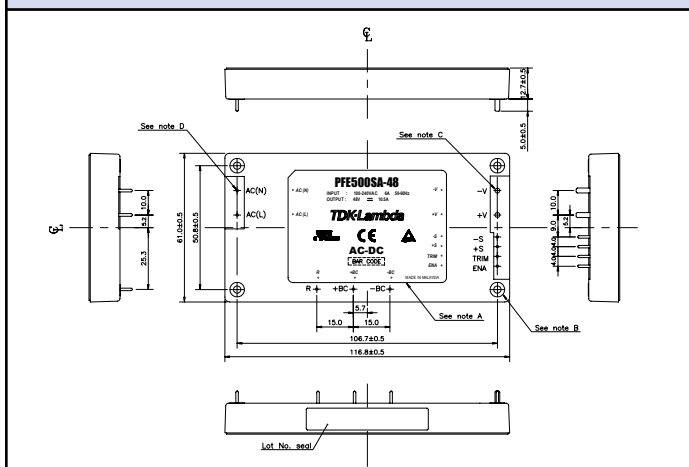
### Specifications

Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Load Reg. (mV)	Line Reg. (mV)	Efficiency typ (5)
PFE300SA-12	12	9.6 - 14.4	25	300	48	48	84 / 86
PFE500SA-12	12	9.6 - 14.4	33	396	48	48	84 / 86
PFE500F-12	12	9.6 - 14.4	42	504	48	48	81 / 83
PFE1000FA-12	12	9.6 - 14.4	60	720	48	48	84.5 / 87
PFE300SA-28	28	22.4 - 33.6	10.8	302	56	56	87.5 / 89.5
PFE500SA-28	28	22.4 - 33.6	18	504	56	56	88 / 90
PFE500F-28	28	22.4 - 33.6	18	504	56	56	84 / 86
PFE1000FA-28	28	22.4 - 33.6	36	1008	56	56	87 / 89.5
PFE300SA-48	48	38.4 - 57.6	6.3	302	96	96	88 / 90.5
PFE500SA-48	48	38.4 - 57.6	10.5	504	96	96	90 / 91
PFE500F-48	48	38.4 - 57.6	10.5	504	96	96	84 / 86
PFE1000FA-48	48	38.4 - 57.6	21	1008	96	96	88 / 90.5
PFE700SA-48	51	None	14	714	50 - 57V (6)		90 / 92

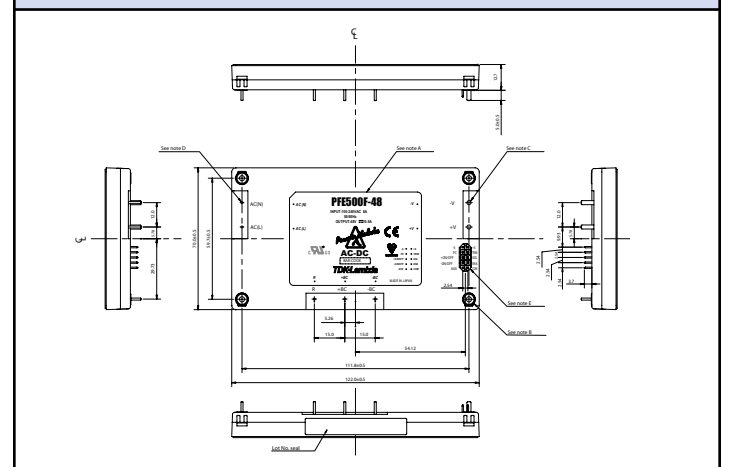
(5) 115 / 230VAC (100/230VAC for PFE500F)

(6) Total regulation range

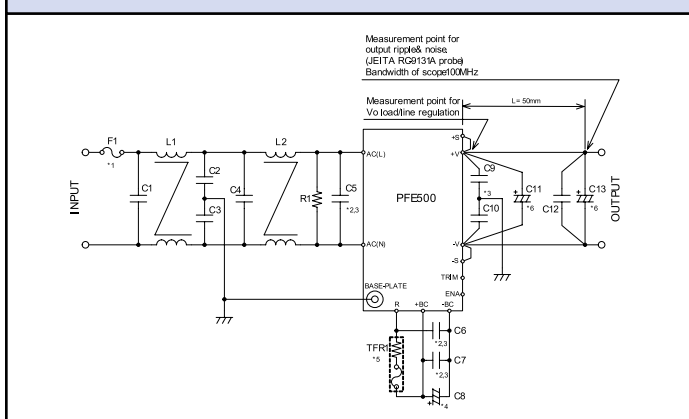
### PFE500SA Outline Drawing



### PFE500F Outline Drawing



### PFE500SA Basic connection



### Heatsink Table

Heatsink	Size (mm)	PFE Module
HAF-10L	116.8 x 25.4 x 61	PFE300/500SA
HAF-15L	116.8 x 38.1 x 61	PFE300/500SA
HAF-15T	116.8 x 38.1 x 61	PFE300/500SA
HAL-F12T	122 x 35 x 69.9	PFE500F
HAM-F10T	160 x 33.4 x 100	PFE1000FA

### Options

Suffix	Description
Blank	M3 tapped mounting inserts (4)
/T	3.3mm non-threaded inserts (4)

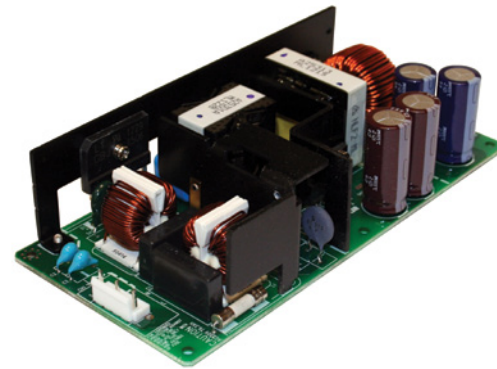
For Additional Information, please visit [us.tdk-lambda.com/lp/products/pfea-series.htm](http://us.tdk-lambda.com/lp/products/pfea-series.htm)



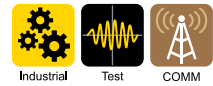
300W Single Output, Convection Cooled Power Supplies

Features

- ◆ Universal Input (85 - 265VAC)
- ◆ Power Factor Corrected
- ◆ Convection cooling (300W) or Forced Air (336-338W)
- ◆ Five year warranty
- ◆ Less than 0.5mA earth leakage current



Key Market Segments & Applications



Specifications		ZWS300BAF
Model		ZWS300BAF
Input Voltage	V	85-265VAC (47-63Hz), 120-370VDC (5)
Input Current	A	3.7 / 1.9 (Convection cooled rating)
Inrush Current (1)(2)	A	15 / 30
Power Factor	-	0.97 at 100VAC, 0.93 at 200VAC, Meets EN61000-3-2
Leakage Current	mA	0.5mA Max. Typically 0.2mA (100VAC), 0.4mA (230VAC)
Off Load Power Draw	W	Typically 0.1W at 100VAC, 0.5W at 200VAC, 0.8W at 265VAC when unit is in inhibit
Temperature Coefficient	%/°C	<0.02%/°C
Overcurrent Protection (3)	-	>116% of convection cooled rated output current (>105% for 12V model)
Overvoltage Protection	V	12V: 13.8-16.2V, 15V: 17.3-20.3V, 24V: 28.8-33.6V, 36V: 41.4-48.6V, 48V: 55.2-64.8V
Hold Up Time (Typ) (1)	ms	18ms at 100VAC input (Convection cooled rating)
Efficiency (1)	%	12 & 15V models: 86 / 89%, 24V, 36V & 48V models: 88 / 91% (Convection cooled rating)
Remote On/Off	-	Optional, see instruction manual
Operating Temperature	°C	Convection: -10°C to +70°C, derate linearly to 40% load from 40°C to 70°C
12V & 15V Models		1.4m/s Airflow: -10°C to +70°C, derate linearly to 60% load from 50°C to 70°C
Operating Temperature	°C	Convection: -10°C to +70°C, derate linearly to 40% load from 45°C to 70°C
24V, 36V & 48V Models		0.7m/s Airflow: -10°C to +70°C, derate linearly to 60% load from 50°C to 70°C
		1.4m/s Airflow: -10°C to +70°C, derate linearly to 70% load from 60°C to 70°C
Storage Temperature	°C	-30 to +75°C
Humidity (non condensing)	%RH	Operating: 30 - 90%RH, Storage: 10 - 90%RH
Cooling	-	Convection or forced air
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (20mA) for 1 min.
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s <sup>2</sup> constant X, Y, Z 1 hour each
Shock	-	< 196.1 m/s <sup>2</sup>
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN50178 OV II, CE Mark
Conducted & Radiated EMI (4)	-	EN55011/EN55022-B, FCC Class B, VCCI-B
Immunity	-	EN61000-4-2 (Ivl2, 3), -3 (Ivl 3), -4 (Ivl 3), -5 (Ivl 3, 4), -6 (Ivl 3), -8 (Ivl 4), -11; EN61000-6-2
Weight (Typ)	g	540g (open frame)
Size (WxHxD)	in (mm)	3.31 x 1.65 x 7.09" (84 x 42 x 180) open frame
Warranty	yrs	Five Years

Notes:

- (1) 100 / 200VAC Input
- (2) 25°C ambient (cold start)
- (3) Avoid prolonged operation in overload
- (4) Forced air rating: Class A radiated
- (5) Safety certified for AC input only

Model Selector

Model	Output Voltage	Adjustment Range	Max Current Convection	Max Current Forced Air	Line Reg (mV)	Load Reg (mV)	Ripple & Noise (mV)
ZWS300BAF12	12V	9.6 - 13.2V	25A	25A	48	100	100
ZWS300BAF15	15V	13.5 - 20.3V	20A	22A	60	120	120
ZWS300BAF24	24V	21.6 - 27.5V	12.5A	14A	96	150	150
ZWS300BAF36	36V	32.4 - 39.6V	8.4A	9.4A	144	240	250
ZWS300BAF48	48V	39.5 - 52.8V	6.3A	7A	192	240	250

Outline Drawing

**CONNECTORS USED:**

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
PIN HEADER (INPUT SIDE CN1)	B3PS-VH	JST	1
PIN HEADER(OUTPUT SIDE CN51)	BBP-VH	JST	1

\*OUTPUT CURRENT OF EACH CONNECTOR PIN MUST BE LESS THAN 5A.

**MATCHING HOUSINGS, PINS & TOOL (NOT INCLUDED WITH THE PRODUCT):**

PART DESCRIPTION	PART NAME	MANUFACT.	QTY
SOCKET HOUSING (CN1)	VHR-SN	JST	1
SOCKET HOUSING (CN51)	VHR-BN	JST	1
TERMINAL PINS	SVH-21T-P1.1	JST	11
HAND CRIMPING TOOL	YC-160R	JST	-

**NOTES:**

- 4-φ3.5 HOLES ARE FOR CUSTOMER'S CHASSIS MOUNTING HOLES. ALL MUST BE SCREWED IN ORDER TO CONFORM THE VIBRATION SPEC.
- MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, AND MAXIMUM OUTPUT CURRENT ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
- COUNTRY OF MANUFACTURE WILL BE SHOWN HERE.
- ⚡ IS FOR SAFETY GROUND CONNECTION.
- TO KEEP THE DISTANCE MORE THAN 4mm BETWEEN PCB EDGE AND CUSTOMER'S CHASSIS.
- OPTION MODEL(ZWS300BAF-\*/R)  
REMOTE ON/OFF CONTROL CONNECTOR (CN52) : B2B-XH-AM (JST)  
MATCHING HOUSING : XHP-2 (JST)  
MATCHING TERMINAL : BXH-001T-P0.6 (JST) OR SXH-001T-P0.6 (JST)  
HAND CRIMPING TOOL : YC-110R (JST) OR YRS-110 (JST)  
MATCHING HOUSING AND TERMINAL --- NOT INCLUDED WITH THE PRODUCT

SCALE FOR NAME PLATE : 2/1

MODEL NAME: ZWS300BAF  
A254-02-01

Options

Suffix	Description
-	JST Connectors
/L	L Bracket
/A	Cover & L Bracket
/R	Remote On/Off
/T	Screw Terminals
/CO2	PCB Coating
Example	ZWS300BAF24/TA*

\* please contact factory for other combinations of option codes

Similar Products

ZWS-B, -BAF, -BP	10W to 240W Single output
HWS	15W to 1800W Single Output, Enclosed
EFE	300W to 400W Single Output, Medical & ITE
CFE400M	300W to 400W Single Output, Medical & ITE

For Additional Information, please visit [us.tdk-lambda.com/lp/products/zws-series.htm](http://us.tdk-lambda.com/lp/products/zws-series.htm)

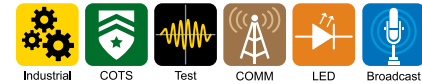


500 Watt AC-DC Power Module

Features

- ◆ 4" x 2.4" Brick Foot-print with Metal Case
- ◆ High Power Density; High Efficiency
- ◆ Suitable for Conduction Cooling
- ◆ Power Factor Corrected
- ◆ PMBus™
- ◆ Droop Load Share (optional)
- ◆ No Minimum Load Requirement

Key Market Segments & Applications

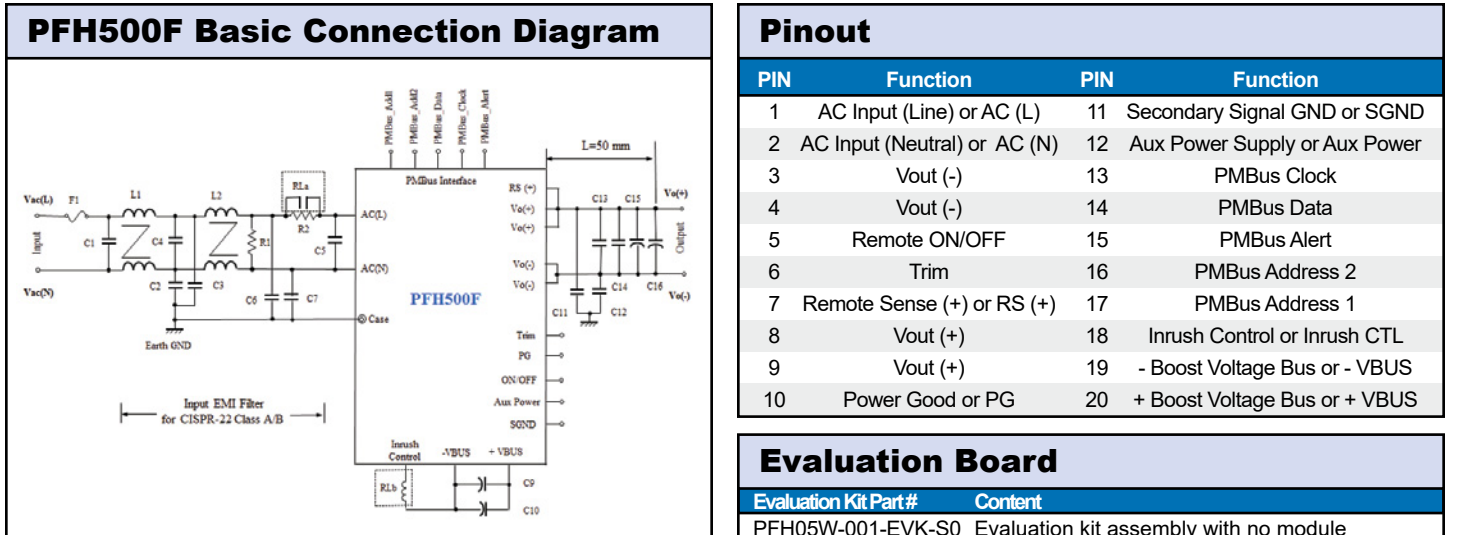
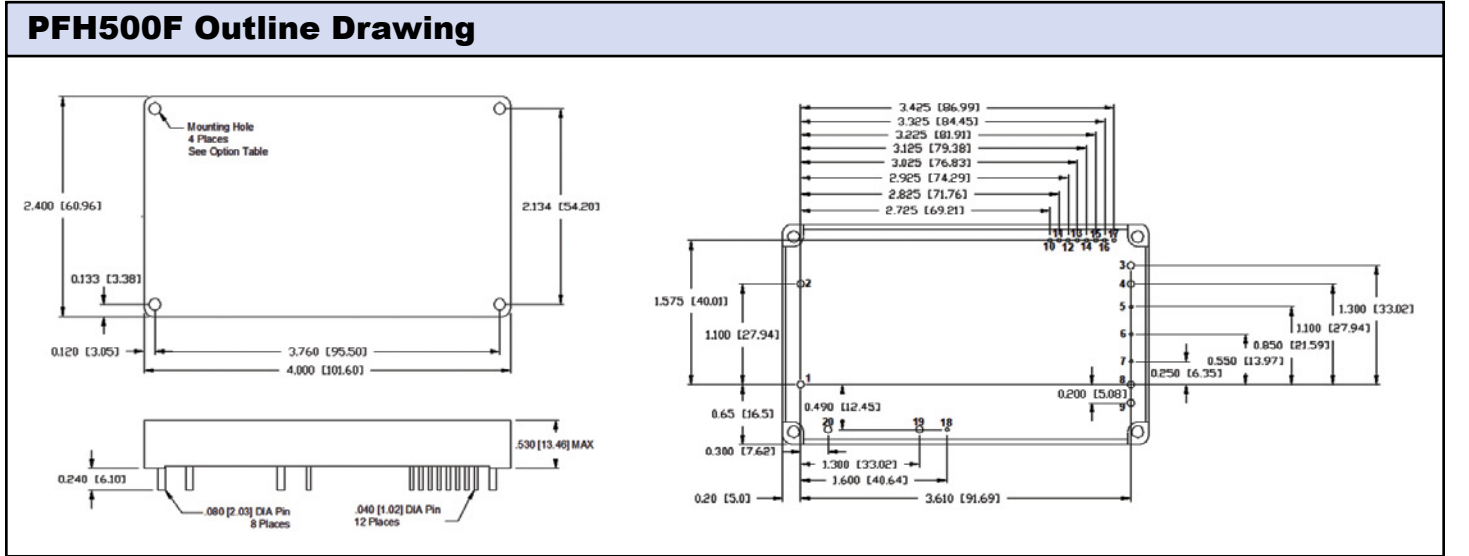


Specifications		PFH500F-12	PFH500F-28
Model		PFH500F-12	PFH500F-28
AC Input Voltage (1)	VAC	85 to 265VAC, 47-63Hz	
AC Input Current (typ) (4)	A	5 / 2.5A	
Power Factor	-	0.95 minimum (Vin=230VAC, Io > 80%, Tc=25°C, meets EN61000-3-2)	
Inrush Current (typ) (4)	A	9A / 18A (peak) (20A max)	
Input Turn-on Voltage	VAC	83V (typ)	
Input Turn-off Voltage	VAC	79V (typ)	
Hold-up (Typ.) (1) (2)	ms	40ms	20ms
Output Voltage Set-point	VDC	11.76 - 12.24VDC (Vin=115Vdc, Io=0%)	27.5 - 28.5 VDC (Vin=115Vdc, Io=0%)
AC Start-Up Delay (115/230 VAC)(2)	s	2.8/1.2 typ	2.7/1.2 typ
Remote ON/OFF Start-Up Delay (2)	s	2.5/1.0 typ (115/230VAC) with AC applied from Remote ON/OFF assertion to 10% of Vo	
Output Voltage Rise Time (typ)	ms	45ms	65ms
Line Regulation (typ)	mV	35mV (0.3%) (Io=50% of Io,max, Vin=Vin,min to Vin, max)	42mV (0.15%) (Io=50% of Io,max, Vin=Vin,min to Vin, max)
Load Regulation (typ)	mV	15 mV (0.125%) (Vin=115/230 Vac, Io= 10% to Io,max, excluding Droop)	28 mV (0.1%) (Vin=115/230 Vac, Io=0 to Io,max, excluding Droop)
Output Ripple (Pk to Pk) (3)	mV	150mV Typ. (250mV max.)	
Over Voltage Protection (max)	VDC	15.7V	35.5V
Over Current Protection (Hiccup) (typ) (5)	A	47.5A	21.5A
Output Capacitance Range	uF	1,000 - 8,000uF	470 - 3,000uF
Power Good Signal	mA	Open collector 200mA max. (Active low)	
Auxiliary Supply	-	10-14V; 200mA	
Remote On/Off	VDC	Low = On, < 0.8VDC (3.3V max input)	
Over Temperature Protection	°C	Input line voltage dependent (see derating curves)	
Series Operation	-	Yes (maximum of two units)	
Parallel Operation (optional)	-	Droop Share	
Operating Baseplate Temperature	°C	-40 to 100°C (with derating)	
Storage Temperature	°C	-55 to 125°C	
Humidity (non condensing)	%	Operating: 20 - 95%RH, Non Operating: 10 - 95%RH	
Cooling	-	Conduction	
Withstand Voltage (1 min)	VAC	Input to Output 3,000VAC; Input to Case 2,500VAC; Output to Case 1,500VDC	
Isolation Resistance	Ω	Output to Case: 100MΩ at 500Vdc, 25C ambient, 70%RH	
Vibration (Non Operating)	-	MIL-STD-810G: 514.6 Cat 4, Cat 21; Sine Vibration 23.52 m/s <sup>2</sup> Constant (XYZ Axis)	
Shock	-	MIL-STD-810G: 516.6 Procedure I (XYZ Axis)	
Safety Certifications	-	UL/cUL60950-1, IEC/EN60950-1, CE Mark	
Size (typ)	in.(mm)	4.00 x 2.40 x 0.53 (101.6 x 61.0 x 13.3)	
Weight (max)	g	225	
Warranty	Years	3	

Notes: External components are required. Consult the Instruction Manual for more detailed information.  
 1) Maximum Power will be de-rated at Vin < 100V with 6.7 W/W (400W@85Vin).  
 2) With 2 x 470uF bulk cap, 100% Load, Tc = 25°C.  
 3) Vin=115/230Vac, Io=100%, Tc=25°C. Measured across one 0.1uF, four 10uF ceramic capacitors and recommended minimum output capacitance located 2 inches away. BW = 20MHz.  
 4) Vin = 115/230Vac, Io = 100%, Tc = 25°C.  
 5) When Vo > Vo\_nominal, OCP trip point will be lower to limit Po\_max allowed.

Specifications					
Model	Output Voltage (V)	Adjust. Range (V)	Maximum Current (A)	Maximum Wattage (W)	Efficiency (typ) (%) (4)
PFH500F-28-XXX-R	28	22.4 - 33.6	18	504	90 / 92
PFH500F-12-XXX-R	12	9.6 - 14.4	42	504	90 / 92

Model Suffix ("XXX") Selector						
Suffix	Mounting Inserts	Overt Voltage Protection	Overcurrent Protection	Overt temperature Protection	Pin Length	Droop Mode Current Share
0D0	3.3mm Ø Non-threaded	Latching	Non-Latching	Non-Latching	0.24" (6.1mm)	Yes
1D0	3mm (M3) Threaded	Latching	Non-Latching	Non-Latching	0.24" (6.1mm)	Yes
000	3.3mm Ø Non-threaded	Latching	Non-Latching	Non-Latching	0.24" (6.1mm)	No
100	3mm (M3) Threaded	Latching	Non-Latching	Non-Latching	0.24" (6.1mm)	No



Heatsink Accessory	
Part #	Description
HS00110	2.4" x 4" x 1.5" Al with cylindrical pin fins and integrated thermal pad

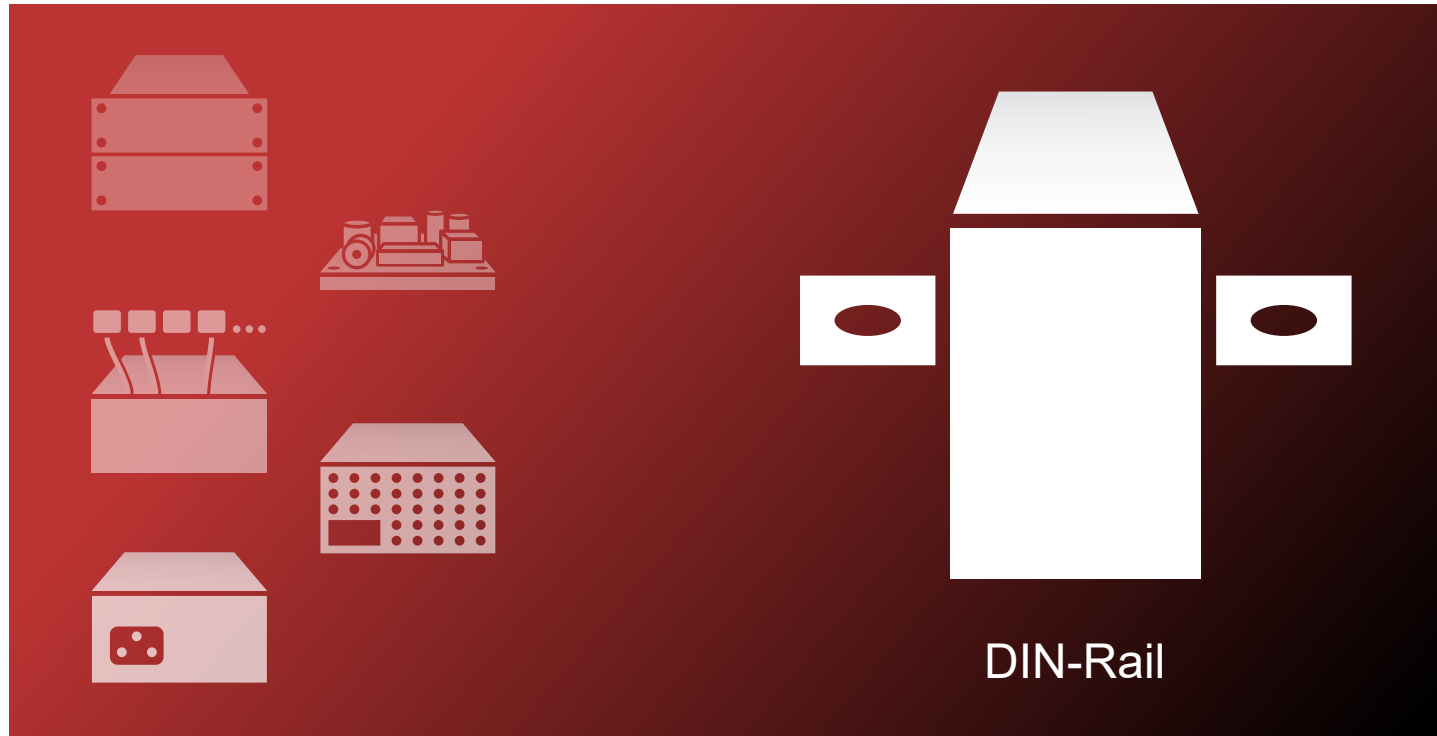
For Additional Information, please visit [us.tdk-lambda.com/lp/products/pfh-series.htm](http://us.tdk-lambda.com/lp/products/pfh-series.htm)



Evaluation Board	
Evaluation Kit Part#	Content
PFH05W-001-EVK-S0	Evaluation kit assembly with no module
PFH05W###-100-EVK-S1	Evaluation kit assembly with PFH500F-###-100-R module
PFH05W###-1D0-EVK-S1	Evaluation kit assembly with PFH500F-###-1D0-R module
PFH05W-S01-EVK-S0	Evaluation kit assembly with I/P Surge Filter; no module

## - Designates Output Voltage (e.g. 12 = 12V; 28 = 28V; 48 = 48V)

 **AC-DC Power Supplies**



**Applications**

- ◆ Factory Automation and controls
- ◆ Facility & Hotel or Home Automation
- ◆ Food & Beverage Industry
- ◆ Robot Controls
- ◆ Paper Handling, Sorting, Delivery Systems
- ◆ Process Automation
- ◆ Conveyors, Elevators, Escalators
- ◆ Typical for DIN-Rail mounting in cabinets

**Features**

- ◆ Efficiency up to 94% – NEW DRF-Series
- ◆ Mainly with 24V output, but also other output voltages from 5V to 48V are available
- ◆ Power range from 10W to 960W with convection-cooling
- ◆ Single-phase and three-phase input (for 120-960W models)
- ◆ Plastic cases for low-power units up to 480W, metal cases for higher output power
- ◆ Flat shape for wall mounted cabinets
- ◆ Slim shape for industrial cabinets
- ◆ UL 508 Listed
- ◆ Additional DC/DC-Converters up to 60W for DIN-Rail are also available

Wattage	Series	Page
10-100W	DRL	120
15-100W	DRB15-100	122
40-60W	DPX (DC Input)	124
120-960W	DRF120-960	126
480W	DRB480	128

Listed by Wattage



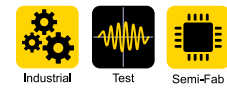
**10-100W Low Profile DIN Rail Mount Power Supplies**

**Features**

- ◆ Low Profile for Building Automation
- ◆ Class II Double Insulation
- ◆ High Efficiency (Up to 90%)
- ◆ ErP Compliant Design
- ◆ Low No Load Power Consumption
- ◆ Class 2 Models to UL1310
- ◆ SEMI F47 Compliant



**Key Market Segments & Applications**



Specifications		DRL10	DRL30	DRL60	DRL100
Model					
Input Voltage range	V	85 - 264VAC, 120 - 373VDC* (Withstands 300VAC for 5 seconds)			
Input Frequency	Hz	47 - 63Hz			
Inrush Current at 230VAC (typ) (Cold Start)	A	40A	50A	60A	60A
Power Factor (115/230VAC)		Meets IEC61000-3-2 Class A			
Input Current (110/230VAC)	A	0.56 / 0.42	0.58 / 0.45	0.5 / 0.43	0.5 / 0.47
Line & Load Regulation	-	See model selector			
Ripple & Noise	-	12 to 15V: 120mV, 24V: 240mV			
Overcurrent Protection	-	>1.05% Hiccup with auto recovery			
Overvoltage Protection	-	See model selector. Cycle AC input voltage to reset			
Hold Up Time (typ) at 115VAC Input	ms	20ms	20ms	20ms	15ms
Efficiency	-	See model selector			
No Load Power Draw	W	<0.3W	<0.3W	<0.5W	<0.5W
LED Indicator	-	Green LED indicates DC is OK			
Operating Temperature (-25°C start-up)	°C	DRL10, 30, 60: -20 to +71°C, derate linearly to 60% load from 55 to 71°C DRL100: -20 to +71°C, derate linearly to 60% load from 51 to 71°C DRL100 (<115VAC): -20 to +71°C, derate linearly to 40% load from 40 to 71°C			
Storage Temperature	-	40 to +85°C			
Operating Humidity (non condensing)	%RH	5 - 95%RH			
Parallel Operation	-	Not available			
Series operation	-	Possible			
Cooling	-	Convection			
Withstand Voltage (For 1 minute)	VAC	Input to Output 3kVAC			
Isolation Resistance	MΩ	>100MΩ at 25°C, 70%RH & 500VDC			
Vibration (Operating)	-	IEC 60068-2-6, Sine Wave, 10-500Hz, 19.6m/s <sup>2</sup> (2G peak) 10 min per cycle, 60 min for all X,Y,Z directions			
Shock	-	IEC 60068-2-27, Half Sine Wave, 39.2m/s <sup>2</sup> (4G) for a duration of 22ms 3 shocks for each 3 directions, 9 times in total			
Safety Agency Certifications	-	UL508 Listed, UL/CSA/EN60950-1†, UL1310 Class 2 (1), CE Mark			
Conducted & Radiated EMI	-	EN55032-B Conducted, EN55032-A Radiated			
Immunity	-	EN61000-4-2 (Iv 3), -3 (Iv 3), -4 (Iv 4), -5 (Iv 3), -6 (Iv 3), -8 (Iv 4), -11 (class 3)			
Line Dips	-	SEMI-F47 (200VAC input)			
Weight (Typ)	g	65	120	200	280
Size (WxHxD)	in	0.71x3.58x2.19	1.42x3.58x2.19	2.13x3.58x2.19	2.83x3.58x2.19
Mounts on TS-35/7.5 or -35/15 rail	mm	18x91x55.6	36x91x55.6	54x91x55.6	72x91x55.6
Case material	-	Flame Retardant Polycarbonate (UL94 V-0)			
Warranty	yrs	Three years			

(1) NEC Class 2 in accordance with UL1310. Excludes DRL100-24-1 model

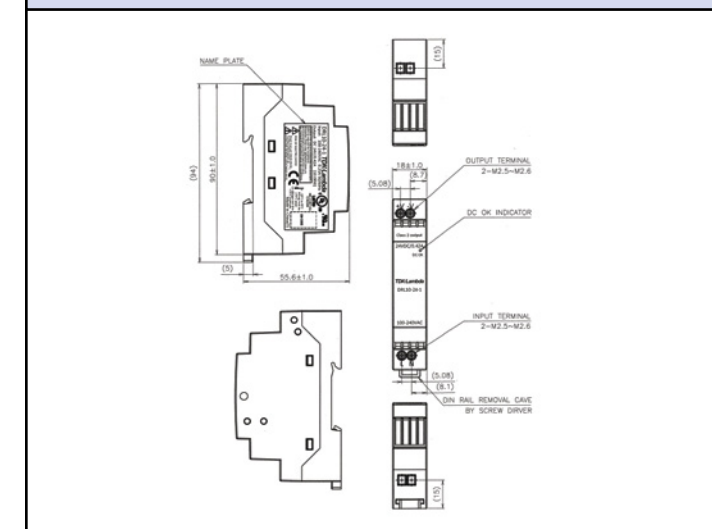
† Certification to the IEC62368-1 standard in progress (2018)

\* Safety certified for AC input only

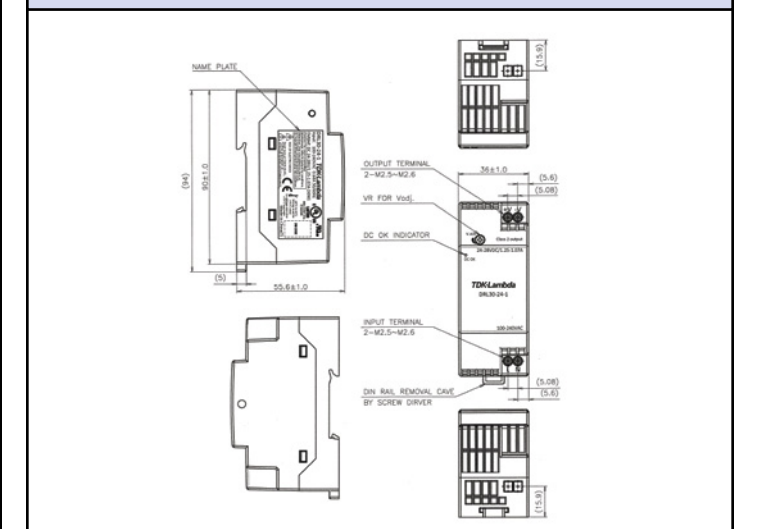
**Output Ratings**

Model	Output Voltage (V)	Adjust Range (V)	Max Current (A)	Max Power (W)	Load Reg (mV)	Line Reg (mV)	Overvoltage V	Efficiency (%) (115/230VAC)	UL1310 Class 2
DRL10-12-1	12V	-	0.84A	10.08W	120mV	120mV	13.8 - 16.2V	85 / 85	Yes
DRL30-12-1	12V	12 - 15V	2.1A	25.2W	120mV	120mV	16 - 19V	87 / 88	Yes
DRL60-12-1	12V	12 - 15V	4.5A	54W	120mV	120mV	16 - 19V	87 / 87	Yes
DRL30-15-1	15V	12 - 15V	1.68A	25.2W	120mV	120mV	16 - 19V	87 / 88	Yes
DRL60-15-1	15V	12 - 15V	3.6A	54W	120mV	120mV	16 - 19V	87 / 87	Yes
DRL10-24-1	24V	-	0.42A	10W	240mV	240mV	29 - 35V	87 / 87	Yes
DRL30-24-1	24V	24 - 28V	1.25A	30W	240mV	240mV	29 - 35V	88 / 90	Yes
DRL60-24-1	24V	24 - 28V	2.5A	60W	240mV	240mV	29 - 35V	89 / 90	Yes
DRL100-24-1	24V	24 - 28V	4.2A	100.8W	240mV	240mV	29 - 35V	88 / 90	-
DRL100-24-1/C2	24V	-	3.67A	88W	240mV	240mV	26 - 30V	88 / 90	Yes

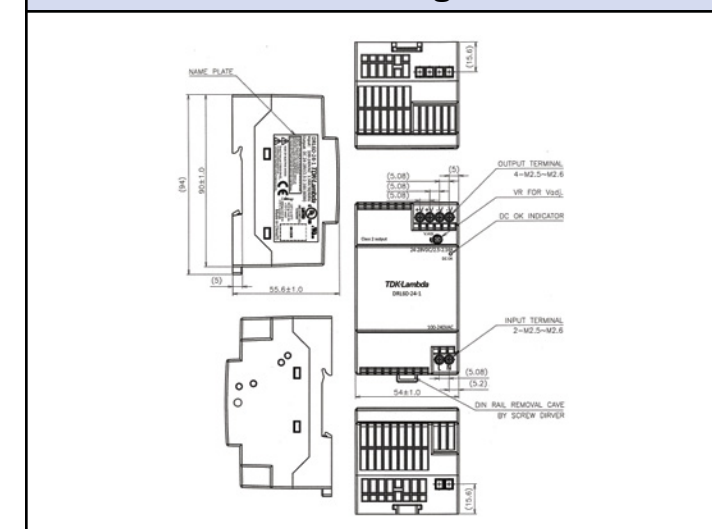
**DRL10 Outline Drawing**



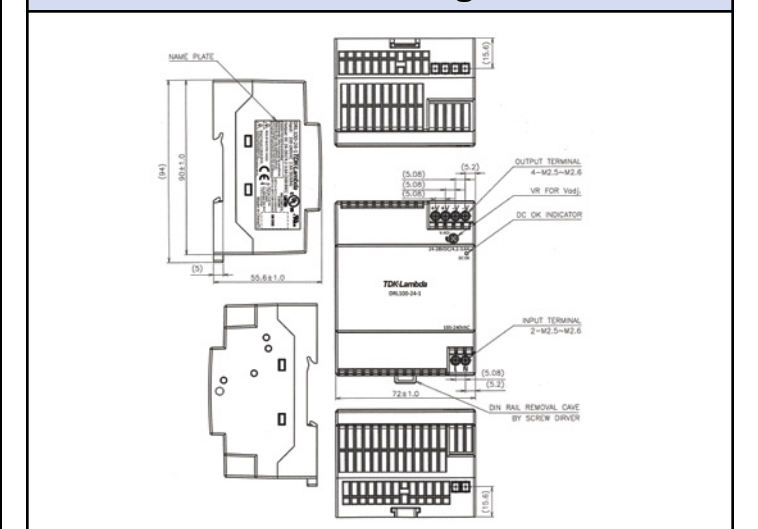
**DRL30 Outline Drawing**



**DRL60 Outline Drawing**



**DRL100 Outline Drawing**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/drl-series.htm](http://us.tdk-lambda.com/lp/products/drl-series.htm)



**15-100W, 5-48V Output DIN Rail Mount Power Supplies**

**Features**

- ◆ Compact Size
- ◆ High Efficiency (Up to 91%)
- ◆ ErP Compliant Design
- ◆ Low No Load Power Draw
- ◆ Class 2 Models to UL1310
- ◆ Class 1 Div 2 for Hazardous Locations



**Key Market Segments & Applications**

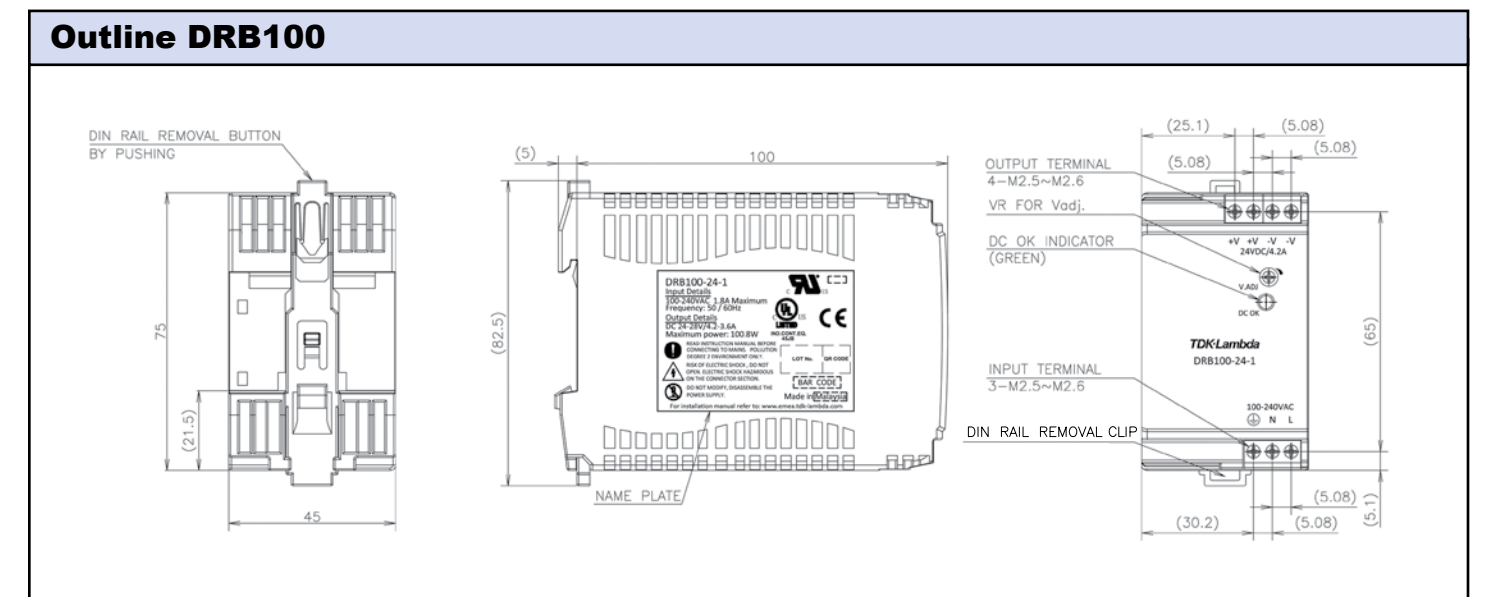
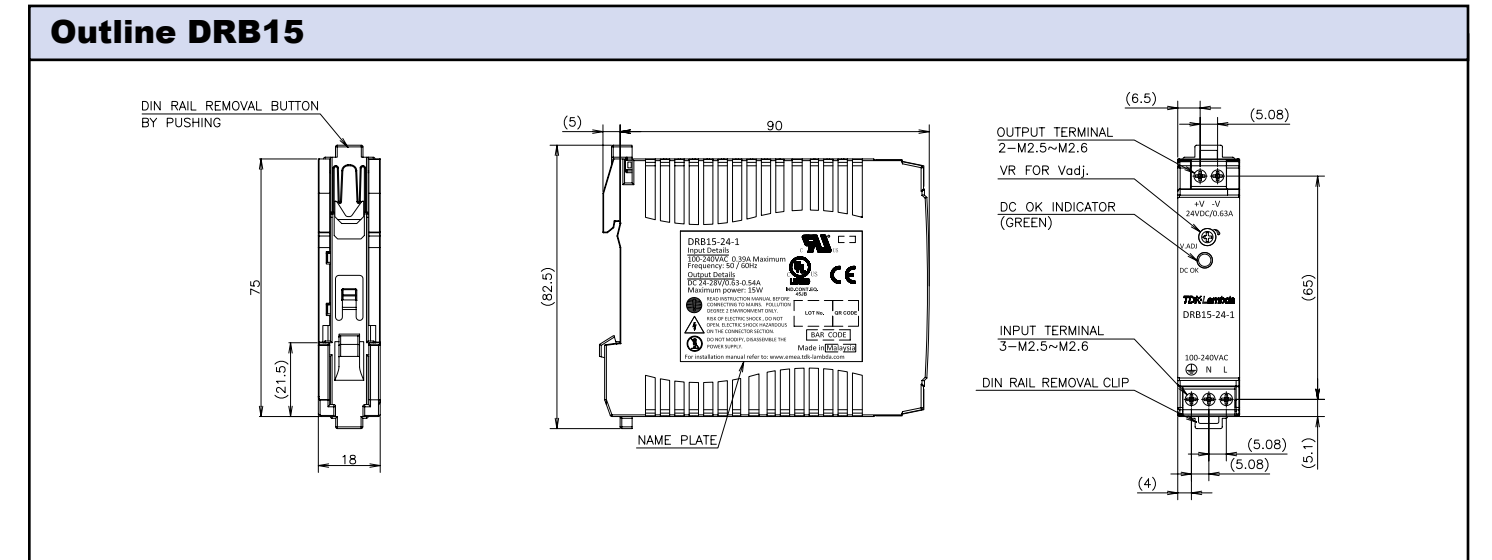


Specifications					
Model		DRB15	DRB30	DRB50	DRB100
Input Voltage range	V	85 - 264VAC, 120 - 373VDC* (Withstands 300VAC for 5 seconds)			
Input Frequency	Hz	47 - 63Hz			
Inrush Current (typ) (Cold Start)	A	35A	40A	50A	40A
Power Factor (110/230VAC) Meets EN61000-3-2	-	0.55 / 0.42	0.56 / 0.46	0.6 / 0.5	0.98 / 0.93
Input Current (110/230VAC)	A	0.27 / 0.17	0.55 / 0.33	0.9 / 0.55	1.2 / 0.6
Line & Load Regulation	-	See model selector			
Ripple & Noise	-	See model selector			
Overcurrent Protection	-	Hiccup with auto recovery			
Overvoltage Protection	-	See model selector. Cycle AC input voltage to reset			
Hold Up Time (230VAC input)	ms	> 20ms			
Efficiency	-	See model selector			
No Load Power Draw	W	<0.3W	<0.3W	<0.3W	<0.5W
LED Indicator	-	Green LED indicates DC is OK			
Operating Temperature (1)	°C	-20 to +70°C. (DRB30-100, derate linearly to 50% load from 55 to 70°C)			
Storage Temperature	-	-40 to +85°C			
Operating Humidity (non condensing)	%RH	5 - 95%RH			
Parallel Operation	-	Not available			
Series Operation	-	Possible			
Cooling	-	Convection			
Withstand Voltage (For 1 minute)	VAC	Input to Output 3kVAC, Input to GND 1.5kVAC, Output to GND 500VAC			
Isolation Resistance	MΩ	>100MΩ at 25°C, 70%RH & 500VDC			
Vibration (Non operating)	-	10-55Hz (sweep for 1 min); 19.6m/s <sup>2</sup> (2G) Constant; X,Y,Z each 1 hour			
Shock	-	294m/s (30G) 11ms half sine			
Safety Agency Certifications	-	UL508 Listed, UL/CSA/EN60950-1†, CE Mark, UL1310 Class 2 (2), Class 1 Div 2, Group A, B, C, D (ISA 12.12.01)			
Conducted & Radiated EMI Immunity	-	EN55032-B Radiated & Conducted EN61000-4-2 (lvl 4), -3 (lvl 3), -4 (lvl 4) -5 (norm mode lvl 3, com mode lvl 4), -6 (lvl 3), -8 (lvl 4), -11 (class 3)			
Line Dips	-	SEMI-F47 (200VAC input)			
Weight (Typ)	g	85	95	175	300
Size (WxHxD)	in	0.71 x 2.95 x 3.54	0.83 x 2.95 x 3.54	1.18 x 2.95 x 3.54	1.77 x 2.95 x 3.94
Mounts on TS-35/7.5 or -35/15 rail	mm	18 x 75 x 90	21 x 75 x 90	30 x 75 x 90	45 x 75 x 100
Case material	-	Flame Retardant Polycarbonate (UL94 V-0)			
Warranty	yrs	Three years			

(1) For operation below -10°C, start up load is derated linearly to 50% load down to -20°C  
 (2) NEC Class 2 in accordance with UL1310. Excludes DRB50-5-1 and DRB100-24-1 models  
 † Certification to the IEC62368-1 standard in progress (2018)  
 \* Safety certified for AC input only

Model	Output Voltage	Adjust Range	Max Current	Max Power	Load Reg	Line Reg	Ripple & Noise	Overvoltage Protection	Efficiency (%) (115/230VAC)
DRB50-5-1	5V	5 - 5.5V	6.0A	30W	50mV	50mV	30mV	5.75 - 6.75V	79 / 80
DRB30-12-1	12V	12 - 15V	2.5A	30W	150mV	150mV	40mV	15.96 - 18.72V	86 / 88
DRB50-12-1	12V	12 - 15V	3.4A	51W(3)	150mV	150mV	20mV	15.96 - 18.72V	88 / 90
DRB50-15-1	15V	12 - 15V	3.4A	51W(3)	150mV	150mV	20mV	15.96 - 18.72V	88 / 90
DRB15-24-1	24V	24 - 28V	0.63A	15.1W	240mV	240mV	20mV	30 - 33.6V	87 / 90
DRB30-24-1	24V	24 - 28V	1.25A	30W	240mV	240mV	30mV	30 - 33.6V	88 / 90
DRB50-24-1	24V	24 - 28V	2.1A	50.4W	240mV	240mV	30mV	30 - 33.6V	88 / 90
DRB100-24-1	24V	24 - 28V	4.2A	100.8W	240mV	240mV	30mV	30 - 33.6V	90 / 91
DRB50-48-1	48V	48 - 52.8V	1.05A	50.4W	480mV	480mV	40mV	53.76 - 68.16V	90 / 91

(3) With output set at 15V. 40.8W maximum power when output is set at 12V.



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/drbs-series.htm](http://us.tdk-lambda.com/lp/products/drbs-series.htm)



**40-60W Single, Dual & Triple Output DIN Mount DC-DC Converters**

**Features**

- ◆ DIN Rail Mount Version of TDK-Lambda's PX Series
- ◆ 1600VDC Input to Output Isolation
- ◆ Wide Operating Temperature Range
- ◆ Internally Protected
- ◆ All In One Package



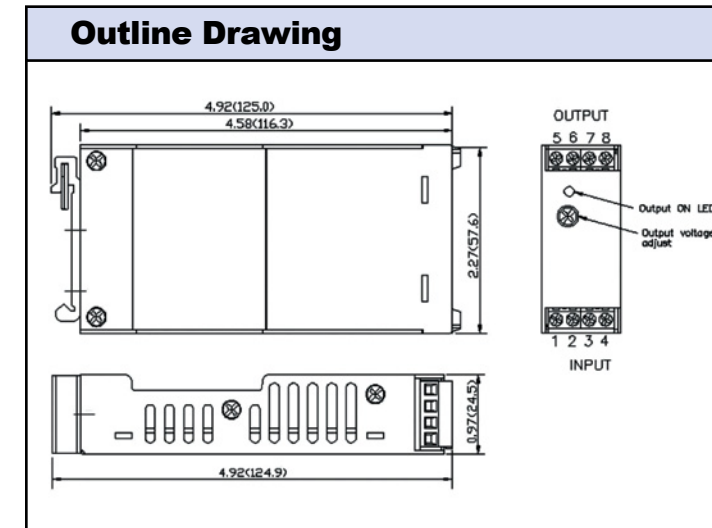
**Key Market Segments & Applications**



Specifications		
Model	DPX40	DPX60
Max Output Power	W	40W
Efficiency	%	85% typical at nominal input & full load
Voltage Accuracy	%	Single, Dual & Triple Main ±1%, Triple auxiliaries ±5%
Volt. Adjust. (Single Output Only)	%	±10%
Minimum Load, each output (1)	%	Single output 0%, Dual & Triple outputs 10%
Line Regulation	%	Single / Dual ±0.5%, Triple (main) ±1%, (auxiliaries) ±5%
Load Regulation (10% to 100%)	%	Single ±0.5%, Dual ±1%, Triple (main) ±2%, (auxiliaries) ±5%
Cross Regulation (25% to 100%)	%	Triple (main) ±1%, Dual / Triple (auxiliaries) ±5%
Start up time	ms	100ms typ.
Remote on/off (ref. to neg. input)	-	/P option: Positive Logic: ON: Open or 3.5-12V, OFF: Short or <1.2V /N option: Negative Logic: ON: Short or <1.2V, OFF Open or 3-12V
Temperature Coefficient	%/°C	<±0.02%/°C
Operating Temperature	°C	-40 to 85°C, derate linearly to 20% load from 60°C to 85°C
Storage Temperature	°C	-40 to 85°C
Thermal Shock	-	MIL-STD-810D
Relative Humidity	%RH	5 to 95%RH (non condensing)
Trans. Resp.(25% step load chng.)	ms	250µs recovery
Overvolt. Protection (Zener clamp)	-	5V: 6.2V, 12V: 15V, 15V: 18V
Overcurr. & Short Circuit Protection	-	Typically at 150%, hiccup with self recovery
Input Surge Volt. (Max. for 100ms)	-	12V input: 36V, 24V input: 50V, 48V input: 100V
Isolation Voltage	VDC	1600VDC minimum
Isolation Resistance	Ω	10 <sup>9</sup> Ohms minimum
Typical Switching Frequency (Fixed)	kHz	300kHz (typ)
Shock & Vibration	-	MIL-STD-810F
Conducted & Radiated Emissions	-	EN55022 Level B
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A
Safety Agency Approval	-	CE Mark
Size (W x H x L)	in(mm)	0.96 x 2.27 x 4.92" (24.5 x 57.6 x 125mm)
Weight	g	182g
Warranty	yrs	Three Years

1. No load operation will not damage the unit

Model Selector					
Output Voltage (V)	Output Current (A)	Input Voltage (VDC)	Model	Ripple & Noise (Pk to Pk mV)	Max Load Cap (uF)
<b>Single Outputs</b>					
5V	8A	9.5 - 36VDC	DPX4024WS05	50mV	13600uF
12V	3.33A	9.5 - 36VDC	DPX4024WS12	75mV	2360uF
15V	2.67A	9.5 - 36VDC	DPX4024WS15	75mV	1510uF
5V	8A	18 - 75VDC	DPX4048WS05	50mV	13600uF
12V	3.33A	18 - 75VDC	DPX4048WS12	75mV	2360uF
15V	2.67A	18 - 75VDC	DPX4048WS15	75mV	1510uF
5V	12A	18 - 36VDC	DPX6024S05	75mV	20400uF
12V	5A	18 - 36VDC	DPX6024S12	100mV	3550uF
15V	4A	18 - 36VDC	DPX6024S15	100mV	2300uF
5V	12A	36 - 75VDC	DPX6048S05	75mV	20400uF
12V	5A	36 - 75VDC	DPX6048S12	100mV	3550uF
15V	4A	36 - 75VDC	DPX6048S15	100mV	2300uF
<b>Dual Outputs</b>					
±12	1.667A	9.5 - 36VDC	DPX4024WD12	120mV	±1200uF
±15	1.333A	9.5 - 36VDC	DPX4024WD15	150mV	±1510uF
±12	1.667A	18 - 75VDC	DPX4048WD12	120mV	±1200uF
±15	1.333A	18 - 75VDC	DPX4048WD15	150mV	±1510uF
<b>Triple Outputs</b>					
+5V, ±12V	6, ±0.4A	9.5 - 18VDC	DPX4012T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	9.5 - 18VDC	DPX4012T0515	50 / 75mV	6800uF, ±110uF
+5V, ±12V	6, ±0.4A	18 - 36VDC	DPX4024T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	18 - 36VDC	DPX4024T0515	50 / 75mV	6800uF, ±110uF
+5V, ±12V	6, ±0.4A	36 - 75VDC	DPX4048T0512	50 / 75mV	6800uF, ±330uF
+5V, ±15V	6, ±0.3A	36 - 75VDC	DPX4048T0515	50 / 75mV	6800uF, ±110uF



Pin Connection			
PIN	SINGLE	DUAL	TRIPLE
1	Ctrl	Ctrl	Ctrl
2	VIN (-)	VIN (-)	VIN (-)
3	VIN (-)	VIN (-)	VIN (-)
4	VIN (+)	VIN (+)	VIN (+)
5	NC	NC	Aux (+)
6	VOUT (-)	VOUT (-)	Common
7	VOUT (+)	Common	Aux (-)
8	NC	VOUT (+)	VOUT (+)

Options	
Suffix	Description
Blank	No remote on-off
/P	Positive Logic
/N	Negative Logic

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dpx-series.htm](http://us.tdk-lambda.com/lp/products/dpx-series.htm)



**120-960W, 24V Output DIN Rail Mount Power Supplies**

**Features**

- ◆ Very Compact Size
- ◆ High Efficiency (Up to 95%)
- ◆ 150% Peak Power Capability for 4s
- ◆ ErP Compliant Design
- ◆ Low Standby Power Draw
- ◆ Remote On/Off
- ◆ Remote Voltage Adjustment
- ◆ Hazardous Location Option (/HL)



**Key Market Segments & Applications**



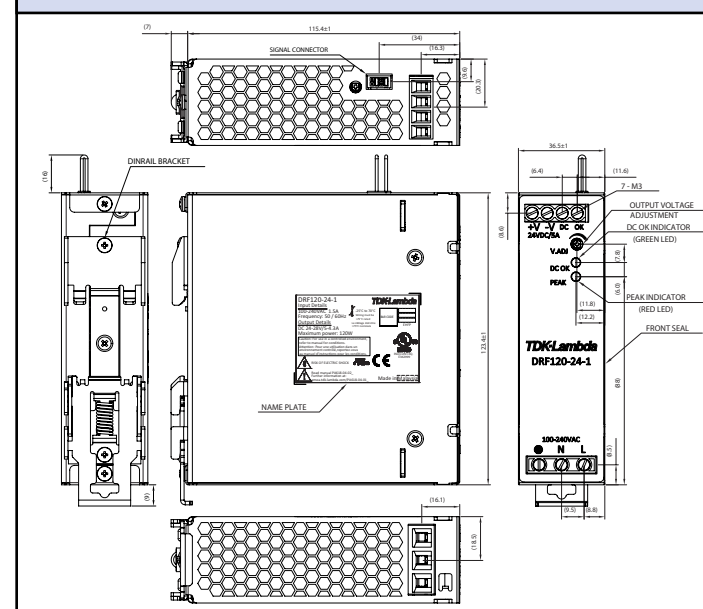
Specifications					
Model		DRF120	DRF240	DRF480	DRF960
Input Voltage Range <sup>(1)</sup>	V	85 - 264VAC, 125 - 370VDC*			180 - 264VAC
Input Frequency	Hz	47 - 63Hz			
Inrush Current (typ) (Cold Start)	A	20			
Power Factor (115/230VAC) (Meets EN61000-3-2)	-	0.98 / 0.95	0.98 / 0.95	0.98 / 0.92	- / 0.98
Input Current (115/230VAC)	A	1.2 / 0.6	2.4 / 1.2	4.7 / 2.5	- / 4.5
Line Regulation	mV	<96mV			
Load Regulation	mV	<240mV			
Ripple & Noise <sup>(2)</sup>	mV	<240mV			
Overcurrent Protection	-	>101% of peak current rating. Shutdown after 4 seconds			
Overvoltage Protection	-	30 - 35.5V, (31.5 - 34V for DRF960). Cycle input voltage or remote on/off to reset			
Hold Up Time (230VAC input)	ms	> 20ms			>10ms
Efficiency (115 / 230VAC)	%	89 / 91	92.5 / 94	92.5 / 94	- / 95
Standby Power Draw	W	<0.5W	<0.5W	<0.75W	<1W
LED Indicators	-	Green LED = DC is OK (>80% Nom). Red LED = Peak Load Operation			
DC OK relay	-	Relay contact 30V/1A			
Remote On / Off	-	When signal is low, the output is On			
Remote Voltage Adjust	-	5 - 6V voltage programs output from 24 - 28V			
Operating Temperature	°C	-25 to +70°C. Start up at -40°C. Derate linearly to 75% load above 60°C (50°C for DRF960)			
Storage Temperature	°C	-40 to +85°C			
Operating Humidity (non condensing)	%RH	5 - 95%RH			
Parallel Operation	-	Droop Mode - Refer to Installation Manual			
Series Operation	-	Possible			
Cooling	-	Convection			
Withstand Voltage (For 1 minute)	VAC	Input to Output 3kVAC, Input to GND 1.5kVAC, Output to GND 500VDC (960W : 500VAC)			
Isolation Resistance	MΩ	>100MΩ at 25°C, 70%RH & 500VDC			
Vibration (Non operating)	-	10-55Hz (sweep for 1 min); 19.6m/s <sup>2</sup> (2G) Constant; X,Y,Z each 1 hour			
Shock	-	<196m/s <sup>2</sup>			
Safety Agency Certifications <sup>(3)</sup>	-	UL508 Listed, IEC/UL/EN60950-1†, CE Mark ATEX, IEC Ex, & GL. Class 1 Div 2, Group A, B, C, D (DRF120-480 only)			
Conducted & Radiated EMI Immunity	-	EN55032-B Radiated & Conducted EN61000-4-2 (contact lvl 2, air lvl 3), -3 (lvl 3), -4 (lvl 3) -5 (norm mode lvl 3, com mode lvl 4), -6 (lvl 3), -8 (lvl 4), -11			
Line Dips	-	SEMI-F47 (200VAC input, 120-480W only)			
Weight (Typ)	g	600	900	1300	1735
Size (WxHxD)	in	1.44 x 4.86 x 4.53	1.93 x 4.86 x 4.53	3.23 x 4.86 x 4.53	4.33 x 4.86 x 5.47
Mounts on TS-35/7.5 or -35/15 rail	mm	36.5 x 123.4 x 115	49 x 123.4 x 115	82 x 123.4 x 115	110 x 123.4 x 139
Case material	-	Metal			
Warranty	yrs	Five years			

(1) Withstands 300VAC for 5s (2) See installation manual (3) See options table \*Safety certified for AC input only  
 (4) Operating period at peak output current is 4 sec, max duty cycle <35% & < rated output power  
 † Certification to the IEC62368-1 standard in progress (2019)

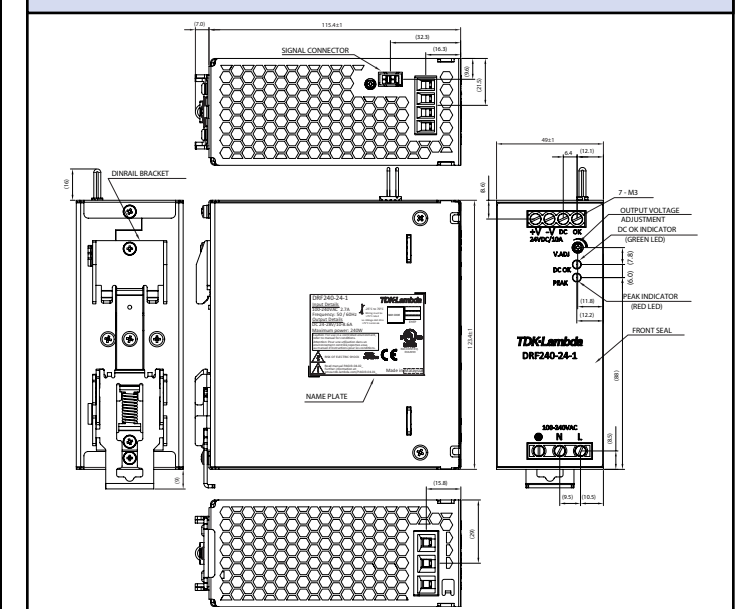
**Model Selector**

Model	Output Voltage	Adjust Range	Max Current	Max Power	Peak Output Current <sup>(4)</sup>	Peak Output Power <sup>(4)</sup>
DRF120-24-1	24V	24 - 28V	5A	120W	7.5A	180W
DRF240-24-1	24V	24 - 28V	10A	240W	15A	360W
DRF480-24-1	24V	24 - 28V	20A	480W	30A	720W
DRF960-24-1	24V	24 - 28V	40A	960W	60A	1440W

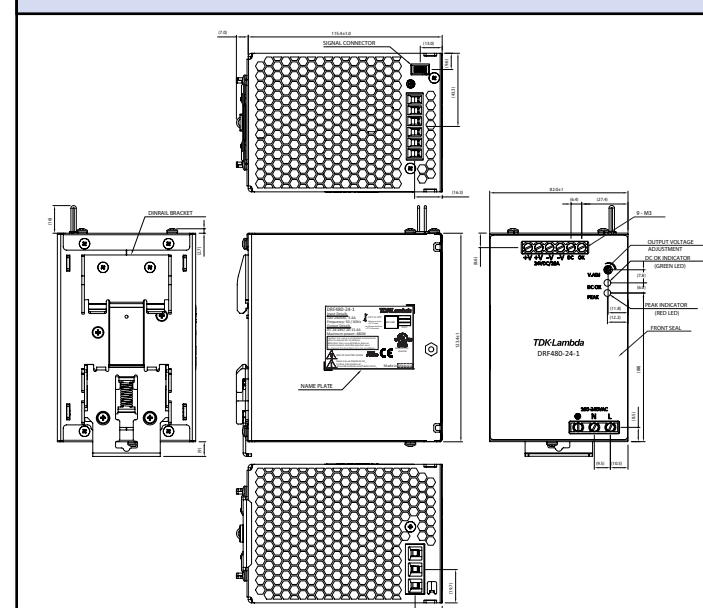
**Outline DRF120-24-1**



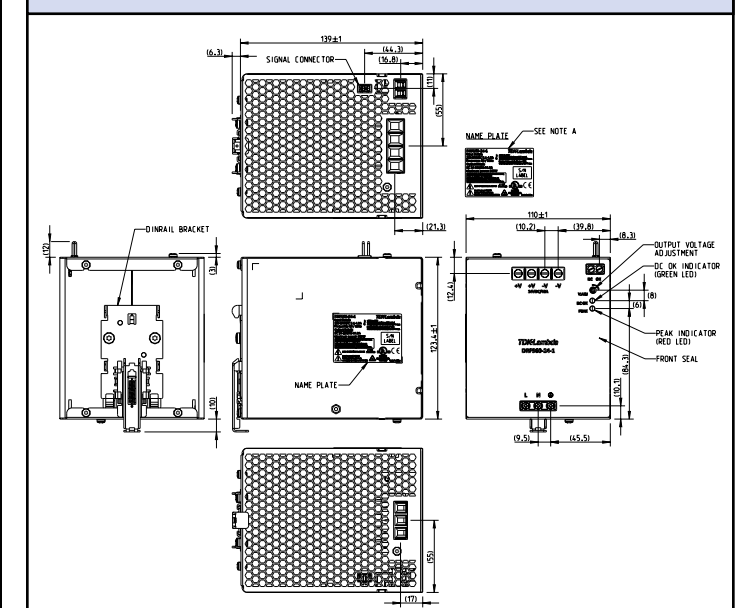
**Outline DRF240-24-1**



**Outline DRF480-24-1**



**Outline DRF960-24-1**



**Options**

Suffix	Description
/HL (DRF120-480 only)	ATEX, IEC EX, GL Certification (Incl pcb coating)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/drif-series.htm](http://us.tdk-lambda.com/lp/products/drif-series.htm)



## 120W - 480W Single Output DIN Rail Mount Power Supplies

### Features

- ◆ High Efficiency
- ◆ Narrow Width
- ◆ Curve B, Conducted & Radiated EMI
- ◆ Up to 7 Year eCap-Life
- ◆ 3 Year Warranty



### Key Market Segments & Applications

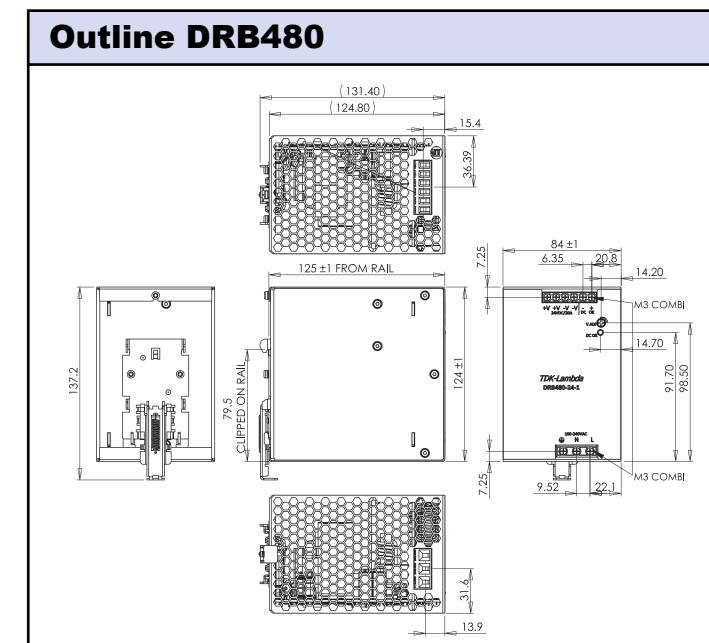
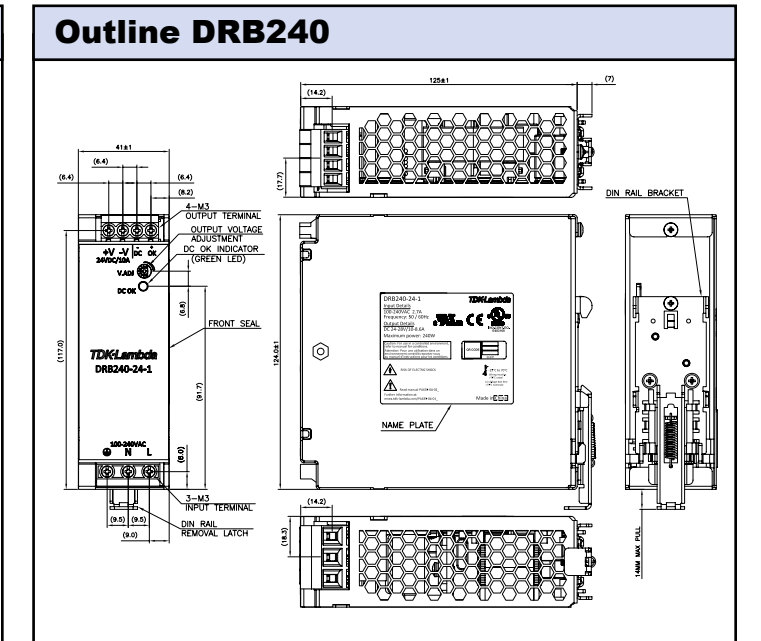
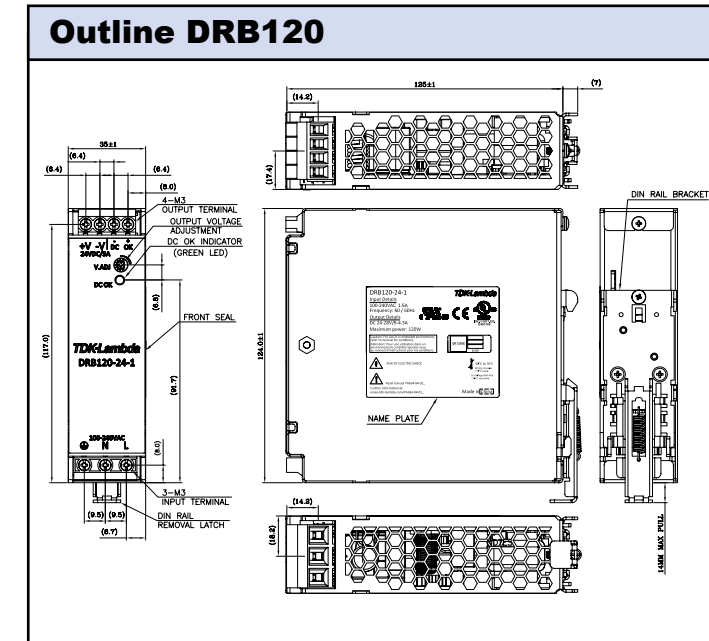


Specifications		DRB120-24-1	DRB240-24-1	DRB480-24-1	DRB480-8-1
Input Voltage Range <sup>(1)</sup>	VAC	85 - 264 (withstands 300VAC for 5s)		90 - 264 (1)	
Input Frequency	Hz	47 - 63			
Inrush Current (Cold Start)	A	55A (Typical at 230VAC)		<40A (at 264VAC)	
Power Factor (115/230VAC) <sup>(2)</sup>	-	0.98 / 0.92		>0.98 / 0.96	
Input Current	A	1.2 / 0.7 (115/230VAC)   2.4 / 1.4 (115/230VAC)		5 / 2.5 (115/230VAC)	
Leakage Current 264VAC 63Hz	mA	<1			
Line Regulation	%	<0.1			
Load Regulation	%	<1			
Ripple and Noise	%	<1			
Temperature Coefficient	%/°C	<±0.02			
Overcurrent Protection	A	>6.06	>12.12	21 - 29	10.5 - 15
Overvoltage Protection (3)	V	30 - 35	30 - 35	30V ±2%	57V ±4%
Overtemperature Protection	-	Yes			
Hold Up Time	ms	20	20	>16	>16
No-load Power Consumption	W	<1	<1.5	<5	<5
Efficiency (120 / 230VAC)	%	See Model Selector			
Average efficiency (230VAC)	%	>87			
LED Indicator	-	Green LED = DC is OK			
DC OK Signal	-	Optocoupler; ON when Vout >80% of nominal output. 50V, 5mA maximum (20mA for DRB480)			
Operating Temperature	°C	UL508, IEC/EN/UL/CSA60950-1, CE Mark (LVD, EMC, RoHS) In addition, for the DRB120 & 240: 120/240W: EN/UL/CSA62368-1, IEC/EN62477-1 OVC III (CB Report)			
Storage Temperature	°C	-40°C to +85°C			
Humidity (non condensing)	% RH	5 - 95%RH (Operating and storage)			
Parallel operation	-	No			
Series operation <sup>(4)</sup>	-	Yes			
Cooling	-	Convection			
Withstand Voltage (for 1 minute)	VAC	Input to Output 3kVAC, Input to GND 1.5kVAC, Output to GND 500VAC			
Isolation Resistance	MΩ	>100MΩ at 25°C, 70%RH & 500VDC			
Vibration (Non operating)	-	120/240W: 2G, 10 to 55Hz, 480W: 2G, IEC 60068-2-6, 10 to 500Hz			
Shock	-	120/240W: 20G, IEC 60068-2-27, half-sine, 22ms, 3 x each axis on DIN rail, 480W: 5G			
Safety agency certifications	-	UL508, IEC/EN/UL/CSA60950-1, CE Mark (LVD, EMC, RoHS2) Also 120/240W: UL/CSA62368-1, Built to meet EN62368-1, IEC/EN62477-1 OVC III			
Conducted & radiated EMI	-	EN55011-B, EN55032-B, CISPR11-B, CISPR22-B, EN61204-3 Class A			
Immunity	-	EN61000-4-2 (Ivl 3), -3 (Ivl 3), -4 (Ivl 3), -5 (Ivl 3), -8 (Ivl 4), -11 (Ivl 3)			
Line Dips	-	SEMI-F47 (200VAC input)			
Weight (typ)	g	500	750	1000	
Size (W x H x D)	mm	35 x 124 x 125	41 x 124 x 125	84 x 124 x 125	
Case material	-	Metal			
Warranty	yrs	3			

Notes: (1) Derate linearly to 92.5% load from 100 to 90VAC  
 (2) EN61000-3-2 Class A  
 (3) Cycle input voltage to reset  
 (4) See installation manual

Model	Output Voltage (V)	Output Adjust Range (V)	Max Output Current (A)	Max Output Power (W)	Peak Output Current <sup>(5)</sup>	Peak Output Power <sup>(5)</sup>	Efficiency (120 / 230VAC)
DRB120-24-1	24V	24 - 28V	5A	120W	6A	144W	91 / 93% (Typ)
DRB240-24-1	24V	24 - 28V	10A	240W	12A	288W	91 / 93% (Typ)
DRB480-24-1	24V	24 - 26.4V	20A	480W	-	-	>90 / 92%
DRB480-48-1	48V	48 - 52.8V	10A	480W	-	-	>90 / 92%

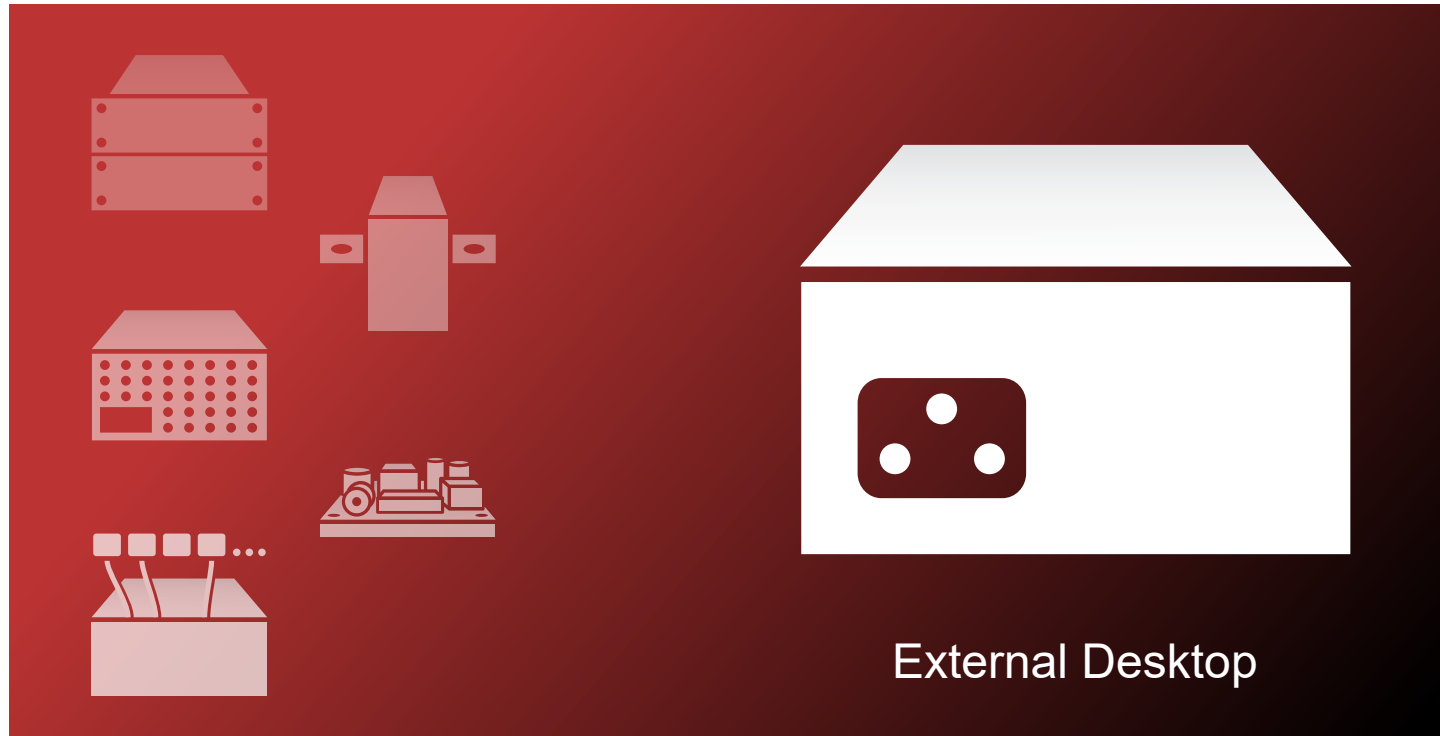
Notes: (5) <10s, Duty Cycle < 35%



For Additional Information, please visit [us.tdk-lambda.com/lp/products/dr-b-series.htm](http://us.tdk-lambda.com/lp/products/dr-b-series.htm)



 **AC-DC Power Supplies**



**Applications**

- ◆ External power supplies as accessory for end equipment
- ◆ Typically used for portable, medical and ITE equipment

**Features**

- ◆ Fully enclosed plastic case
- ◆ Plug and play – no input range setting or output voltage adjustment required
- ◆ IEC AC input connection
- ◆ DC output cable and connector
- ◆ ErP, CEC, DOE and EISA compliant models
- ◆ Class I and Class II versions
- ◆ DTM series suitable for medical equipment

Wattage	Series	Page
40-65W	DTM65-C8	132
40-65W	DTM65-D	134
40-80W	DT62-80D	136
90-110W	DTM110-C	138
100-150W	DT100-150-D	140
110W	DTM110-C8	142
250W	DTM250-D	144
300W	DTM300-D	146

Listed by Wattage

**40W to 65W Medical Class II AC-DC External Power Supplies**

**Features**

- ◆ Meets DOE Level VI Efficiency
- ◆ 60601-1 & 60601-1-11 Medical Certifications
- ◆ Class II Input
- ◆ < 0.21W Off-load Power Draw

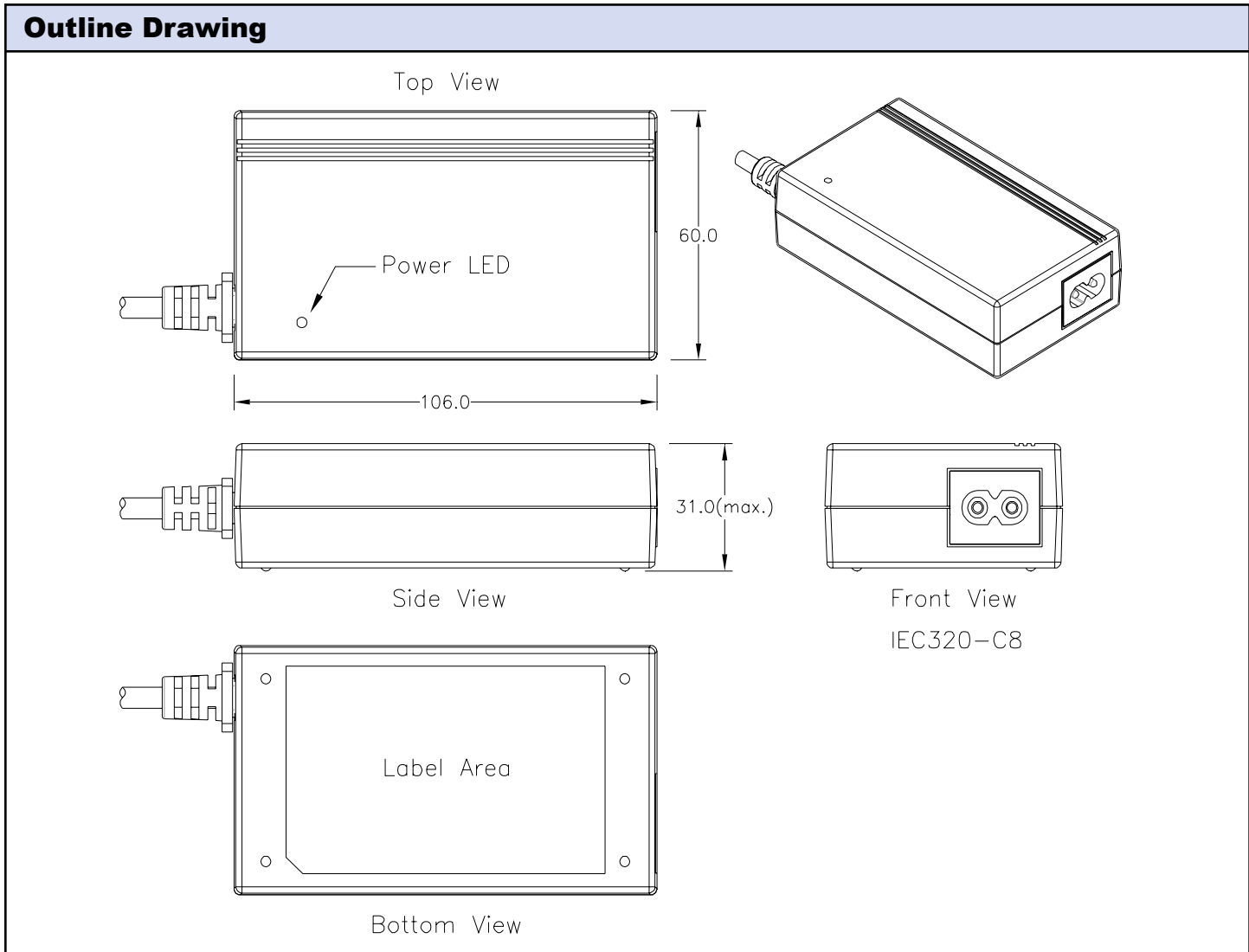


**Key Market Segments & Applications**



Specifications		
Model		
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<100A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Power Factor	-	Meets EN61000-3-2 Class A
Hold Up Time (Typ)	ms	10ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	-	5V to 15V Models:±5%, >15V models ±3%
Ripple & Noise	%	1% pk-pk
Overload & Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Overtemperature Protection	-	Yes (Cycle input power to reset)
Efficiency	%	>88%, average efficiency (5V model: >83.8%)
Operating Temperature	-	0 to +60°C derate linearly to 50% load from 41 to 60°C
Storage Temperature	°C	-10 to +70°C
Humidity (non condensing)	%RH	10 - 90% RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 4kVAC
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Certifications	-	ANSI/AAMI ES60601-1, EN/IEC60601-1, CSA-C22.2 No.60601 3rd edition (2 x MOPP)
Offload Power Consumption	W	< 0.21W
EMC	-	EN55011B, EN60601-1-2
IP Rating	-	IP22
Weight (Typ)	g	240g
Size (WxLxH)	in (mm)	2.36 x 4.17 x 1.22" (60 x 106 x 31mm)
Cable Length	mm	1050mm
AC Input Connector	-	IEC 320-C8 (2 prong)
Output Connector	-	Kycon KPPX-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
Warranty	Years	Three Years

Output Ratings				
Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Efficiency Level
DTM65PW050C8	5	8	40	V
DTM65PW120C8	12	5	60	VI
DTM65PW150C8	15	4	60	VI
DTM65PW190C8	19	3.42	65	VI
DTM65PW240C8	24	2.7	65	VI
DTM65PW280C8	28	2.32	65	VI
DTM65PW480C8	48	1.35	65	VI



Other AC-DC Products	
DT62-C	62W CEC Compliant Adapters
DT80-C	80W CEC Compliant Adapters
DT100 / 150-C	100W & 150W CEC Compliant Adapters
DTM110-C	110W CEC Compliant Medical Adapters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



**40-65W Medical AC-DC External Power Supplies**

**Features**

- ◆ DOE Level VI & EU Tier 2 Efficiency Compliant
- ◆ Medical Certifications
- ◆ Class I Input
- ◆ < 0.15W Off-load Power Draw
- ◆ <100µA Touch Current

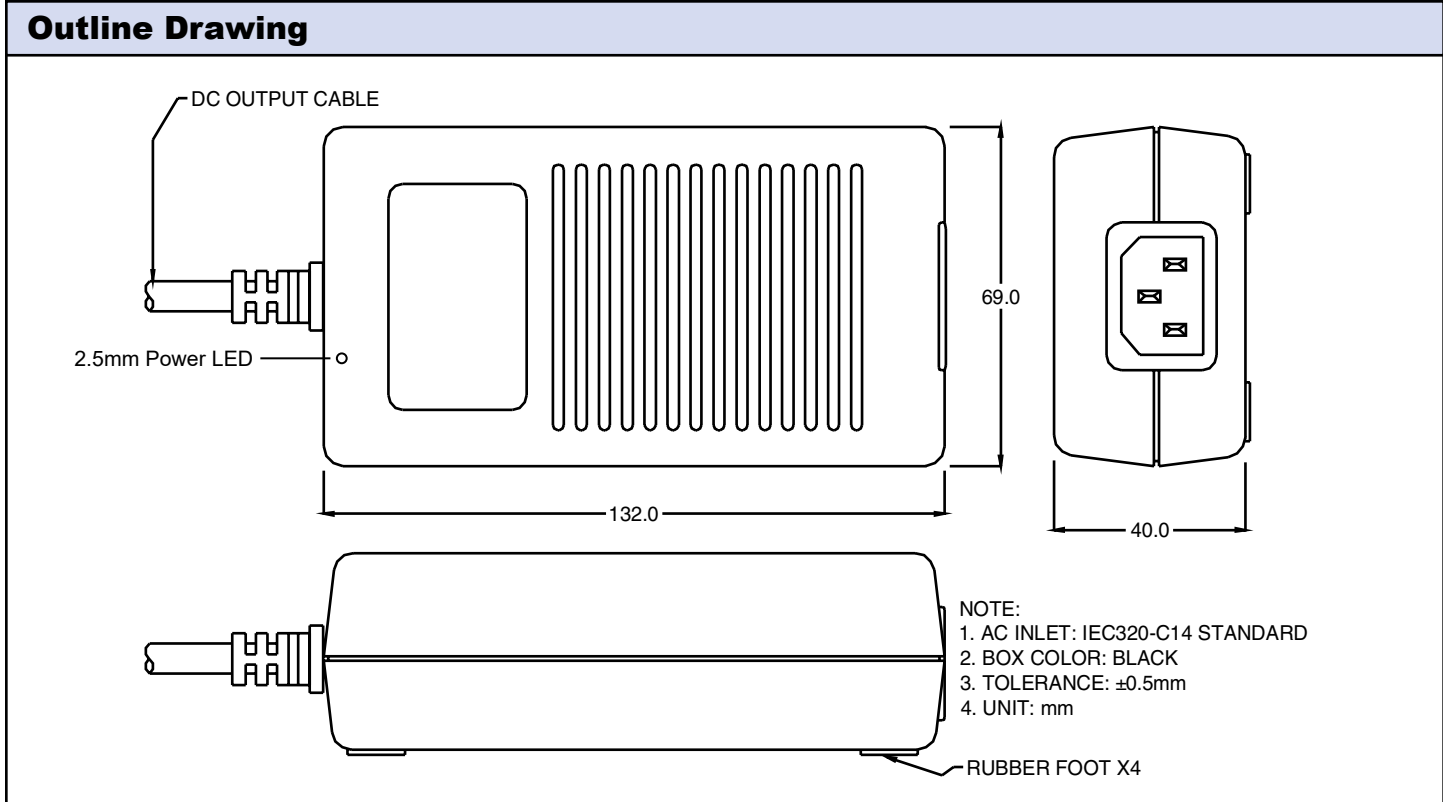


**Key Market Segments & Applications**



Specifications		
Model		
Input Voltage range	-	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<50A at 115VAC, <90A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Offload Power Consumption	W	< 0.15W
Touch Current	µA	<100µA
Power Factor	-	None
Hold Up Time	ms	>10ms at 115VAC input
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	%	5V to 15V Models:±5%, >15V models ±3%
Ripple & Noise	mV	1% pk-pk or 120mV whichever is greater
Overload & Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	%	110 - 170% of nominal (Cycle input power to reset)
Overtemperature Protection	-	Yes (Cycle input power to reset)
Efficiency	%	>89%, average efficiency (5V model: 87.3%)
Operating Temperature	°C	-20 to +60°C derate linearly to 50% load from 51 to 60°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	%RH	10 - 90% RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 4kVAC (2xMOPPs), Output to Ground 1.5kVAC
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Certifications	-	UL/EN/IEC60601-1, CSA-C22.2 No.60601 3rd edition
Altitude	m	5,000m
Offload Power Consumption	W	< 0.15W
EMC	-	EN55011B, EN60601-1-2, FCC Part 18 Class B
Immunity	-	IEC60601-1-2 Ed4:2014
Weight (Typ)	g	390g
Size (WxLxH)	in (mm)	2.72 x 5.2 x 1.57" (69 x 132 x 40mm)
Cable Length	mm	1050mm (5V model: 600mm)
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)
Output Connector	-	Kycon KPP-4P or equivalent; Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
Warranty	yrs	Three Years

Output Ratings				
Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Efficiency Level
DTM65PW050D	5	8	40	VI
DTM65PW120D	12	5	60	VI
DTM65PW150D	15	4	60	VI
DTM65PW190D	19	3.42	65	VI
DTM65PW240D	24	2.71	65	VI
DTM65PW280D	28	2.32	65	VI
DTM65PW360D	36	1.81	65	VI
DTM65PW480D	48	1.35	65	VI



For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)





**40W to 80W AC-DC External Power Supplies**

**Features**

- ◆ Meets DoE Level VI & EU Tier 2 Efficiency
- ◆ No load Power consumption <150mW
- ◆ Power Factor Correction (DT80)
- ◆ LED ON indicator (Blue)



**Key Market Segments & Applications**



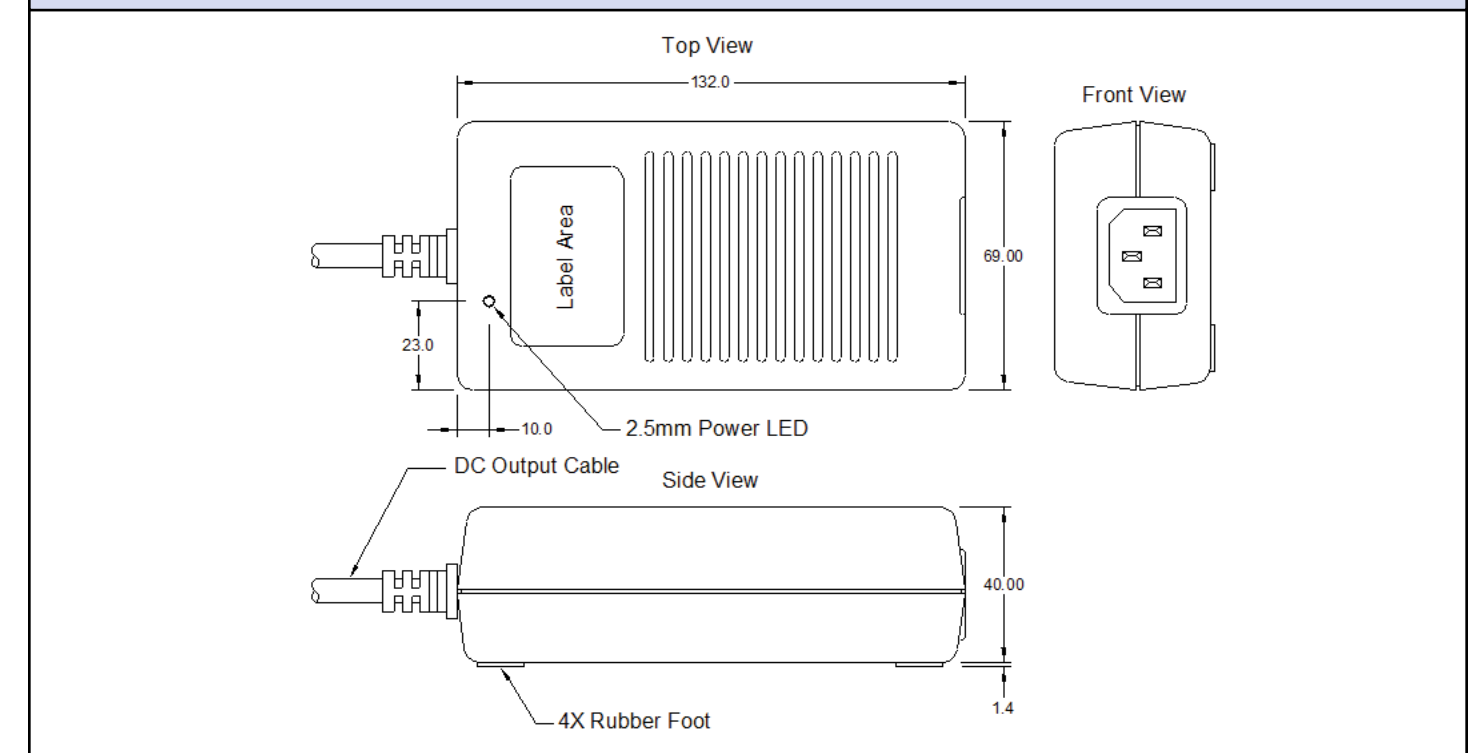
Specifications			
Model		DT62PWxxxD	DT80PWxxxD
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)	
Inrush Current at 115VAC, cold start 25°C ambient	A	<50A	<75A
Input Current (Maximum)	A	2A (90VAC input)	
Power Factor	-	Meets EN61000-3-2	Typically 0.9 at full load (Meets EN61000-3-2)
Leakage Current (typ, 264VAC 63Hz)	mA	0.7mA	
Hold Up Time (Typ) at 115VAC input, full load	ms	>10ms	>20ms
Temperature Coefficient	°C	±0.05%/°C	
Voltage Accuracy	%	±2%	
Adjustment Range	-	None	
Minimum Load	A	None	
Total Regulation	-	±5%	
Ripple & Noise	%	1% or 240mV ( whichever is lower)	240mV
Short Circuit Protection	-	Continuous - hiccup mode	
Overvoltage Protection	V	110 - 140% of nominal (Cycle input power to reset)	
Efficiency at Average Load	%	>89% (>86.1% 5V, >87.6% 6-10V models)	>89% (>88% 9V model)
Operating Temperature	°C	0 to +70°C, derating linearly to 50% load above 50°C	0 to +60°C, derating linearly to 50% load above 40°C
Storage Temperature	-	-10 to +85°C	
Humidity (non condensing)	-	10 - 90% RH	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 1.5kVAC, Input to Output 3kVAC (Output is connected to Ground)	
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)	
Shock	-	< 196.1 m/s <sup>2</sup> (20G)	
Safety Agency Certifications	-	UL/EN/IEC60950-1, CE Mark	
Department of Energy (DOE) regulation	-	See model selector	
EU CoC V.5	-	See model selector	
Offload Power Consumption	mW	<150mW	
Conducted & Radiated EMI	-	EN55032-B, FCC Class B	
Immunity	-	EN55024	
Weight (Typ)	g	400g	440g
Size (WxLxH)	Inches (mm)	2.72 x 5.2 x 1.57" (69 x 132 x 40mm)	
Cable Length and Thickness	mm	1050mm	
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)	
Output Connector	-	Kycon KPPX-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout	
MTBF (MIL-HDBK), 100% load, 25C	Hours	140,000 hours	120,000 hours
Warranty	Years	Three Years	

**Output Ratings**

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	DOE		EU CoC V.5	
				V	VI	Tier 1	Tier 2
DT62PW050D	5	8	40	Y	Y*	Y*	-
DT62PW080D	8	5	40	Y	Y*	Y*	-
DT62PW120D	12	5.41	65	Y	Y	Y	Y
DT62PW150D	15	4.33	65	Y	Y	Y	Y
DT62PW190D	19	3.43	65	Y	Y	Y	Y
DT62PW240D	24	2.71	65	Y	Y	Y	Y
DT62PW360D	36	1.81	65	Y	Y	Y	Y
DT62PW480D	48	1.36	65	Y	Y	Y	Y
DT80PW090D	9	8	72	Y	Y*	Y*	-
DT80PW120D	12	6.67	80	Y	Y	Y	Y
DT80PW150D	15	5.34	80	Y	Y	Y	Y
DT80PW180D	18	4.45	80	Y	Y	Y	Y
DT80PW240D	24	3.34	80	Y	Y	Y	Y
DT80PW280D	28	2.86	80	Y	Y	Y	Y
DT80PW480D	48	1.67	80	Y	Y	Y	Y

\* Product built after July 2016

**Outline Drawing**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



**90-110W Medical AC-DC External Power Supplies**

**Features**

- ◆ CEC, EISA<sup>(1)</sup> & ErP Stage 2 Compliant
- ◆ Wide Range AC Input
- ◆ Medical Certifications
- ◆ > 87% Average Efficiency



**Key Market Segments & Applications**



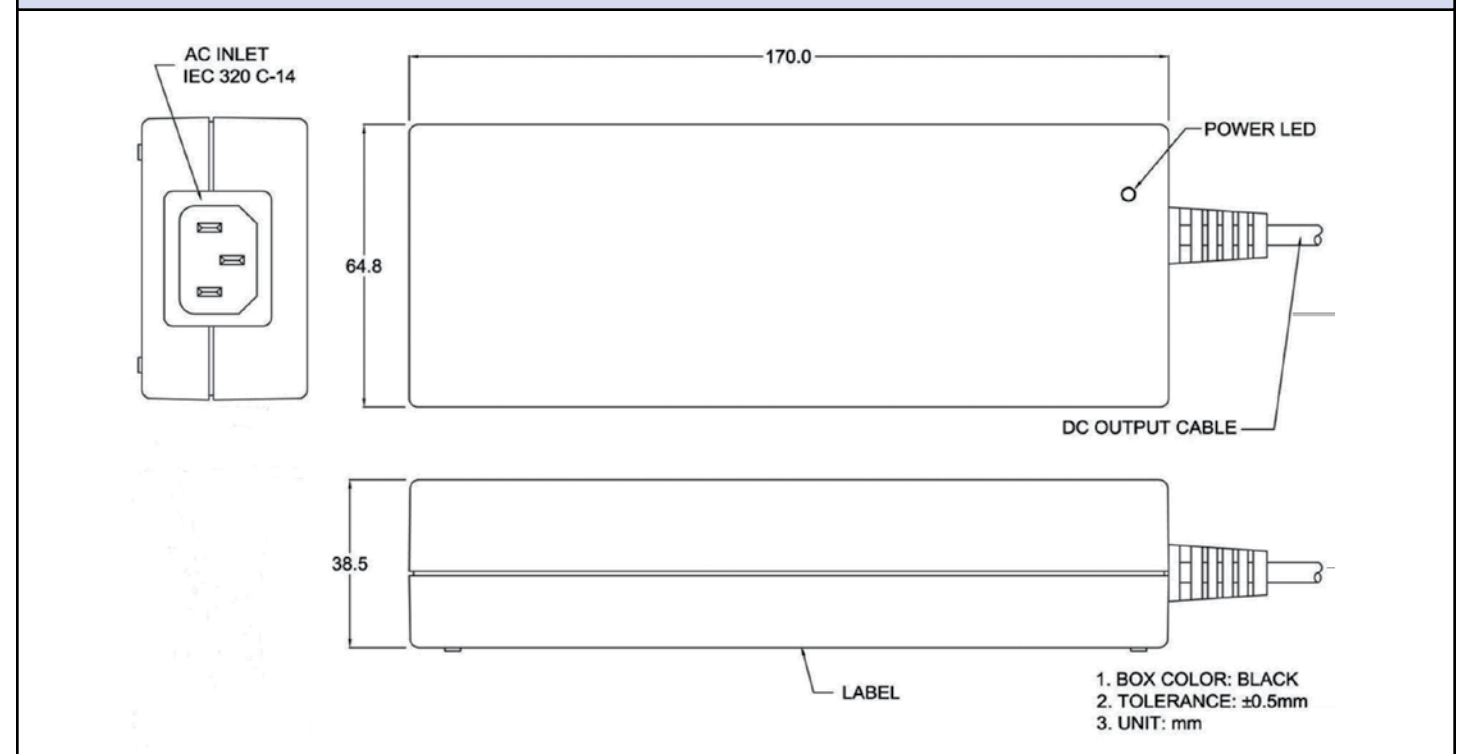
Specifications		
Model	DTM110PWxxx-C	
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<100A at 230VAC input, 25°C ambient cold start
Input Current	A	2A at 90VAC, Full Load
Power Factor	-	Meets EN61000-3-2. >0.9 PF
Leakage Current (264VAC 60Hz)	µA	<300µA
Hold Up Time (Typ)	ms	>10ms
Temperature Coefficient	%/°C	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	V	None
Minimum Load	A	None
Total Regulation	%	12V to 15V Models:±5%, >15V models ±3%
Ripple & Noise	%	1%
Short Circuit Protection	-	<160% - hiccup mode
Overvoltage Protection	V	110 - 150% of nominal (Cycle input power to reset)
Efficiency	%	>87% average efficiency
Operating Temperature	°C	0 to +40°C
Storage Temperature	°C	-10 to +70°C
Humidity (non condensing)	%RH	10 - 90%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 4kVAC (Reinforced) (2 x MOPPS 3rd Edition) (Output is isolated from Ground)
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Approvals	-	UL/CSA/IEC/EN 60601-1, ANSI/AAMI ES60601-1, CE Mark
California Energy Commission (CEC)	-	See model selector
EISA	-	See model selector
Offload Power Consumption	W	< 0.5W
Conducted & Radiated EMI	-	EN55022, EN60601-1-2, FCC Part 18 Class B
Immunity	-	EN55024
Weight (Typ)	g	605g
Size (WxLxH)	Inches	2.55 x 6.7 x 1.51"
Cable Length	mm	1050mm
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)
Output Connector	-	Kycon KPPx-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
Warranty	yrs	Two Years

(1) EISA - Energy Independence and Security Act of 2007

**Output Ratings**

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	CEC	EISA Efficiency Level
DTM110PW120C	12	7.5	90	V	V
DTM110PW135C	13.5	6.67	90	V	V
DTM110PW150C	15	6.67	100	V	V
DTM110PW190C	19	5.8	110	V	V
DTM110PW200C	20	5.5	110	V	V
DTM110PW240C	24	4.6	110	V	V

**Outline Drawing**



**Other AC-DC Products**

DT62-C	62W CEC Compliant Adapters
DTM65-C	40W to 65W Medical Adapters
DT80-C	80W CEC Compliant Adapters
DT100 / 150-C	100W & 150W CEC Compliant Adapters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



**100W to 150W AC-DC External Power Supplies**

**Features**

- ◆ DOE level VI and EU tier 2 Efficiency Levels
- ◆ >89% Average Efficiency
- ◆ <150mW Off-load Power Draw
- ◆ Wide Range AC Input
- ◆ Power Factor Correction

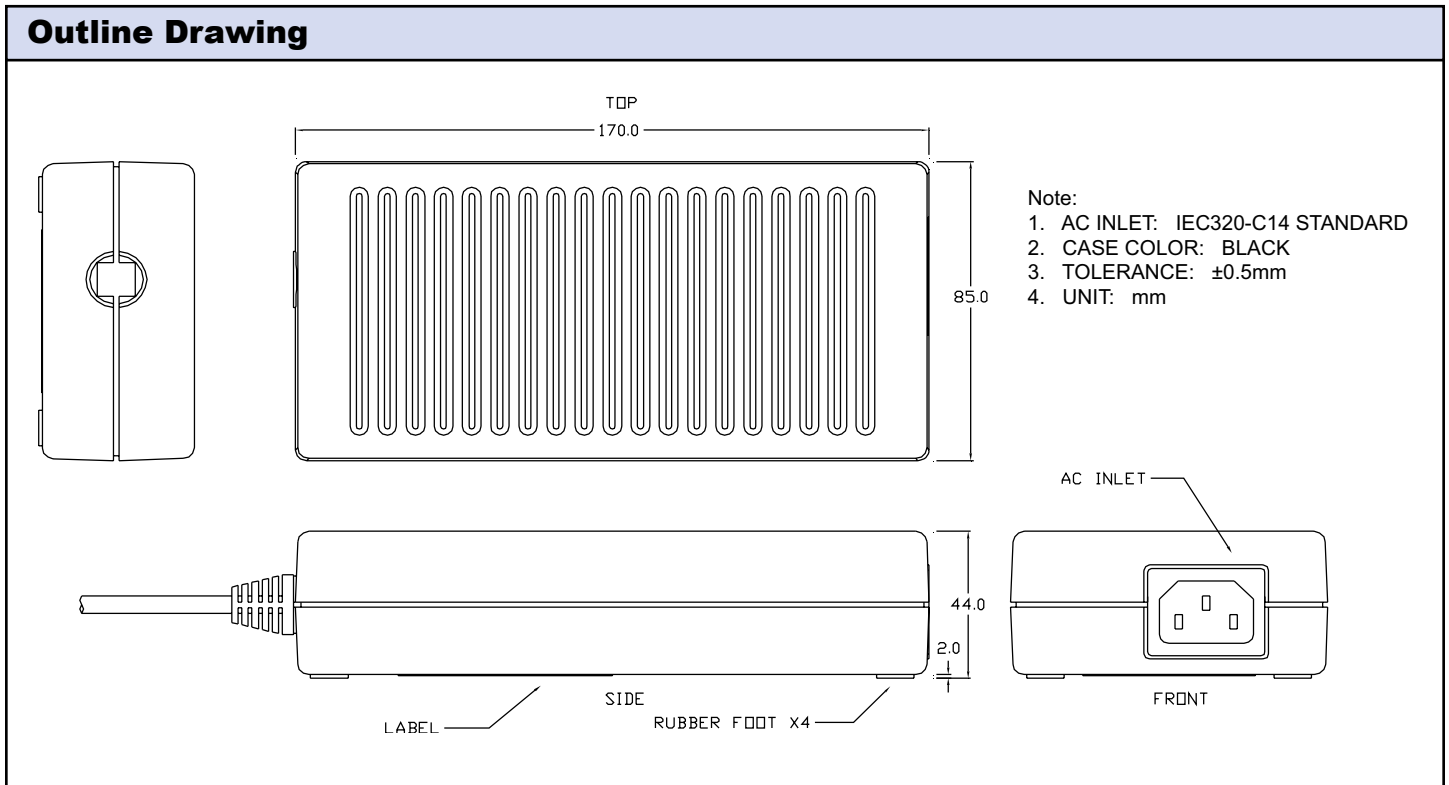
**Key Market Segments & Applications**



Specifications		
Model	DT100PWxxx-D	DT150PWxxx-D
Input Voltage range	-	90 - 264VAC (47 - 63Hz)
Inrush Current	A	< 150A at 230VAC input, 25°C ambient cold start
Input Current (Maximum)	A	2.5A
Power Factor	-	Typically 0.9 at full load, 230VAC (Meets EN61000-3-2)
Leakage Current	uA	<300uA at 264VAC input
Hold Up Time (Typ)	ms	16ms at 115VAC input
Temperature Coefficient	%/°C	±0.05%/°C
Voltage Accuracy	%	±1%
Adjustment Range	V	None
Minimum Load	A	None
Total Regulation	%	See model selector
Ripple & Noise	%	See model selector
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	110 - 130% of nominal (Cycle input power to reset)
Efficiency	%	>89% Avg Active Efficiency
Operating Temperature	°C	-20 to +60°C, de-rate linearly to 50% load from 40 to 60°C
Storage Temperature	°C	-20 to +70°C
Humidity (non condensing)	%RH	10 - 90%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VDC*
Vibration (non operating)	-	23.52m/s <sup>2</sup> (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s <sup>2</sup> (20G)
Safety Agency Approvals	-	UL/CSA/EN/IEC60950-1
Efficiency Level	-	VI
Offload Power Consumption	W	< 0.15W
Conducted & Radiated EMI Immunity	-	EN55022-B, FCC Class B EN55024
Weight (Typ)	g	780g
Size (WxLxH)	mm (in)	85 x 170 x 44 (3.35 x 6.7 x 1.73")
Cable Length and Thickness	mm	1050mm; 12 to 24V Models: #14 AWG, 36 to 48V Models: #16 AWG
AC Input Connector	-	IEC 320-C14 (Accepts IEC 320-C13)
Output Connector	-	Kycon KPPX-4P or equivalent Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
MTBF	hrs	140,000 hours, 100% load, 25°C ambient, MIL-HNBK
Warranty	yrs	Three years

\* Versions available for output to be internally connected to ground. Contact factory.

Output Ratings					
Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Output Regulation	Ripple & Noise (mV)
DT100PW120D	12	8.34	100	±5%	240
DT100PW160D	16	6.25	100	±5%	320
DT100PW190D	19	5.27	100	±5%	380
DT100PW240D	24	4.17	100	±3%	480
DT100PW360D	36	2.78	100	±3%	480
DT100PW480D	48	2.09	100	±3%	480
DT150PW120D	12	11.67	140	±5%	240
DT150PW160D	16	9.38	150	±5%	320
DT150PW190D	19	7.90	150	±5%	380
DT150PW240D	24	6.25	150	±3%	480
DT150PW360D	36	4.17	150	±3%	480
DT150PW480D	48	3.13	150	±3%	480



Other TDK-Lambda Adapters	
DT62-D	65W Level VI Compliant Adapters
DTM65-C	65W Level V Compliant Medical Adapters
DT80-D	80W Level VI Compliant Adapters
DTM110-C	110W Level V Compliant Medical Adapters
DTM165-C	165W Level V Compliant Medical Adapters

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



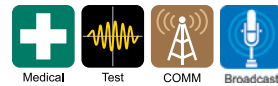
**110W Medical/ITE Class II External Power Supplies**

**Features**

- ◆ Meets DoE Level VI & EU Tier 2 Efficiency
- ◆ Medical & ITE Certifications
- ◆ Class II Input (No Earth Ground Required)
- ◆ < 0.15W Off-load Power Draw
- ◆ Meets IEC60601-1-2 Ed4 & 60601-1-11
- ◆ Suitable for B & BF Rated Equipment



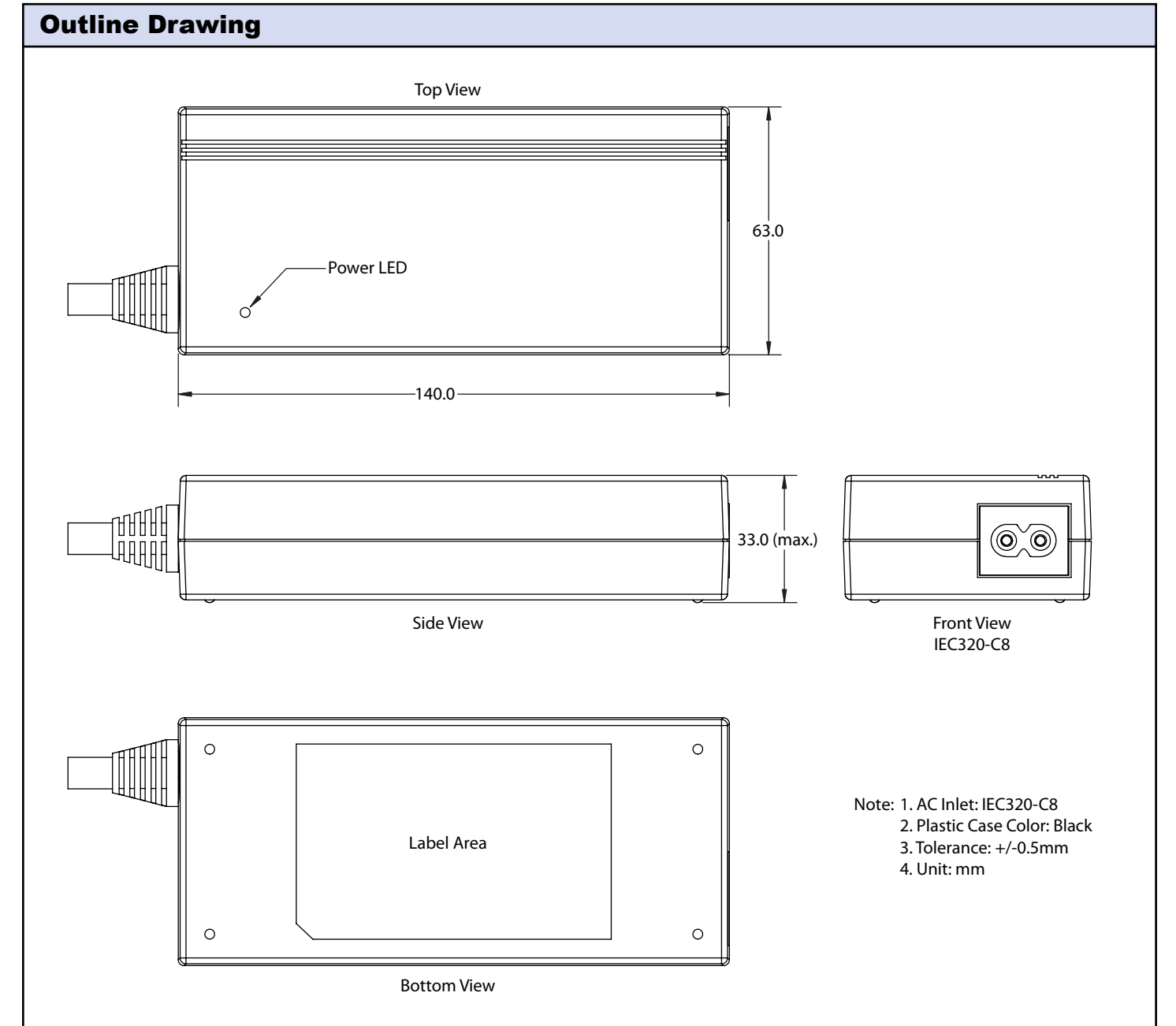
**Key Market Segments & Applications**



Specifications		
Model	DTM110-C8	
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<120A at 230VAC input, 25°C ambient cold start
Input Current	A	2A @90VAC; 1.25A @264VAC Maximum
Touch Current	-	<100uA @ 264VAC
Power Factor	-	Meets EN61000-3-2, >0.9 at 230VAC full load
Hold Up Time (Typ)	ms	10ms at 115VAC input
Temperature Coefficient	%/°C	±0.05%/°C
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	%	12-19V: ±5%, 24-48V: ±3%
Ripple & Noise (pk-pk)	mV	150mV
Overload & Short Circuit Protection	-	105 - 150% - hiccup mode
Overvoltage Protection	V	Cycle input power to reset
Efficiency	%	>89%, average efficiency
Operating Temperature	°C	-20 to +60°C derate linearly to 50% load from 40 to 60°C Derate linearly to 80% load from 0 to -20°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	%RH	0 - 95%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Output 4kVAC (2xMoPP)
Safety Agency Certification	-	IEC/ES/CSA/EN60601-1, IEC60601-1-11, IEC/UL/CSA/EN60950-1, CE Mark
Offload Power Consumption	W	< 0.15W
EMC	-	IEC60601-1-2 Ed4:2014, EN55011 Class B, EN55032 Class B, FCC Part 15 Class B, FCC Part 18 Class B
IP Rating	-	IP41
Altitude	m	5,000m maximum
Weight (Typ)	g	780g
Size (WxLxH)	in (mm)	2.48 x 5.5 x 1.29" (63 x 140 x 33mm)
Cable Length	mm	1000mm
AC Input Connector	-	IEC 320-C8 (2 prong)
Output Connector	-	Kycon KPPX-4P or equivalent; Pins 1 & 2: -Vout, Pins 3 & 4: +Vout
Warranty	yrs	Three Years

Notes:  
Other connectors are available. Contact factory.

Model Selector			
Model	Output (V)	Maximum Output (A)	Maximum Power (W)
DTM110PW120C8	12V	8.75A	105W
DTM110PW150C8	15V	7.34A	110W
DTM110PW190C8	19V	5.79A	110W
DTM110PW240C8	24V	4.59A	110W
DTM110PW280C8	28V	3.93A	110W
DTM110PW360C8	36V	3.06A	110W
DTM110PW480C8	48V	2.29A	110W



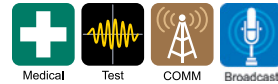
**250W Medical / ITE External Power Supplies**

**Features**

- ◆ Meets DoE Level VI & EU Tier 2 Efficiency
- ◆ Medical & ITE Certifications
- ◆ < 0.15W Off-load Power Draw
- ◆ Meets IEC60601-1-2 Ed4
- ◆ Suitable for B & BF Rated Equipment



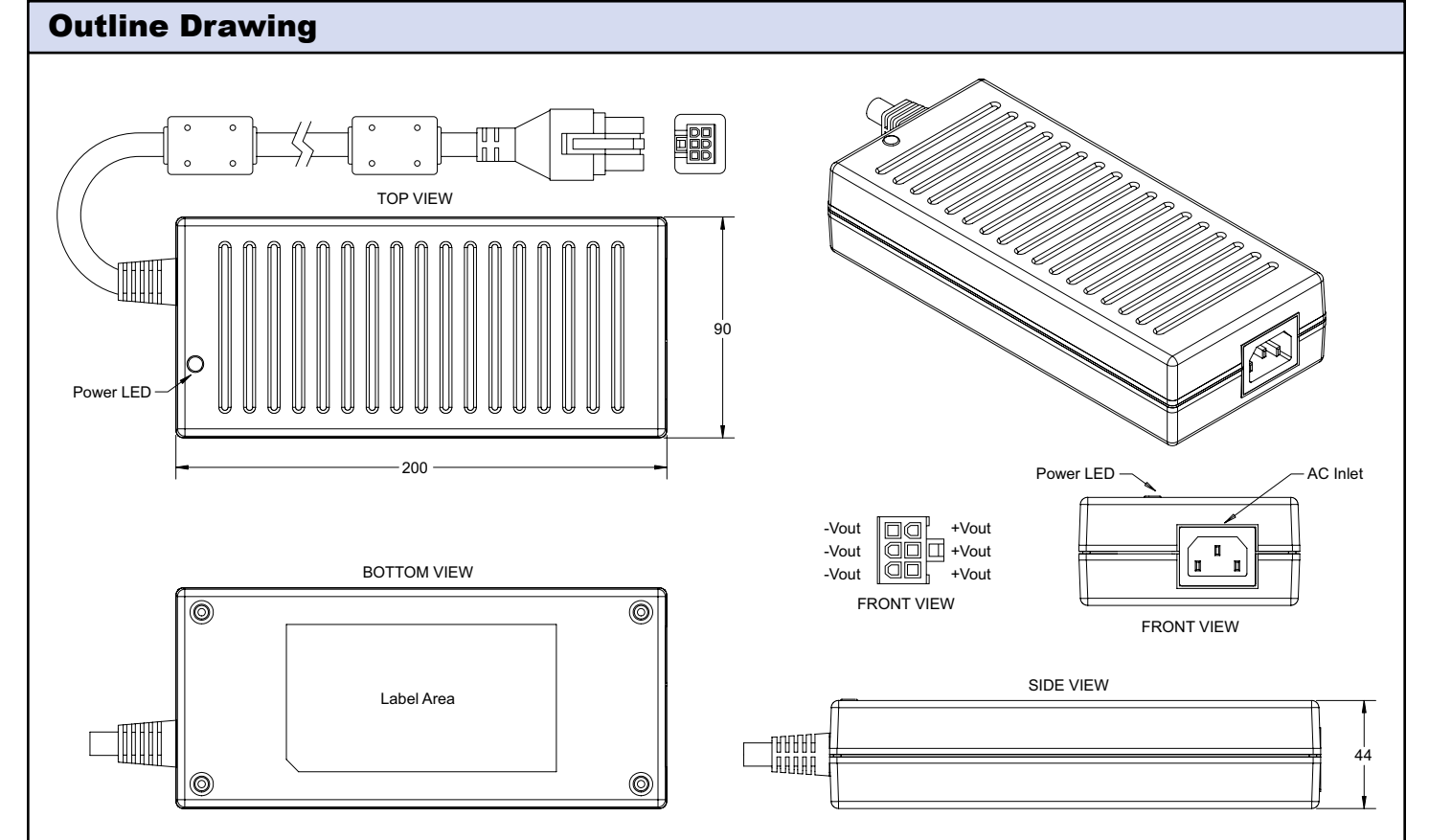
**Key Market Segments & Applications**



Specifications		
Model	DTM250-D	
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<80A at 230VAC input, 25°C ambient cold start
Input Current	A	2.5A @115VAC; 1.3A @230VAC Maximum
Touch Current	-	<100uA @ 264VAC
Power Factor	-	Meets EN61000-3-2, >0.9 at 230VAC full load
Hold Up Time (Typ)	ms	10ms at 115VAC input
Temperature Coefficient	%/°C	±0.05%/°C
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	%	±5%
Ripple & Noise (pk-pk)	mV	12V: 240mV, 19 - 54V: 300mV
Overload & Short Circuit Protection	-	105 - 160% - hiccup mode
Overvoltage Protection	V	Auto-recovery
Efficiency	%	>89%, average efficiency
Operating Temperature	°C	-20 to +60°C derate linearly to 50% load from 40 to 60°C Derate linearly to 80% load from 0 to -20°C
Storage Temperature	°C	-20 to +85°C
Humidity (non condensing)	%RH	0 - 95%RH
Cooling	-	Convection
Withstand Voltage	VAC	Input to Output 4kVAC (2xMoPP), Input and Output to Ground 1.5kVAC (1xMoPP)
Safety Agency Certification	-	IEC/ES/CSA/EN60601-1, IEC/UL/CSA/EN60950-1, CE Mark
Offload Power Consumption	W	< 0.15W
EMC	-	IEC60601-1-2 Ed4:2014, EN55011 Class B, EN55032 Class B, FCC Part 15 Class B, FCC Part 18 Class B
Altitude	m	5,000m maximum
Weight (Typ)	g	1300g
Size (WxLxH)	in (mm)	3.543 x 7.874 x 1.77" (90 x 200 x 45mm)
Cable Length	mm	800mm
AC Input Connector	-	IEC 320-C14 (3 prong)
Output Mating Connector	-	Molex Mini Fit 39-28-1063 or equivalent; Pins 1 - 3: -Vout, Pins 4 - 6: +Vout
Warranty	Years	Three Years

Notes:  
Other connectors are available. Contact factory.

Model Selector			
Model	Output (V)	Maximum Output (A)	Maximum Power (W)
DTM250PW120D	12V	20.83A	250W
DTM250PW190D	19V	13.157A	250W
DTM250PW240D	24V	10.416A	250W
DTM250PW280D	28V	8.928A	250W
DTM250PW360D	36V	6.94A	250W
DTM250PW480D	48V	5.208A	250W
DTM250PW540D	54V	4.629A	250W



For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



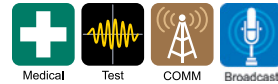
**300W Medical/ITE Class I and II External Power Supplies**

**Features**

- ◆ Meets DoE Level VI Efficiency
- ◆ Medical & ITE Certifications
- ◆ Class I & II Inputs
- ◆ < 0.5W Off-load Power Draw
- ◆ Meets IEC60601-1-2 Ed4 & 60601-1-11\*
- ◆ Suitable for B & BF Rated Equipment



**Key Market Segments & Applications**



Specifications		
Model	DTM300-D	
Input Voltage range	VAC	90 - 264VAC (47 - 63Hz)
Inrush Current	A	<70A at 230VAC input, 25°C ambient cold start
Input Current	A	3A at 115VAC Maximum
Touch Current	-	<100uA @ 264VAC
Power Factor	-	Meets EN61000-3-2, >0.9 at 230VAC full load
Hold Up Time (Typ)	ms	10ms at 115VAC input
Temperature Coefficient	%/°C	±0.05%/°C
Adjustment Range	-	None
Minimum Load	A	None
Total Regulation	%	±5% (-20 to -30°C ±10%)
Ripple & Noise	mV	12V model: 240mV; all others 300mV
Overload & Short Circuit Protection	-	105 - 150% - hiccup mode
Overvoltage Protection	V	Auto-recovery
Efficiency	%	>88%, average efficiency
Operating Temperature	°C	-30 to +60°C derate linearly to 50% load from 40 to 60°C Derate linearly to 70% load from 0 to -30°C
Storage Temperature	°C	-30 to +85°C
Humidity (non condensing)	%RH	0 - 95%RH
Cooling	-	Convection
Withstand Voltage	VAC	Class I: Input to Ground 1.5kVAC, Input to Output 4kVAC (2xMoPP), Output to Ground: 1.5kVAC Class II: Input to Output 4kVAC (2xMoPP)
Safety Agency Certification	-	IEC/ES/CSA/EN60601-1, IEC60601-1-11*, IEC/UL/CSA/EN60950-1, CE Mark
Offload Power Consumption	W	< 0.5W
EMC	-	EN60601-2, IEC60601-1-2 Ed4:2014, EN55011 Class B, EN55024 Class B, FCC Part 15 Class B, FCC Part 18 Class B
IP Rating	-	IP42
Altitude	m	5,000m maximum
Weight (Typ)	g	1570g
Size (WxLxH)	in (mm)	4.4 x 8.75 x 1.77" (112 x 222 x 45mm)
Cable Length	mm	800mm
AC Input Connector	-	Class I: IEC 320-C14 (3 prong); Class II: IEC 320-C18 (2 prong)
Output Connector	-	See Output Connector on page 2
Warranty	yrs	Three Years

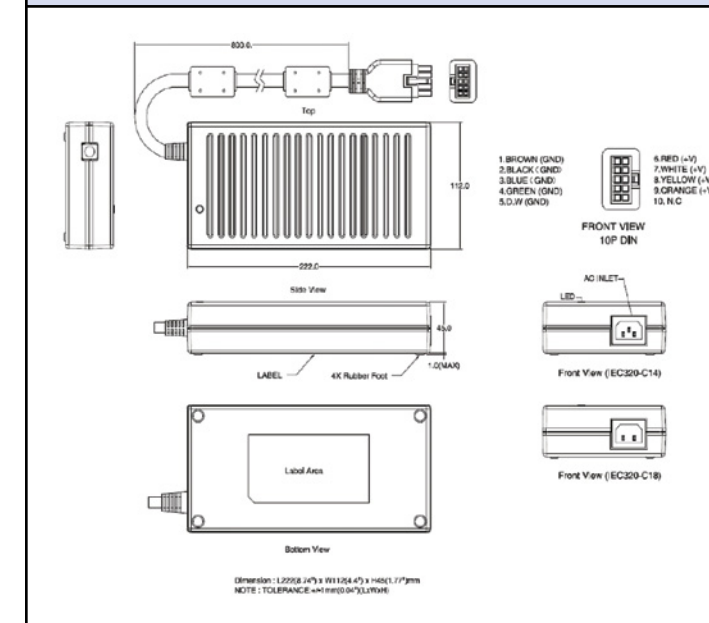
Notes:

\* Class II D2 models

**Model Selector**

Model	Output (V)	Maximum Output (A)	Maximum Power (W)	Regulation (mV)	Ripple/Noise	Efficiency Level	Class
DTM300PW-120D1	12V	25A	300W	240mV	+/-5%	VI	I
DTM300PW-150D1	15V	20A	300W	300mV	+/-5%	VI	I
DTM300PW-190D1	19V	15.79A	300W	300mV	+/-5%	VI	I
DTM300PW-240D1	24V	12.5A	300W	300mV	+/-5%	VI	I
DTM300PW-280D1	28V	10.71A	300W	300mV	+/-5%	VI	I
DTM300PW-480D1	48V	6.25A	300W	300mV	+/-5%	VI	I
DTM300PW-540D1	54V	5.56A	300W	300mV	+/-5%	VI	I
DTM300PW-120D2	12V	25A	300W	240mV	+/-5%	VI	II
DTM300PW-150D2	15V	20A	300W	300mV	+/-5%	VI	II
DTM300PW-190D2	19V	15.79A	300W	300mV	+/-5%	VI	II
DTM300PW-240D2	24V	12.5A	300W	300mV	+/-5%	VI	II
DTM300PW-280D2	28V	10.71A	300W	300mV	+/-5%	VI	II
DTM300PW-480D2	48V	6.25A	300W	300mV	+/-5%	VI	II
DTM300PW-540D2	54V	5.56A	300W	300mV	+/-5%	VI	II

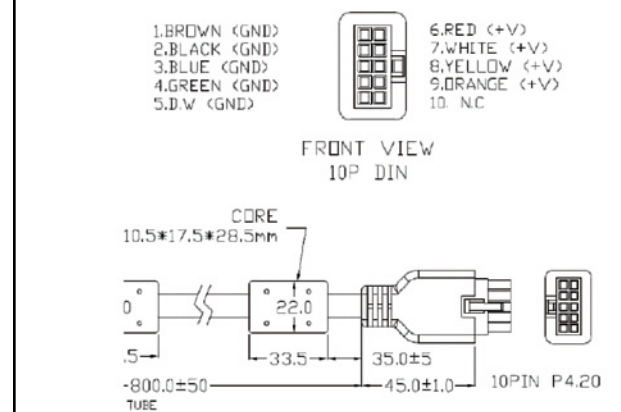
**Outline Drawing**



**Output Connector**

**Matching connectors**

DC Output Connector  
Standard male plug (power supply side): 10 PIN Mini Fit Jr. Pitch; 4.2mm Mating Connector: Molex P/N: 39-28-1103 or equivalent.  
DC output cable: 8C+1, UL2464, 16AWG, VW-1, 80°C, 300V



For Additional Information, please visit [us.tdk-lambda.com/lp/products/dt-c-series.htm](http://us.tdk-lambda.com/lp/products/dt-c-series.htm)



 DC-DC Converters



Applications DC-DC Converters

- ◆ Distributed Power Architecture with DC Bus
- ◆ Small subsystems with battery backup

Applications Bidirectional DC-DC Converters

- ◆ Electrical motor energy re-generation/storage (lifts, cranes, etc)
- ◆ Battery tests systems energy re-generation to avoid energy waste
- ◆ Smart-grid, particularly “micro-grid” applications

Features DC-DC Converters

- ◆ Galvanic isolation between input and output
- ◆ Power range from 1.5W to 700W
- ◆ Convection cooling, conduction cooling with baseplate or forced air cooling
- ◆ Input voltage ranges 2:1 or 4:1
- ◆ Nominal input voltages 5V, 12V, 24V, 48V, 110V or 280V

Features Point of Load Converters

- ◆ No galvanic isolation
- ◆ High efficiency
- ◆ Very fast transient response time
- ◆ SMT or through hole mounting
- ◆ Supply of logic voltages below 5V direct at the load

Features Bidirectional DC-DC Converters

- ◆ Grid voltage 320Vdc nominal, (300-380Vdc)
- ◆ Battery voltage 48Vdc nominal, (36-60Vdc)
- ◆ High efficiency up to 94.6%

Isolated 

Series	Total Power (W)	Outputs	Input Volts (VDC)	Output Volts (VDC)	Amps (A)	Size (inches)	Type	Page
CC-E	1.5-25	1 to 2	4.5-76	3.3-30	up to 7.5	DIP/SIP	PCB Mount	152
PXC-M03	3	1 to 2	9-75	3.3-30	up to 1	1.25 x 0.8 x 0.4	PCB Mount	154
PXC-M06	6	1 to 2	9-75	3.3-30	up to 1.8	1.25 x 0.8 x 0.4	PCB Mount	156
PXC-M10	10	1 to 2	9-75	3.3-30	up to 2.5	1.25 x 0.8 x 0.4	PCB Mount	158
CCG15	13-15	1	9-76	3.3-15	up to 4	1 x 1 x 0.39	PCB Mount	160
PXE	20-30	1 to 2	9-75	3.3-30	up to 6	2 x 1.6 x 0.4	PCB Mount	162
PXF	40-60	1 to 3	9-75	3.3-30	up to 14	2 x 2 x 0.4	PCB Mount	164
iEH	300	1	36-75	12	up to 25	2 x 0.9 x 0.49	Eighth Brick	166
CN-A110	30-100	1	60-160	5-24	up to 20	2.28 x 1.45 x 0.5	Quarter Brick	168
iQE	49-204	1	16-75	3.3-15	up to 30	2.28 x 1.45 x 0.41	Quarter Brick	170
CN-A24	50-100	1	14-36	5-24	up to 20	2.28 x 1.45 x 0.5	Quarter Brick	172
PH-A280	50-150	1	200-425	3.3-48	up to 20	1.46 x 0.5 x 2.3	Quarter Brick	174
iQL	72-308	1	18-75	1.2-28	up to 60	2.28 x 1.45 x 0.52	Quarter Brick	176
HQA85	85	1	9-40	5-28	up to 17	2.39 x 2.2 x 0.5	Quarter Brick	178
GQA120	120	1	9-36	5-48	up to 17	2.39 x 1.95 x 0.5	Quarter Brick	180
HQA120	120	1	9-40	5-48	up to 24	2.39 x 2.2 x 0.5	Quarter Brick	182
iQG	300-504	1	36-75	9.6-12	up to 47	2.28 x 1.45 x 0.52	Quarter Brick	184
CN-200A110	200	1	60-160	5-24	up to 40	2.4 x 2.28 x 0.5	Half Brick	168
PAH300-450	300-450	1	18-76	12-48	up to 29	2.4 x 2.28 x 0.5	Half Brick	186
iHG	300-456	1	36-75	12	up to 38	2.36 x 2.24 x 0.52	Half Brick	188
PAF600F	600	1	19-76	12, 28	up to 50	4.6 x 2.4 x 0.5	Full Brick	190
EZA11K-320240	11,000	1	150-300/240-400	150-300/240-400	up to 45.8	16.65 x 20.87 x 1.72	1U rack mount	192

Non-Isolated 

Series	Total Power (W)	Outputs	Input Volts (VDC)	Output Volts (VDC)	Amps (A)	Size (inches)	Type	Page
i6AN	75	1	9-40	-3.5- -30	up to 8	1.3 x 0.9 x 0.5	Sixteenth Brick	196
iBH	80	1	3-14	0.7-5.5	up to 20	0.8 x 0.45 x 0.39	DOSA 2+	198
iCH	85	1	4.5-14	0.7-8.5	up to 12	0.48 x 0.48 x 0.335	DOSA 2+	200
i3A4W008A033V	100	1	9 - 53	3.3-16.5	up to 8	0.75 x 0.92 x 0.38	1/32 Brick	202
i3A4W005A150V	100	1	9 - 53	5-30	up to 4.5	0.75 x 0.92 x 0.38	1/32 Brick	202
iJA	100	1	8-14	0.6-3.3	up to 35	0.9 x 0.5 x 0.38	SMT	204
iJB	120	1	8-14	0.6-2	up to 60	1.055 x 0.948 x 0.381	SMT	206
iJC	150	1	8-14	0.6-1.5	up to 100	1.1 x 1.37 x 0.39	SMT	208
iAH	150	1	3.5-17	0.7-5.5	up to 40	1.3 x 0.53 x 0.4	DOSA 2+	210
i6A	250	1	9-40	3.3-24	up to 14	1.3 x 0.9 x 0.5	Sixteenth Brick	212
i6A4W	250	1	9-53	3.3-15	up to 20	1.3 x 0.9 x 0.5	Sixteenth Brick	214
i7C	300	1	9 - 53	5-48	up to 12.5A	1.34 x 1.45 x 0.5	Sixteenth brick	216

\*Arranged by Total Power (W).

DC-DC Converters



Applications

- ◆ Distributed power architecture
- ◆ Battery powered devices
- ◆ Industrial
- ◆ Medical
- ◆ Communications
- ◆ Computing
- ◆ Data storage
- ◆ Test & measurement
- ◆ Transportation
- ◆ COTS

Features

- ◆ Galvanic isolation between input and output
- ◆ Power range from 1.5W to 700W
- ◆ Convection cooling, conduction cooling with baseplate or forced air cooling
- ◆ Input voltage ranges 2:1 or 4:1
- ◆ Nominal input voltages 5V, 12V, 24V, 48V, 110V or 280V
- ◆ Very high efficiencies
- ◆ Industry leading power density



Isolated

Series	Total Power (W)	Outputs	Input Volts (VDC)	Output Volts (VDC)	Amps (A)	Size (inches)	Type	Page
CC-E	1.5-25	1 to 2	4.5-76	3.3-30	up to 7.5	DIP/SIP	PCB Mount	152
PXC-M03	3	1 to 2	9-75	3.3-30	up to 1	1.25 x 0.8 x 0.4	PCB Mount	154
PXC-M06	6	1 to 2	9-75	3.3-30	up to 1.8	1.25 x 0.8 x 0.4	PCB Mount	156
PXC-M10	10	1 to 2	9-75	3.3-30	up to 2.5	1.25 x 0.8 x 0.4	PCB Mount	158
CCG15	13-15	1	9-76	3.3-15	up to 4	1 x 1 x 0.39	PCB Mount	160
PXE	20-30	1 to 2	9-75	3.3-30	up to 6	2 x 1.6 x 0.4	PCB Mount	162
PXF	40-60	1 to 3	9-75	3.3-30	up to 14	2 x 2 x 0.4	PCB Mount	164
iEH	300	1	36-75	12	up to 25	2 x 0.9 x 0.49	Eighth Brick	166
CN-A110	30-100	1	60-160	5-24	up to 20	2.28 x 1.45 x 0.5	Quarter Brick	168
iQE	49-204	1	16-75	3.3-15	up to 30	2.28 x 1.45 x 0.41	Quarter Brick	170
CN-A24	50-100	1	14-36	5-24	up to 20	2.28 x 1.45 x 0.5	Quarter Brick	172
PH-A280	50-150	1	200-425	3.3-48	up to 20	1.46 x 0.5 x 2.3	Quarter Brick	174
iQL	72-308	1	18-75	1.2-28	up to 60	2.28 x 1.45 x 0.52	Quarter Brick	176
HQA85	85	1	9-40	5-48	up to 17	2.39 x 2.2 x 0.5	Quarter Brick	178
GQA120	120	1	9-36	5-48	up to 17	2.39 x 1.95 x 0.5	Quarter Brick	180
HQA120	120	1	9-40	5-48	up to 24	2.39 x 2.2 x 0.5	Quarter Brick	182
iQG	300-504	1	36-75	9.6-12	up to 47	2.28 x 1.45 x 0.52	Quarter Brick	184
CN-200A110	200	1	60-160	5-24	up to 40	2.4 x 2.28 x 0.5	Half Brick	168
PAH300-450	300-450	1	18-76	12-48	up to 29	2.4 x 2.28 x 0.5	Half Brick	186
iHG	300-456	1	36-75	12	up to 38	2.36 x 2.24 x 0.52	Half Brick	188
PAF600F	600	1	19-76	12, 28	up to 50	4.6 x 2.4 x 0.5	Full Brick	190
EZA11K-320240	11,000	1	150-300/240-400	150-300/240-400	up to 45.8	16.65 x 20.87 x 1.72	1U rack mount	192

\*Arranged by product type, then by wattage.



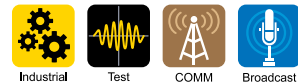
**1.5-25W, Ultra Compact Single and Dual DC-DC Converters**

**Features**

- ◆ Compact Footprint / Low Profile
- ◆ Through Hole or SMT Versions
- ◆ 5V, 12V, 24V & 48V Inputs
- ◆ 3.3 to 30V<sup>1</sup> Single, ±12 to 15V Dual Outputs
- ◆ Output Voltage Adjustment
- ◆ Input - Output Isolation
- ◆ RoHS Compliant
- ◆ 5 Year Warranty
- ◆ Self contained
- ◆ Multiple Input Voltage configurations
- ◆ Open frame (no potting)



**Key Market Segments & Applications**



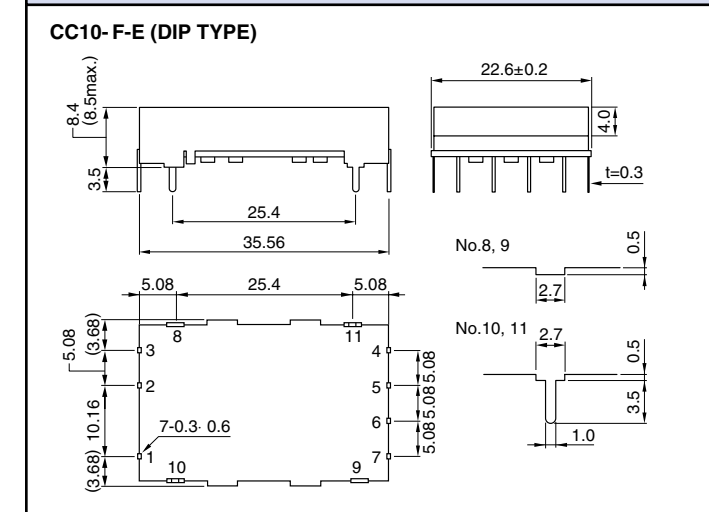
Specifications					
Model					
Nominal Output Voltage	V	3.3V	5V	12/15V	±12/15 (24/30) <sup>1</sup>
DC Input	V	5V: 4.5-9.0V, 12V: 9-18V, 24V: 18-36V, 48V: 36-76V			
Efficiency	%	71 to 90% model dependant			
Output Voltage Tolerance	%	1.5-10W: ±3%, 15-25W: ±5%			±5%
Output Adjustment (via trim pin)	V	3.15-3.6V (5)	4.75-6.0V (5)	11.4-15V	22.8 - 30V
Line Regulation	mV	20 (40 CC15; 30 CC25)		40	80
Load Regulation	mV	40 (120 CC15; 200 CC25)		100	600 <sup>2</sup>
Temperature Coefficient	%	<± 0.02%/°C			
Preload	-	No preload required			
Output Ripple (typ./max.BW 50MHz)	mV	40/120		30/120	
Overcurrent Protection	-	Output current limiting with automatic recovery, shutdown CC15, 25 type			
Overvoltage Protection	-	No			
Remote On/ Off	-	CC1R5, 3, 6, & 10: RC terminal open, output is OFF; RC terminal to -Vin (0-0.4V), output is ON CC15 & CC25: RC terminal open, output is ON; RC terminal to +Vin, output is OFF			
Operating Temp.- Convection	°C	-40 to 85°C, derates linearly to 40% load from 50°C to 85°C			
Operating Temp.- Forced Air	°C	-40°C to 85°C with 1m/s air full load			
Storage Temperature	°C	-40°C to 85°C			
Humidity (non Condensing)	-	95% RH max.(maximum wet-bulb temperature: 38°C)			
Isolation Voltage	-	500VAC 1 min. Input to output, input to case, output to case			
Isolation Resistance	-	Input to output, input to case, output to case: 50M ohm min. (500VDC)			
Shock	m/s <sup>2</sup>	980m/s <sup>2</sup> (100G) 6ms (6 directions, each 3 times)			
Vibration (non Operating)	-	10 to 55Hz (sweep for 15min) 1.52mm constant, 3 directions X, Y, Z each 2 hours			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark			
Weight	g	CC1R5: 3.2, CC3: 4.5, CC6: 5.8, CC10:10.0, CC15: 12.5, CC25: 20.0			
Size (L x W x H)	in	CC1R5: 0.650 x 0.654 x 0.335; CC3: 0.900 x 0.654 x 0.335; CC6: 0.900 x 0.831 x 0.335 CC10: 1.400 x 0.890 x 0.335; CC15: 1.500 x 1.264 x 0.295; CC25: 1.701 x 1.768 x 0.295			
(DIP Through Hole and SMD package)		CC3 (SIP): 1.09 x 0.362 x 0.705			
(SIP Through Hole only)					
Warranty	yrs	5 years			

1. For 24V/30V output - connect across +Vout & -Vout and leave "common out" pin not connected
2. Based upon equal load current from both outputs
3. For 15V output connect trim to -Vout
4. See Installation Manual for full specs, test methods of parameters & application notes
5. Not available on CC15 and CC25 models

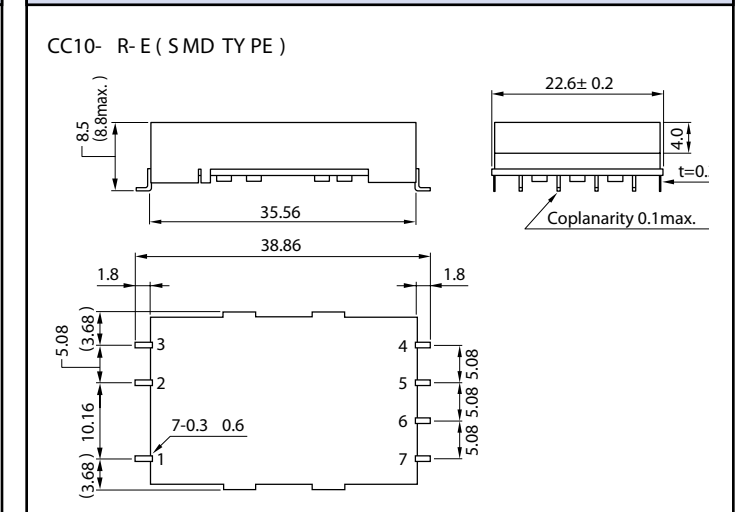
**Model Selector**

Output Voltage (V)	Output Current (A)	Output Power (W)	5V Input	12V Input	24V Input	48V Input
<b>Single Outputs</b>						
3.3	0.4	1.5	CC1R5-0503SF-E	CC1R5-1203SF-E	CC1R5-2403SF-E	CC1R5-4803SF-E
3.3	0.8	3	CC3-0503SF-E	CC3-1203SF-E	CC3-2403SF-E	CC3-4803SF-E
3.3	1.2	6	CC6-0503SF-E	CC6-1203SF-E	CC6-2403SF-E	CC6-4803SF-E
3.3	2.5	10	CC10-0503SF-E	CC10-1203SF-E	CC10-2403SF-E	CC10-4803SF-E
3.3	4.5	15	-	-	CC15-2403SF-E*	-
3.3	7.5	25	-	-	CC25-2403SF-E*	-
5	0.3	1.5	CC1R5-0505SF-E	CC1R5-1205SF-E	CC1R5-2405SF-E	CC1R5-4805SF-E
5	0.6	3	CC3-0505SF-E	CC3-1205SF-E	CC3-2405SF-E	CC3-4805SF-E
5	1.0	5	CC6-0505SF-E	-	-	-
5	1.2	6	-	CC6-1205SF-E	CC6-2405SF-E	CC6-4805SF-E
5	2.0	10	CC10-0505SF-E	CC10-1205SF-E	CC10-2405SF-E	CC10-4805SF-E
5	3.0	15	-	-	CC15-2405SF-E*	-
5	5.0	25	-	-	CC25-2405SF-E*	-
12(15)	0.125(0.1)	1.5	CC1R5-0512SF-E	CC1R5-1212SF-E	CC1R5-2412SF-E	CC1R5-4812SF-E
12(15)	0.25(0.2)	3	CC3-0512SF-E	CC3-1212SF-E	CC3-2412SF-E	CC3-4812SF-E
12(15)	0.5(0.4)	6	CC6-0512SF-E	CC6-1212SF-E	CC6-2412SF-E	CC6-4812SF-E
12(15)	0.8(0.64)	10	CC10-0512SF-E	-	-	-
12(15)	1.0(0.8)	10	-	CC10-1212SF-E	CC10-2412SF-E	CC10-4812SF-E
<b>Dual Outputs</b>						
±12 (15)3	0.06(0.05)	1.5	CC1R5-0512DF-E	CC1R5-1212DF-E	CC1R5-2412DF-E	CC1R5-4812DF-E
±12 (15)3	0.125(0.1)	3	CC3-0512DF-E	CC3-1212DF-E	CC3-2412DF-E	CC3-4812DF-E
±12 (15)3	0.25(0.2)	6	CC6-0512DF-E	CC6-1212DF-E	CC6-2412DF-E	CC6-4812DF-E
±12 (15)3	0.4(0.32)	10	CC10-0512DF-E	-	-	-
±12 (15)3	0.45(0.36)	10	-	CC10-1212DF-E	CC10-2412DF-E	CC10-4812DF-E

**Outline Drawing**



**Outline Drawing**



**Options**

Version	Description
F-E	Through hole mounting (DIP pkg)
R-E	Surface mount (DIP pkg)
S-E	Through hole mounting (SIP pkg - CC3)

\*CC15 and CC25 - Last time buy June, 2018

**Pinout (CC1R5, 3, 6, and 10)**

Pin	Single	Dual
1	+Vin	+Vin
2	RC	RC
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	Common out
6	TRM	TRM
7	+Vout	+Vout

For CC15 and 25 see Installation Manual online

For Additional Information, please visit  
us.tdk-lambda.com/lp/products/cc-series.htm



**3W Medical DC-DC Converters**

**Features**

- ◆ Industry Standard DIP-24 Package
- ◆ 9-36V or 18-75VDC Input
- ◆ 5kVAC Isolation (2xMOPPs)
- ◆ 2.5uA Leakage Current
- ◆ Low Off-Load Power Draw



**Key Market Segments & Applications**



Specifications		PXC-M03	PXC-M03W
Model		PXC-M03	PXC-M03W
Max Output Power	W		3W
Voltage Accuracy	%		±1%
Voltage Adjustment (T)	%	±10% (-10% +20% on 15V & 24V single output models) (see options table)	
Minimum Load	-	None	
Line Regulation	%	Single Output: ±0.2%, Dual Output: ±0.5%	
Load Regulation	%	Single Output: ±0.2%, Dual Output: ±1%	
Cross Regulation	%	±5% (25-100% load)	
Ripple and Noise	-	See table	
Start up time	ms	30ms	
Remote on/off	-	See options table	
Temperature Coefficient	%/°C	<±0.02%/°C	
Operating Temperature (1)	°C	-40 to +105°C, derating necessary above 94°C	
Storage Temperature	°C	-55 to 125°C	
Thermal Shock	-	MIL-STD-810F	
Relative Humidity (non condensing)	%RH	5 to 95%RH	
Transient Response (25% step load change)	µs	< 250µs recovery	
Overvoltage Protection	V	Single Output: 3.3V: 3.7-5V, 5V: 5.6-7V, 12V: 13.5-16V, 15V: 18.3-22V, 24V: 29.1-34.5V Dual Output: 5V: 5.6-7V, 12V: 13.5-18.2V, 15V: 17-22V	
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	V	5V input: 16V, 24V input: 50V, 48V input: 100V	
Isolation Voltage	V	5,000VAC	
Isolation Resistance	Ω	10 <sup>9</sup> Ω minimum	
Isolation Capacitance (max)	pF	17pF maximum	
Typical Switching Frequency (Fixed)	kHz	150kHz (±15kHz)	
MTBF (MIL-HDBK-217F)	Hours	6,444,000	
Vibration	-	MIL-STD-810F	
Conducted and Radiated Emissions	-	See Installation Diagrams	
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A	
Safety Agency Certifications	-	IEC/EN60601-1, ES60601-1, CE Mark	
Size (L x W x H)	mm(")	31.8 x 20.3 x 10.2mm (1.25 x 0.8 x 0.4")	
Weight	g	14g	
Warranty	Yrs	Five Years	

**Notes:**

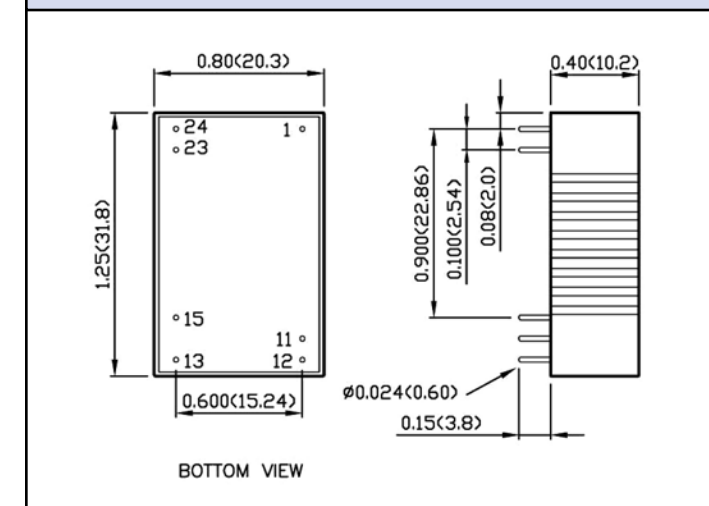
See installation manual for full specifications and test measurements.

(1) Convection cooling. See installation manual for forced air ratings.

**Model Selector**

Model	Output Voltage (V)	Output Current (A)	Output Power (W)	Input Voltage (V)	Input Current No Load (mA)	Efficiency (%)	Ripple & Noise (Pk-Pk mV)	Max Load Capacitance (µF)
<b>Single Outputs</b>								
PXC-M03-24WS3P3-A	3.3	1	3.3	9 - 36	6	82.0	30	1050
PXC-M03-48WS3P3-A	3.3	1	3.3	18 - 75	4	81.0	30	1050
PXC-M03-24WS05-A	5	0.6	3.0	9 - 36	6	84.5	30	750
PXC-M03-48WS05-A	5	0.6	3.0	18 - 75	4	84.0	30	750
PXC-M03-24WS12-A	12	0.25	3.0	9 - 36	6	87.0	40	130
PXC-M03-48WS12-A	12	0.25	3.0	18 - 75	4	87.0	40	130
PXC-M03-24WS15-A	15	0.2	3.0	9 - 36	6	87.0	40	100
PXC-M03-48WS15-A	15	0.2	3.0	18 - 75	4	86.5	40	100
PXC-M03-24WS24-A	24	0.125	3.0	9 - 36	6	87.0	50	39
PXC-M03-48WS24-A	24	0.125	3.0	18 - 75	4	86.5	50	39
<b>Dual Outputs</b>								
PXC-M03-24WD05-A	±5	±0.3	3.0	9 - 36	6	83.0	30	±430
PXC-M03-48WD05-A	±5	±0.3	3.0	18 - 75	4	83.0	30	±430
PXC-M03-24WD12-A	±12	±0.125	3.0	9 - 36	6	87.0	40	±75
PXC-M03-48WD12-A	±12	±0.125	3.0	18 - 75	4	86.0	40	±75
PXC-M03-24WD15-A	±15	±0.1	3.0	9 - 36	6	86.0	40	±56
PXC-M03-48WD15-A	±15	±0.1	3.0	18 - 75	4	86.0	40	±56

**Outline Drawing, Pinout Style A**



**Pinout (Style A)**

PIN #	Single Output	Dual Output
1	+ Input	+ Input
11	No pin	Common
12	- Output	No pin
13	+ Output	- Output
15	No pin	+ Output
23	- Input	- Input
24	- Input	- Input

(See website for Pinout Style B)

**Options**

-A	Pinout style A (Standard Version)
No suffix	Pinout style B (No remote on/off & no trim pin)
-P	Pinout style B (Positive remote on/off & no trim pin)
-T	Pinout style B (Trim pin & no remote on/off)
-PT	Pinout style B (Positive remote on/off & trim pin)

**Other DC-DC Products**

PX	10 - 60W, 12V, 24V, 48V input DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC
i6A	14A, 9-40V input POL
iA, iB, iC, iJ	3 - 60A, 5V & 12V input POL

For Additional Information, please visit [us.tdk-lambda.com/lp/products/pxc-m-series.htm](http://us.tdk-lambda.com/lp/products/pxc-m-series.htm)



Medical 6W DC-DC Converters

Features

- ◆ Industry Standard DIP-24 Package
- ◆ 9-36V or 18-75VDC Input
- ◆ 5kVAC Isolation (2xMOPPs)
- ◆ 2.5uA Leakage Current
- ◆ Low Off-Load Power Draw



Key Market Segments & Applications



Specifications		
Model	PXC-M06	PXC-M06W
Max Output Power	W	6W
Voltage Accuracy	%	±1%
Voltage Adjustment (T)	%	±10% (-10% +20% on 15V & 24V single output models) (see options table)
Minimum Load	-	None
Line Regulation	%	Single Output: ±0.2%, Dual Output: ±0.5%
Load Regulation	%	Single Output: ±0.2%, Dual Output: ±1%
Cross Regulation	%	±5% (25-100% load)
Ripple and Noise	-	See table
Start up time	ms	30ms
Remote on/off	-	See options table
Temperature Coefficient	%/°C	<±0.02%/°C
Operating Temperature (1)	°C	-40 to +105°C, derating necessary above 88°C
Storage Temperature	°C	-55 to 125°C
Thermal Shock	-	MIL-STD-810F
Relative Humidity (non condensing)	%RH	5 to 95%RH
Transient Response (25% step load change)	µs	< 250µs recovery
Overvoltage Protection	V	Single Output: 3.3V: 3.7-5V, 5V: 5.6-7V, 12V: 13.5-16V, 15V: 18.3-22V, 24V: 29.1-34.5V Dual Output: 5V: 5.6-7V, 12V: 13.5-18.2V, 15V: 17-22V
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery
Input Surge Voltage (Maximum for 100ms)	V	24V input: 50V, 48V input: 100V
Isolation Voltage	V	5,000VAC
Isolation Resistance	Ω	10 <sup>9</sup> Ω minimum
Isolation Capacitance (max)	pF	17pF maximum
Typical Switching Frequency (Fixed)	kHz	250kHz (±25kHz)
MTBF (MIL-HDBK-217F)	Hours	4,718,000
Vibration	-	MIL-STD-810F
Conducted and Radiated Emissions	-	See Installation Diagrams
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A
Safety Agency Certifications	-	IEC/EN60601-1, ES60601-1, CE Mark
Size (L x W x H)	mm(")	31.8 x 20.3 x 10.2mm (1.25 x 0.8 x 0.4")
Weight	g	14g
Warranty	Yrs	Five Years

Notes:

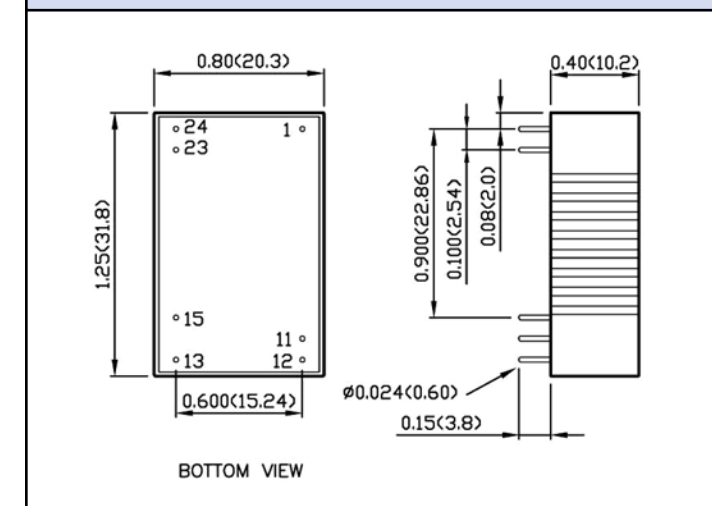
See installation manual for full specifications and test measurements.

(1) Convection cooling. See installation manual for forced air ratings.

Model Selector

Model	Output Voltage (V)	Output Current (A)	Output Power (W)	Input Voltage (V)	Input Current No Load (mA)	Efficiency (%)	Ripple & Noise (Pk-Pk mV)	Max Load Capacitance (µF)
<b>Single Outputs</b>								
PXC-M06-24WS3P3-A	3.3	1.8	5.9	9 - 36	6	83.0	30	2100
PXC-M06-48WS3P3-A	3.3	1.8	5.9	18 - 75	4	82.5	30	2100
PXC-M06-24WS05-A	5	1.2	6.0	9 - 36	6	86.0	30	1500
PXC-M06-48WS05-A	5	1.2	6.0	18 - 75	4	86.5	30	1500
PXC-M06-24WS12-A	12	0.5	6.0	9 - 36	6	89.0	40	260
PXC-M06-48WS12-A	12	0.5	6.0	18 - 75	4	88.0	40	260
PXC-M06-24WS15-A	15	0.4	6.0	9 - 36	6	89.0	40	210
PXC-M06-48WS15-A	15	0.4	6.0	18 - 75	4	88.5	40	210
PXC-M06-24WS24-A	24	0.25	6.0	9 - 36	6	88.5	50	75
PXC-M06-48WS24-A	24	0.25	6.0	18 - 75	4	88.0	50	75
<b>Dual Outputs</b>								
PXC-M06-24WD05-A	±5	±0.6	6.0	9 - 36	6	85.0	30	±860
PXC-M06-48WD05-A	±5	±0.6	6.0	18 - 75	4	85.0	30	±860
PXC-M06-24WD12-A	±12	±0.25	6.0	9 - 36	6	88.5	40	±150
PXC-M06-48WD12-A	±12	±0.25	6.0	18 - 75	4	88.0	40	±150
PXC-M06-24WD15-A	±15	±0.2	6.0	9 - 36	6	88.5	40	±110
PXC-M06-48WD15-A	±15	±0.2	6.0	18 - 75	4	87.0	40	±110

Outline Drawing, Pinout Style A



Pinout (Style A)

PIN #	Single Output	Dual Output
1	+ Input	+ Input
11	No pin	Common
12	- Output	No pin
13	+ Output	- Output
15	No pin	+ Output
23	- Input	- Input
24	- Input	- Input

(See website for Pinout Style B)

Options

-A	Pinout style A (Standard Version)
No suffix	Pinout style B (No remote on/off & no trim pin)
-P	Pinout style B (Positive remote on/off & no trim pin)
-T	Pinout style B (Trim pin & no remote on/off)
-PT	Pinout style B (Positive remote on/off & trim pin)

Other DC-DC Products

PX	10 - 60W, 12V, 24V, 48V input DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC
i6A	14A, 9-40V input POL
iA, iB, iC, iJ	3 - 60A, 5V & 12V input POL

For Additional Information, please visit [us.tdk-lambda.com/lp/products/pxc-m-series.htm](http://us.tdk-lambda.com/lp/products/pxc-m-series.htm)



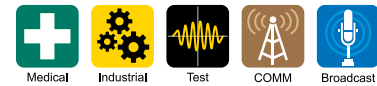
**10W Medical DC-DC Converters**

**Features**

- ◆ Industry Standard DIP-24 Package
- ◆ 9-36V or 18-75VDC Input
- ◆ 5kVAC Isolation (2xMOPPs)
- ◆ 2.5uA Leakage Current
- ◆ Low Off-Load Power Draw



**Key Market Segments & Applications**



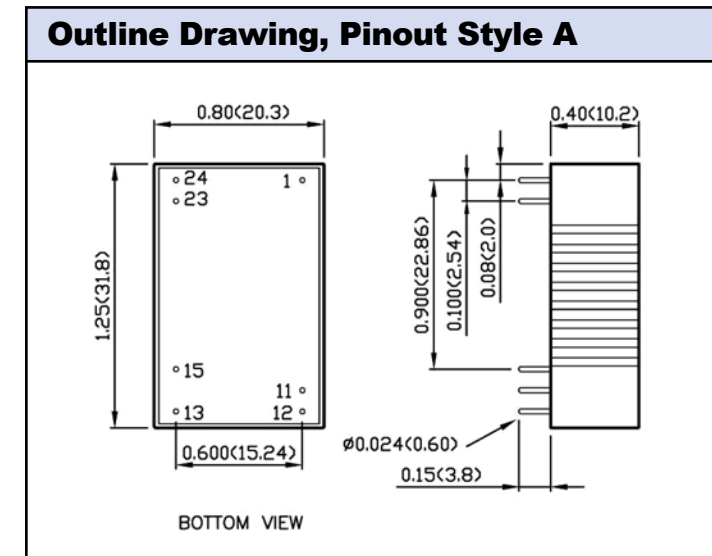
Specifications		
Model	PXC-M10	PXC-M10W
Max Output Power	W	10W
Voltage Accuracy	%	±1%
Voltage Adjustment (T)	%	+/-10% (-10% +20% on 15V & 24V single output models) (see options table)
Minimum Load	-	None
Line Regulation	%	Single Output: ±0.2%, Dual Output: ±0.5%
Load Regulation	%	Single Output: ±0.2%, Dual Output: ±1%
Cross Regulation	%	±5% (25-100% load)
Ripple and Noise	-	See table
Start up time	ms	30ms
Remote on/off	-	See options table
Temperature Coefficient	%/°C	<±0.02%/°C
Operating Temperature (1)	°C	-40 to +105°C, derating necessary above 77°C
Storage Temperature	°C	-55 to 125°C
Thermal Shock	-	MIL-STD-810F
Relative Humidity (non condensing)	%RH	5 to 95%RH
Transient Response (25% step load change)	µs	< 250µs recovery
Overvoltage Protection	V	Single Output: 3.3V: 3.7-5V, 5V: 5.6-7V, 12V: 13.5-16V, 15V: 18.3-22V, 24V: 29.1-34.5V Dual Output: 5V: 5.6-7V, 12V: 13.5-18.2V, 15V: 17-22V
Overcurrent and Short Circuit Protection	%	Typically at 150%, hiccup with self recovery
Input Surge Voltage (Maximum for 100ms)	V	5V input: 16V, 24V input: 50V, 48V input: 100V
Isolation Voltage	V	5,000VAC
Isolation Resistance	Ω	10 <sup>9</sup> Ω minimum
Isolation Capacitance (max)	pF	17pF maximum
Typical Switching Frequency (Fixed)	kHz	300kHz (±30kHz)
MTBF (MIL-HDBK-217F)	Hours	3,849,000
Vibration	-	MIL-STD-810F
Conducted and Radiated Emissions	-	See Installation Diagrams
Immunity	-	EN61000-4-2, -3, -4, -5, -6 Pref Criteria A
Safety Agency Certifications	-	IEC/EN60601-1, ES60601-1, CE Mark
Size (L x W x H)	mm( inches)	31.8 x 20.3 x 10.2mm (1.25 x 0.8 x 0.4")
Weight	g	14g
Warranty	yrs	Five Years

**Notes:**

See installation manual for full specifications and test measurements.

(1) Convection cooling. See installation manual for forced air ratings.

Model Selector								
Model	Output Voltage (V)	Output Current (A)	Output Power (W)	Input Voltage (V)	Input Current No Load (mA)	Efficiency (%)	Ripple & Noise (Pk-Pk mV)	Max Load Capacitance (µF)
<b>Single Outputs</b>								
PXC-M10-24WS3P3-A	3.3	2.5	8.3	9 - 36	6	83.0	30	3000
PXC-M10-48WS3P3-A	3.3	2.5	8.3	18 - 75	4	82.5	30	3000
PXC-M10-24WS05-A	5	2	10.0	9 - 36	6	86.5	30	2500
PXC-M10-48WS05-A	5	2	10.0	18 - 75	4	86.5	30	2500
PXC-M10-24WS12-A	12	0.83	10.0	9 - 36	6	89.0	40	430
PXC-M10-48WS12-A	12	0.83	10.0	18 - 75	4	89.0	40	430
PXC-M10-24WS15-A	15	0.67	10.1	9 - 36	6	89.0	40	350
PXC-M10-48WS15-A	15	0.67	10.1	18 - 75	4	89.0	40	350
PXC-M10-24WS24-A	24	0.416	10.0	9 - 36	6	89.0	50	125
PXC-M10-48WS24-A	24	0.416	10.0	18 - 75	4	88.5	50	125
<b>Dual Outputs</b>								
PXC-M10-24WD05-A	±5	±1	10.0	9 - 36	6	85.0	30	±1440
PXC-M10-48WD05-A	±5	±1	10.0	18 - 75	4	85.0	30	±1440
PXC-M10-24WD12-A	±12	±0.416	10.0	9 - 36	6	89.0	40	±250
PXC-M10-48WD12-A	±12	±0.416	10.0	18 - 75	4	88.0	40	±250
PXC-M10-24WD15-A	±15	±0.333	10.0	9 - 36	6	88.0	40	±180
PXC-M10-48WD15-A	±15	±0.333	10.0	18 - 75	4	88.0	40	±180



Pinout (Style A)		
PIN #	Single Output	Dual Output
1	+ Input	+ Input
11	No pin	Common
12	- Output	No pin
13	+ Output	- Output
15	No pin	+ Output
23	- Input	- Input
24	- Input	- Input

(See website for Pinout Style B)

Options	
-A	Pinout style A (Standard Version)
No suffix	Pinout style B (No remote on/off & no trim pin)
-P	Pinout style B (Positive remote on/off & no trim pin)
-T	Pinout style B (Trim pin & no remote on/off)
-PT	Pinout style B (Positive remote on/off & trim pin)

Other DC-DC Products	
PX	10 - 60W, 12V, 24V, 48V input DC-DC
CC-E	1.5 - 25W, 5V, 12V, 24V & 48V input DC-DC
i6A	14A, 9-40V input POL
iA, iB, iC, iJ	3 - 60A, 5V & 12V input POL

For Additional Information, please visit [us.tdk-lambda.com/lp/products/pxc-m-series.htm](http://us.tdk-lambda.com/lp/products/pxc-m-series.htm)



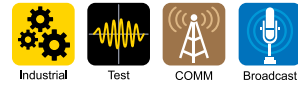
**15W DC-DC Converters**

**Features**

- ◆ Industry Standard 1 x 1" Footprint
- ◆ Wide Range DC Input 9 - 36 or 18 - 76V
- ◆ High Efficiency - Up to 88%
- ◆ Six Sided Shielding



**Key Market Segments & Applications**



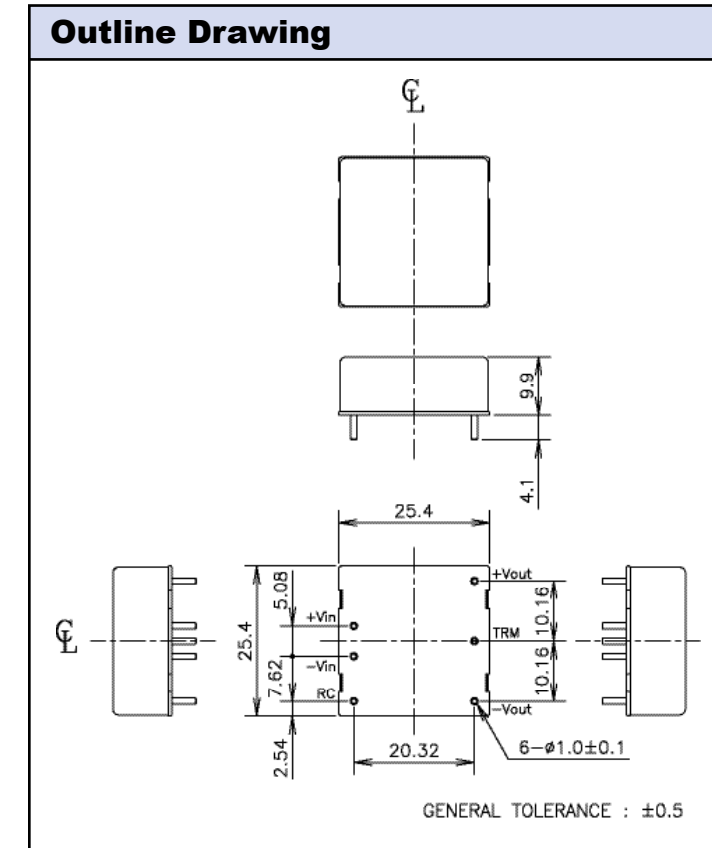
Specifications		CCG15			
Model		3.3	5V	12V	15V
Nominal Output Voltage	VDC	3.3	5V	12V	15V
Input Voltage Range	VDC	9 - 36V or 18 - 76VDC			
Input Current	A	0.32 - 0.74A (model dependant)			
Output Voltage Adjustment	VDC	2.97 - 3.63	4.5 - 5.5	10.8 - 13.2	13.5 - 16.5
Output Voltage Accuracy	%	±2%			
Ripple & Noise (max) pk-pk	mV	70	70	95	95
Line Regulation (max)	mV	13.2	20	48	60
Load Regulation (max)	mV	13.2	20	48	60
Overcurrent Protection	%	>105% (Hiccup current style)			
Overvoltage Protection	%	-			
Remote On/Off	-	Yes; Low = ON, Open = OFF			
Operating Temperature	°C	-40°C to +110°C Case, -40°C to +85°C Ambient. See installation manual for operation above 60°C			
Storage Temperature	°C	-55°C to +125°C			
Temperature Coefficient	%/°C	0.02%/°C			
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating			
Cooling	-	Convection or forced air			
Withstand Voltage	VAC	Input to Case: 1kVDC; Input to Output 1.5kVDC; Output to Case: 1kVDC			
Isolation Resistance	-	>100M at 25°C and 70%RH, Output to Case 500VDC			
		Non Operating, 10-55Hz (sweep for 3 min.)			
Vibration	-	Amplitude 1.52mm constant (Max 98m/s <sup>2</sup> ) X,Y,Z 1 hour each			
Shock	-	490.3m/s <sup>2</sup>			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark			
Weight (Typ)	g	20g			
Size (WxHxD)	in (mm)	1.0 x 0.39 x 1.0" (25.4 x 9.9 x 25.4)			
Warranty	yrs	5 Years			

Note: See Installation Manual for full details, test methods of parameters and application notes

**Output Ratings**

Model	Output Voltage (V)	Output Current (A)	Input Voltage (V)	Maximum Power (W)	Input Current at Nominal Input (A)	Efficiency (%) (100% load, nominal input)
CCG15-24-03S	3.3	4	9 - 36	13.2	0.65	85
CCG15-24-05S	5	3	9 - 36	15.0	0.72	87
CCG15-24-12S	12	1.3	9 - 36	15.6	0.74	88
CCG15-24-15S	15	1	9 - 36	15.0	0.71	88
CCG15-48-03S	3.3	4	18 - 76	13.2	0.32	85
CCG15-48-05S	5	3	18 - 76	15.0	0.36	87
CCG15-48-12S	12	1.3	18 - 76	15.6	0.37	88
CCG15-48-15S	15	1	18 - 76	15.0	0.36	88

**Outline Drawing**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/ccg-series.htm](http://us.tdk-lambda.com/lp/products/ccg-series.htm)



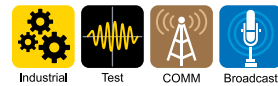
## 20-30W Single and Dual Output DC-DC Converters

### Features

- ◆ Industry Standard 2" x 1.6" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12V, 24V and 48V Inputs
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



### Key Market Segments & Applications



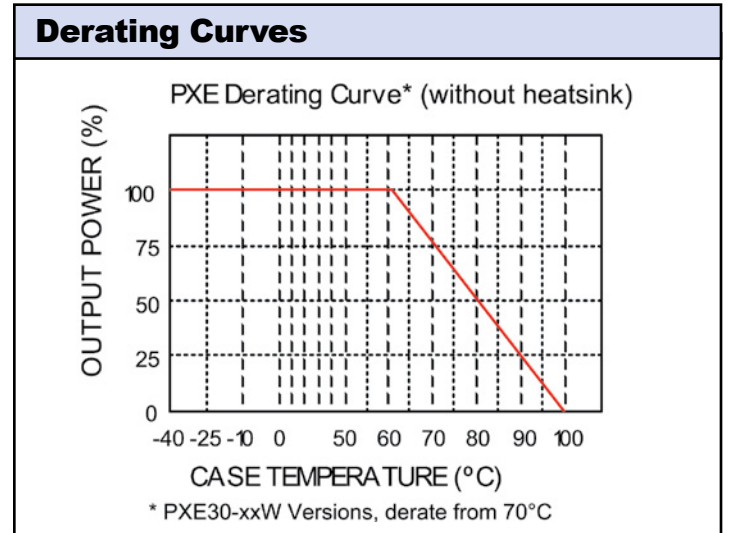
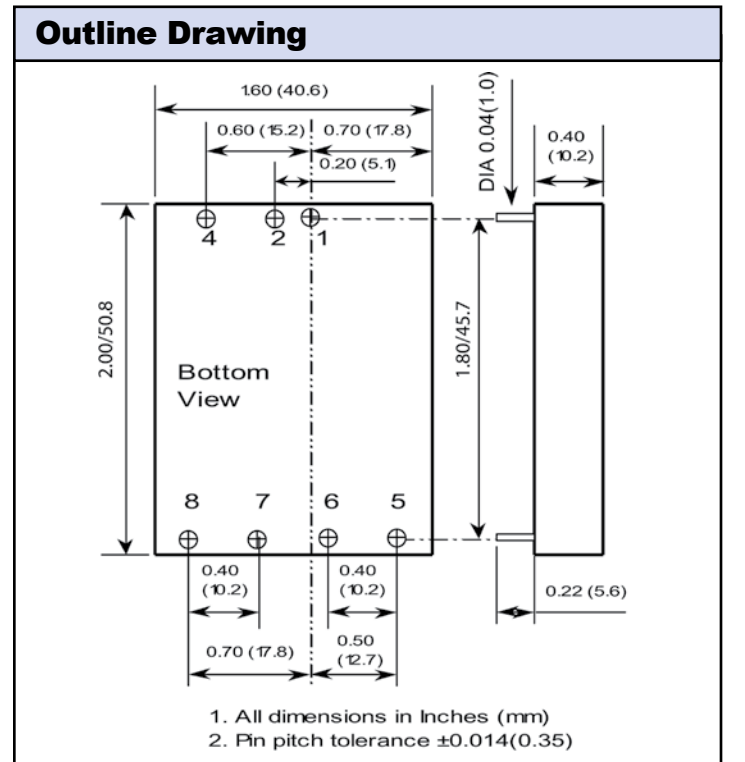
Specifications		
Model	PXE20	PXE30
Max Output Power	20W	30W
Voltage Accuracy	±2%	±1%
Voltage Adjustment	±10%	
Minimum Load, each output (1)	10%	10%
Line Regulation	±0.2% for single, ±0.5% for dual	
Load Regulation (25% to 100%)	Single ±0.5%, Dual ±3%	Single ±0.5%, Dual ±1%
Cross Regulation (25% to 100%)	Dual ±5%	
Ripple and Noise (P-P)	Single: 75mV; Dual: 100mV	
Start up time	20ms - 1100ms typ.	10 - 25ms typ.
Remote on/off (3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V	
Temperature Coefficient	<±0.02%/°C	
Operating Temperature	-40 to +100°C, see derating curve	
Maximum Case Temperature	100°C (Over temperature protection at 115°C - PXE30 model)	
Storage Temperature	-55 to 105°C	
Thermal Shock	MIL-STD-810D	
Relative Humidity (non condensing)	5 to 95%	
Transient Response (25% step load change)	500us recovery	300us recovery
Overvoltage Protection (Zener clamp)	3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak) (2)	25mA	30mA
Isolation Voltage	1600VDC minimum (Input-Output, Input-Case)	
Isolation Resistance	10 <sup>9</sup> Ohms minimum	
Isolation Capacitance (max)	300pF	1000pF
Typical Switching Frequency (Fixed)	300kHz	
MTBF (BELLCORE TR-NWT-000332)	1,976,000 hours	1,535,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis	
Conducted and Radiated Emissions	See Installation Diagrams	
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2	
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)	
Size (L x W x H)	2 x 1.6 x 0.4"	
Weight	1.69 oz (48g)	
Warranty	Three Year	

### Notes:

- (1) To meet regulation & noise specifications. Operation at zero load will not damage the device
- (2) 12uH source impedance in series with + input
- (3) Max sink current 20mA (PXE20), 2.5mA (PXE30); The on/off pin is referenced to the negative input

Model Selector					
Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (VDC)	Model	Eff.(%)
<b>Single Outputs</b>					
3.3	6.0	20	9 - 18	PXE30-12S3P3	85
3.3	6.0	20	10 - 40	PXE30-24WS3P3	87
3.3	6.0	20	18 - 36	PXE30-24S3P3	86
3.3	6.0	20	18 - 75	PXE30-48WS3P3	87
3.3	6.0	20	36 - 75	PXE30-48S3P3	87
5	4.0	20	9 - 36	PXE20-24WS05	79
5	4.0	20	18 - 75	PXE20-48WS05	80
5	6.0	30	9 - 18	PXE30-12S05	87
5	6.0	30	10 - 40	PXE30-24WS05	87
5	6.0	30	18 - 36	PXE30-24S05	88
5	6.0	30	18 - 75	PXE30-48WS05	88
5	6.0	30	36 - 75	PXE30-48S05	89
12	1.67	20	9 - 36	PXE20-24WS12	81
12	1.67	20	18 - 75	PXE20-48WS12	81
12	2.5	30	9 - 18	PXE30-12S12	88
12	2.5	30	10 - 40	PXE30-24WS12	87
12	2.5	30	18 - 36	PXE30-24S12	89
12	2.5	30	18 - 75	PXE30-48WS12	87
12	2.5	30	36 - 75	PXE30-48S12	90
15	1.33	20	9 - 36	PXE20-24WS15	81
15	1.33	20	18 - 75	PXE20-48WS15	81
15	2.0	30	9 - 18	PXE30-12S15	88
15	2.0	30	10 - 40	PXE30-24WS15	88
15	2.0	30	18 - 36	PXE30-24S15	89
15	2.0	30	18 - 75	PXE30-48WS15	88
15	2.0	30	36 - 75	PXE30-48S15	90
<b>Dual Outputs</b>					
±5	±2.0	20	9 - 36	PXE20-24WD05	79
±5	±2.0	20	18 - 75	PXE20-48WD05	79
±12	±0.833	20	9 - 36	PXE20-24WD12	81
±12	±0.833	20	18 - 75	PXE20-48WD12	83
±12	±1.25	30	9 - 18	PXE30-12D12	87
±12	±1.25	30	18 - 36	PXE30-24D12	88
±12	±1.25	30	36 - 75	PXE30-48D12	88
±15	±0.666	20	9 - 36	PXE20-24WD15	82
±15	±0.666	20	18 - 75	PXE20-48WD15	84
±15	±1.0	30	9 - 18	PXE30-12D15	87
±15	±1.0	30	18 - 36	PXE30-24D15	88
±15	±1.0	30	36 - 75	PXE30-48D15	88

Pinout		
PIN #	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
4	Remote on/off	Remote on/off
5	No Pin	+ Output
6	+ Output	Common
7	- Output	- Output
8	Trim	Trim



Heat Sink (0.22" high)	
HAPXE	(includes thermal adhesive pad)
HAPXECLIP	(two clips required when used)

Other Industrial Products	
CC-E	1.5-25W, 5 to 48VDC input
PAQ	50 - 700W quarter, half & full bricks
PAH	
PAF	

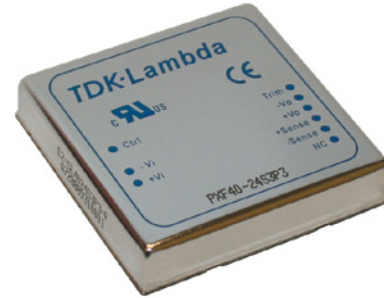
For Additional Information, please visit  
us.tdk-lambda.com/lp/products/px-series.htm



## 40W & 60W Single, Dual, Triple Output DC-DC Converters

### Features

- ◆ Industry Standard 2" x 2" Footprint
- ◆ Six Sided Shielding
- ◆ Agency Approved
- ◆ 12, 24V, and 48V Inputs (including 4:1 ranges)
- ◆ UL, CSA, EN, CE approvals
- ◆ Wide range input



### Key Market Segments & Applications



Specifications	
Model	
Maximum Output Power	40W or 60W
Voltage Accuracy (Full Load, Nom. Vin)	Single, Dual and Triple Main $\pm 1\%$ , Triple Auxiliaries $\pm 5\%$
Voltage Adjustment (1)	$\pm 10\%$ (Single and Dual Output Only)
Minimum Load, each output (2)	Single Output = 0%, Dual and Triple = 10% of full load rating
Line Regulation	Single / Dual $\pm 0.5\%$ , Triple (main) $\pm 1\%$ , Triple (auxiliary) $\pm 5\%$
Load Regulation (10% to 100%) (3)	Single $\pm 0.5\%$ , Dual $\pm 1\%$ , Triple (main) $\pm 2\%$ , Triple (auxiliary) $\pm 5\%$
Cross Regulation (25% to 100%) (4)	Triple (main) $\pm 1\%$ , Dual/Triple (auxiliary) $\pm 5\%$
Start up time	PXF40: 25ms typ., PXF40xxW, PXF60: 20ms max.
Remote on/off (referenced to negative input)	Positive Logic: ON: Open or 3.0-12V, OFF Short or $< 1.2V$
Temperature Coefficient	$\leq \pm 0.02\%/^{\circ}C$
Operating Temperature	See derating curves
Maximum Case Temperature	PXF40: 100°C, PXF40-xxW 105°C, PXF60 110°C
Storage Temperature	PXF40: -55 to 105°C, PXF40xxW, PXF60 125°C
Thermal Shock	MIL-STD-810F
Relative Humidity (non condensing)	5 to 95%
Transient Response (25% step load change)	250us recovery
Overvoltage Protection (Zener clamp)	Typical 3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V
Reflected input ripple (peak to peak) (5)	PXF40: 40mA, PXF40xxW, PXF60: 20mA
Isolation Voltage	Input - Output, Input to Case: 1600VDC minimum
Isolation Resistance	$10^9$ Ohms minimum
Isolation Capacitance (max)	PXF40, PXF60: 1000pF, PXF40xxW: 2500pF
Switching Frequency (Fixed)	300kHz (typ.)
MTBF (BELLCORE TR-NWT-000332)	PXF40: 1,398,000; PXF40xxW: 1,105,000, PXF60: 1,093,000 hours
Vibration	10 - 55Hz, 10G, 30 minutes each X, Y, Z axis
Conducted and Radiated Emissions	See Installation Diagrams
Immunity	EN61000-4-2, -3, -4, -5, -6
Safety Agency Approval	IEC60950-1, UL60950-1, EN60950-1, CE Mark (48V input only)
Size (L x W x H)	2 x 2 x 0.4"
Weight	2.11 oz (60g)
Warranty	Three Year

Refer to application notes on website for external circuitry and PCB layout.

- (1) Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Sense and - Sense should be connected to their corresponding outputs; + output, -output.
- (2) Dual and Triple output models require a minimum load of 10% on the output to maintain specified regulation. No load operation will not damage the device.
- (3) Load regulation for triple output: Main output: 10-100%, with 10-100% balanced load on auxiliaries. Auxiliary outputs: 10% to 100% balanced on all outputs.
- (4) Cross regulation for dual output: asymmetrical load 25% / 100% full load. Cross regulation for triple output: Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%. Auxiliary outputs: main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25%, auxiliary 25%, other auxiliary 25% to 100%.
- (5) Simulated Source impedance of 12uH placed in series with + input.

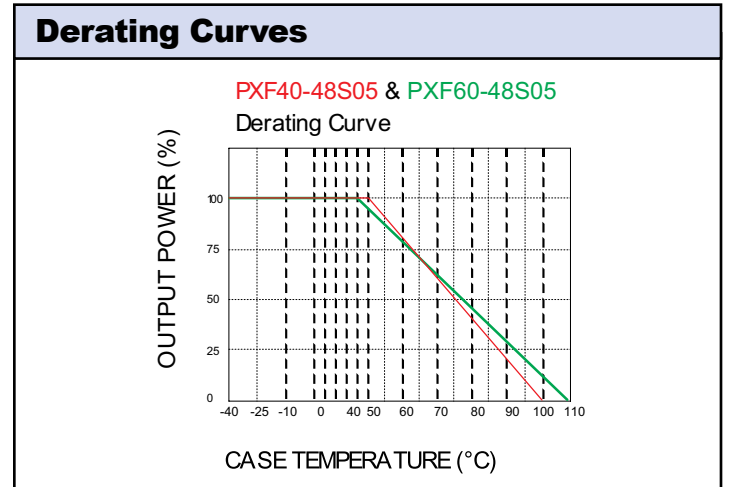
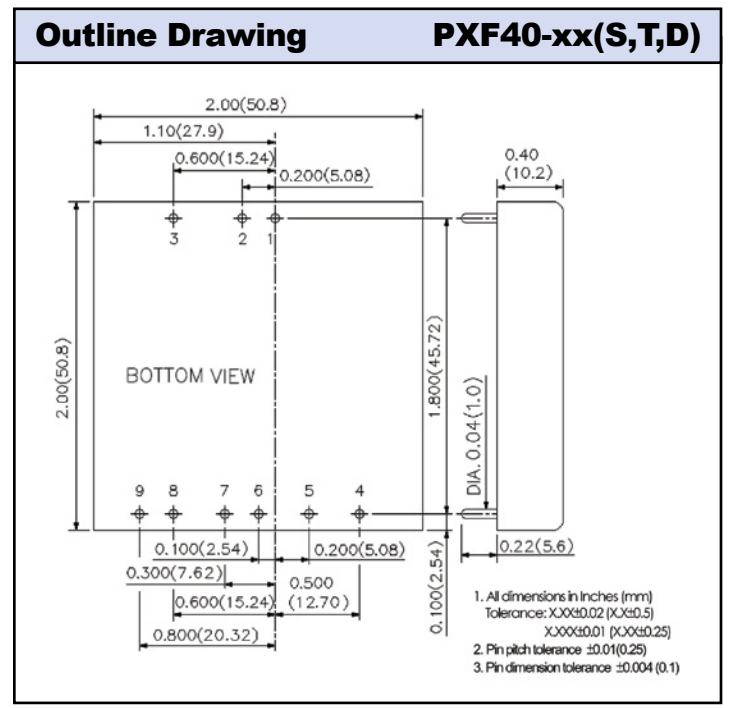
Model Selector						
Output Volt(V)	Output Curr(A)	Input Volt(VDC)	Model	Ripple/Noise (mV)	Max Load Eff.(%)	Max Load Cap(uF)
<b>Single Outputs</b>						
3.3	8	9 - 18	PXF40-12S3P3	50	84	21000
3.3	10	9 - 36	PXF40-24WS3P3	50	86	25750
3.3	8	18 - 36	PXF40-24S3P3	50	87	21000
3.3	10	18 - 75	PXF40-48WS3P3	50	86	25750
3.3	14	18 - 36	PXF60-24S3P3	75	89	36000
3.3	8	36 - 75	PXF40-48S3P3	50	88	21000
3.3	14	36 - 75	PXF60-48S3P3	75	89	36000
5	8	9 - 18	PXF40-12S05	50	86	13600
5	8	9 - 36	PXF40-24WS05	50	87	13600
5	8	18 - 36	PXF40-24S05	50	89	13600
5	8	18 - 75	PXF40-48WS05	50	88	13600
5	8	36 - 75	PXF40-48S05	50	90	13600
5	12	18 - 36	PXF60-24S05	75	90	20400
5	12	36 - 75	PXF60-48S05	75	90	20400
12	3.333	9 - 18	PXF40-12S12	75	86	2360
12	3.333	9 - 36	PXF40-24WS12	75	87	2360
12	3.333	18 - 36	PXF40-24S12	75	88	2360
12	3.333	18 - 75	PXF40-48WS12	75	87	2360
12	3.333	36 - 75	PXF40-48S12	75	89	2360
12	5	18 - 36	PXF60-24S12	100	90	3550
12	5	36 - 75	PXF60-48S12	100	90	3550
15	2.666	9 - 18	PXF40-12S15	75	87	1510
15	2.666	9 - 36	PXF40-24WS15	75	87	1510
15	2.666	18 - 36	PXF40-24S15	75	89	1510
15	2.666	18 - 75	PXF40-48WS15	75	87	1510
15	2.666	36 - 75	PXF40-48S15	75	89	1510
15	4	18 - 36	PXF60-24S15	100	90	2300
15	4	36 - 75	PXF60-48S15	100	90	2300

Dual Outputs						
$\pm 12$	$\pm 1.667$	9 - 36	PXF40-24WD12	120	86	$\pm 1200$
$\pm 12$	$\pm 1.8$	9 - 18	PXF40-12D12	120	85	$\pm 1200$
$\pm 12$	$\pm 1.8$	18 - 36	PXF40-24D12	120	87	$\pm 1200$
$\pm 12$	$\pm 1.667$	18 - 75	PXF40-48WD12	120	86	$\pm 1200$
$\pm 12$	$\pm 1.8$	36 - 75	PXF40-48D12	120	87	$\pm 1200$
$\pm 15$	$\pm 1.333$	9 - 36	PXF40-24WD15	150	86	$\pm 750$
$\pm 15$	$\pm 1.4$	9 - 18	PXF40-12D15	150	85	$\pm 750$
$\pm 15$	$\pm 1.4$	18 - 36	PXF40-24D15	150	87	$\pm 750$
$\pm 15$	$\pm 1.333$	18 - 75	PXF40-48WD15	150	86	$\pm 750$
$\pm 15$	$\pm 1.4$	36 - 75	PXF40-48D15	150	87	$\pm 750$

Triple Outputs						
3.3V, $\pm 12V 6.0, \pm 0.4$	9 - 18	PXF40-12T3312	50 / 75	83	13000, $\pm 330$	
3.3V, $\pm 12V 6.0, \pm 0.4$	18 - 36	PXF40-24T3312	50 / 75	85	13000, $\pm 330$	
3.3V, $\pm 12V 6.0, \pm 0.4$	36 - 75	PXF40-48T3312	50 / 75	86	13000, $\pm 330$	
5V, $\pm 12V 6.0, \pm 0.4$	9 - 18	PXF40-12T0512	50 / 75	85	6800, $\pm 330$	
5V, $\pm 12V 6.0, \pm 0.4$	18 - 36	PXF40-24T0512	50 / 75	87	6800, $\pm 330$	
5V, $\pm 12V 6.0, \pm 0.4$	36 - 75	PXF40-48T0512	50 / 75	88	6800, $\pm 330$	
5V, $\pm 15V 6.0, \pm 0.3$	9 - 18	PXF40-12T0515	50 / 75	86	6800, $\pm 110$	
5V, $\pm 15V 6.0, \pm 0.3$	18 - 36	PXF40-24T0515	50 / 75	87	6800, $\pm 110$	
5V, $\pm 15V 6.0, \pm 0.3$	36 - 75	PXF40-48T0515	50 / 75	88	6800, $\pm 110$	

Heat Sink (0.22" high)	
HAPXF	(includes thermal adhesive pad)
HAPXFCLIP	(two clips required when used)

Other Industrial Products	
CC-E	1.5 - 30W, 5 to 48VDC input
PAQ, PAH, PAF	50 - 700W quarter, half & full bricks



Pinout PXF40-xx(S,T,D)			
PIN#	Function	Dual Output	Triple Output
1	+ Input	+ Input	+ Input
2	- Input	- Input	- Input
3	Remote on/off	Remote on/off	Remote on/off
4	No Connection	No Pin	+ Aux
5	- Sense (Note 1)	+ VO	Common
6	+ Sense (Note 1)	Common	-Aux
7	+ Output	Common	+ Output
8	- Output	- VO	- Output (Com)
9	Trim	Trim	N/C

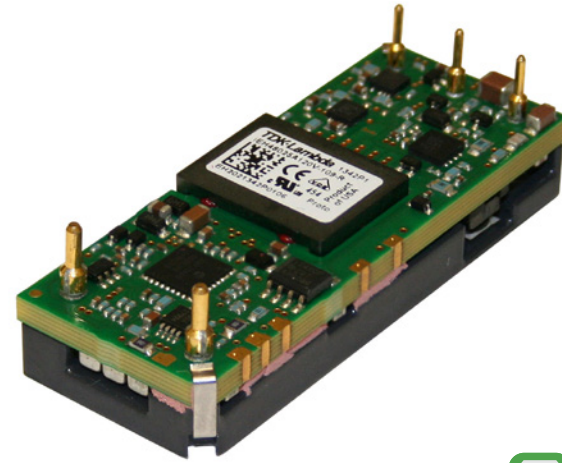
For Additional Information, please visit [us.tdk-lambda.com/lp/products/px-series.htm](http://us.tdk-lambda.com/lp/products/px-series.htm)



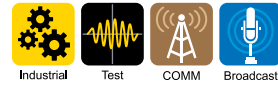
**300W Eighth Brick Converter**

**Features**

- ◆ Standard Eighth Brick Footprint
- ◆ 36-75VDC Input
- ◆ 12V Nominal Output
- ◆ Through Hole Mounting
- ◆ 2250VDC Basic Isolation
- ◆ Digital adaptive control for fast transient response
- ◆ High Operating Efficiency (up to 94.6%)
- ◆ Constant Switching Frequency
- ◆ Baseplate Cooled



**Key Market Segments & Applications**



Specifications		iEH300	
Model		iEH300	
Nominal Output Voltage	VDC	10.8	12
Input Voltage Range	VDC	36-75*	
Ripple & Noise (max) (pk-pk) (1)	mV	150	120
Line Regulation (max)	mV	50	60
Load Regulation (max)	mV	100	60
Overload Protection Threshold (3)	A	36	29.5
Overvoltage Protection (Typ) (2)	VDC	13.1	14.8
Overtemperature Protection (3)	-	Yes	
Remote On / Off	-	Negative Logic	
Temperature (operating)	°C	-40 to 124	-40 to 130
Temperature (storage)	°C	-55 to 125	
Humidity (operating)	%RH	20-95% RH Non condensing	
Humidity (storage)	%RH	10-95% RH Non condensing	
Cooling	-	Conduction, convection or forced air (see detailed datasheet for derating)	
Isolation Voltage	VDC	2250VDC Input to Output, 1500VDC Input to Baseplate	
Vibration (non operating)	-	5-50Hz @ 0.5g (4.9m/s <sup>2</sup> ), and 50-500Hz @ 1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4 196.1m/s <sup>2</sup>	
Shock	-		
Safety Agency Approvals	-	UL60950 (US and Canada), CB scheme IEC 60950-1 (2nd edition)AM1, CE Mark EN 60950-1/A12	
Weight (max)	g	50	
Size	mm/in.	50.42 x 22.86 x 12.70 / 2.02 x 0.9 x 0.49	
Warranty	yrs	3 Years	

\*When operating below 40V input, the module will operate, but load regulation may be out of specification.

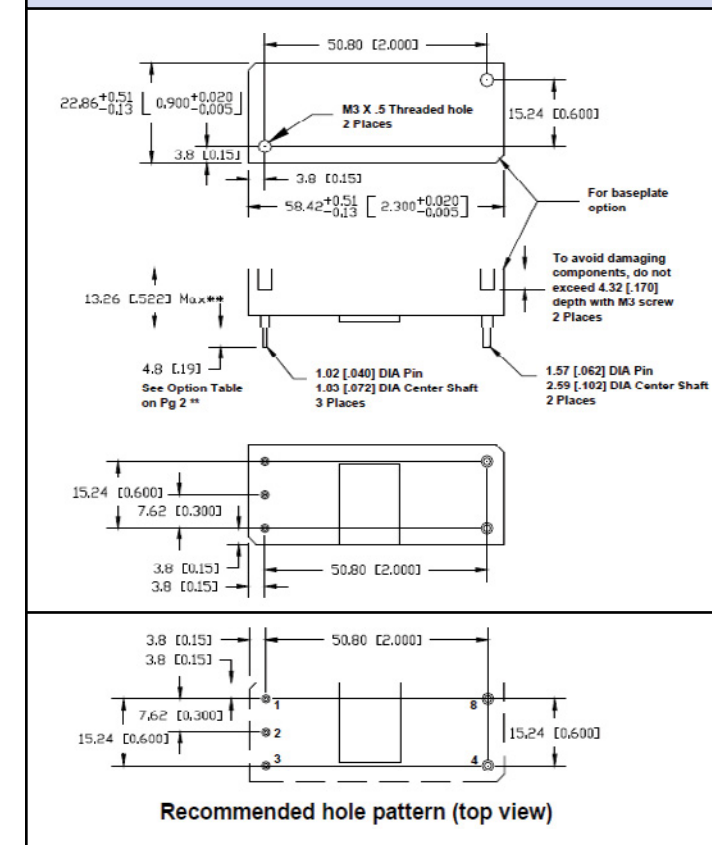
- (1) See website for detailed specification and test methods.  
 (2) See model selector  
 (3) Non-Latching

**Model Selector**

Model	Input Voltage (V)	Output Voltage (V)	Drop Share	Max. Curr. (A)	Max. Output Power (W)	Base Plate	OVP	Efficiency at Full Load (%)	Pin Length
iEH48028A108V-103-R	36-75	10.8	No	28	300	Yes	Non-Latch	94	0.145
iEH48028A108V-109-R	36-75	10.8	No	28	300	Yes	Latch	94	0.190
iEH48025A120V-003-R	36-75	12	No	25	300	No	Non-Latch	94.6	0.145
iEH48025A120V-103-R	36-75	12	No	25	300	Yes	Non-Latch	94.6	0.145
iEH48025A120V-107-R	36-75	12	No	25	300	Yes	Non-Latch	94.6	0.190
iEH48025A120V-109-R	36-75	12	No	25	300	Yes	Latch	94.6	0.190

**Preferred model**

**Outline Drawing**



**Pinout**

PIN	Function	PIN	Function
1	Vin (+)	5	none
2	On / Off	6	none
3	Vin (-)	7	none
4	Vo (-)	8	Vo (+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/ieh-series.htm](http://us.tdk-lambda.com/lp/products/ieh-series.htm)





**30-200W, 60 to 160VDC Input DC-DC Converters**

**Features**

- ◆ 60 - 160VDC Input
- ◆ IEC 61373 Shock and Vibration
- ◆ Base plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Parallel Operation (200W Only)
- ◆ Small Size
- ◆ Quarter / Half Brick Footprint
- ◆ Full Power from -40 to +100°C
- ◆ Parallel Function (CN200)



**Key Market Segments & Applications**



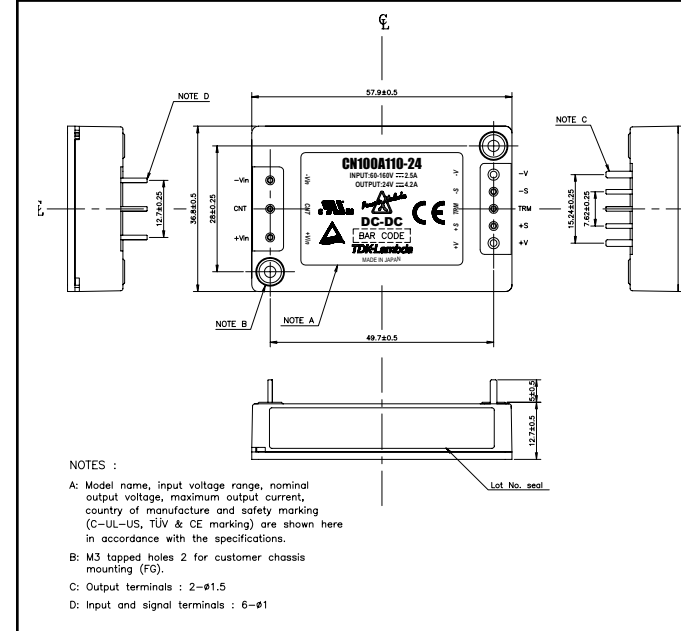
Specifications					
Model		5V	12V	15V	24V
Nominal Output Voltage	VDC	5V	12V	15V	24V
Input Voltage Range	VDC	60 - 160VDC			
Input Current	A	0.34 - 2.16A (model dependant)			
Output Voltage Adjustment	VDC	4.5 - 6	10.8 - 13.2	13.5 - 16.5	21.6 - 26.4
Ripple & Noise (max) pk-pk	mV	100	150	150	240
Line Regulation (max)	mV	20	48	60	96
Load Regulation (max)	mV	40	96	120	192
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	125 - 145% (Cycle input or remote on/off to reset)			
Remote Sense	-	Yes			
Remote On/Off	-	Yes; Low = ON, Open = OFF			
Parallel Operation	-	CN200A 12V, 15V & 24V only			
Operating Temperature	°C	-40°C to +100°C Baseplate			
Storage Temperature	°C	-40°C to +100°C			
Temperature Coefficient	%/°C	0.02%/°C			
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Withstand Voltage	VAC	Input to Baseplate: 1.5kVAC; Input to Output 3.0kVAC for 1 min.; Output to Baseplate: 500VAC for 1 min			
Isolation Resistance	-	>100M at 25°C and 70%RH, Output to Base plate 500VDC			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B			
Shock	-	196.1m/s <sup>2</sup> , IEC61373 - Category 1, Grade B			
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g	CN30A-100A: 70g, CN200A 150g			
Size (WxHxD)	in	CN30A-100A: 1.45 x 0.5 x 2.28", CN200A: 2.4 x 0.5 x 2.28"			
Warranty	yrs	5 Years			

Note: See Installation Manual for full details, test methods of parameters and application notes

**Model Selector**

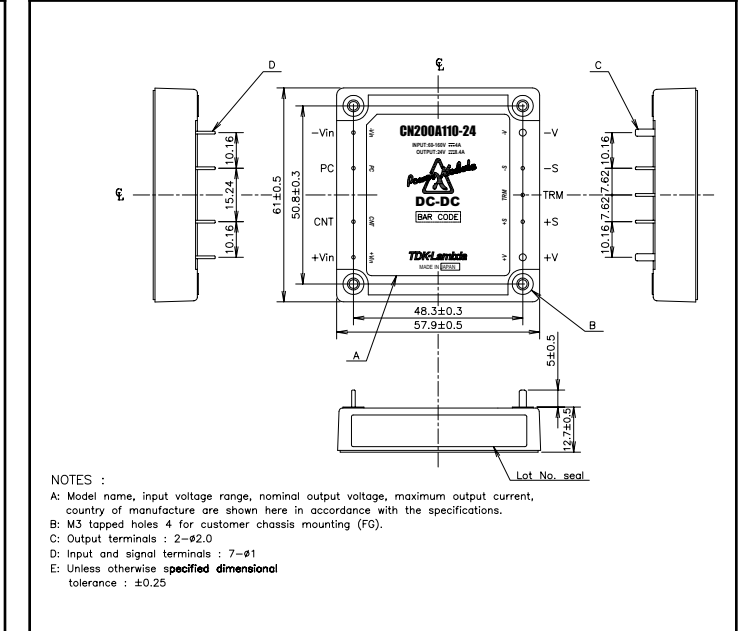
Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 110VDC In)
CN30A110-5	5	6	30	0.34	83
CN50A110-5	5	10	50	0.55	84
CN100A110-5	5	20	100	1.08	85
CN200A110-5	5	40	200	2.16	85
CN30A110-12	12	2.5	30	0.34	84
CN50A110-12	12	4.2	50.4	0.55	86
CN100A110-12	12	8.4	100.8	1.05	88
CN200A110-12	12	16.7	200.4	2.09	88
CN30A110-15	15	2	30	0.34	84
CN50A110-15	15	3.4	51	0.55	86
CN100A110-15	15	6.7	100.5	1.05	88
CN200A110-15	15	13.4	201	2.1	88
CN30A110-24	24	1.3	31.2	0.34	84
CN50A110-24	24	2.1	50.4	0.55	86
CN100A110-24	24	4.2	100.8	1.05	88
CN200A110-24	24	8.4	201.6	2.11	88

**Outline Drawing CN30A to CN100A**



NOTES :  
 A: Model name, input voltage range, nominal output voltage, maximum output current, country of manufacture and safety marking (C-UL-US, TÜV & CE marking) are shown here in accordance with the specifications.  
 B: M3 tapped holes 2 for customer chassis mounting (FG).  
 C: Output terminals : 2-#1.5  
 D: Input and signal terminals : 6-#1

**Outline Drawing CN200A**



NOTES :  
 A: Model name, input voltage range, nominal output voltage, maximum output current, country of manufacture are shown here in accordance with the specifications.  
 B: M3 tapped holes 4 for customer chassis mounting (FG).  
 C: Output terminals : 2-#2.0  
 D: Input and signal terminals : 7-#1  
 E: Unless otherwise specified dimensional tolerance : ±0.25

**Option**

Suffix	Description
/CO	Pcb coating for EN50155 & IEC60571 compliance
Example	CN50A110-5/CO

**Heat Sink Accessories**

Model	Description
HAQ-10T	CN30A to 100A 25mm transverse fins
HAH-10T	CN200A 25mm transverse fins
HAH-15T	CN200A 38mm transverse fins
HAH-15L	CN200A 38mm longitudinal fins

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cn-series.htm](http://us.tdk-lambda.com/lp/products/cn-series.htm)



**49-204W Quarter Brick Converter**

**Features**

- ◆ Standard Quarter Brick Footprint
- ◆ 16-40\*, 36-75VDC Inputs
- ◆ 5V 30A - 15V 10A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 10.41mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (>90%)
- ◆ Constant switching frequency
- ◆ Low component count



**Key Market Segments & Applications**



Specifications					
Model		5	8	12	15
Nominal Output Voltage	VDC	5	8	12	15
Input Voltage Range	VDC	See Model Selector			
Input Current (max)	A	10			
Efficiency	-	Typically 90% at full load			
Output Voltage Tolerance	VDC	4.85 - 5.15	7.76 - 8.24	11.58 - 12.42	14.48 - 15.52
Ripple & Noise (max)(pk to pk) (1)	mV	150	150	150	150
Line Regulation (max)	mV	15	24	30	30
Load Regulation (max)	mV	30	24	30	30
Overload Protection (typ)	%	Inception- 133-158% of rated output; Short circuit - auto recovery			
Overshoot Protection	VDC	5.7 - 6.7	9.2 - 12	13.6 - 16.5	16.7 - 21
Remote Sense	-	Yes			
Remote On / Off	-	Positive or Negative Logic available, see Model Selector			
Temperature (operating)	°C	-40 to 125			
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20-95% RH Non condensing			
Humidity (storage)	-	10-95% RH Non condensing			
Cooling	-	Convection or forced air			
Isolation Voltage	VDC	1500			
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s <sup>2</sup> ), and 50 to 500Hz @ 1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s <sup>2</sup>			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)			
Weight (max)	g	50			
Size	mm	57.9 x 36.8 x 10.41			
Warranty	-	3 Years			

Notes: See website for detailed specifications

- (1) Measured across one 22µF and one 0.1µF ceramic capacitor;  
BW = 20MHz

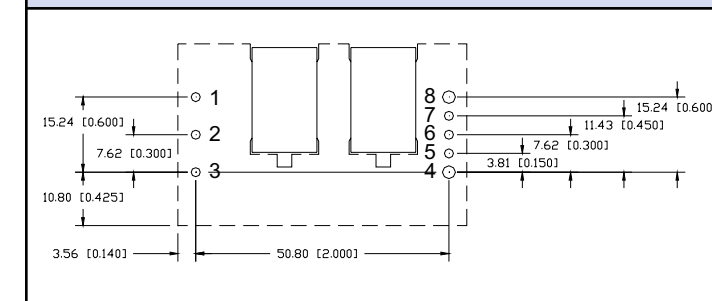
**Model Selector**

Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length
iQE48030A050V-000-R	36 - 75	5	4.5 - 5.5	30	150	Pos	0.145
iQE48030A050V-001-R	36 - 75	5	4.5 - 5.5	30	150	Neg	0.145
iQE4W011A120V-001-R	18 - 60	12	10.8 - 13.2	11	132	Neg	0.145
iQE48017A120V-000-R	36 - 75	12	10.8 - 13.2	17	204	Pos	0.145
iQE48017A120V-001-R	36 - 75	12	10.8 - 13.2	17	204	Neg	0.145
iQE48017A120V-007-R	36 - 75	12	10.8 - 13.2	17	204	Neg	0.180
iQE48010A150V-001-R	36 - 75	15	13.5 - 16.5	10	150	Neg	0.145
iQE48010A150V-007-R	36 - 75	15	13.5 - 16.5	10	150	Neg	0.180

Preferred Model

Other models available for volume opportunities. Contact factory.

**Recommended Footprint (Top View)**



**Pinout**

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/iqe-series.htm](http://us.tdk-lambda.com/lp/products/iqe-series.htm)



**50 & 100W 14.4 to 36VDC Input DC-DC Converters**

**Features**

- ◆ 14.4 - 36VDC Input
- ◆ IEC 61373 Shock and Vibration
- ◆ Base-plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Small Size
- ◆ Quarter Brick Footprint
- ◆ Wide input range



**Key Market Segments & Applications**



Specifications		Model		
Model		5V	12V	24V
Nominal Output Voltage	VDC	5V	12V	24V
Input Voltage Range	VDC	14.4 - 36VDC (40V transient for 3 seconds)		
Input Current	A	2.48 - 4.91A (model dependant)		
Output Voltage Adjustment	VDC	4.5 - 6	10.8 - 13.2	21.6 - 26.4
Ripple & Noise (max) pk-pk	mV	100	150	240
Line Regulation (max)	mV	20	48	96
Load Regulation (max)	mV	40	96	192
Overcurrent Protection	%	105 - 140%		
Overvoltage Protection	%	125 - 145% (Cycle input or remote on/off to reset)		
Remote Sense	-	Yes		
Remote On/Off	-	Yes; Low = ON, Open = OFF		
Operating Temperature	°C	-40°C to +100°C Baseplate		
Storage Temperature	°C	-40°C to +100°C		
Temperature Coefficient	%/°C	0.02%/°C		
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Withstand Voltage	VAC	Input to Base-plate: 2kVAC; Input to Output 3.0kVAC for 1 min.; Output to Base-plate: 500VAC for 1 min		
Isolation Resistance	-	>100M at 25C and 70%RH, Output to Base plate 500VDC		
Vibration (1)	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each IEC61373 - Category 1, Grade B		
Shock (1)	-	196.1m/s <sup>2</sup> , IEC61373 - Category 1, Grade B		
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1		
Weight (Typ)	g	70g		
Size (WxHxD)	in(mm)	1.45 x 0.5 x 2.28" (36.8 x 12.7 x 57.9)		
Warranty	yrs	5 Years		

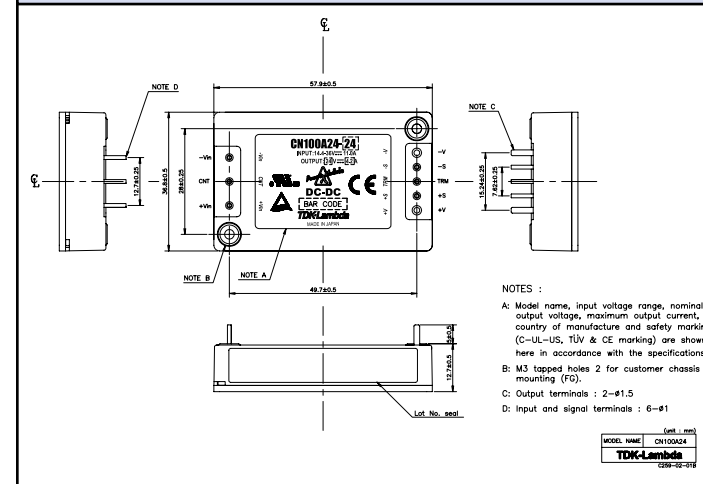
Note: See Installation Manual for full details, test methods of parameters and application notes

(1) Compliant to EN50155 & IEC60571

**Model Selector**

Model	Voltage (V)	Output Current (A)	Maximum Power (W)	Input Current (A)	Efficiency (%) (100% load, 24VDC In)
CN50A24-5	5	10	50	2.48	85
CN100A24-5	5	20	100	4.91	86
CN50A24-12	12	4.2	50.4	2.47	86
CN100A24-12	12	8.4	100.8	4.83	88
CN50A24-24	24	2.1	50.4	2.47	86
CN100A24-24	24	4.2	100.8	4.83	88

**Outline Drawing**



**Option**

Suffix	Description
/CO	Pcb coating for EN50155 & IEC60571 compliance
Example	CN50A24-5/CO

**Heat Sink Accessory**

Model	Description
HAQ-10T	25mm transverse fins

For Additional Information, please visit [us.tdk-lambda.com/lp/products/cn-series.htm](http://us.tdk-lambda.com/lp/products/cn-series.htm)



**50W to 300W, 200 to 425VDC Input DC-DC Converters**

**Features**

- ◆ 200 - 425VDC Input
- ◆ Base-plate Cooled
- ◆ Full Power at 100°C base plate
- ◆ Quarter and Half Brick (300W) Footprint
- ◆ EN62477-1 (OVC III, PH300A only)



(Quarter brick shown)

**Key Market Segments & Applications**



Specifications								
Model								
Nominal Output Voltage	VDC	3.3V	5V	12V	15V	24V	28V	48V
Input Voltage Range	VDC	200 - 425VDC						
Input Current	A	See model selector						
Output Voltage Adjustment	VDC	See model selector						
Ripple & Noise (max) pk-pk	mV	100	100	150	150	240	280	400 (300W: 480mV)
Line Regulation (max)	mV	10	10	24	30	48	56	96
Load Regulation (max)	mV	10	10	24	30	48	56	96
Overcurrent Protection	%	102 - 150% (Constant current style)						
Overvoltage Protection (1)	%	130 - 200	125 - 150 (1)	50-150W: 115 - 145%, 300W: 125 - 145%				
Remote Sense	-	Yes						
Remote On/Off	-	Yes; Low = ON, Open = OFF						
Operating Temperature	°C	-40°C to +100°C Base-plate, -40°C to +85°C Ambient						
Storage Temperature	°C	-40°C to +100°C						
Temperature Coefficient	%/°C	0.02%/°C						
Humidity (non condensing)	%RH	5 - 95% RH Operating and Non Operating						
Cooling	-	Conduction (See Installation Manual for heatsink selection)						
Withstand Voltage	VAC	Input to Base-plate: 2.5kVAC; Input to Output 3.0kVAC for 1 min.; Output to Base-plate: 500VAC for 1 min						
Isolation Resistance	MΩ	>100MΩ at 25C and 70%RH, Output to Base plate 500VDC						
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each						
Shock	-	196.1m/s <sup>2</sup>						
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, EN62477-1 (OVC III, PH300A only) CE Mark						
Weight (Typ)	g	50-150W: 55g, 300W: 100g						
Size (WxHxD)	in (mm)	50 to 150W: 1.46 x 0.5 x 2.30" (37.2 x 12.7 x 58.3) 300W: 2.4 x 0.5 x 2.28" (61.0 x 12.7 x 57.9)						
Warranty	yrs	5 Years						

Note: See Installation Manual for full details, test methods of parameters and application notes

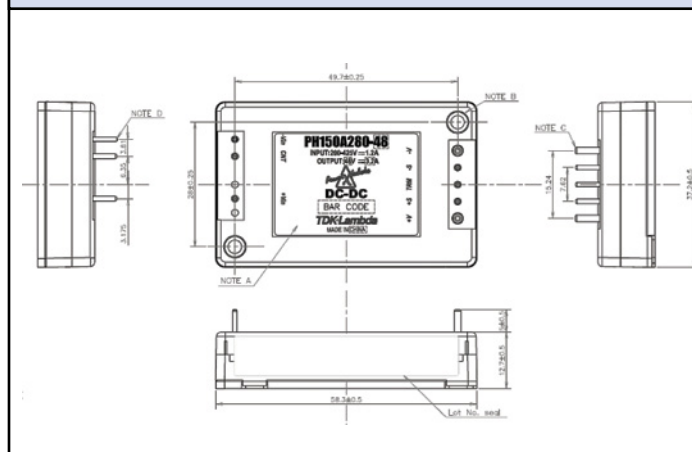
(1) Cycle input or remote on/off to reset. PH300A280-5: 125 - 145%

**Model Selector**

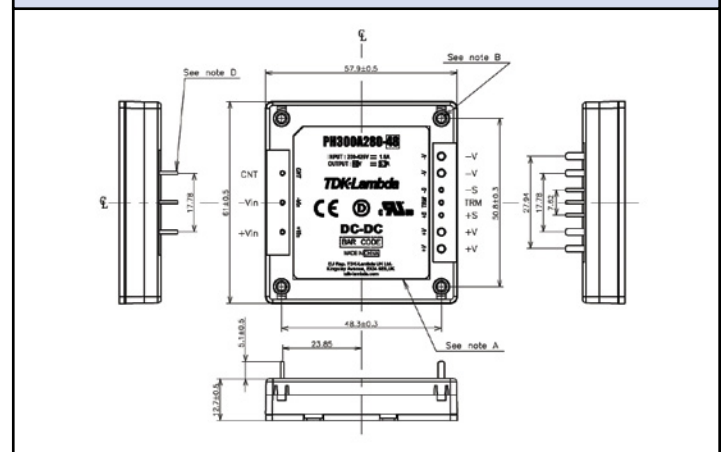
Model	Voltage (V)	Output Adjustment	Output Current (A)	Maximum Power (W)	Input Current (A) <sup>(2)</sup>	Efficiency (%) <sup>(2)</sup>
PH75A280-3.3	3.3	2.97 - 3.96	15	49.5	0.22	83
PH100A280-3.3	3.3	2.97 - 3.96	20	66	0.29	83
PH50A280-5	5	4 - 6	10	50.0	0.21	86
PH75A280-5	5	4 - 6	15	75.0	0.32	86
PH100A280-5	5	4 - 6	20	100.0	0.42	86
PH300A280-5	5	2.5 - 6	60	300.0	1.22	89
PH50A280-12	12	9.6 - 13.2	4.2	50.4	0.20	89
PH75A280-12	12	9.6 - 13.2	6.3	75.6	0.31	89
PH100A280-12	12	9.6 - 13.2	8.4	100.8	0.41	89
PH150A280-12	12	9.6 - 13.2	12.5	150.0	0.62	88
PH300A280-12	12	7.2 - 14.4	25	300.0	1.22	89
PH75A280-15	15	12 - 16.5	5	75.0	0.3	90
PH150A280-15	15	12 - 16.5	10	150.0	0.6	90
PH50A280-24	24	19.2 - 26.4	2.1	50.4	0.20	89
PH75A280-24	24	19.2 - 26.4	3.2	76.8	0.31	90
PH100A280-24	24	19.2 - 26.4	4.2	100.8	0.40	90
PH150A280-24	24	19.2 - 26.4	6.3	151.2	0.61	89
PH300A280-24	24	14.4 - 28.8	12.5	300.0	1.2	90.5
PH75A280-28	28	22.4 - 30.8	2.7	75.6	0.3	90
PH150A280-28	28	22.4 - 30.8	5.4	151.2	0.61	90
PH300A280-28	28	16.8 - 33.6	10.8	302.4	1.2	91
PH50A280-48	48	38.4 - 52.8	1.1	52.8	0.21	89
PH75A280-48	48	38.4 - 52.8	1.6	76.8	0.31	90
PH100A280-48	48	38.4 - 52.8	2.1	100.8	0.4	90
PH150A280-48	48	38.4 - 52.8	3.2	153.6	0.6	90
PH300A280-48	48	28.8 - 57.6	6.3	302.4	1.19	92

(2) At 100% load, 280V input

**Outline Drawing (50 - 150W)**



**Outline Drawing (300W)**



**Heat Sink Accessories**

Model	Description
HAQ-10T	PH50A to 150A 25mm transverse fins
HAH-10T	PH300A 25mm transverse fins
HAH-15T	PH300A 38mm transverse fins
HAH-15L	PH300A 38mm longitudinal fins

**Options**

Suffix	Description
Blank	M3 tapped mounting inserts
/T	3.3mm non-threaded inserts

For Additional Information, please visit [us.tdk-lambda.com/lp/products/pha-series.htm](http://us.tdk-lambda.com/lp/products/pha-series.htm)

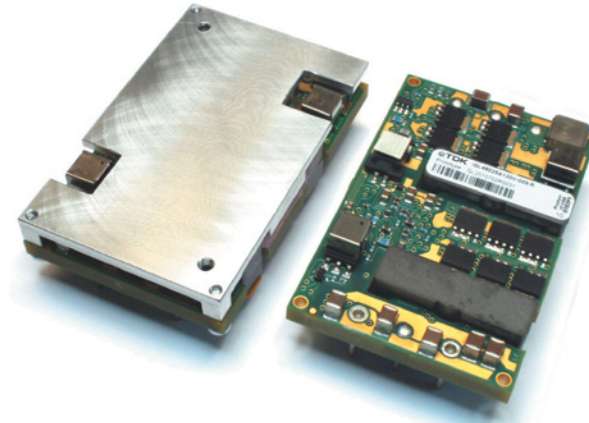


**72-308W Quarter Brick Converter**

**Features**

- ◆ Standard Quarter Brick Footprint
- ◆ 18-36, 36-75VDC Inputs
- ◆ 1.2V 60A, 28V 11A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ 1500VDC Basic Isolation
- ◆ Baseplate cooling
- ◆ High operating efficiency (up to 93.5%)
- ◆ Constant switching frequency

**Key Market Segments & Applications**



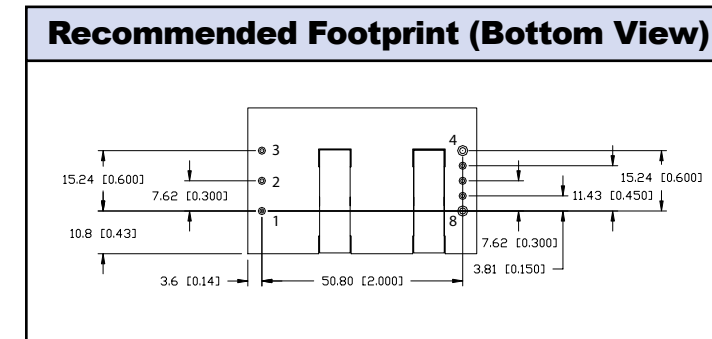
Specifications							
Model	iQL						
Nominal Output Voltage	VDC	1.2	2.5	3.3	5	12	28
Input Voltage Range	VDC	See Model Selector					
Ripple & Noise (max)(pk-pk) (1)	mV	60	30	100	80	120	500
Line Regulation (max)	mV	1	5	6.6	10	60	100
Load Regulation (max)	mV	1	5	15	10	60	100
Overload Protection Threshold (3)	A	71	69	70	50	27.5	12.4
Overvoltage Protection (Typ) (6)	VDC	1.4	3.1	4.1	6.1	14.7	33.6
Overtemperature Protection (3)	-	Yes					
Remote Sense	-	Yes	Yes	Yes	Yes	Yes <sup>(4)</sup>	Yes
Remote On / Off	-	Negative Logic (5)					
Temperature (operating)	°C	-40 to 115	-40 to 115	-40 to 125	-40 to 119	-40 to 118	-40 to 115
Temperature (storage)	°C	-55 to 125					
Humidity (operating)	-	20 to 95% (non-condensing)					
Humidity (storage)	-	10 to 95% (non-condensing)					
Cooling	-	Conduction, convection, or forced air					
Isolation Voltage	VDC	1500 Input - Output, 1500 Input - Baseplate					
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s <sup>2</sup> ), and 50 to 500Hz@1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4					
Shock	-	50 G at 6 ms pulse in three axes					
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805, CB scheme (IEC950), CE Mark (EN60950)					
Weight (max)	g	55g open frame, 70g with base plate					
Size	mm	57.9 x 36.8 x 13.21					
Warranty	yrs	3 Years					

- (1) See website for detailed specification and test methods.  
 (2) Latching.  
 (3) Non-latching.  
 (4) iQL24021A120V has remote sense, iQL48025A120V does not have remote sense.  
 (5) Positive Logic is an option available for all codes.  
 (6) All models have the latching type except for model numbers with note (3).

Model Selector								
Model	Input Voltage (V)	Output Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Base Plate	Efficiency at Full Load (%)	Pin Length (in)
iQL48060A012V-0B3-R (3)	36 - 75	1.2	0.96 - 1.32	60	72.0	No	83.5	0.145
iQL48060A025V-0B3-R (3)	36 - 75	2.5	2.0 - 2.75	60	150.0	No	89.0	0.145
iQL48060A025V-0B9-R	36 - 75	2.5	2.0 - 2.75	60	150.0	No	89.0	0.180
iQL24050A033V-009-R	18 - 36	3.3	2.64 - 3.63	50	165.0	Yes	90.5	0.180
iQL48060A033V-003-R (3)	36 - 75	3.3	2.64 - 3.63	60	198.0	Yes	91.0	0.145
iQL48060A033V-009-R	36 - 75	3.3	2.64 - 3.63	60	198.0	Yes	91.0	0.180
iQL48060A033V-0B9-R	36 - 75	3.3	2.64 - 3.63	60	198.0	No	91.0	0.180
iQL24040A050V-001-R (2)	18 - 36	5.0	4.0 - 5.5	40	200.0	Yes	91.0	0.145
iQL24040A050V-009-R	18 - 36	5.0	4.0 - 5.5	40	200.0	Yes	91.0	0.180
iQL48045A050V-001-R	36 - 75	5.0	4.0 - 5.5	45	225.0	Yes	91.0	0.145
iQL48045A050V-003-R (3)	36 - 75	5.0	4.0 - 5.5	45	225.0	Yes	91.0	0.145
iQL48045A050V-0B3-R (3)	36 - 75	5.0	4.0 - 5.5	45	225.0	No	91.0	0.145
iQL48045A050V-009-R	36 - 75	5.0	4.0 - 5.5	45	225.0	Yes	91.0	0.180
iQL48045A050V-0B9-R	36 - 75	5.0	4.0 - 5.5	45	225.0	No	91.0	0.180
iQL24021A120V-001-R (2)	20 - 36	12.0	9.6 - 13.2	21	252.0	Yes	92.0	0.145
iQL24021A120V-009-R	20 - 36	12.0	9.28 - 12.76	21	252.0	Yes	92.0	0.180
iQL48025A120V-009-R	36 - 75	12.0	9.6 - 13.2	25	300.0	Yes	93.5	0.180
iQL48025A120V-0B9-R	36 - 75	12.0	9.6 - 13.2	25	300.0	No	93.5	0.180
iQL48025A120V-001-R	36 - 75	12.0	9.6 - 13.2	25	300.0	Yes	94.0	0.145
iQL48011A280V-008-R	36 - 75	28.0	22.4 - 30.8	11	308.0	Yes	92.5	0.180
iQL48011A280V-009-R	36 - 75	28.0	22.4 - 30.8	11	308.0	Yes	92.5	0.180

- (2) Latching.  
 (3) Non-latching.

**Preferred Model**



Pinout			
PIN	Function	PIN	Function
1	Vin (+)	5	Sense (-)(if applicable)
2	On / Off	6	Trim
3	Vin (-)	7	Sense (+)(if applicable)
4	Vo (-)	8	Vo (+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/iql-series.htm](http://us.tdk-lambda.com/lp/products/iql-series.htm)



## 85W MIL-COTS Quarter Brick Converters

### Features

- ◆ Standard Quarter Brick Footprint
- ◆ 9-40 Input
- ◆ Up to 90% Efficiency
- ◆ Up to 115°C baseplate temperatures
- ◆ 2250VDC Isolation
- ◆ Encapsulated for Rugged Environments
- ◆ No optocouplers used
- ◆ Designed to meet MIL-STD-461; MIL-STD-1275; Sec 16-18 of RTCA/DO-160 with FQx Filters<sup>2</sup>



### Key Market Segments & Applications



Specifications						
Model	HQA					
Nominal Output Voltage	VDC	5V	12V	15V	24V	28V
Input Voltage Range	VDC	9 - 40V				
Input Current	A	13A Maximum				
Efficiency (100% load, 24V input)	%	91	90	92	87	88.5
Output Voltage Adjustment	VDC	4.5 - 5.5	10.8 - 13.2	13.5 - 16.5	21.6 - 26.4	25.2 - 30.8
Output Voltage Accuracy	%	±3%				
Ripple & Noise (max) pk-pk	mV	150	200	200	250	200
Line Regulation (typ)	%	0.05	0.05	0.05	0.05	0.05
Load Regulation (max)	%	0.03	0.03	0.03	0.03	0.03
Overcurrent Protection (typ)	A	27	11	8	5.2	4.2
Overvoltage Protection (typ)	V	6.5	15	18	32	35
Remote On/Off	-	Yes; Low = ON, Open = OFF				
Remote Sense	-	Yes		Not as standard		
Operating Temperature	°C	Standard screening: -40°C to +115°C				
Storage Temperature	°C	-65°C to +125°C				
Temperature regulation	%	0.5% across full temperature range				
Cooling	-	Conduction, convection or forced air				
Isolation Voltage	VDC	Input to Output, Input to Baseplate, Output to Baseplate, 2250 VDC				
Isolation Resistance	MΩ	>10MΩ				
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark				
Qualification Methods	-	Consistent with MIL-STD-883F and MIL-STD-202G				
Weight (Typ)	g	100 (Flanged version)				
Size (LxWxH)	in (mm)	Flanged version: 2.39 x 2.2 x 0.5" (60.6 x 55.9 x 12.7); Non-flanged version: 2.39 x 1.54 x 0.5" (60.6 x 39 x 12.7)				
Warranty	yrs	3 Years				

Note:  
 1) See Installation Manual for full details, test methods of parameters and application notes.  
 2) TDK Filter part numbers: FQA020ADC (EMI); FQB020ADC (EMI + Input Transient). Please refer to the Application Notes for details of the applicable Standards & Tests conducted.

### Model Selector

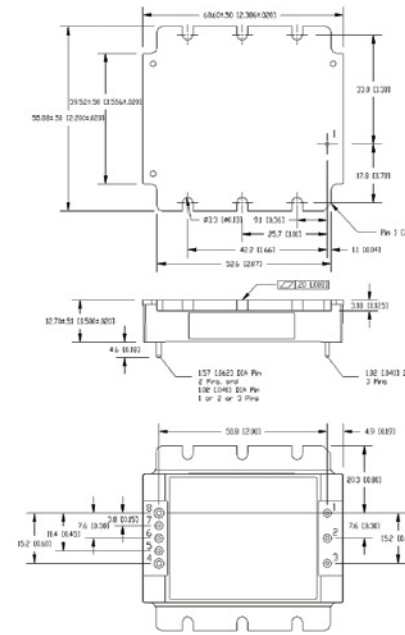
Model	Input Voltage (V)	Output Voltage (V)	Max Current (A)	Maximum Power (W)
HQA2W085W050V-007-S	9 - 40	5	17	85
HQA2W085W120V-007-S	9 - 40	12	7.1	85
HQA2W085W150V-007-S	9 - 40	15	5.7	85
HQA2W085W240V-007-S	9 - 40	24	3.5	85
HQA2W085W280V-007-S	9 - 40	28	3	85

### Options

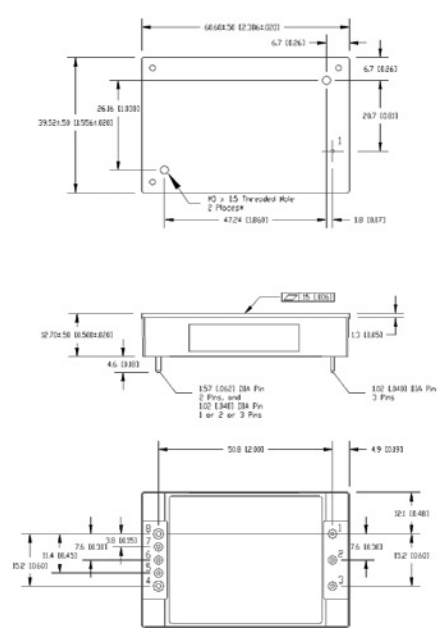
Suffix	Description
-007-S	Flanged Baseplate, Standard Screening
-N07-S	Non-Flanged Baseplate, Standard Screening

\*Contact factory for other Voltages or option codes

### Outline Drawing Flange Version



### Outline Drawing Non-Flange Version



### Screening

Operation	S-Grade (Standard Screening)
Functional Test	Room and Hot Test
Burn in	Yes
Temperature Cycling	No
Hi-Pot	2250VDC
Visual Inspection	Yes

### Evaluation Board

Part #	Contents
FQX-HQA-EVK-D0	Evaluation board (no modules); fits either an FQA or FQB filter and two (2) HQA or GQA modules.

### Pinout

Pin	Function
1	Vin(+)
2	On/Off
3	Vin(-)
4	Vo(-)
5	Sense (-), available on Vo ≤ 15V models
6	Trim
7	Sense (+), available on Vo ≤ 15V models
8	Vo(+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/hqa-series.htm](http://us.tdk-lambda.com/lp/products/hqa-series.htm)



**120W Industrial Quarter Brick Converters**

**Features**

- ◆ Standard Quarter Brick Footprint
- ◆ 9-36 or 18-36V Input
- ◆ Up to 91.5% Efficiency
- ◆ Up to 105°C baseplate temperatures
- ◆ 1,500VDC Isolation (2,250VDC or 3,000VDC option)



**Key Market Segments & Applications**



Specifications		GQA120						
Model		5V	12V	15V	24V	28V	48V	
Nominal Output Voltage (1)	VDC							
Input Voltage Range	VDC	9 - 36V					18 - 36V	
Input Current (Maximum)	A	17A					10A	
Efficiency (100% load, 24V input)	%	90%	89%	89%	87%	89%	91.5%	
Output Voltage Adjustment	VDC	4.5 - 5.5V	10.8 - 13.2V	13.5 - 16.5V	21.6 - 26.4V	25.2 - 30.8V	45.6 - 52.8V	
Ripple & Noise (max) pk-pk	mV	150mV	180mV	200mV	250mV	250mV	300mV	
Line Regulation (typ)	%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	
Load Regulation (max)	%	0.03%	0.03%	0.03%	0.03%	0.03%	0.03%	
Overcurrent Protection (typ)	A	37A	14.5A	12A	6.2A	5.1A	4A	
Overvoltage Protection (typ)	V	6.5V	15V	18V	32V	35V	54V	
Remote On/Off	-	Yes; Low = ON, Open = OFF						
Remote Sense	-	Yes			Not as standard			
Operating Temperature	°C	-40°C to +105°C						
Storage Temperature	°C	-55°C to +125°C						
Temperature regulation	%	0.5% across full temperature range						
Cooling	-	Conduction, convection or forced air						
Withstand Voltage	VDC	Input to Output 1,500VDC (-NP7 suffix: 2,250VDC, -OP7 suffix: 3,000VDC), Baseplate to Input or Output 1,500VDC. (-NP7 & -OP7 suffix: 2,250VDC)						
Isolation Resistance	MΩ	>10MΩ						
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark						
Weight (Typ)	g	85g (Flanged baseplate, open frame)						
Size (LxWxH)	in (mm)	Flanged version: 2.39 x 1.95 x 0.5" (60.6 x 49.5 x 12.7); Non-flanged version: 2.39 x 1.56 x 0.5" (60.6 x 39.5 x 12.7)						
Warranty	yrs	3 Years						

Note: See Installation Manual for full details, test methods of parameters and application notes

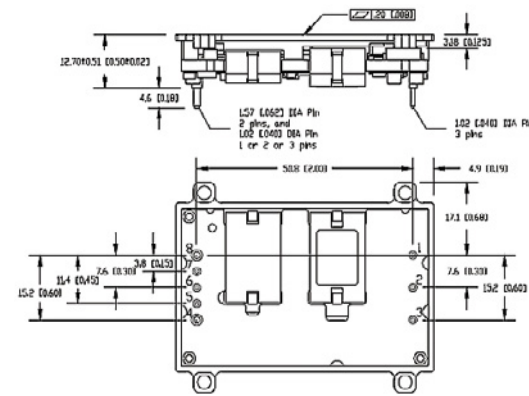
(1) Up to 50V input transient for 1 second

**Model Selector**

Model	Input Voltage (V)	Output Voltage (V)	Max Current (A)	Maximum Power (W)
GQA2W024A050V-007-R	9 - 36	5	24	120
GQA2W010A120V-007-R	9 - 36	12	10	120
GQA2W008A150V-007-R	9 - 36	15	8	120
GQA2W005A240V-007-R	9 - 36	24	5	120
GQA2W004A280V-007-R	9 - 36	28	4.28	120
GQA24003A480V-007-R	18 - 36	48	2.5	120

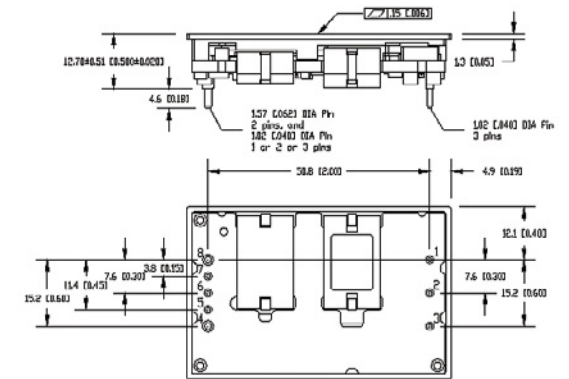
**Outline Drawing**

**Flange Baseplate, Open Frame**



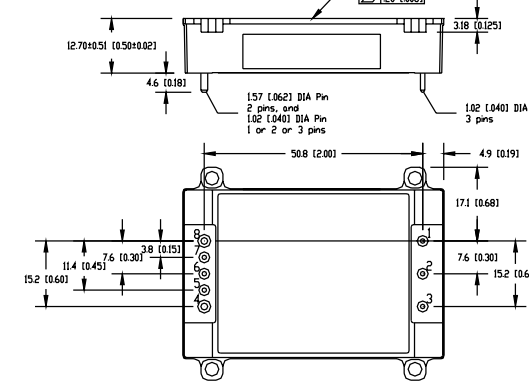
**Outline Drawing**

**Non-Flange Baseplate, Open Frame**



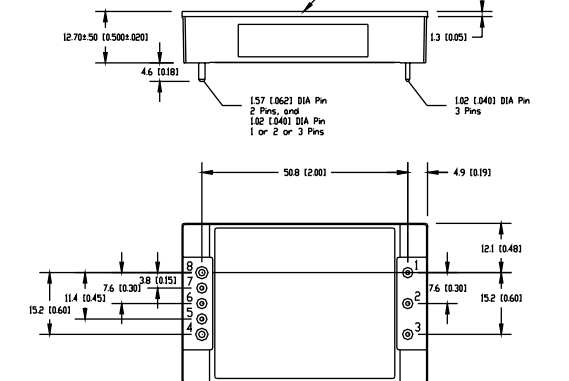
**Outline Drawing**

**With Flange, Potted**



**Outline Drawing**

**No Flange, Potted**



**Options**

Suffix	Description
-007-R	Flanged Baseplate, Open Frame
-N07-R	Non-Flanged Baseplate, Open Frame
-OP7-R	Flanged Baseplate, Enclosed With Potting, 3kV Input to Output Isolation
-NP7-R	Non-Flanged Baseplate, Enclosed With Potting

Standard Model \*Contact factory for other Voltages or option codes

**Pinout**

Pin	Function	Pin	Function
1	Vin(+)	5	sense (-), select models
2	On/Off	6	Trim
3	Vin(-)	7	Sense (+), select models
4	Vo(-)	8	Vo(+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/gqa-series.htm](http://us.tdk-lambda.com/lp/products/gqa-series.htm)



## 120W MIL-COTS Quarter Brick Converters

### Features

- ◆ Standard Quarter Brick Footprint
- ◆ 9-40, 18-40VDC Inputs
- ◆ 5 to 48V Nominal Outputs
- ◆ Up to 91.5% Efficiency
- ◆ Up to 115°C Baseplate Temperature
- ◆ 2250VDC Isolation
- ◆ Encapsulated for Rugged Environments
- ◆ No optocouplers used
- ◆ Enhanced Screening Option
- ◆ Designed to meet MIL-STD-461; MIL-STD-1275; Sec 16-18 of RTCA/DO-160 with FQx Filters<sup>2</sup>



### Key Market Segments & Applications



Specifications		HQA						
Model		5V	12V	15V	24V	28V	48V	
Nominal Output Voltage	VDC	5V	12V	15V	24V	28V	48V	
Input Voltage Range	VDC	9 - 40V						
Input Current	A	16A Maximum						
Efficiency (100% load, 24V input)	%	90	90	89	87	89	91.5	
Output Voltage Adjustment	VDC	4.5 - 5.5	10.8 - 13.2	13.5 - 16.5	21.6 - 26.4	25.2 - 30.8	45.6 - 52.8	
Output Voltage Accuracy	%	±3%						
Ripple & Noise (max) pk-pk	mV	150	150	200	250	250	300	
Line Regulation (typ)	%	0.05	0.05	0.05	0.05	0.05	0.05	
Load Regulation (max)	%	0.03	0.03	0.03	0.03	0.03	0.03	
Overcurrent Protection (typ)	A	37	14.5	12	6.2	5.2	4.0	
Overvoltage Protection (typ)	V	6.5	15	18	32	35	54	
Remote On/Off	-	Yes; Low = ON, Open = OFF						
Remote Sense	-	Yes			Not as standard			
Operating Temperature	°C	Standard screening: -40°C to +115°C, Enhanced screening: -55°C to +115°C						
Storage Temperature	°C	-65°C to +125°C						
Temperature regulation	%	0.5% across full temperature range						
Humidity (non condensing)	%RH	MIL-STD 883 Method 1004.7						
Cooling	-	Conduction, convection or forced air						
Isolation Voltage	VDC	Input to Output, Input to Baseplate, Output to Baseplate, 2250 VDC						
Isolation Resistance	-	>10M						
Vibration	-	MIL-STD-202G, Method 201A, Unpowered, sweep 1: 5 to 50 Hz at 0.5g, sweep 2: 50 to 500 Hz at 1.5g, three axis						
Shock	-	MIL-STD-202G, Method 213B, Table 213-1, Test Condition I, Unpowered, 50G half sine 6ms, three axis						
Safety Agency Certifications	-	UL60950-1, CSA60950-1, EN60950-1, CE Mark						
Qualification Methods	-	MIL-STD-883F and MIL-STD-202G						
Weight (Typ)	g	100 (Flanged version)						
Size (LxWxH)	in(mm)	Flanged version: 2.39 x 2.2 x 0.5" (60.6 x 55.9 x 12.7); Non-flanged version: 2.39 x 1.54 x 0.5" (60.6 x 39 x 12.7)						
Warranty	yrs	3 Years						

Note:  
 1) See Installation Manual for full details, test methods of parameters and application notes.  
 2) TDK Filter part numbers: FQA020ADC (EMI); FQB020ADC (EMI + Input Transient). Please refer to the Application Notes for details of the applicable Standards & Tests conducted.

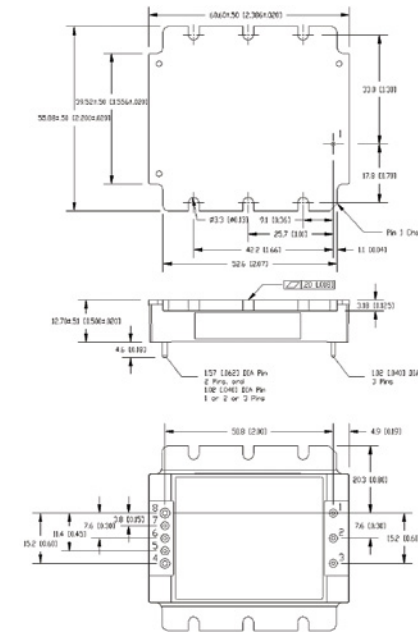
### Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max Current (A)	Maxumim Power (W)
HQA2W120W050V-007-S	9 - 40	5	24	120
HQA2W120W120V-007-S	9 - 40	12	10	120
HQA2W120W150V-007-S	9 - 40	15	8	120
HQA2W120W240V-007-S	9 - 40	24	5	120
HQA2W120W280V-007-S	9 - 40	28	4.2	118
HQA24120W480V-007-S	18 - 40	48	2.5	120

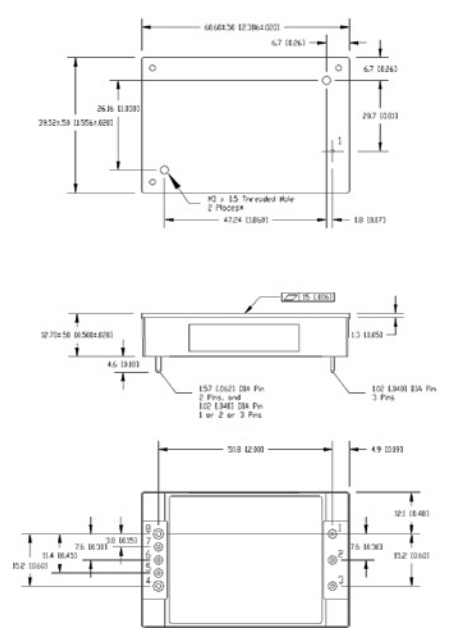
### Screening

Operation	S-Grade (Standard Screening)	M-Grade (Enhanced Screening)
Functional Test	Room and Hot Test	Cold, Room, and Hot Test
Burn in	Yes	Extended, 96 hour
Temperature Cycling	No	10 Cycles
Hi-Pot	2250VDC	2250VDC
Visual Inspection	Yes	Yes

### Outline Drawing Flange Version



### Outline Drawing Non-Flange Version



### Options

Version	Description
-007-S	Flanged Baseplate, Standard Screening
-N07-S	Non-Flanged Baseplate, Standard Screening
-007-M	Flanged Baseplate, Enhanced Screening
-N07-M	Non-Flanged Baseplate, Enhanced Screening

Standard Model

\*Contact factory for other Voltages or option codes

### Evaluation Board

Part #	Contents
FQX-HQA-EVK-D0	Evaluation board (no modules); fits either an FQA or FQB filter and two (2) HQA or GQA modules.

### Pinout

Pin	Function
1	Vin(+)
2	On/Off
3	Vin(-)
4	Vo(-)
5	Sense (-), available on Vo ≤ 15V models
6	Trim
7	Sense (+), available on Vo ≤ 15V models
8	Vo(+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/hqa-series.htm](http://us.tdk-lambda.com/lp/products/hqa-series.htm)

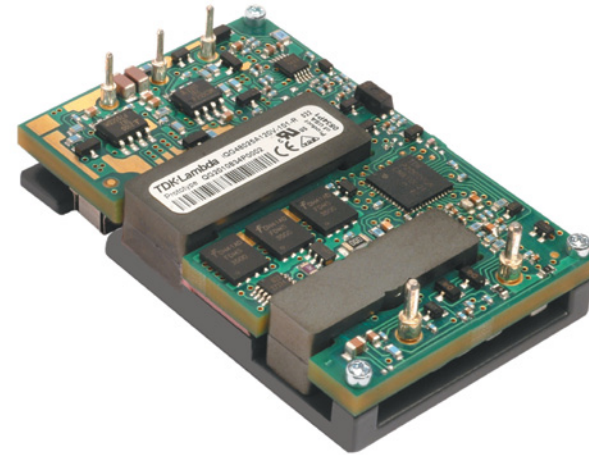




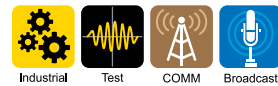
**300-504W Quarter Brick Converters**

**Features**

- ◆ Standard Quarter Brick Footprint
- ◆ 36-75VDC Input
- ◆ 9.6 or 12V Outputs
- ◆ Through Hole Mounting
- ◆ Low 13.2mm Profile
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 95%)
- ◆ Constant switching frequency
- ◆ Starts with pre-biased output
- ◆ Baseplate cooled
- ◆ Parallel Operation (400W model)



**Key Market Segments & Applications**



Specifications		iQG48033A120V-000-109	iQG48033A120V-1D1 & 1D9	iQG48042A120V-109 & 1U9
Model				
Nominal Output Voltage	VDC	12V	12V	12V
Input Voltage Range	VDC	36 - 75VDC		39 - 75VDC
Input Current (max)	A	10.5A		15A
Efficiency (48V Input)	%		94.5%	
Output Voltage Tolerance	VDC	11.5 - 11.85	11.6 - 12.0	11.93 - 12.35
Output Voltage Adjustment	-		None	
Ripple & Noise (max) (pk - pk)	mV	125mV	150mV	175mV
Line Regulation (typical)	mV	20mV		12mV
Load Regulation (typical)	mV	35mV	n/a	35mV (-109 only)
Overload Protection (typ)	A	39A (non-latching)		52A (non-latching)
Overvoltage Protection	VDC		13.7 - 15.6 (latching)	
Remote Sense	-	No	Yes	No
Remote On / Off	-		Negative	
Current Share (Droop Mode)	-	No	Yes	(-1U9 only)
Current Share Accuracy	-		±10% (50-100% of total load)	
Temperature (operating)	°C	-40 to 124°C (1)		-40 to 125°C (1)
Temperature (storage)	°C	-55 to 125		
Humidity (operating)	%RH	20-95% RH Non Condensing		
Humidity (storage)	%RH	10-95% RH Non Condensing		
Cooling	-	Conduction, convection, or forced air (See detailed datasheet for derating)		
Isolation Voltage	VDC	1500VDC Input to Output, Input to Baseplate		
Vibration (non operating)	-	5-50Hz @ 0.5g (4.9m/s <sup>2</sup> ) and 50-500Hz @ 1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4		
Shock	-	196.1m/s <sup>2</sup>		
Safety Agency Certifications	-	UL60950-1 (US and Canada), VDE0805 (IEC60950-1), CB scheme (IEC60950-1), CE Mark		
Weight	g	70g		88g
Size (LxWxH)	mm	57.91 x 36.83 x 13.21		57.91 x 36.83 x 13.97
Warranty	Yrs	3 Years		

Note: See website for detailed specifications and test methods

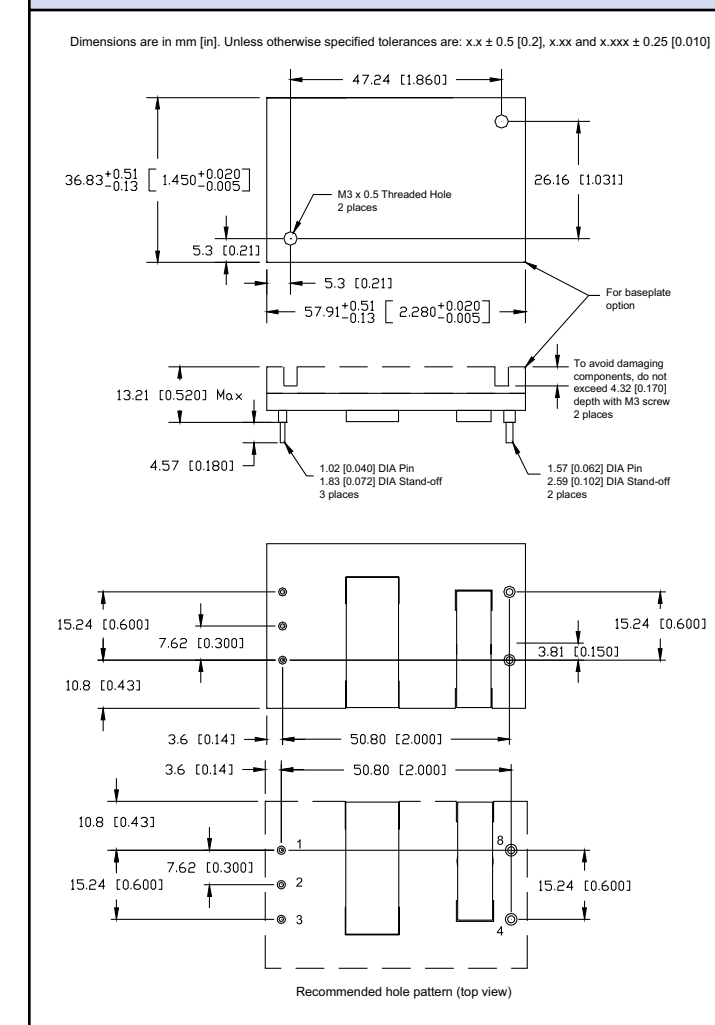
(1) See detailed datasheet for derating

**Model Selector**

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	On/Off Polarity	Pin Length	Base Plate
iQG48047A096V-1D1-R	36 - 75	9.6	47	450	Neg	0.145"	Yes
iQG48025A120V-001-R	36 - 75	12	25	300	Neg	0.145"	No
iQG48025A120V-101-R	36 - 75	12	25	300	Neg	0.145"	Yes
iQG48025A120V-009-R	36 - 75	12	25	300	Neg	0.180"	No
iQG48025A120V-109-R	36 - 75	12	25	300	Neg	0.180"	Yes
iQG48033A120V-109-R	36 - 75	12	33	396	Neg	0.180"	Yes
iQG48033A120V-1D9-R	36 - 75	12	33	396	Neg	0.180"	Yes
iQG48033A120V-101-R	36 - 75	12	33	400	Neg	0.145"	Yes
iQG48033A120V-1D1-R	36 - 75	12	33	400	Neg	0.145"	Yes
iQG48033A120V-009-R	36 - 75	12	33	400	Neg	0.180"	No
iQG48042A120V-109-R	39 - 75	12	42	504	Neg	0.180"	Yes
iQG48042A120V-1U9-R	39 - 75	12	42	504	Neg	0.166"	Yes

**Preferred Model**

**Recommended Footprint (Top View)**



**Pinout**

PIN	Function	PIN	Function
1	Vin (+)	5	None
2	On / Off	6	None
3	Vin (-)	7	None
4	Vout (-)	8	Vout (+)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/iqg-series.htm](http://us.tdk-lambda.com/lp/products/iqg-series.htm)



**300-450W Half Brick Converters**

**Features**

- ◆ Standard Half Brick Footprint
- ◆ 18-36 or 36-76VDC Inputs
- ◆ 12V 29A - 48V 9.4A Nominal Outputs
- ◆ Through Hole Mounting
- ◆ Low 12.7mm Profile
- ◆ High operating efficiencies (up to 92%)
- ◆ Constant switching frequency
- ◆ Baseplate cooling



**Key Market Segments & Applications**



Specifications				
PAH300S, 350S, 450S (see model selector)				
Model		12V	28V	48V
Nominal Output Voltage	VDC	12V	28V	48V
Input Voltage range	VDC	18-36 or 36-76		
Input Current (max)	A	6.8-17.4A (model dependant)		
Output Voltage Adjustment	VDC	7.2 - 13.2	16.8 - 33	28.8 - 57.6(5)
Ripple & Noise (max) (pk to pk)	mV	200	280(1)	480
Line Regulation (max)	mV	24	56	96
Load Regulation (max)	mV	24	56	96
Overload Protection	%	105 - 140%, constant current with auto recovery		
Overvoltage Protection (3)	%	115-135%	125-140%(2)	125-145%(6)
Remote Sense	-	Yes		
Remote On / Off (See options)	-	Standard; Low = ON, Open = OFF /P option; Low = OFF, Open = ON		
Temperature (operating)	°C	-40°C to +100°C baseplate, full power(4)		
Temperature (storage)	°C	-40°C to +100°C		
Temperature Coefficient	-	0.02%/°C		
Humidity (operating)	-	5-95% RH Non condensing		
Humidity (storage)	-	5-95% RH Non condensing		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	VDC	1500VDC Input to output & baseplate, 500VDC Output to baseplate		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)		
Amplitude	-	0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each		
Shock	-	196.1m/s <sup>2</sup>		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V input models only)		
Weight (Typ)	g	110		
Size (WxHxD)	in(mm)	2.4x0.5x2.28 (61x12.7x57.9) See outline drawing		
Warranty	yrs	2 Years		

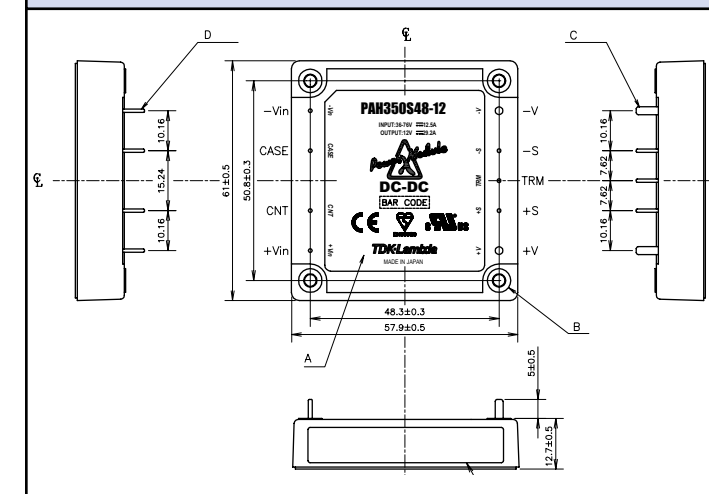
Note: See Installation Manual for full details, test methods of parameters and application notes

- (1) 240mV for PAH300
- (2) 125-145% for PAH450S48-28
- (3) Manual reset
- (4) PAH350S24-28 & -48: derate linearly to 85% load from 90°C to 100°C
- (5) 28.8-52.8 PAH350S28-48
- (6) 115-140% PAH350S28-48

**Model Selector**

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency Typ. (%)
PAH300S24-12	18 - 36	12	25	300	87
PAH300S48-12	36 - 76	12	25	300	90
PAH350S48-12	36 - 76	12	29.2	350	89
PAH300S24-28	18 - 36	28	11	308	88
PAH350S24-28	18 - 36	28	12.5	350	88
PAH350S24-48	18 - 36	48	7.3	350	87
PAH300S48-28	36 - 76	28	11	308	90
PAH350S48-28	36 - 76	28	12.5	350	89
PAH450S48-28	36 - 76	28	16	448	92
PAH450S48-48	36 - 76	48	9.4	451	92

**Outline Drawing**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/pah300-series.htm](http://us.tdk-lambda.com/lp/products/pah300-series.htm)



**Pinout**

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

**Options**

Suffix	Description
-	M3 Tapped inserts for mounting
/T	M3 clearance inserts for mounting
/P	Positive logic remote On/Off (Not on PAH450S)

**Other DC-DC Products**

PAF	400-700W Full brick DC-DC
PAH	Other half brick DC-DC converters
PAQ	Quarter brick DC-DC converters
PAE	Eighth brick DC-DC converters
PX	10-48W, 12-48V DC-DC

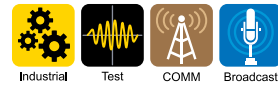
## 300-456W, 48V Input Half Brick Converter

### Features

- ◆ Standard Half Brick Footprint with Baseplate
- ◆ 36 -75VDC Input
- ◆ 12V Nominal Output
- ◆ Through Hole Mounting
- ◆ 1500VDC Basic Isolation
- ◆ High operating efficiency (up to 94%)
- ◆ Constant switching frequency
- ◆ Low component count



### Key Market Segments & Applications



Specifications		iHG48025A120V-101-R	iHG48038A120V-109-R
Model		iHG48025A120V-101-R	iHG48038A120V-109-R
Nominal Output Voltage	VDC	12	
Input Voltage Range	VDC	36 - 75	38 - 75
Efficiency	%	94	92.5
Ripple & Noise (max)(pk-pk) (1)	mV	250	280
Line Regulation (max)	mV	12	15
Load Regulation (max)	mV	10	15
Overload Protection Threshold (3)	A	30	45
Overvoltage Protection (2)	VDC	14.7	14.7
Overtemperature Protection (3)	-	Yes	
Remote Sense	-	Yes	
Remote On-Off	-	Negative Logic	
Temperature (operating)	°C	-40 to 116	
Temperature (storage)	°C	-55 to 125	
Humidity (operating)	-	20 to 95% (non-condensing)	
Humidity (storage)	-	10 to 95% (non-condensing)	
Cooling	-	Convection or Forced Air	
Isolation Voltage	VDC	1500	
Vibration (non operating)	-	5 to 50Hz@0.5g (4.9m/s <sup>2</sup> ), and 50 to 500Hz@1.5g (14.7m/s <sup>2</sup> ) per Bellcore TR-EOP-000063-5.4.4	
Shock	-	50 G at 6ms pulse in three axes	
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805, CB scheme (IEC950), CE Mark (EN60950)	
Weight (max)	g	105	
Size	mm	59.94 x 56.90 x 13.21	
Warranty	yrs	3 years	

### Notes:

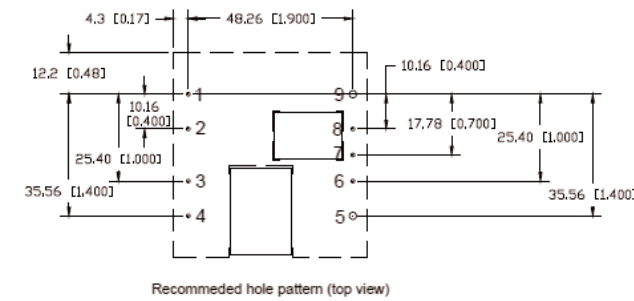
- (1) Measured across one 10uf, one 0.47uf, one 0.1uf ceramic capacitors, and one 220uf electrolytic capacitor. BW = 20MHz.
- (2) Latching
- (3) Non-latching

### Model Selector

Model	Input Volt. (V)	Output Volt. (V)	Adjust Range (V)	Max. Current (A)	Max. Output Power (W)	On/Off Logic	Pin Length
iHG48025A120V-101-R	36 - 75	12	6 - 13.2	25	300	Neg	0.145
iHG48038A120V-109-R	38 - 75	12	6 - 13.2	38	456	Neg	0.180

### Preferred Model

### Outline Drawing



### PIN Assignments

PIN	Function	PIN	Function
1	Vin (+)	6	Sense (-)
2	On / Off	7	Trim
3	Case	8	Sense (+)
4	Vin (-)	9	Vout (+)
5	Vout (-)		

For Additional Information, please visit [us.tdk-lambda.com/lp/products/iHG-series.htm](http://us.tdk-lambda.com/lp/products/iHG-series.htm)



### Other DC-DC Products

Series	Isolation	Rating	Output	Input
CC-E	Isolated	1.5 - 30W	1 -2 Outputs	5 - 48VDC
PX	Isolated	10 - 60W	1 -3 Outputs	12 - 48VDC
iSA	Isolated	36 - 82.5W	1.2 - 12V	36 - 75VDC
iEA	Isolated	48 - 78W	5 - 28V	36 - 75VDC
iEH	Isolated	300 - 317W	9.6 - 12V	36 - 75VDC
PAE50/100	Isolated	50 - 100W	1.8 - 5V	36 - 76VDC
iQL	Isolated	72 - 308W	1.2 - 28V	18 - 75VDC
iQE	Isolated	49.4 - 204W	3.3 - 12V	18 - 75VDC
iQG	Isolated	300 - 450W	9.6 - 12V	36 - 75VDC
iHG	Isolated	300 - 456W	12V	36 - 75VDC
PAH	Isolated	30 - 450W	2.5 - 48V	18 - 76VDC
PAF	Isolated	450 - 700W	3.3 - 48V	36 - 75VDC
iJB	POL, Digital	60A	0.6 - 2.0V	8 - 14VDC
i6A	POL	250W	3.3 - 20V	9 - 40VDC
iA,iB,iC	POL	3,6,12,20A	0.6 - 5.5V	2.4 - 14VDC

**600W, 24V & 48V Input Full brick DC-DC Converters**

**Features**

- ◆ 12V output for driving non-isolated converters
- ◆ Safety Approved
- ◆ Full power at 100°C baseplate
- ◆ Opto Isolated Remote On / Off
- ◆ Wide Adjustable Output Range
- ◆ Parallel Pin
- ◆ ASIC Design
- ◆ 24V & 48V Inputs



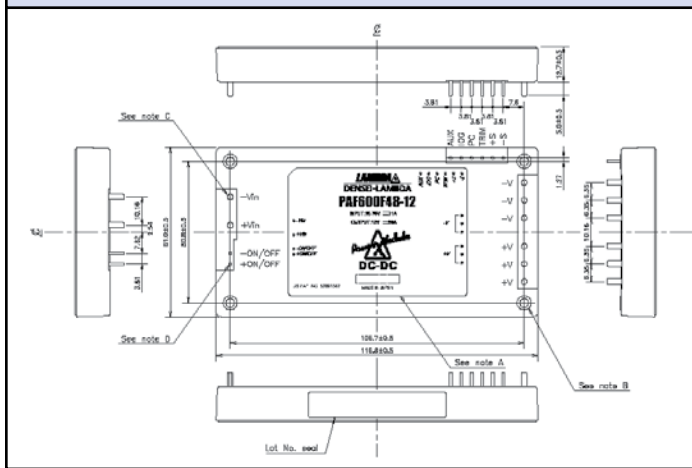
**Key Market Segments & Applications**



Specifications		PAF600F24-12	PAF600F24-28	PAF600F48-12	PAF600F48-28
Model					
Nominal Output Voltage	VDC	12		28	
Output Current (Max)	A	50		21.5	
Output Power (Max)	W	600		602	
Efficiency (Typ)	%	89 to 90%			
Input Voltage Range	VDC	20-36 / 36-76		19-36 / 36-76	
Input Current (Typ) 24/48V input	A	28.9 / 14.2		28.9 / 14.1	
Output Voltage Accuracy	%	±1			
Output Voltage Adjustment	VDC	7.2 - 13.2		16.8 - 30.8	
Ripple & Noise (Max)	mV	200		280	
Line Regulation (Max)	mV	24		56	
Load Regulation (Max)	mV	24		56	
Temperature Coefficient	-	0.02%/°C			
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	115-135%			
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good, 7-10V Auxiliary voltage			
Operating Temperature	-	-40°C to +100°C baseplate			
Humidity (operating)	-	30-95% RH Non condensing			
Humidity (storage)	-	10-95% RH Non condensing			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V (for 1 min.)			
Shock	-	196.1m/s <sup>2</sup>			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s <sup>2</sup> ) X,Y,Z 1 hour each			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V model only)			
Weight (Typ)	g	250			
Size (WxHxD)	in(mm)	2.4 x 0.5 x 4.6 (61 x 12.7 x 116.8) See outline drawing			
Warranty	yrs	2 years			

Note: See Installation Manual for full details, test methods of parameters and application notes.

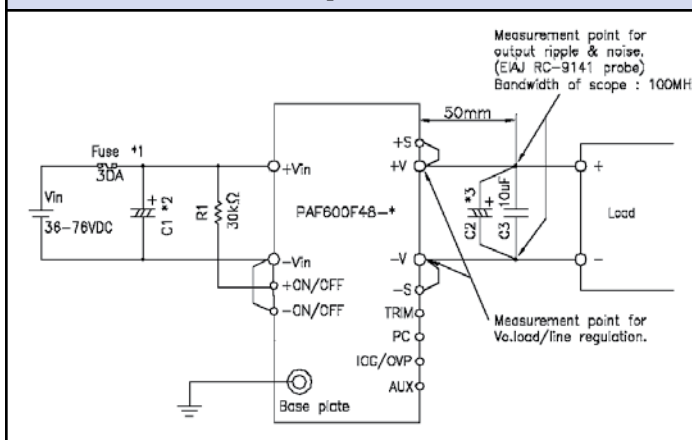
**PAF Outline Drawing**



**Other DC-DC Products**

PAF	Full brick 400-700W DC-DC
PAH	Half brick DC-DC
PAQ	Quarter brick DC-DC
PX	10-60W, 12-48V DC-DC

**Connection Example**



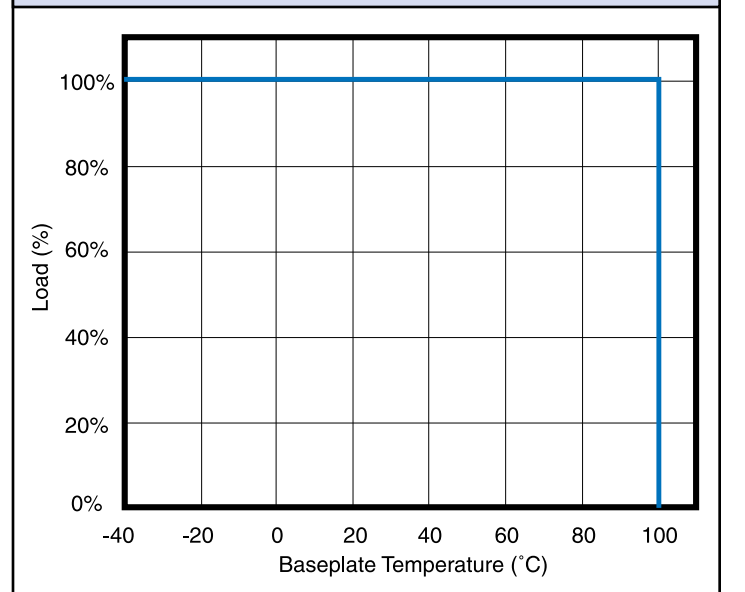
**Heatsink Table**

Heatsink	Size (mm)	Thermal Resistance
HAF-10L	116.8 x 25.4 x 61	2.2°C/W
HAF-15L	116.8 x 38.1 x 61	1.9°C/W
HAF-15T	116.8 x 38.1 x 61	1.5°C/W

**Pinout**

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
- ON/OFF	Remote On/Off Negative Terminal
+ON/OFF	Remote On/Off Positive Terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	7-10V Aux Voltage
IOG	DC Good
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense

**Derating Curve**



**Options**

Suffix	Description
Blank	
/T	No thread in mounting holes.

For Additional Information, please visit [us.tdk-lambda.com/lp/products/paf-series.htm](http://us.tdk-lambda.com/lp/products/paf-series.htm)



**11,000W Bi-Directional DC-DC Converter**

**Features**

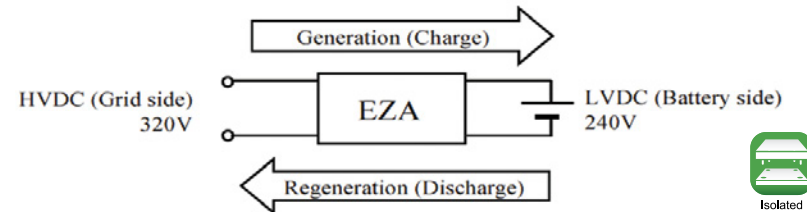
- ◆ 1U rackmount
- ◆ Battery Side 240VDC
- ◆ Grid Side 320VDC
- ◆ High Efficiency (95%)
- ◆ RS-485 Communications & Control



**Key Market Segments & Applications**



**Basic Operation**



Specifications			
Model			
		Low Voltage DC (Battery Side)	High Voltage DC (Grid Side)
Voltage Range (1)(2)	VDC	150 - 300VDC (240V Nominal)	240 - 400VDC (320V Nominal)
Output Current (Maximum)	A	±45.8A	±34.4A
Constant Current Programming Range (1)(2)	A	1 - 50A	1 - 40A
Maximum Output Power	W	±11,000W	±11,000W
Efficiency	%	95%	95%
Pre-charge Voltage (required)	VDC	>150V	>240V
Inrush Current (Typical)	A	3.6A	3.6A
Line Regulation (Maximum)	V	1.2V	1.6V
Load Regulation (Maximum)	V	2.4V	3.2V
Temperature Regulation (Maximum)	V	1.5V	2.0V
Output Ripple & Noise (Maximum pk-pk)	V	3V	4V
Sink Current (When applied V > output set V)	A	1.6A	1.2A
Overcurrent Protection (Manual reset)	A	70A	60A
Overpower Protection	W	12,000W (Constant power)	12,000W (Constant power)
Input Current Limit (typical)	A	52A	42A
Under & Overvoltage Protection (2)	V	144 - 306V	230 - 410V
Overtemperature Protection	-	Yes, Alarm signal is given	
Remote On/Off & Reset (2)	-	Yes	
Parallel Operation	-	Yes (Droop mode, can be set via RS-485)	
Front panel Indicators and Settings	-	Operating mode (Generating, Regenerating & Alarm), Alarm clear & RS-485 address selection	
Operating Temperature	°C	-10 to +50°C, full load. Refer to application notes for input/output derating	
Storage Temperature	°C	-20 to +70°C	
Humidity (Non condensing)	%RH	Operating: 30 - 85%RH, Storage: 20 - 85%RH	
Cooling	-	Internal fans	
Vibration (Non operating)	-	10-55Hz (1 min sweep), 19.6m/s <sup>2</sup> constant for 1 hour in each direction: X, Y & Z axis	
Shock	-	196.1m/s <sup>2</sup> maximum	
Withstand Voltage (3)	-	Input (HVDC) to Output (LVDC) 2.2kVAC, Input/Output to Ground 2kVAC, Signals to Ground 400VAC	
Isolation Resistance	MΩ	>100MΩ at 25°C & 70%RH, Input/Output to Ground 1kVDC, Signals to Ground 500VAC	
Safety Certification	-	IEC/EN/UL/CSA60950-1, IEC/EN/UL/CSA62368-1, CE Mark (LVD, EMC RoHS)	
Size (W x H x D)	mm	422.8 x 43.6 x 530mm	
Weight	kg	20kg	
Warranty	Yrs	Five Years	

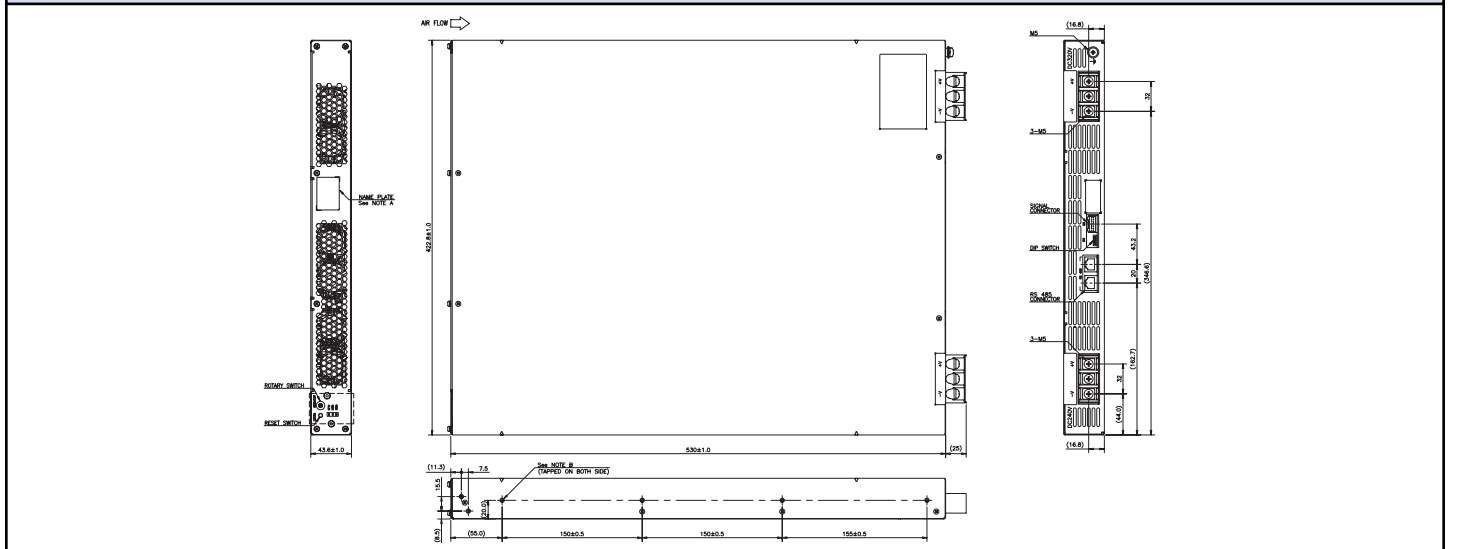
**Notes**

- (1) See installation manual for detailed specifications & test methods
- (2) Can be set via RS-485 or signal connector
- (3) See specification on website for signal isolation voltages

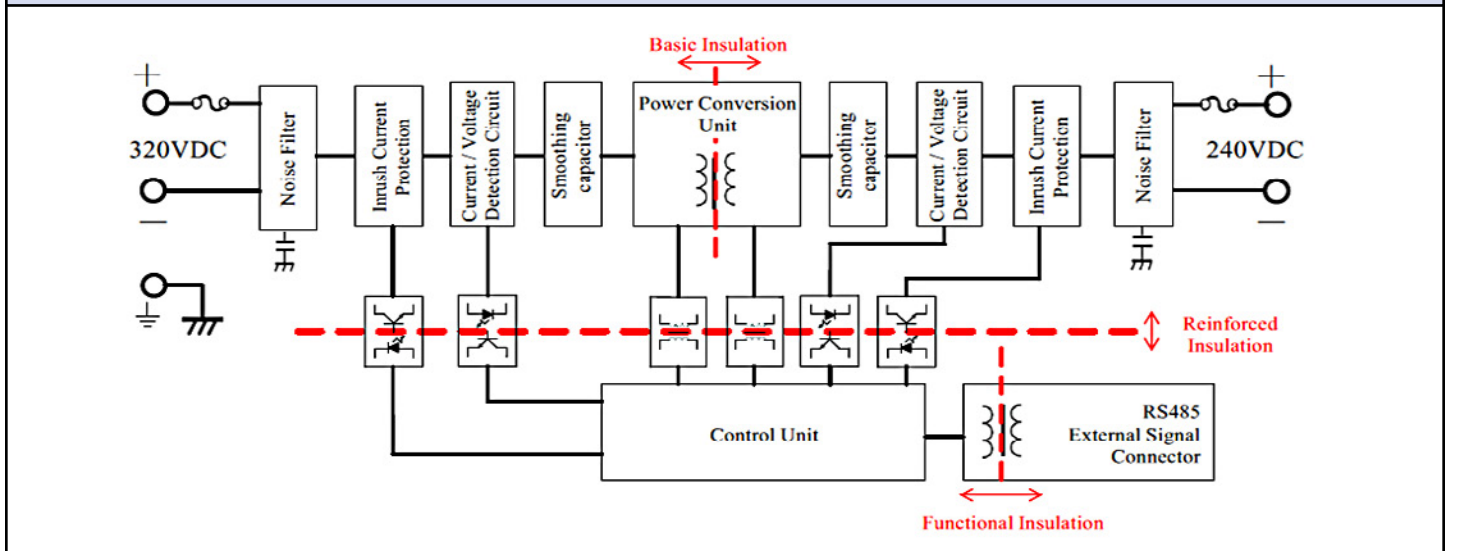
**RS-485 Functions**

Items		
Voltage Setting Accuracy	-	< ±6V
Current Setting Accuracy	-	< ±1A
Voltage Setting Resolution	-	< 600mV
Current Setting Resolution	-	< 100mA
Voltage Reading Accuracy	-	< ±6V
Current Reading Accuracy	-	< ±1A
Voltage Reading Resolution	-	< 600mV
Current Reading Resolution	-	< 100mA
RS-485 Baud Rate	-	19.2kbps / 33.6kbps / 57.6kbps (Set by DIP Switch)
RS-485 Maximum Connection	-	14

**Outline Drawing**



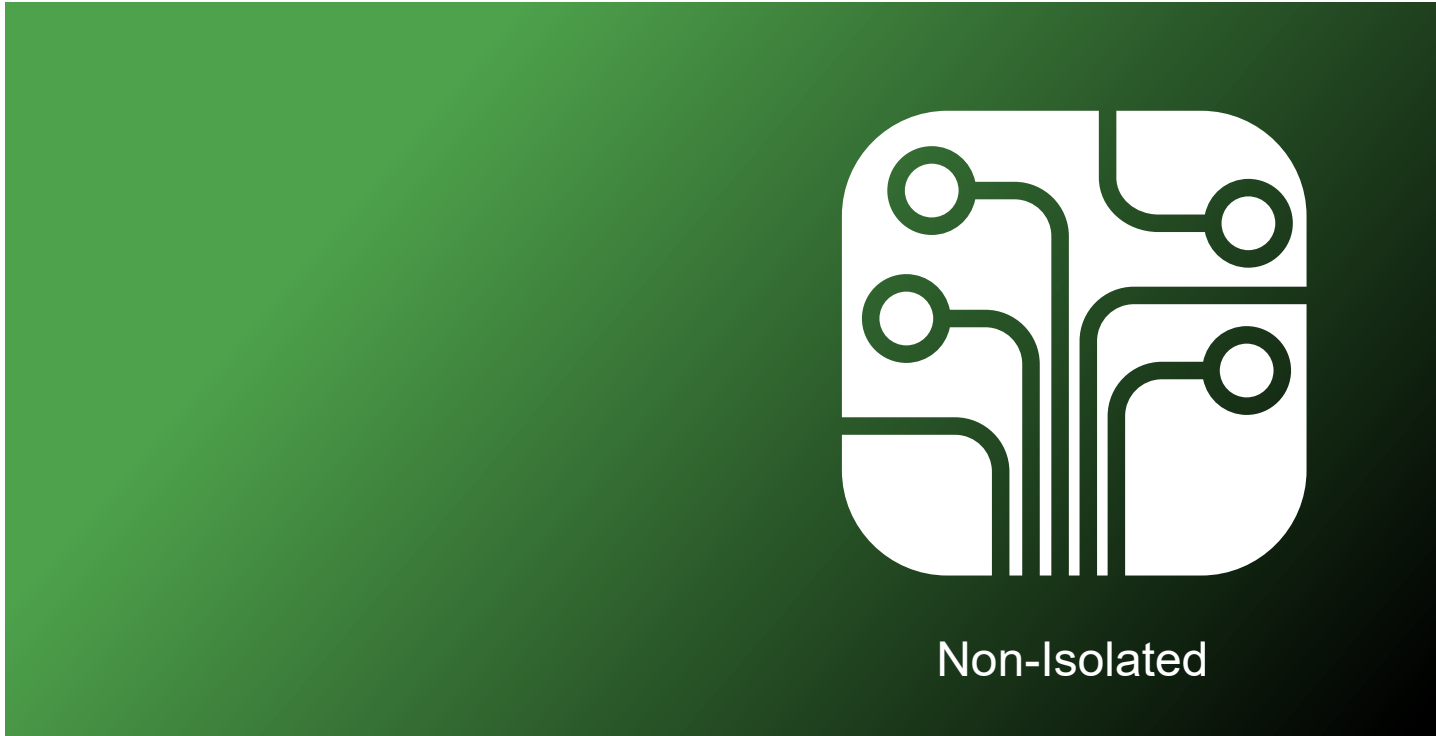
**Block Diagram**



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/eza-series.htm](http://us.tdk-lambda.com/lp/products/eza-series.htm)



 DC-DC Converters



Applications DC-DC Converters

- ◆ Distributed power architecture
- ◆ Battery powered devices
- ◆ Industrial
- ◆ Medical
- ◆ Communications
- ◆ Computing
- ◆ Data storage
- ◆ Test & measurement
- ◆ Transportation
- ◆ COTS

Features DC-DC Converters

- ◆ No galvanic isolation
- ◆ Very high efficiency
- ◆ Very fast transient response time
- ◆ SMT or through hole mounting
- ◆ Supply of logic voltages directly at the load
- ◆ Industry leading power density
- ◆ iJx models offer digital adaptive control with PMBus

Non-Isolated



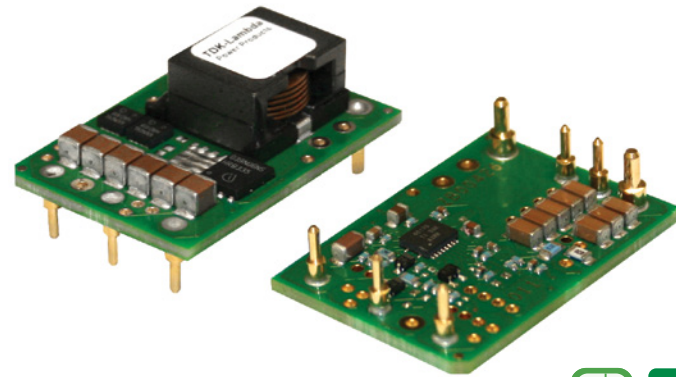
Series	Total Power (W)	Outputs	Input Volts (VDC)	Output Volts (VDC)	Amps (A)	Size (inches)	Type	Page
i6AN	75	1	9-40	-3.5- -30	up to 8	1.3 x 0.9 x 0.5	Sixteenth Brick	196
iBH	80	1	3-14	0.7-5.5	up to 20	0.8 x 0.45 x 0.39	DOSA 2+	198
iCH	85	1	4.5-14	0.7-8.5	up to 12	0.48 x 0.48 x 0.335	DOSA 2+	200
i3A4W008A033V	100	1	9 - 53	3.3-16.5	up to 8	0.75 x 0.92 x 0.38	1/32 Brick	202
i3A4W005A150V	100	1	9 - 53	5-30	up to 4.5	0.75 x 0.92 x 0.38	1/32 Brick	202
iJA	100	1	8-14	0.6-3.3	up to 35	0.9 x 0.5 x 0.38	SMT	204
iJB	120	1	8-14	0.6-2	up to 60	1.055 x 0.948 x 0.381	SMT	206
iJC	150	1	8-14	0.6-1.5	up to 100	1.1 x 1.37 x 0.39	SMT	208
iAH	150	1	3.5-17	0.7-5.5	up to 40	1.3 x 0.53 x 0.4	DOSA 2+	210
i6A	250	1	9-40	3.3-24	up to 14	1.3 x 0.9 x 0.5	Sixteenth Brick	212
i6A4W	250	1	9-53	3.3-15	up to 20	1.3 x 0.9 x 0.5	Sixteenth Brick	214
i7C	300	1	9 - 53	5-48	up to 12.5A	1.34 x 1.45 x 0.5	Sixteenth brick	216

\*Arranged by Total Power (W).

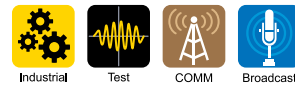
## 75W, 9 to 40V Input Non-isolated DC-DC Converter with Negative Output

### Features

- ◆ 75W 8A Output
- ◆ 1/16th brick Footprint
- ◆ Wide Output Adjustment -3.3 to -30V
- ◆ Minimal External Components Needed
- ◆ Constant Switching Frequency



### Key Market Segments & Applications



Specifications		
Model	i6A24-N	
DC Output Voltage	V	-3.3 to -30V Note - Output voltage range is dependent on input voltage (see graph on page 2)
DC Input Voltage	V	9 to 40 (Turn on at 10V or greater)
Efficiency	%	90 - 94
Output Voltage Tolerance	%	±4
Switching Frequency	kHz	400
Line Regulation	%	0.5
Load Regulation	%	0.6
External Load Capacitance	uF	200 - 1600
Output Ripple and Noise	mVpp	20
Overcurrent Protection	A	15
Remote On / Off	-	See options table
Remote Sense	-	(-) Sense, compensating up to 5% of output voltage
Operating Temperature	°C	-40 to 125 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	UL/EN/IEC 60950-1, CE Mark
Weight	g / oz	15g / 0.53 oz
Size (LxWxH)	mm / in.	33 x 22.9 x 12.1 / 1.3 x 0.9 x 0.47
Warranty		3 years

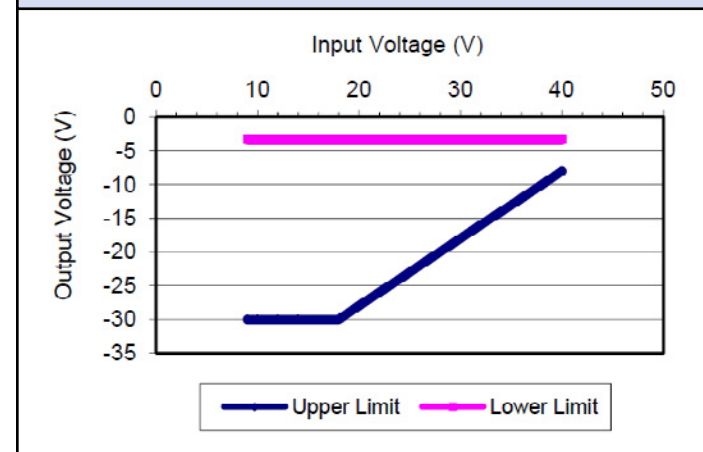
Note: (1) Consult the Full Datasheet for additional product information.

### Model Selector

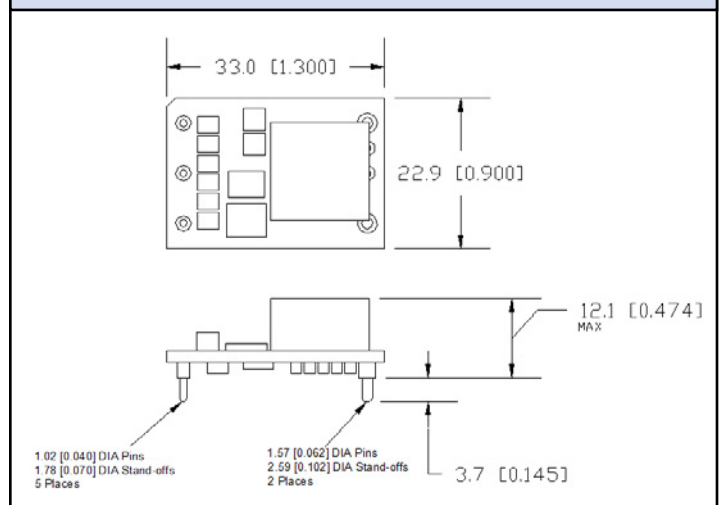
Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off
i6A24008A033V-N00-R	+9 to +40	8	-3.3 to -30	Yes	-
i6A24008A033V-N01-R	+9 to +40	8	-3.3 to -30	-	Yes

Preferred

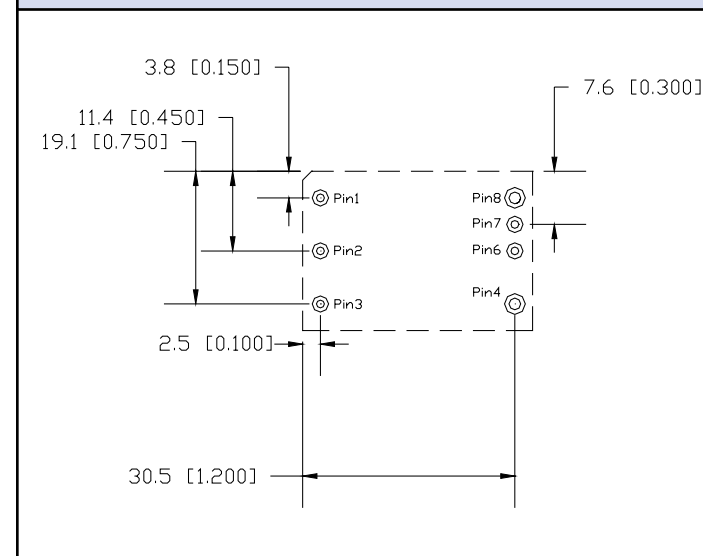
### Output Voltage vs Input Voltage Operating Range



### Mechanical Specification



### Recommended Hole Pattern (top view)



### Pinout

PIN	Function	PIN	Function
1	VIN (+)	6	TRIM
2	ON / OFF	7	SENSE
3	VOUT (-)	8	VIN (-), VOUT (+)
4	VOUT (-)		

### Other Industrial Products

CC-E, CCG	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAH, iBF, iBH, iCF, iCH, iCG	3 - 40A DOSA2 non isolated DC-DC converters
iJA, iJB, iJC	35 - 100A non isolated DC-DC converters with PMBus

For Additional Information, please visit [us.tdk-lambda.com/lp/products/i6a-series.htm](http://us.tdk-lambda.com/lp/products/i6a-series.htm)



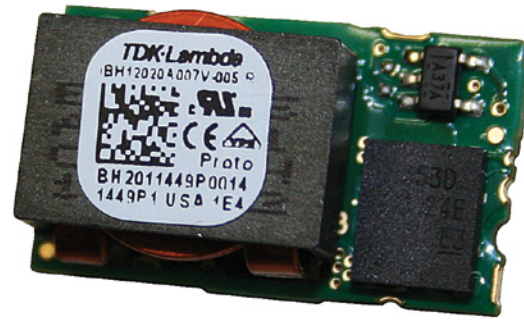
### Evaluation Board

Evaluation kit part #	Contents
i6A14A-001-EVK-D2PN	Populated with I6A24014A033V-001-R & I6A24008A033V-N01-R for dual ± outputs
User manual available at I6AN technical files in our website	

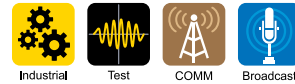
**80W, 20A Non-isolated SMT Point of Load**

**Features**

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



**Key Market Segments & Applications**



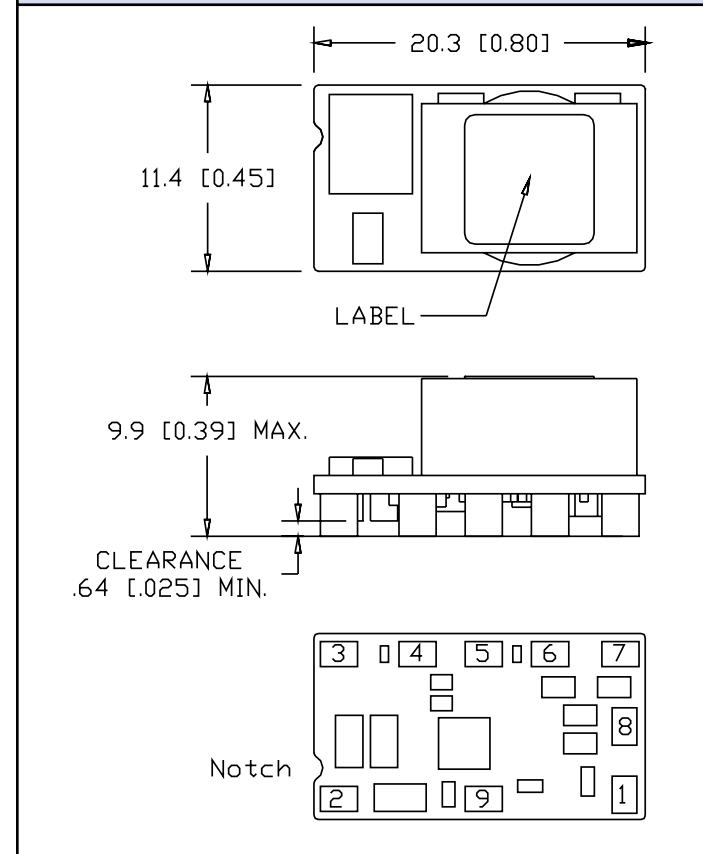
Specifications		
Model	iBH12	
DC Output Voltage	V	0.7 - 5.5
DC Output Power (max)	W	80
DC Input Voltage	V	3.5 - 14
Efficiency	%	85.5 - 96
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	4
Load Regulation	mV	7
External Load Capacitance	uF	200 - 2000
Output Ripple and Noise	mVpp	20
Overcurrent Protection	A	35A typical
Remote On / Off	-	Yes, see model selector table
Remote Sense	-	(+) Sense, compensating up to 0.5V
Power Good	-	Yes, Low on fail
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	Pending
Weight	g / oz	6g / 0.21 oz
Size (LxWxH)	mm / in.	20.3 x 11.4 x 9.9 / 0.8 x 0.45 x 0.39
Warranty	yrs	3 years

**Model Selector**

Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing
iBH12020A007V-006-R	3.5 - 14	20	0.7 - 5.5	yes	-	-
iBH12020A007V-007-R	3.5 - 14	20	0.7 - 5.5	-	yes	-

Preferred

**Outline Drawing**



**Pinout**

PIN	Function	PIN	Function
1	ON / OFF	6	VOUT
2	VIN	7	SENSE (+)
3	Sequencing	8	Reserved
4	GND	9	PWR GOOD
5	TRIM		

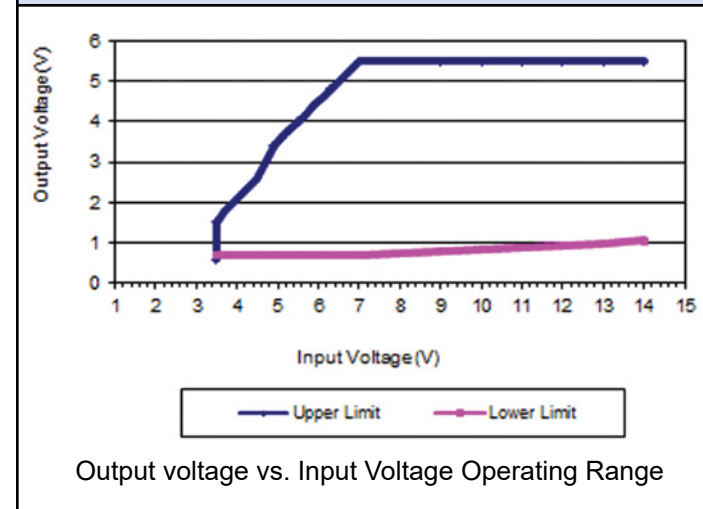
**Other Industrial Products**

CC-E, CCG	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAH, iBF, iCF, iCH, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iJA, iJB, iJC	35 - 100A non isolated DC-DC converters with PMBus

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dosa2-series.htm](http://us.tdk-lambda.com/lp/products/dosa2-series.htm)



**Voltage Operating Range**





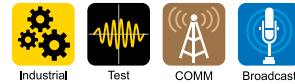
## 85W, 12A Non-isolated SMT Point of Load

### Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



### Key Market Segments & Applications



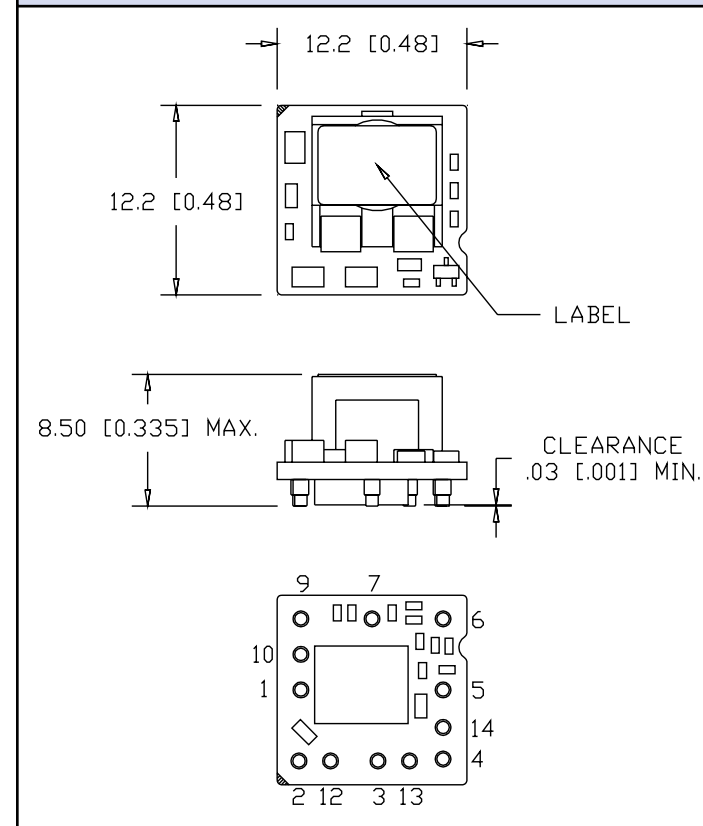
Specifications		
Model	iCH12	
DC Output Voltage	V	0.7 - 8.5
DC Output Power (max)	W	85
DC Input Voltage	V	4.5 - 14
Efficiency	%	88.5 - 97
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	500
Line Regulation	mV	5
Load Regulation	mV	6
External Load Capacitance	uF	200 - 2000
Output Ripple and Noise	mVpp	15
Overcurrent Protection	A	22A typical
Remote On / Off	-	Positive or Negative Logic available, see Model Selector
Remote Sense	-	(+) Sense, compensating up to 0.5V
Power Good	-	Yes, Low on fail
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	Pending
Weight	g / oz	2.5g / 0.088 oz
Size (LxWxH)	mm / in.	12.2 x 12.2 x 8.5 / 0.48 x 0.48 x 0.335
Warranty	yrs	3 years

### Model Selector

Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off
ICH12012A007V-007-R	4.5 - 14	12	0.7 - 8.5	-	yes
ICH12012A007V-006-R	4.5 - 14	12	0.7 - 8.5	yes	-

### Preferred Model

### Outline Drawing



### Pinout

PIN	Function	PIN	Function
1	ON / OFF	8	Not Fitted
2	VIN	9	Not Connected
3	GND	10	PWR GOOD
4	VOUT	11	Not Fitted
5	SENSE (+)	12	VIN
6	TRIM	13	GND
7	GND	14	VOUT

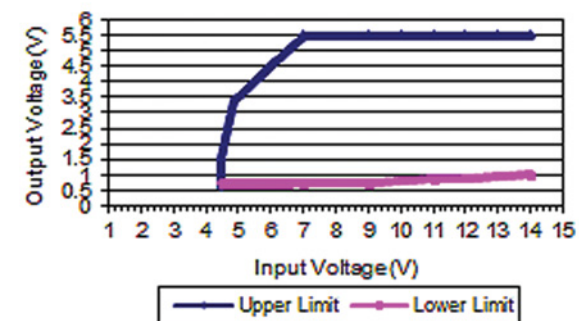
### Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAH, iBF, iBH, iCF, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iJA, iJB	35 - 60A non isolated DC-DC converters with PMBus

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dosa2-series.htm](http://us.tdk-lambda.com/lp/products/dosa2-series.htm)



### Voltage Operating Range

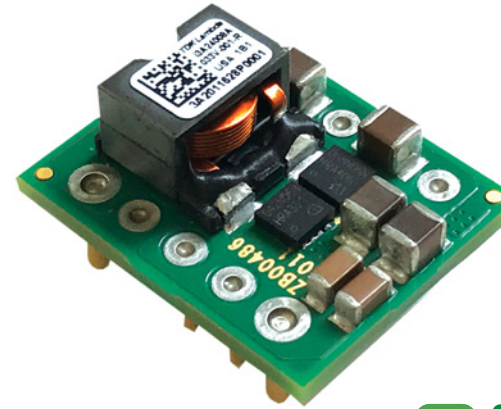


Output voltage vs. Input Voltage Operating Range

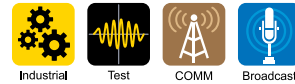
## 100W, 9 to 53V Input Non-isolated DC-DC Converters

### Features

- ◆ 100W 4.5 or 8A Output
- ◆ 1/32nd brick Footprint
- ◆ Wide Output Adjustment 3.3 to 16.5V or 5 to 30V
- ◆ Minimal External Components Needed
- ◆ Constant Switching Frequency



### Key Market Segments & Applications



Specifications		i3A4W008A033V	i3A4W005A150V
DC Output Voltage	V	3.3 - 16.5 (1)	5 - 30 (1)
DC Input Voltage	V	9 - 53 (Turn on at 10V or greater)	
Efficiency (Typical)	%	89 - 96.5	95.5 - 98
Output Voltage Tolerance	%	±4	
Switching Frequency	kHz	450	400
Line Regulation	%	0.3%	0.2%
Load Regulation	%	0.7%	0.5%
External Load Capacitance	uF	0 - 1200	
Output Ripple and Noise	mVpp	20	40
Overcurrent Protection (Typ)	A	14	9
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)	
Remote Sense	-	(+ Sense, compensating up to 5% of output voltage)	
Power Good	-	Optional, contact factory for status	
Operating Temperature	°C	-40 to 125 (see thermal data on website)	
Storage Temperature	°C	-55 to 125	
Safety Agency Certifications	-	UL/EN/IEC 60950-1, CE Mark	
Weight	g / oz	8g / 0.29 oz	
Size (LxWxH)	mm / in.	19.1 x 23.4 x 9.6 / 0.75 x 0.92 x 0.38	
Warranty	yrs	3 years	

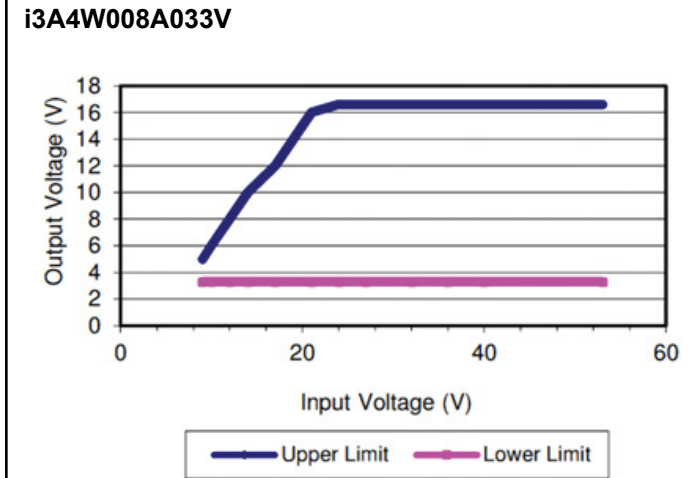
Note: (1) Output voltage cannot exceed input voltage (see graph on page 2)  
 (2) Consult the Full Datasheet for additional product information.

### Model Selector

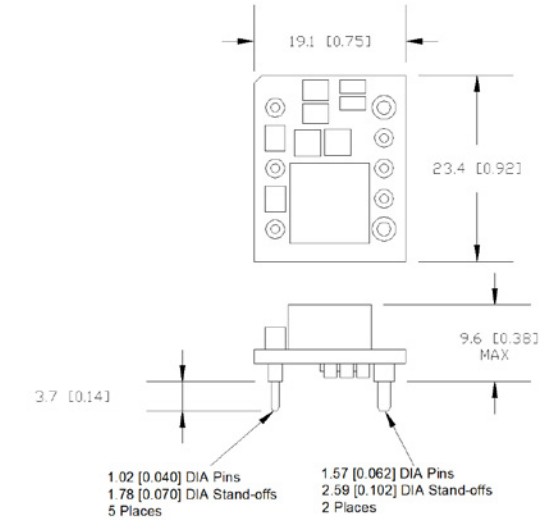
Model	Input Voltage (V)	Output Current (A)	Output Voltage (V) (1)	Positive Logic On/Off	Negative Logic On/Off
i3A4W008A033V-001-R	9 - 53	8	3.3 - 16.5	-	Yes
i3A4W005A150V-001-R	9 - 53	4.5	5 - 30	-	Yes

Note: (1) Output voltage cannot exceed input voltage (see graph below)

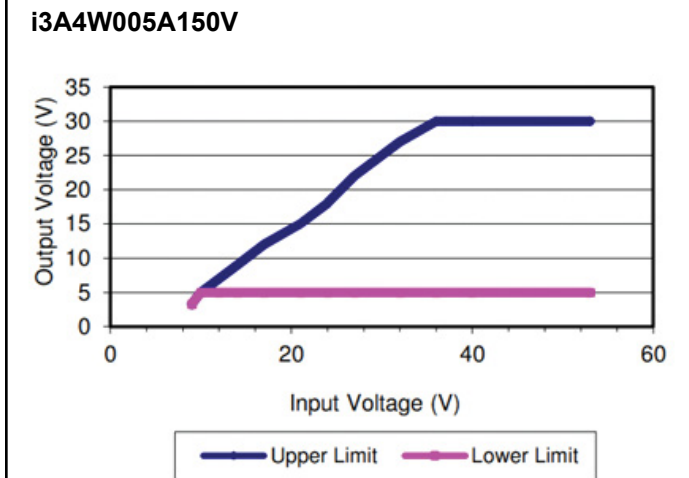
### Output Voltage vs Input Voltage Operating Range



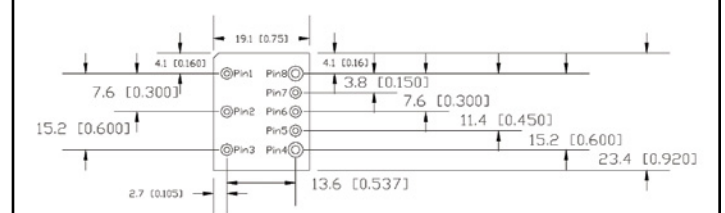
### Mechanical Specification



### Output Voltage vs Input Voltage Operating Range



### Recommended Hole Pattern (top view)



### Evaluation Board

Evaluation kit part #	Contents
i3A5A8A-001-EVK-D2PP	Populated with one piece i3A4W008A033V-001-R and one piece i3A4W005A150V-001-R

For Additional Information, please visit [us.tdk-lambda.com/lp/products/i6a-series.htm](http://us.tdk-lambda.com/lp/products/i6a-series.htm)



### Pinout

PIN	Function	PIN	Function
1	VIN (+)	5	PWR GOOD (Option)
2	ON / OFF	6	TRIM
3	VIN (-)	7	SENSE (+)
4	VOUT (-)	8	VOUT (+)

## 100W, 35A Non-isolated SMT Point of Load with PMBus

### Features

- ◆ Only 0.45 in<sup>2</sup> Board Space
- ◆ PMBus Compliant (Read & Write)
- ◆ Surface Mountable
- ◆ Digital Adaptive Control
- ◆ Parallel Operation with Current Sharing
- ◆ Configurable Sequence & Fault Management



### Key Market Segments & Applications



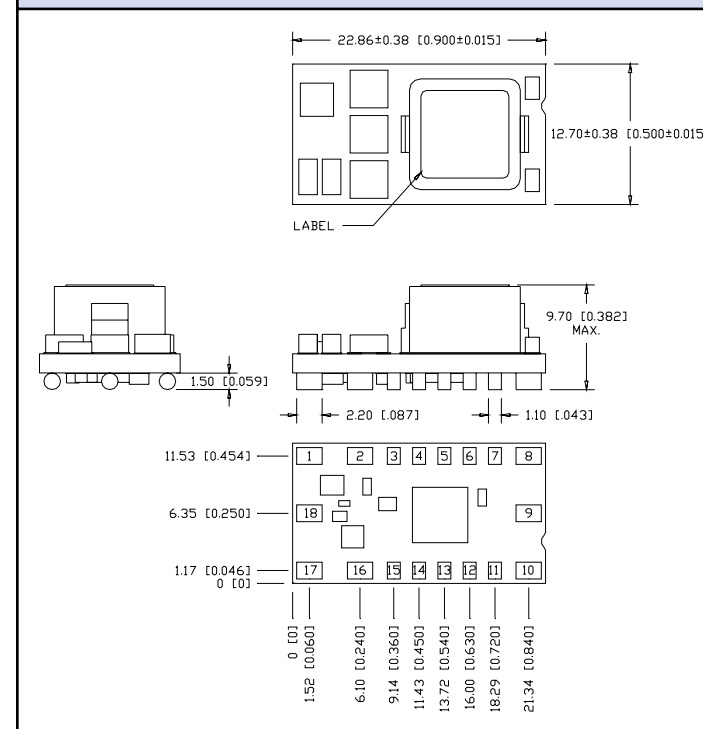
Specifications			iJA12035
Model			iJA12035
DC Output Voltage	V		0.6 - 3.3V
DC Output Power (max)	W		100W
DC Input Voltage	V		8 - 14V
Efficiency	%		85 - 94%
Output Voltage Tolerance	%		±2
Line Regulation	mV		4 (Typical)
Load Regulation	mV		8 (Typical)
External Load Capacitance	uF		400 - 2400
Output Ripple and Noise	mVpp		10
Overcurrent Protection (Typ)	A		40A
Remote On / Off	-		Negative Logic
Remote Sense	-		Yes
Operating Temperature	°C		-40 to 120 (see thermal data on website)
Storage Temperature	°C		-55 to 125
Safety Agency Approvals	-		IEC/EN/UL/CSA 60950-1, CE MARK
Weight	g / oz		6.5g / 0.23 oz
Size (LxWxH)	mm / in.		22.9 x 12.7 x 9.7 (0.9 x 0.5 x 0.382")
Warranty	yrs		3 years

### Model Selector

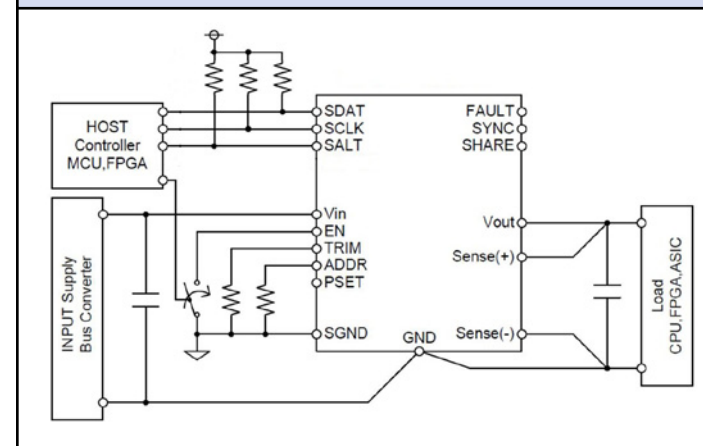
Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Remote On/Off	Pin 6 Function
iJA12035A007V-001-R	8 - 14	35	0.6 - 3.3	Negative	SALERT
iJA12035A007V-0P1-R	8 - 14	35	0.6 - 3.3	Negative	FAULT indication (parallel operation)

Preferred

### Outline Drawing



### Typical Application Circuit



### Pinout

PIN	Function	PIN	Function
1	Power Ground (0V)	10	+V Output
2	Power Ground (0V)	11	+ Remote Sense
3	Remote On/Off	12	- Remote Sense
4	PMBus Clock	13	Output Trim
5	PMBus Data	14	Current Share
6	PMBus Alert / Fault	15	Synchronize
7	PMBus Address	16	Power Ground (0V)
8	+V Output	17	Power Ground (0V)
9	+V Output	18	+V Input

### Evaluation Board

Evaluation kit part #	Contents
iJA35A-001-EVKIT-S1	Evaluation board with one piece of iJA12035A007V-001-R PMBus Dongle Board & USB cable CD ROM User manual available at iJx series technical file in our website

### Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iJA, iJB, iJC	35 - 100A non isolated DC-DC converters with PMBus
iAF, iBF, iCF, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iQE, iQL, iQG	96 - 400W Quarter bricks
iEH	300W Eighth brick

For Additional Information, please visit [us.tdk-lambda.com/lp/products/ijb-series.htm](http://us.tdk-lambda.com/lp/products/ijb-series.htm)



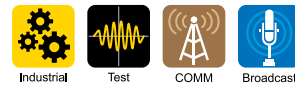
## 60A Non-isolated SMT Point of Load with PMBus

### Features

- ◆ Only 1.0 in<sup>2</sup> Board Space
- ◆ PMBus Compliant (Read & Write)
- ◆ Surface Mountable
- ◆ Digital Adaptive Control
- ◆ Parallel Operation with Current Sharing
- ◆ Configurable Sequence & Fault Management



### Key Market Segments & Applications



Specifications		iJB12
Model		iJB12
DC Output Voltage	V	0.6 - 2.0V
DC Output Power (max)	W	120W
DC Input Voltage	V	8 - 14V
Efficiency	%	85 - 93%
Output Voltage Tolerance	%	±1.2
Line Regulation	mV	4 (Typical)
Load Regulation	mV	4 (Typical)
External Load Capacitance	uF	1000 - 5000
Output Ripple and Noise	mVpp	20
Overcurrent Protection (Typ)	A	65A
Remote On / Off	-	Negative Logic or Positive Logic (See model selector)
Remote Sense	-	Yes
Power Good	-	Yes
Operating Temp	°C	-40 to 120 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Approvals	-	IEC/EN/UL/CSA 60950-1, CE MARK
Weight	g / oz	12.2g / 0.43 oz
Size (LxWxH)	mm / in.	26.8 x 24.08 x 9.68 (1.05 x 0.95 x 0.381")
Warranty	yrs	3 years

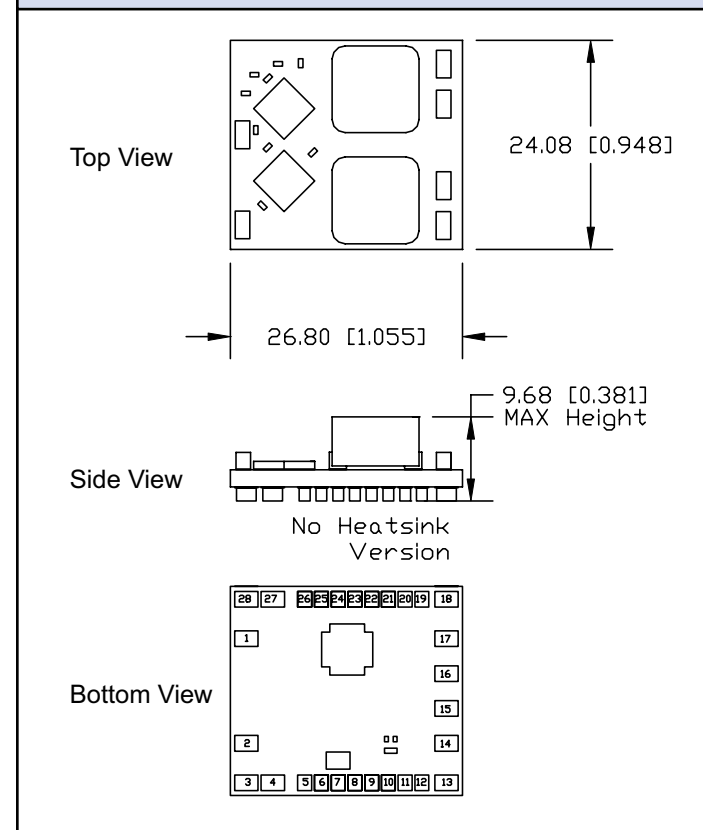
### Model Selector

Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Remote On/Off	OCP/OVP Recovery
iJB12060A006V-001-R (1)	8 - 14	60	0.6 - 2.0	Negative	Automatic
iJB12060A006V-002-R	8 - 14	60	0.6 - 2.0	Positive	Automatic
iJB12060A006V-003-R	8 - 14	60	0.6 - 2.0	Negative	Automatic

(1) Standard Transient Response.

### Preferred Model

### Outline Drawing



### Pinout

PIN	Function	PIN	Function
1	+V Input	15	+V Output
2	+V Input	16	+V Output
3	Power Ground (0V)	17	+V Output
4	Power Ground (0V)	18	Power Ground (0V)
5	Signal Ground (0V)	19	PMBus Clock
6	Not Connected	20	PMBus Data
7	Output Trim	21	PMBus Alarm
8	PMBus Address	22	Remote On/Off
9	Not Connected	23	Fault Mgmt
10	Set Parallel Operation (PSET)	24	Power Good
11	+ Remote Sense	25	Current Share
12	- Remote Sense	26	Synchronize
13	Power Ground (0V)	27	Power Ground (0V)
14	+V Output	28	Power Ground (0V)

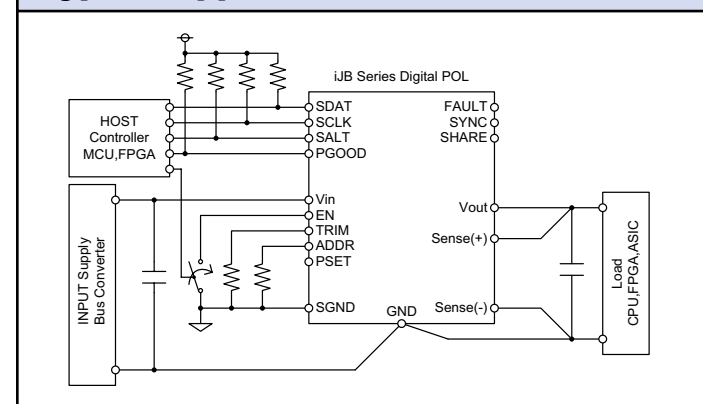
### Evaluation Board

Evaluation kit part #	Contents
iJB60A-003-EVKIT-S1	Evaluation board with one piece of iJB12060A006V-003-R PMBus Dongle Board & USB cable CD ROM User manual available at iJx series technical file in our website

### Other Industrial Products

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iAF, iBF, iCF, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iQE, iQL, iQG	96 - 400W Quarter bricks
iEH	300W Eighth brick

### Typical Application Circuit



For Additional Information, please visit [us.tdk-lambda.com/lp/products/ijb-series.htm](http://us.tdk-lambda.com/lp/products/ijb-series.htm)



**150W, 100A Non-isolated SMT Point of Load with PMBus™**

**Features**

- ◆ Only 1.5 in<sup>2</sup> Board Space
- ◆ PMBus Compliant (Read & Write)
- ◆ Surface Mountable
- ◆ Digital Adaptive Control
- ◆ Parallel Operation with Current Sharing
- ◆ Configurable Sequence & Fault Management



**Key Market Segments & Applications**



Specifications		
Model	iJC	
DC Output Voltage	V	0.6 - 1.5V
DC Output Power (max)	W	150W
DC Input Voltage	V	8 - 14V
Efficiency	%	86.5 - 91.5%
Output Voltage Tolerance	%	±1.5%
Line Regulation	mV	8 (Typical)
Load Regulation	mV	8 (Typical)
External Load Capacitance	uF	1000 - 5000
Output Ripple and Noise	mVpp	15
Overcurrent Protection	A	>105A
Remote On / Off	-	Negative Logic or Positive Logic (See model selector)
Remote Sense	-	Yes
Operating Temperature	°C	-40 to 120 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	IEC/EN/UL/CSA 60950-1, CE Mark
Weight	g / oz	20g / 0.7 oz
Size (LxWxH)	mm / in.	28.0 x 35.0 x 10.0mm / 1.10 x 1.37 x 0.39"
Warranty	yrs	3 years

**Model Selector**

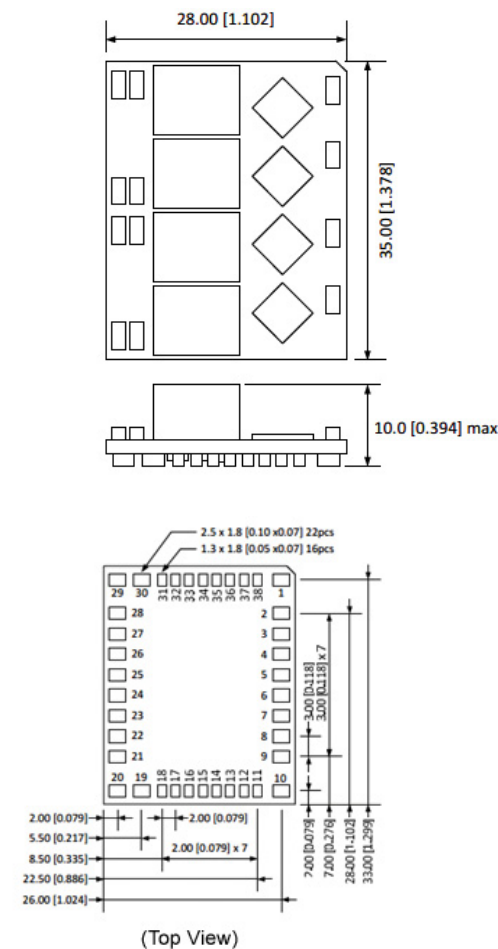
Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Remote On/Off
iJC12100A006V-002-R	8 - 14	100	0.6 - 1.5	Positive
iJC12100A006V-003-R	8 - 14	100	0.6 - 1.5	Negative

Preferred

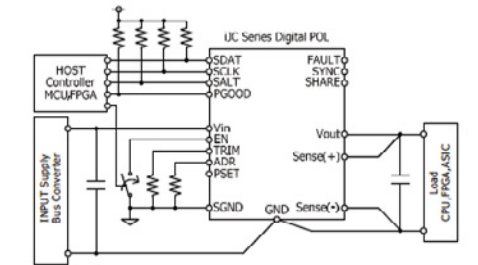
**Pinout**

PIN	Function	PIN	Function	PIN	Function	PIN	Function
1	Power Ground (0V)	11	Signal Ground (0V)	21	+V Output	31	PMBus Clock
2	Power Ground (0V)	12	Not Connected	22	+V Output	32	PMBus Data
3	+V Input	13	Output Trim	23	+V Output	33	PMBus Alert / Fault
4	+V Input	14	PMBus Address	24	Power Ground (0V)	34	Remote On/Off
5	Power Ground (0V)	15	Not Connected	25	Power Ground (0V)	35	Fault Mgmt
6	Power Ground (0V)	16	Set Parallel Operation (PSET)	26	+V Output	36	Power Good
7	+V Input	17	+ Remote Sense	27	+V Output	37	Current Share
8	+V Input	18	- Remote Sense	28	+V Output	38	Synchronize
9	Power Ground (0V)	19	Power Ground (0V)	29	Power Ground (0V)		
10	Power Ground (0V)	20	Power Ground (0V)	30	Power Ground (0V)		

**Outline Drawings**



**Typical Application Circuit**



**Evaluation Board**

Evaluation kit part #	Contents
iJC100A-003-EVKIT-S1	Evaluation board with one piece of iJC12100A006V-003-R PMBus Dongle Board & USB cable CD ROM User manual available at iJx series technical file in our website

**Other Industrial Products**

CC-E	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iJA, iJB, iJC	35 - 100A non isolated DC-DC converters with PMBus
iAF, iBF, iCF, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iQE, iQL, iQG	96 - 400W Quarter bricks
iEH	300W Eighth brick

For Additional Information, please visit [us.tdk-lambda.com/lp/products/ijb-series.htm](http://us.tdk-lambda.com/lp/products/ijb-series.htm)



## 150W, 40A Non-isolated SMT Point of Load

### Features

- ◆ DOSA Compatible Footprint
- ◆ Surface Mountable
- ◆ Constant Switching Frequency
- ◆ No external loop tuning components needed
- ◆ Excellent Transient Response



### Key Market Segments & Applications



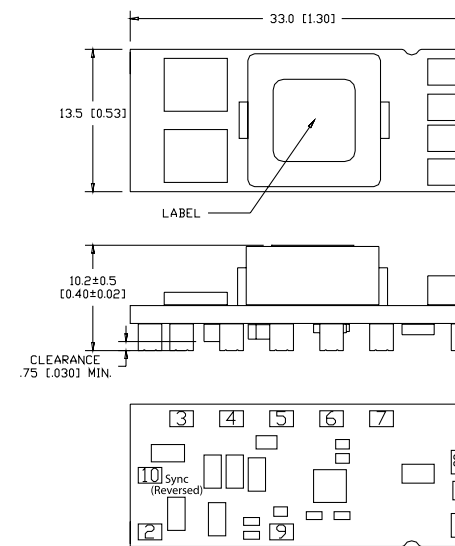
Specifications		iAH12
Model		iAH12
DC Output Voltage	V	0.7 - 5.5
DC Output Current	A	Vo.set <= 2.5V and Vin > 4.5V, 40A max. Observe max. power limit Vo.set > 2.5V or Vin < 4.5V, 30A max. As Vout increases, current must decrease in order to observe max. power limit
DC Output Power (max)	W	150
DC Input Voltage	V	3.5 - 17
Efficiency	%	84 - 96
Output Voltage Tolerance	%	±3
Switching Frequency	kHz	600
Line Regulation	mV	4
Load Regulation	mV	7
External Load Capacitance	uF	200 - 2000
Output Ripple and Noise	mVpp	20
Overcurrent Protection	A	50A typical
Remote On / Off	-	Yes, see model selector table
Remote Sense	-	(+) Sense, compensating up to 0.5V
Power Good	-	Yes, Low on fail
Operating Temperature	°C	-40 to 115 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	Pending
Weight	g/oz	12g / 0.42 oz
Size (LxWxH)	mm/in.	33 x 13.5 x 10.2 / 1.3 x 0.53 x 0.4
Warranty	yrs	3 years

### Model Selector

Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Sequencing
iAH12040A007V-006-R	3.5 - 17	40	0.7 - 5.5	yes	-	-
iAH12040A007V-007-R	3.5 - 17	40	0.7 - 5.5	-	yes	-

Preferred

### Outline Drawing



### Pinout

PIN	Function	PIN	Function
1	ON / OFF	6	TRIM
2	VIN	7	SENSE (+)
3	Sequencing	8	Reserved
4	GND	9	PWR GOOD
5	VOUT	10	Sync (Reserved)

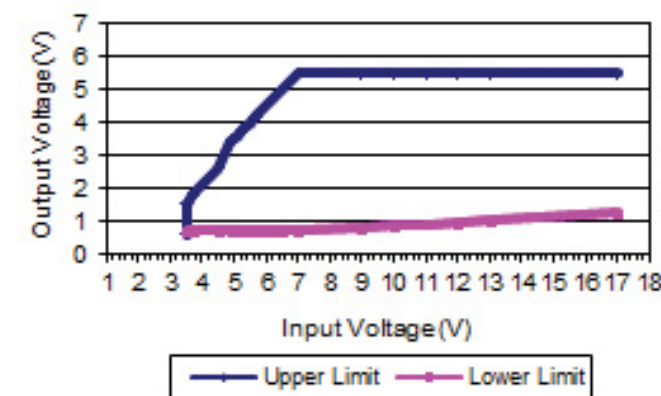
### Other Industrial Products

CC-E, CCG	1.5 - 30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
iBF, iBH, iCF, iCH, iCG	3 - 20A DOSA2 non isolated DC-DC converters
iJA, iJB, iJC	35 - 100A non isolated DC-DC converters with PMBus

For Additional Information, please visit [us.tdk-lambda.com/lp/products/dosa2-series.htm](http://us.tdk-lambda.com/lp/products/dosa2-series.htm)



### Voltage Operating Range



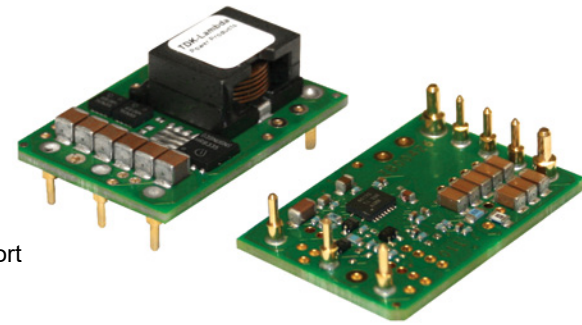
Output voltage vs. Input Voltage Operating Range

## 250W, 9-40V Input Non-isolated DC-DC Converter

### Features

- ◆ 250W 14A Output
- ◆ 1/16th brick Footprint
- ◆ Wide Output Adjustment 3.3 to 24V
- ◆ Minimal External Components Needed
- ◆ Constant Switching Frequency

\*For applications requiring a constant current output, contact Technical Support



### Key Market Segments & Applications



Specifications		i6A
Model		i6A
DC Output Voltage	V	3.3 - 24V. Note - Output voltage cannot exceed input voltage (see graph on page 2).
DC Input Voltage	V	9 - 40 (Turn on at 10V or greater)
Efficiency	%	92.5 - 98
Output Voltage Tolerance	%	±4
Switching Frequency	kHz	400
Line Regulation	%	0.3
Load Regulation	%	1
External Load Capacitance	uF	0 - 2000
Output Ripple and Noise	mVpp	20
Overcurrent Protection	A	22A typical
Remote On / Off	-	Negative Logic (For Positive Logic Contact Factory)
Remote Sense	-	(+) Sense, compensating up to 5% of output voltage
Power Good	-	Optional (Full Feature Version)
Sync & Sequencing	-	Optional (Full Feature Version)
Operating Temperature	°C	-40 to 125 (see thermal data on website)
Storage Temperature	°C	-55 to 125
Safety Agency Certifications	-	UL/EN/IEC 60950-1, CE Mark
Weight	g / oz	15g / 0.53 oz
Size (LxWxH)	mm / in.	33 x 22.9 x 12.1 / 1.3 x 0.9 x 0.47
Warranty	yrs	3 years

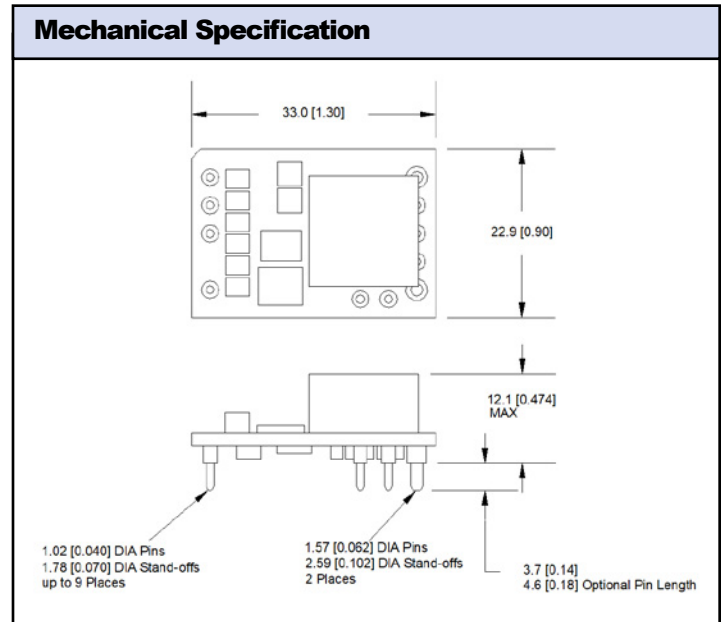
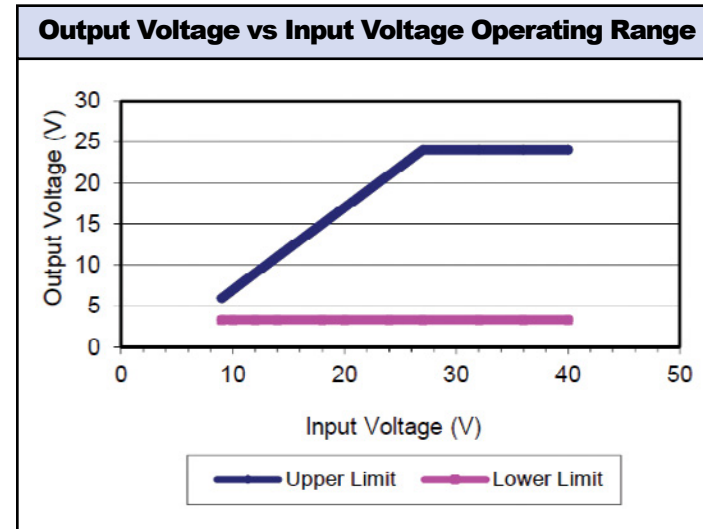
Note: (1) Consult the Full Datasheet for additional product information.

### Model Selector

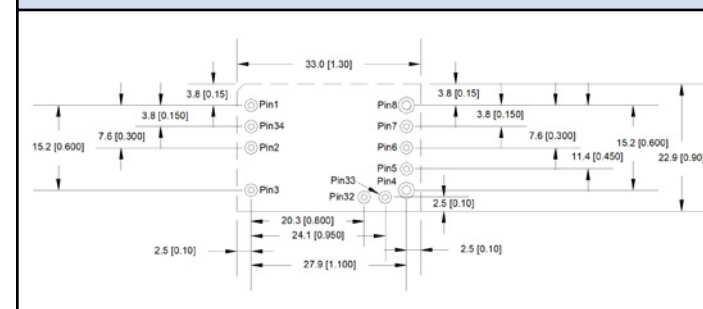
Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Full Feature
i6A24014A033V-000-R	9 - 40	14	3.3 - 24	Yes	-	-
i6A24014A033V-001-R	9 - 40	14	3.3 - 24	-	Yes	-
i6A24014A033V-002-R	9 - 40	14	3.3 - 24	Yes	-	Yes
i6A24014A033V-003-R	9 - 40	14	3.3 - 24	-	Yes	Yes

### Preferred

Note: Output voltage cannot exceed input voltage (see graph below).



### Recommended Hole Pattern (top view)



### Pinout

PIN	Function	PIN	Function
1	VIN (+)	7	SENSE (+)
2	ON / OFF	8	VOUT (+)
3	VIN (-)	32	Sync (Option)
4	VOUT (-)	33	MS (Option)
5	PWR GOOD (Option)	34	SEQ (Option)
6	TRIM		

### Evaluation Board

Evaluation kit part #	Contents
i6A14A-001-EVK-S1PX	Populated with one piece of I6A24014A033V-001-R
I6A14A-001-EVK-D2PN	Populated with I6A24014A033V-001-R & I6A24008A033V-N01-R for dual ± outputs

User manual available at I6A series technical files in our website

### Other Industrial Products

CC-E, CCG	1.5-30W 5, 12, 24 or 48V input isolated DC-DC converters
PX	10 - 60W 12, 24 or 48V input isolated DC-DC converters
IAH, IBF, IBH, ICF, ICH, ICG	3 - 40A DOSA2 non isolated DC-DC converters
IJA, IJB, IJC	35-100A non isolated DC-DC converters with PMBus

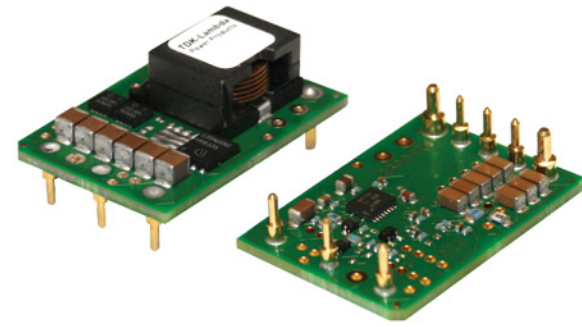
For Additional Information, please visit [us.tdk-lambda.com/lp/products/i6a-series.htm](http://us.tdk-lambda.com/lp/products/i6a-series.htm)



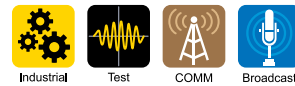
## 250W, 9-53V Input Non-isolated DC-DC Converter

### Features

- ◆ Up to 250W Output
- ◆ 1/16th brick Footprint
- ◆ Wide Output Adjustment 3.3 to 15V or 3.3 to 40V
- ◆ Minimal External Components Needed
- ◆ Constant Switching Frequency



### Key Market Segments & Applications



Specifications		Model	I6A4W010A033V	I6A4W020A033V
DC Output Voltage	V		3.3 to 40V	3.3 to 15V
DC Output Power (max)	W		250	
DC Input Voltage	V		9 to 53 (Turn on at 10V or greater)	
Efficiency	%		94 - 97.5	90 - 97
Output Voltage Tolerance	%		±4	
Switching Frequency	kHz		400	
Line Regulation	%		0.3	0.4
Load Regulation	%		0.9	1.2
External Load Capacitance	uF		0 - 1500	
Output Ripple and Noise	mVpp		50	20
Overcurrent Protection	A		15	27
Remote On / Off	-		See options table	
Remote Sense	-		(+ Sense, compensating up to 5% of output voltage	
Power Good	-		Optional (Full Feature Version)	
Sync & Sequencing	-		Optional (Full Feature Version)	
Operating Temperature	°C		-40 to 125 (see thermal data on website)	
Storage Temperature	°C		-55 to 125	
Safety Agency Certifications	-		UL/EN/IEC 60950-1, CE Mark	
Weight	g / oz		15g / 0.53 oz	
Size (LxWxH)	mm / in.		33 x 22.9 x 12.1 / 1.3 x 0.9 x 0.47	
Warranty	yrs		3 years	

Note: (1) Consult the Full Datasheet for additional product information.

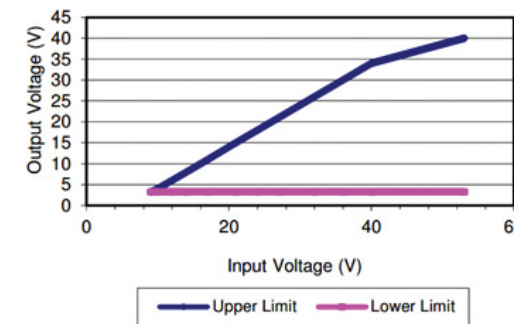
### Model Selector

Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	Positive Logic On/Off	Negative Logic On/Off	Full Feature
I6A4W010A033V-001-R	9 to 53	10	3.3 to 40	-	Yes	-
i6A4W020A033V-000-R	9 to 53	20	3.3 to 15	Yes	-	-
i6A4W020A033V-001-R	9 to 53	20	3.3 to 15	-	Yes	-
i6A4W020A033V-002-R	9 to 53	20	3.3 to 15	Yes	-	Yes
i6A4W020A033V-005-R	9 to 53	20	3.3 to 15	-	Yes	Yes (1)

Preferred Note: Output voltage cannot exceed input voltage (see graph below).  
(1) Full Feature module but without the SEQ pin installed.

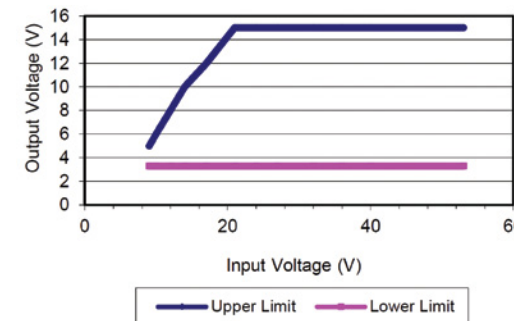
### Output Voltage vs Input Voltage Operating Range

#### i6A4W10A

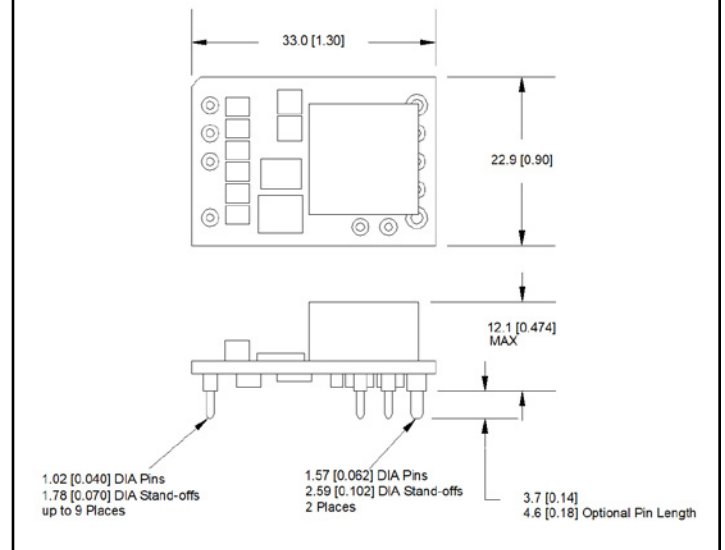


### Output Voltage vs Input Voltage Operating Range

#### i6A4W20A



### Mechanical Specification

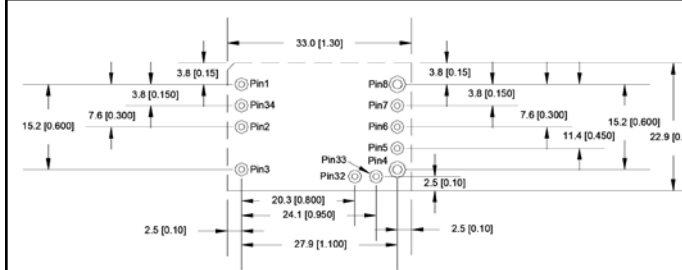


### Evaluation Board

Evaluation kit part #	Contents
i6A20A-001-EVK-S1PX	Populated with one piece of I6A4W020A033V-001-R
i6A20A-001-EVK-S1CC	Populated with one piece of I6A4W020A033V-001-R to set for constant current operation
i6A10A-001-EVK-S1PX	Populated with one piece i6A4W010A033V-001-R.
i6A10A-001-EVK-S1CC	Populated with one piece i6A4W010A033V-001-R set for constant current operation.

User manual available at I6A4W technical files in our website, contact technical support for more details on constant current version.

### Recommended Hole Pattern (top view)



### Pinout

PIN	Function	PIN	Function
1	VIN (+)	7	SENSE (+)
2	ON / OFF	8	VOUT (+)
3	VIN (-)	32	Sync (Option)
4	VOUT (-)	33	MS (Option)
5	PWR GOOD (Option)	34	SEQ (Option)
6	TRIM		

For Additional Information, please visit [us.tdk-lambda.com/lp/products/i6a-series.htm](http://us.tdk-lambda.com/lp/products/i6a-series.htm)





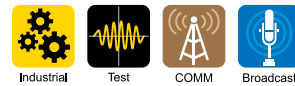
## 300W, 9 to 53V Input Non-Isolated Buck-Boost DC-DC Converter

### Features

- ◆ Up to 300W, 8 to 12.5A Output
- ◆ 1/16th Brick Footprint
- ◆ Step Up and Step Down Functionality
- ◆ Wide Output Adjustment 5 to 28V or 9.6 to 48V
- ◆ Baseplate and Heatsink Options



### Key Market Segments & Applications



Specifications		i7C4W012A050V		i7C4W008A120V	
Model		i7C4W012A050V		i7C4W008A120V	
DC Output Voltage	V	5 - 28		9.6 - 48	
DC Output Power (max)	W	300		300	
DC Input Voltage	V	9 - 53 (Turn on at 9.5V typ)			
Efficiency	%	91 - 96		93 - 97	
Output Voltage Tolerance <sup>(2)</sup>	%	±4			
Switching Frequency	kHz	250			
Line Regulation	%	0.8		0.8	
Load Regulation	%	0.8		0.5	
External Load Capacitance	uF	330 - 3000			
Output Ripple and Noise	mVpp	200		180	
Overcurrent Protection	A	17A typical		15A typical	
Remote On / Off	-	See options table			
Remote Sense	-	(+ Sense, compensating up to 5% of output voltage)			
Power Good	-	Optional (Full Feature Version)			
Synchronization <sup>(3)</sup>	-	Optional (Full Feature Version)			
Current Monitor	-	Optional (Full Feature Version)			
Operating Temperature	°C	-40 to 125 (see thermal data on website)			
Storage Temperature	°C	-55 to 125°C			
Safety Agency Certifications	-	UL/EN/IEC 60950-1, UL/EN/IEC 62368-1, CE Mark			
Weight	g / oz	Open Frame : 25g (0.88 oz) With Baseplate : 49g (1.71 oz) With Heatsink : 64g (2.25 oz)			
Size (LxWxH)	mm / in.	Open Frame : 34 x 36.8 x 12.7 With Baseplate : 34 x 36.8 x 13.0 With Heatsink : 34 x 36.8 x 24.9			
Warranty	yrs	3 years			

#### Note:

- 1) Consult the Full Datasheet for additional product information.
- 2) Over all rated input voltage, load and temperature conditions to end of life.
- 3) Sync pin should be connected to ground when not used.

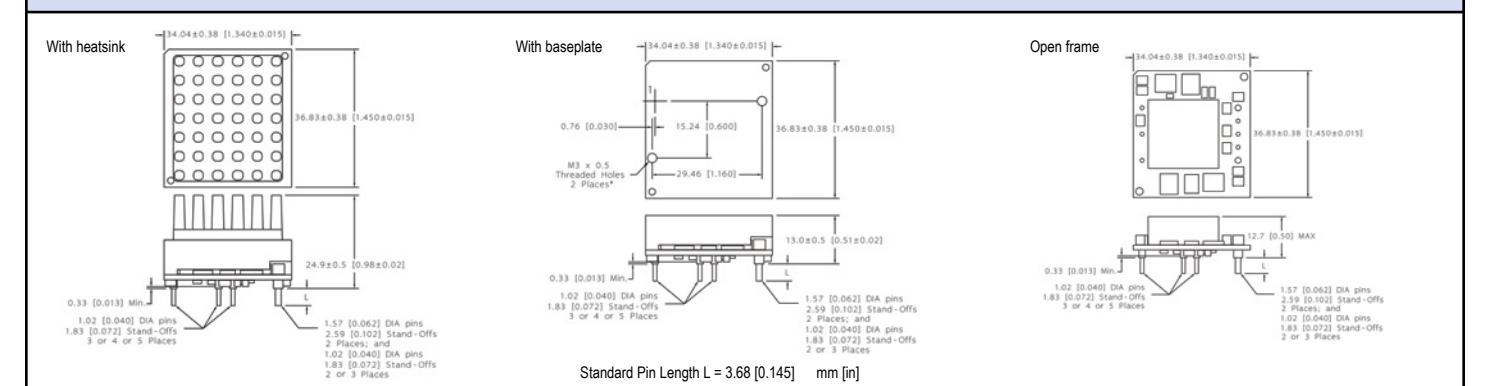
# PRELIMINARY

### Model Selector

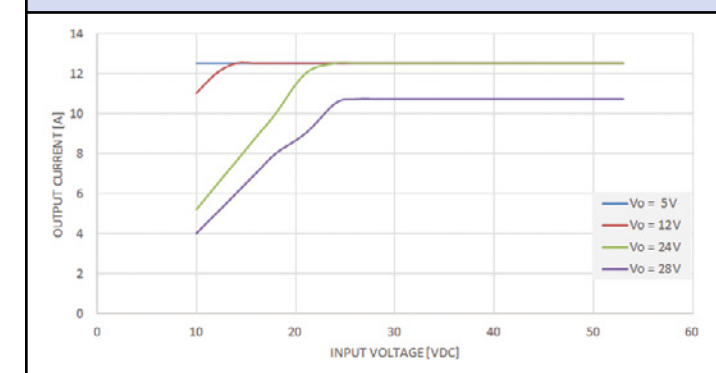
Input Model	Input Voltage (V)	Output Current (A)	Output Voltage (V)	On/Off Logic	Full Feature	Integrated Heatsink	Baseplate
i7C4W008A120V-001-R	9 - 53	8	9.6 - 48	Negative	-	-	-
i7C4W008A120V-003-R	9 - 53	8	9.6 - 48	Negative	Yes	-	-
i7C4W008A120V-0C1-R	9 - 53	8	9.6 - 48	Negative	-	-	Yes
i7C4W008A120V-0F1-R	9 - 53	8	9.6 - 48	Negative	-	Yes	-
i7C4W008A120V-002-R	9 - 53	8	9.6 - 48	Positive	Yes	-	-
i7C4W012A050V-001-R	9 - 53	12.5	5 - 28	Negative	-	-	-
i7C4W012A050V-003-R	9 - 53	12.5	5 - 28	Negative	Yes	-	-
i7C4W012A050V-0C1-R	9 - 53	12.5	5 - 28	Negative	-	-	Yes
i7C4W012A050V-0F1-R	9 - 53	12.5	5 - 28	Negative	-	Yes	-
i7C4W012A050V-002-R	9 - 53	12.5	5 - 28	Positive	Yes	-	-

Consult TDK Sales for part number suffix of other mechanicals vs. feature combinations.

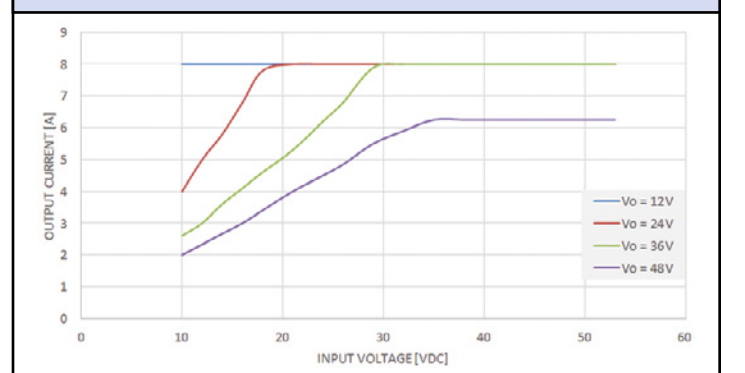
### Mechanical Specification



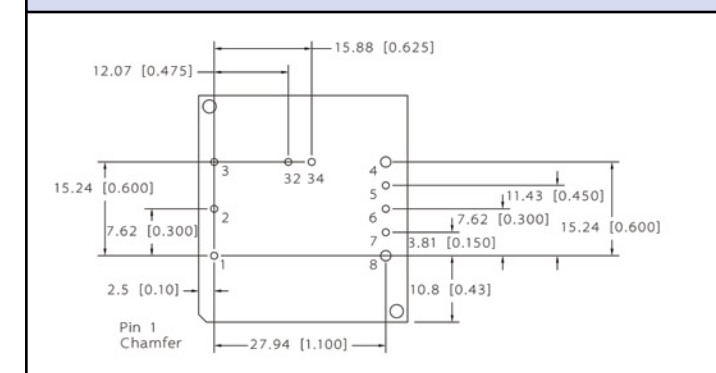
### i7C4W012A050V Output Voltage vs. Input Voltage



### i7C4W008A120V Output Voltage vs. Input Voltage



### Recommended Hole Pattern (top view)



### Pin Assignment

PIN	Function	PIN	Function
1	VIN (+)	6	TRIM
2	ON / OFF	7	SENSE (+)
3	VIN (-)	8	VOUT (+)
4	VOUT (-)	32	Sync (Option)
5	PWR GOOD (Option)	34	I Mon (Option)

For Additional Information, please visit [us.tdk-lambda.com/lp/products/i7c-series.htm](http://us.tdk-lambda.com/lp/products/i7c-series.htm)



# PRELIMINARY

 Programmable Power Supplies



Applications

- ◆ ATE Systems
- ◆ Battery simulation
- ◆ Component burn-in
- ◆ Plating and etching

Features

- ◆ Output voltage up to 650V, output current up to 72A. Outputs in series-two max; outputs in parallel-six max.
- ◆ Constant voltage or constant current operation with automatic crossover
- ◆ Last setting memory stores latest settings when power supply is switched off
- ◆ Analog programming and monitoring for output voltage and current with 0-5V or 0-10V scale
- ◆ Integrated RS232/RS485 (and USB for Z+) communication interface as standard
- ◆ IEEE, LAN and isolated analog optional interfaces
- ◆ Comprehensive parameter setting menus via front panel or digital interface
- ◆ Parallel operation with active current share and advanced parallel mode
- ◆ Arbitrary function generation and storage on Z+
- ◆ Suitable for benchtop use or 19" rack integration

Wattage	Series	Page
200-800W	Z+	220
200-800W	Z+ HV	222

Listed by Wattage

**200-800W Programmable Power Supplies**

**Features**

- ◆ 2U high
- ◆ Built-in USB, RS-232 & RS-485 Interface
- ◆ Optional LAN, GPIB & Isolated Analog Programming
- ◆ Bench or Rack Mount
- ◆ Constant Current or Voltage Modes
- ◆ Five Year Warranty



**Key Market Segments & Applications**



Model Selector								
Model	Voltage Adjust Range	Current Adjust Range	Max Power (W)	Ripple 5Hz-1MHz (mV)	Noise 20MHz BW (mV)	Ripple 5Hz-1MHz (mA)	Efficiency % (100-200VAC)	Front Panel Output Jacks (Option)
Z10-20-U	0 - 10	0 - 20	200	5	50	50	80 / 82	Yes
Z10-40-U	0 - 10	0 - 40	400	5	50	50	80 / 82	Yes
Z10-60-U	0 - 10	0 - 60	600	6.25	75	75	80 / 82	Yes
Z10-72-U	0 - 10	0 - 72	720	6.25	75	75	80 / 82	Yes
Z20-10-U	0 - 20	0 - 10	200	5	50	30	82 / 84	Yes
Z20-20-U	0 - 20	0 - 20	400	5	50	30	81 / 83	Yes
Z20-30-U	0 - 20	0 - 30	600	6.25	75	45	82 / 84	Yes
Z20-40-U	0 - 20	0 - 40	800	6.25	75	45	82 / 84	Yes
Z36-6-U	0 - 36	0 - 6	216	5	50	15	83 / 85	Yes
Z36-12-U	0 - 36	0 - 12	432	5	50	15	83 / 85	Yes
Z36-18-U	0 - 36	0 - 18	648	6.25	75	22	84 / 85	Yes
Z36-24-U	0 - 36	0 - 24	864	6.25	75	22	84 / 85	Yes
Z60-3.5-U	0 - 60	0 - 3.5	210	5	50	8	83 / 85	Yes
Z60-7-U	0 - 60	0 - 7	420	5	50	8	83 / 85	Yes
Z60-10-U	0 - 60	0 - 10	600	6.25	75	12	83 / 85	Yes
Z60-14-U	0 - 60	0 - 14	840	6.25	75	12	83 / 85	Yes
Z100-2-U	0 - 100	0 - 2	200	8	80	3	83 / 85	No
Z100-4-U	0 - 100	0 - 4	400	8	80	3	84 / 86	No
Z100-6-U	0 - 100	0 - 6	600	10	100	4.5	84 / 86	No
Z100-8-U	0 - 100	0 - 8	800	10	100	4.5	84 / 86	No

Options	
	Option Code
Front panel terminals (60V or 24A max)*	-L
Front panel insulated output sockets (100V or 24A max)*	-L2
<b>Only one of the options below can be included:</b>	
GPIB Interface*	-IEEE
Voltage Programming Isolated Analog Interface*	-IS510
Current Programming Isolated Analog Interface*	-IS420
LAN Interface	-LAN

Part Number Example
Z10-20-LAN-L-U

\*Requires wide body (105mm) case style

Specifications (See website for detailed specifications)						
Model		Z10	Z20	Z36	Z60	Z100
Load Regulation	CV	2mV + 0.01% of rated voltage over 0 - 100% load change				
Line Regulation	CV	2mV + 0.01% of rated voltage over a 85 - 132 or 170 - 265VAC line change				
Recovery Time	(1) CV	1ms				
Temperature Coefficient	CV	30ppm/°C following 30 minute warm up				
Temperature Stability	CV	0.02% of rated voltage over 8 hours following 30 minute warm up time				
Warm up Drift	(2) CV	<0.05% of rated voltage + 2mV of rated output voltage				
Up programming response time (10-90% or 90-10% of Vmax)	CV	15ms	30ms	30ms	50ms	50ms
Down programming resp time (CV) (10-90% or 90-10% of Vmax)	Full load	10ms	30ms	30ms	50ms	50ms
Down programming resp time (CV) (90-10% of Vmax)	Zero load	190ms	200ms	250ms	310ms	900ms
Load Regulation	CC	5mA + 0.01% of rated current over 0 - 100% Vout change				
Load Regulation thermal drift	CC	< 0.05% of rated current over 30 minutes after load change				
Line Regulation	CC	2mA + 0.01% of rated current over a 85 - 132 or 170 - 265VAC line change				
Temperature Coefficient	CC	100ppm/°C of rated current after 30 minute warm up time				
Temperature Stability	CC	0.05% of rated current over 8 hours following 30 minute warm up time				
Warm up Drift	(2) CC	<±0.1% of rated current				
Vout & Iout programming & readback resolution	Digitally	< 0.012% of rated voltage/current				
Vout & Iout programming & readback accuracy	Digitally	< 0.05% of rated voltage, < 0.1% of rated current				
Voltage & Current Programming	Analog	By either Voltage (0-5V or 0-10V) or Resistance (0-5k or 0-10k)				
Voltage & Current Monitoring	Analog	0-5V or 0-10V Voltage (user selectable), ±1% accuracy				
Overvoltage Shutdown (user programmable)	V	0.5 - 12	1 - 24	2 - 40	5 - 66	5 - 110
Overtemperature Protection	-	User selectable - latched or non-latching				
Display - Voltage	-	4 digits. Accuracy 0.5% of rated voltage or current ±1 count				
Remote On/Off	-	By applied voltage or dry contact relay (user selectable logic)				
Output Good	-	Open Collector, Low on fail				
Remote Sense Compensation (per wire)	V	1	1	2	3	5
Communication Interface	-	RS232, RS485 & USB standard, IEEE488 (GPIB) & LAN optional				
Series Operation	-	Up to two identical units (with external diodes)				
Parallel Operation	-	Up to six units in master-slave configuration				
Input Voltage / Frequency	(3) -	85-265VAC, 47-63Hz				
Inrush Current	-	< 25A				
Hold Up Time (Typical)	ms	16ms				
Power Factor Correction	-	Complies with EN61000-3-2 Class A (0.99 typ)				
Operating Temperature	°C	0 - 50°C				
Storage Temperature	°C	-20 to +85°C				
Humidity (non condensing)	%RH	Operating: 10 - 90%RH, Storage 10 - 95%RH				
Cooling	-	Internal temperature controlled fan				
Withstand Voltage	-	I/P to GND 2kVAC, I/P to O/P 3kVAC, O/P to GND 1380VDC 1 min				
Insulation Resistance	-	>100M at 25°C & 70%RH				
Vibration (non operating)	-	IEC60068-2-64				
Shock	-	<20G, half sine, 11ms. IEC60068-2-27				
Safety Agency Certifications	-	UL61010-1, EN61010-1, IEC61010 (Designed to meet UL/EN60950-1)				
Immunity	-	IEC61326 (Designed to meet EN55022 / EN55024)				
Conducted & Radiated EMI	-	EN55022-B, FCC part 15-B, VCCI-B				
Size (H x W x D) (Excluding handles and busbars)	mm	Standard body 83 x 70 x 350mm; Wide Body 83 x 105 x 350mm				
Weight	kg	Standard body 1.9kg; Wide Body 2.4kg				
Warranty	yrs	Five Years				

**Notes:**

- (1) Recovery to within 0.5% of rated voltage after a load change of 10-90% (Output current 10-100% of Imax)
- (2) Over 30 minute warm up time after power on
- (3) Derate for 85-100 VAC; Z10-72-U (66A), Z20-40-U (36A), Z36-24-U (20A), Z60-14-U (12.5A), Z100-8-U (7.5A)

For Additional Information, please visit [www.tdk-lambda.com/lp/products/zplus-series.htm](http://www.tdk-lambda.com/lp/products/zplus-series.htm)



**200-800W Programmable Power Supplies**

**Features**

- ◆ 2U high
- ◆ Built-in USB, RS-232 & RS-485 Interface
- ◆ Optional LAN, GPIB & Isolated Analog Programming
- ◆ Bench or Rack Mount
- ◆ Constant Current or Voltage Modes
- ◆ Five Year Warranty



**Key Market Segments & Applications**



Model Selector							
Model	Voltage Adjust Range	Current Adjust Range	Max Power (W)	Ripple 5Hz-1MHz (mV)	Noise 20MHz BW (mV)	Ripple 5Hz-1MHz (mA)	Efficiency % (100-200VAC)
Z160-1.3-U	0 - 160	0 - 1.3	208	10	100	1.2	79 / 81
Z160-2.6-U	0 - 160	0 - 2.6	416	10	100	1.5	84 / 86
Z160-4-U	0 - 160	0 - 4	640	10	100	2.0	86.5 / 88.5
Z160-5-U	0 - 160	0 - 5	800	10	100	2.0	86.5 / 88.5
Z320-0.65-U	0 - 320	0 - 0.65	208	25	150	0.8	79 / 81
Z320-1.3-U	0 - 320	0 - 1.3	416	25	150	1.0	84 / 86
Z320-2-U	0 - 320	0 - 2	640	30	150	1.5	87 / 88.5
Z320-2.5-U	0 - 320	0 - 2.5	800	30	150	1.5	86.5 / 89
Z375-2.2-U	0 - 375	0 - 2.2	825	30	150	1.5	87.5 / 89.5
Z650-0.32-U	0 - 650	0 - 0.32	208	60	250	0.5	79 / 81
Z650-0.64-U	0 - 650	0 - 0.64	416	60	250	0.6	84 / 86
Z650-1-U	0 - 650	0 - 1	650	60	250	1.0	86.5 / 88.5
Z650-1.25-U	0 - 650	0 - 1.25	812	60	250	1.0	87 / 89

Options	
	Option Code
IEC320 cable USA plug (Included in model number above)	-U
Front panel insulated output sockets (650V or 5A max)*	-L2
<b>Only one of the options below can be included:</b>	
GPIB Interface*	-IEEE
Voltage Programming Isolated Analog Interface*	-IS510
Current Programming Isolated Analog Interface*	-IS420
LAN Interface	-LAN

Part Number Example
Z160-1.3-LAN-U

\*Requires wide body (105mm) case style

**Specifications (See brochure on website for full detailed specifications)**

Model	Z160	Z320	Z375	Z650	
Load Regulation	CV	0.01% of rated voltage over 0 - 100% load change			
Line Regulation	CV	0.01% of rated voltage over 0 - 100% input change			
Recovery Time (1)	CV	2ms			
Temperature Coefficient	CV	30ppm/°C following 30 minute warm up			
Temperature Stability	CV	0.02% of rated voltage over 8 hours following 30 minute warm up time			
Warm up Drift (2)	CV	<0.05% of rated voltage of rated output voltage			
Up programming response time (10-90% or 90-10% of Vmax)	CV	80ms	150ms	55ms	150ms
Down programming resp time (CV) (10-90% or 90-10% of Vmax)	Full load	100ms	150ms	65ms	150ms
Down programming resp time (CV) (90-10% of Vmax)	Zero load	2ms	2.5ms	2.5ms	3ms
Load Regulation	CC	0.09% of rated current over 0 - 100% Vout change			
Load Regulation thermal drift	CC	< 0.05% of rated current over 30 minutes after load change			
Line Regulation	CC	0.02% of rated current over a 85 - 132 or 170 - 265VAC line change			
Temperature Coefficient	CC	100ppm/°C of rated current after 30 minute warm up time			
Temperature Stability	CC	0.05% of rated current over 8 hours following 30 minute warm up time			
Warm up Drift(2)	CC	<±0.1% of rated current			
Vout & Iout programming & readback resolution	Digitally	< 0.012% of rated voltage/current			
Vout & Iout programming & readback accuracy	Digitally	0.05% of rated voltage + 0.05% of actual, 0.2% of rated current			
Voltage & Current Programming	Analog	By either Voltage (0-5V or 0-10V) or Resistance (0-5k or 0-10k)			
Voltage & Current Monitoring	Analog	0-5V or 0-10V Voltage (user selectable), ±1% accuracy			
Overvoltage Shutdown (user programmable)	V	5 - 176	5 - 353	5 - 413	5 - 717
Overtemperature Protection	-	User selectable - latched or non-latching			
Display - Voltage	-	4 digits. Accuracy 0.5% of rated voltage or current ± 1 count			
Remote On/Off	-	By applied voltage or dry contact relay (user selectable logic)			
Output Good	-	Open Collector, Low on fail			
Remote Sense Compensation (per wire)	V	5	5	5	5
Communication Interface	-	RS232, RS485 & USB standard, IEEE488 (GPIB) & LAN optional			
Series Operation	-	Up to two identical units (with external diodes)			
Parallel Operation	-	Up to six units in master-slave configuration			
Input Voltage / Frequency	-	85-265VAC, 47-63Hz			
Inrush Current	-	< 25A			
Hold Up Time (Typical)	ms	16ms			
Power Factor Correction	-	Complies with EN61000-3-2 Class A (0.99 typ)			
Operating Temperature	°C	0 - 50°C			
Storage Temperature	°C	-20 to +85°C			
Humidity (non condensing)	%RH	Operating: 20 - 90%RH, Storage 10 - 95%RH			
Cooling	-	Internal temperature controlled fan			
Withstand Voltage	-	I/P to GND 2kVAC, I/P to O/P 3kVAC, O/P to GND 1380VDC 1 min			
Insulation Resistance	-	>100M at 25°C & 70%RH			
Vibration (non operating)	-	IEC60068-2-64			
Shock	-	<20G, half sine, 11ms. IEC60068-2-27			
Safety Agency Certifications	-	UL61010-1, EN61010-1, IEC61010 (Designed to meet UL/EN60950-1)			
Immunity	-	IEC61326 (Designed to meet EN55022 / EN55024)			
Conducted EMI	-	IEC/EN61326-1 Industrial location B, FCC part 15-B, VCCI-B			
Radiated EMI	-	IEC/EN61326-1 Industrial location A, FCC part 15-A, VCCI-A			
Size (H x W x D) (Excluding handles and busbars)	mm	Standard body 83 x 70 x 350mm; Wide Body 83 x 105 x 350mm			
Weight	kg	Standard body 1.9kg; Wide Body 2.4kg			
Warranty	yrs	Five Years			

Notes:

- (1) Recovery to within 0.5% of rated voltage after a load change of 10-90% (Output current 10-100% of Imax)
- (2) Over 30 minute warm up time after power on

For Additional Information, please visit [us.tdk-lambda.com/lp/products/zplus-series.htm](http://us.tdk-lambda.com/lp/products/zplus-series.htm)



 EMC/EMI Filters



Applications

- ◆ Improve EMC performance in complex equipment
- ◆ Improve EMC performance with long mains wires

Features

- ◆ Single-phase, three-phase and three-phase with Neutral
- ◆ 0.5A to 300A line current
- ◆ Single-stage and two-stage filters with high attenuation over a wide frequency range
- ◆ With surge protection
- ◆ Medical versions with reduced leakage currents
- ◆ Models for DIN-Rail mounting

Current	Series	Page
3-300A	RSHN	226
6-30A	RSEV	228
6-60A	RTAN	230
6-300A	RTHN	232
10A	iDQ	234
20A	FQA	236
20A	FQB	238
50A	RDEN	240

\*For additional models offered, please see TDK Lambda's web page.

Listed by Amps

**3A to 300A, 250VAC EMI Filters**

**Features**

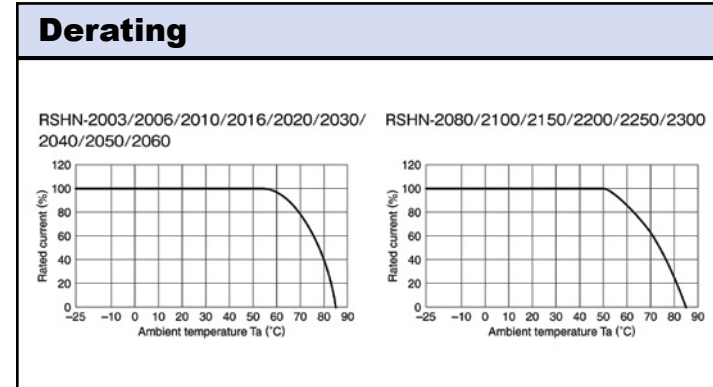
- ◆ Two Stage Filter for Better Performance
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Low Earth Leakage Current Option (Up to 30A)
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



**Key Market Segments & Applications**



Specifications						
<b>Model</b>		RSHN-2003 RSHN-2003D RSHN-2003L	RSHN-2006 RSHN-2006D RSHN-2006L	RSHN-2010 RSHN-2010D RSHN-2010L	RSHN-2016 RSHN-2016D RSHN-2016L	RSHN-2020 RSHN-2020D RSHN-2020L
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	3A	6A	10A	16A	20A
DC Resistance (total)	mΩ	350	140	60	35	22
<b>Model</b>		RSHN-2030 RSHN-2030D RSHN-2030L	RSHN-2040	RSHN-2050	RSHN-2060	RSHN-2080
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	30A	40A	50A	60A	80A
DC Resistance (total)	mΩ	12	10	8	6	7
<b>Model</b>		RSHN-2100	RSHN-2150	RSHN-2200	RSHN-2250	RSHN-2300
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	100A	150A	200A	250A	300A
DC Resistance (total)	mΩ	6	4	3	2	1.5
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	RSHN-20xx 1mA; RSHN20xxL 100uA (250VAC, 60Hz)				
Operating Temperature	°C	-25 to +85°C (Derate above 50 / 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	Up to 30A Models - UL1283, CSA C22.2 No.8, EN60939				
Weight	g	190g to 13000g model dependant (See weights chart on website)				
Warranty	yr	5 Year				

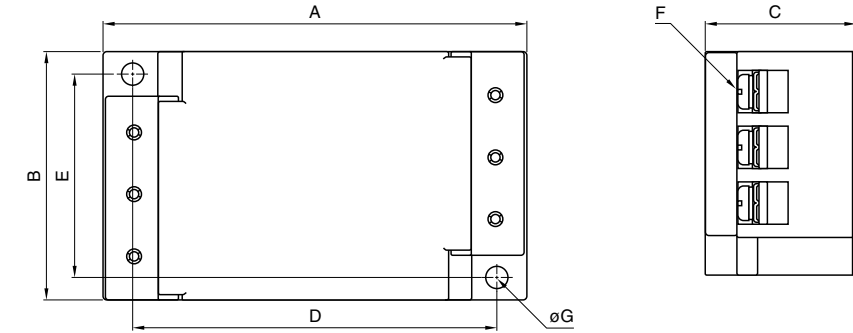


**Options**

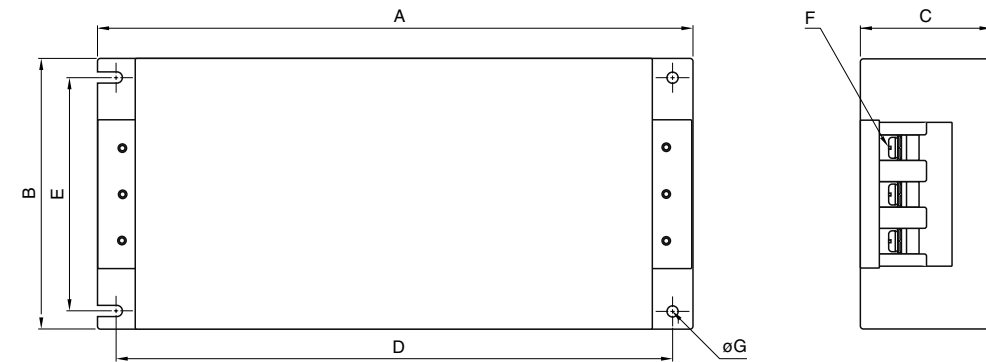
Chassis Mount & Standard Leakage Current	RSHN-20xx
DIN Rail Mount & Standard Leakage Current	RSHN-20xxD
Chassis Mount & Low Leakage Current	RSHN-20xxL

**Outline Drawing**

RSHN-2003/2006/2010/2016/2020/2030



RSHN-2040/2050/2060/2080/2100/2150/2200/2250/2300



Dimensions in mm

Part No.	A	B	C	D	E	F	G	Recommended clamping torque
RSHN-2003	98	52	35	86	43	M4	4.5	1.27N m
RSHN-2006								
RSHN-2010								
RSHN-2016	127	52	35	115	43	M4	4.5	1.27N m
RSHN-2020								
RSHN-2030								
RSHN-2040	272	100	60	254	82	M5	5.5	2.5N m
RSHN-2050								
RSHN-2060								
RSHN-2080	430	161	85	410	135	M8	6.5	7.64N m
RSHN-2100								
RSHN-2150								
RSHN-2200	593	195	103	573	169	M10	6.5	11.8N m
RSHN-2250								
RSHN-2300								

For Additional Information, please visit [us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



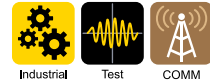
## 6A to 30A, 250VAC EMC Filters

### Features

- ◆ Integrated Terminal Block With Captive Screws
- ◆ Compact Size
- ◆ DIN Rail Mount Accessory Kit
- ◆ Conforms to UL, CSA and EN Safety Agency Certifications



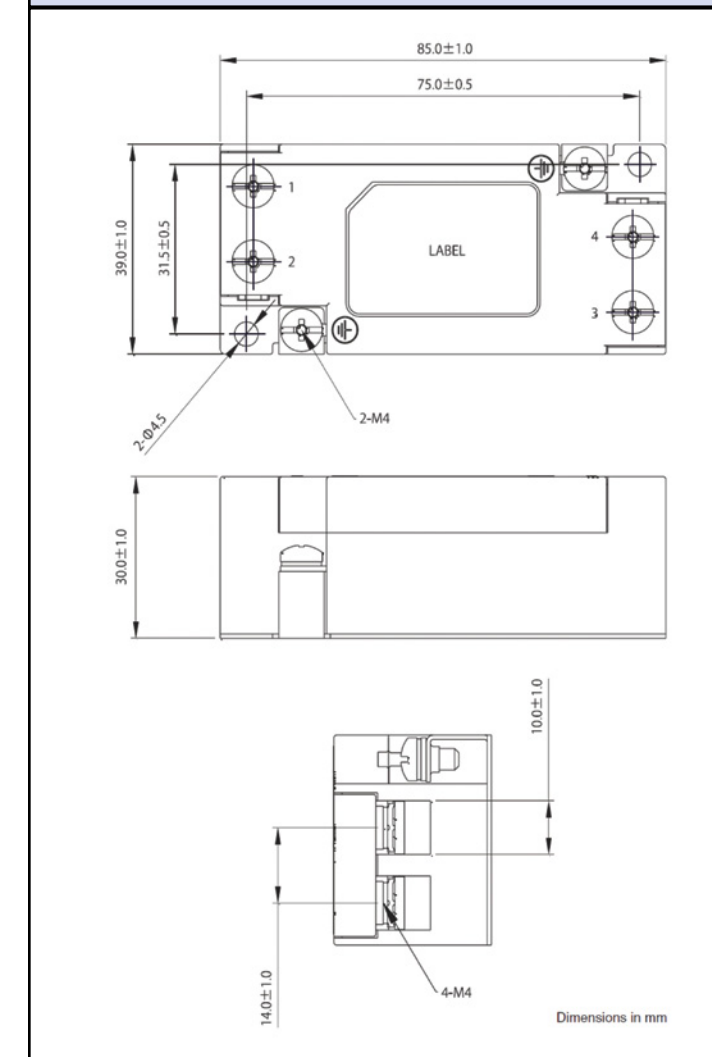
### Key Market Segments & Applications



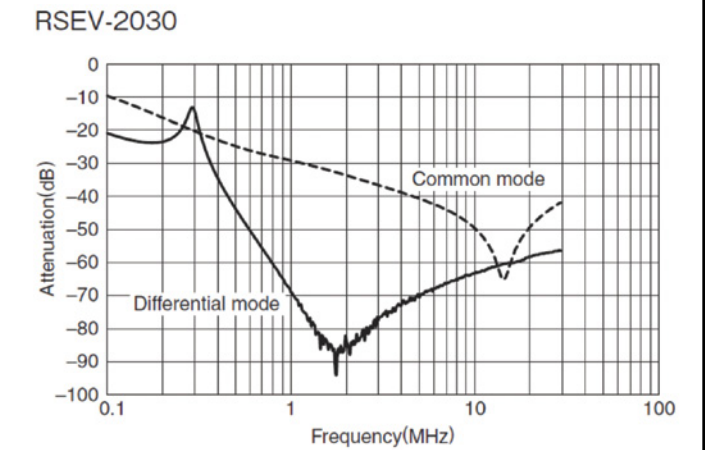
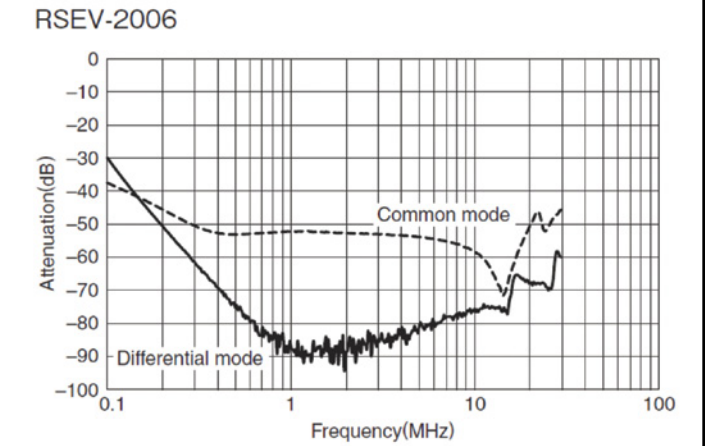
### Specifications

Model		RSEV-2006	RSEV-2010	RSEV-2016	RSEV-2020	RSEV-2030
Rated Voltage (AC, DC)	V	250V				
Rated Current	A	6A	10A	16A	20A	30A
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	1mA (250VAC, 60Hz)				
DC Resistance (total)	mΩ	110	40	20	10	6
Operating Temperature	°C	-25 to +85°C (Derate above 55°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283, CSA C22.2 No.8, EN60939-3				
Weight	g	150g				
Size (W x L x H)	mm	39 x 85 x 30mm				
Warranty	yr	5 Year				

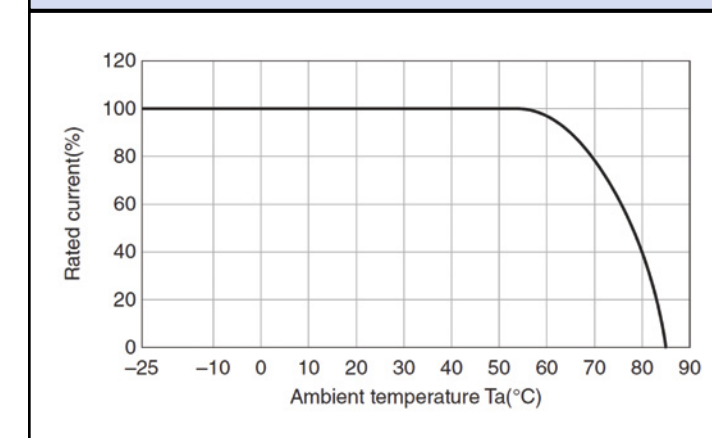
### Outline Drawings



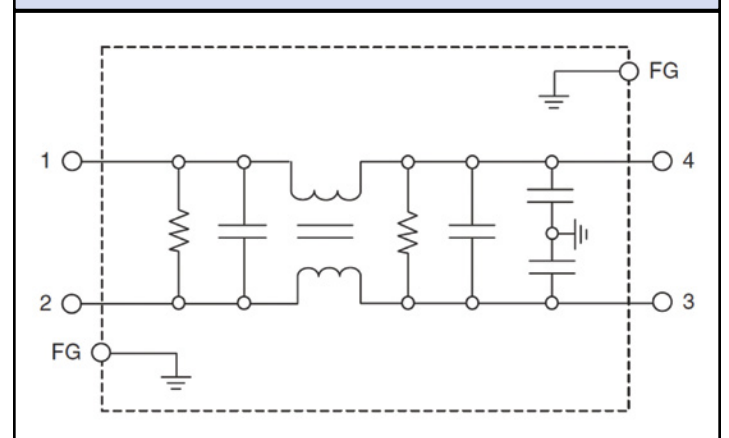
### Attenuation Characteristics



### Derating



### Circuit



### Accessory

DIN Rail Mounting Kit                      DIN-RSEV

For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



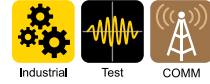
## 6A to 60A, 500VAC EMI Filters

### Features

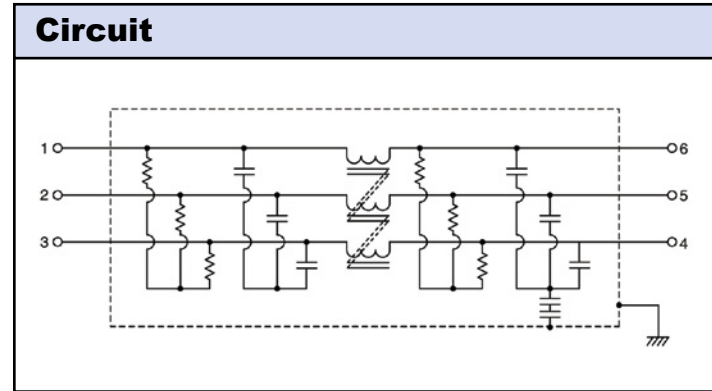
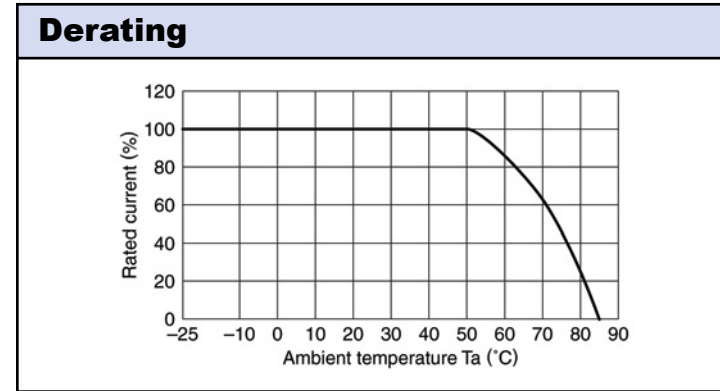
- ◆ High Voltage Pulse Attenuation
- ◆ DIN Rail Mount Option (Up 30A)
- ◆ Conforms to UL and EN Safety Agency Certifications



### Key Market Segments & Applications



Specifications		RTAN-5006	RTAN-5010	RTAN-5020	RTAN-5030	RTAN-5040
Model		RTAN-5006D	RTAN-5010D	RTAN-5020D	RTAN-5030D	
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	350	140	60	35	22
Model		RTAN-5050	RTAN-5060			
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A			
DC Resistance (total)	mΩ	7	5			
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	A	2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 & EN60939				
Weight	g	360g to 1120g model dependant (See weights chart on website)				
Warranty	yr	5 Year				

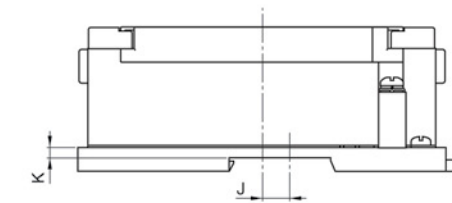
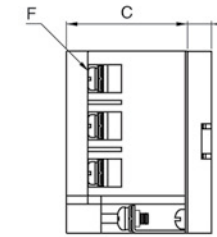
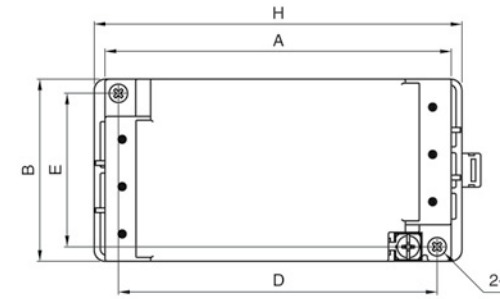


### Options

Chassis Mount	RTAN-50xx
DIN Rail Mount (Models up to 30A)	RTAN-50xxD

### Outline Drawing

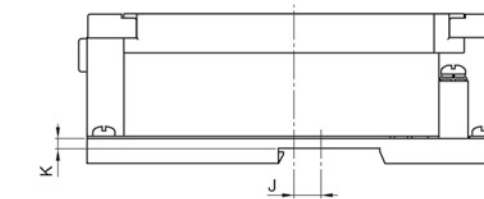
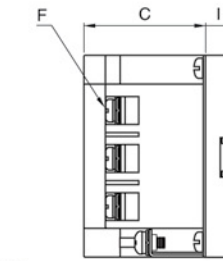
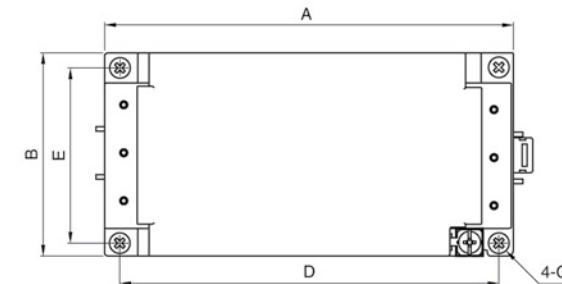
RTAN-5006D/5010D



Dimensions in mm

Part No.	A	B	C	D	E	F	G	φH	Recommended clamping torque
RTAN-5006	120	63	42	110	53	M4	M4	4.5	M4 : 1.27N · m M5 : 2.5N · m
RTAN-5010									
RTAN-5020	140	70	42	130	60	M4	M4	4.5	
RTAN-5030									
RTAN-5040	170	90	54	160	80	M5	M4	4.5	
RTAN-5050									
RTAN-5060									

RTAN-5020D/5030D



Dimensions in mm

Part No.	A	B	C	D	E	F	G	H	I	J	K
RTAN-5006D	120	63	42	110	53			127	8.4	6	3.5
RTAN-5010D											
RTAN-5020D	140	70	42	130	60	M4	M4	-	8.4	12.5	3.5
RTAN-5030D											

For Additional Information, please visit [us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)

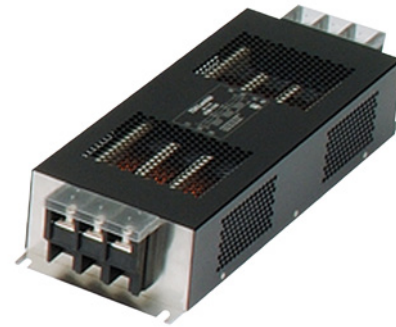




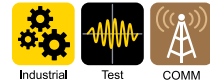
**6A to 300A, 500VAC EMI Filters**

**Features**

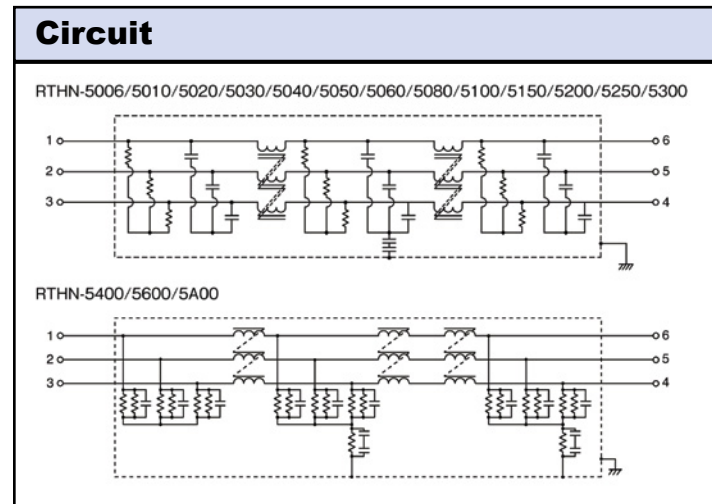
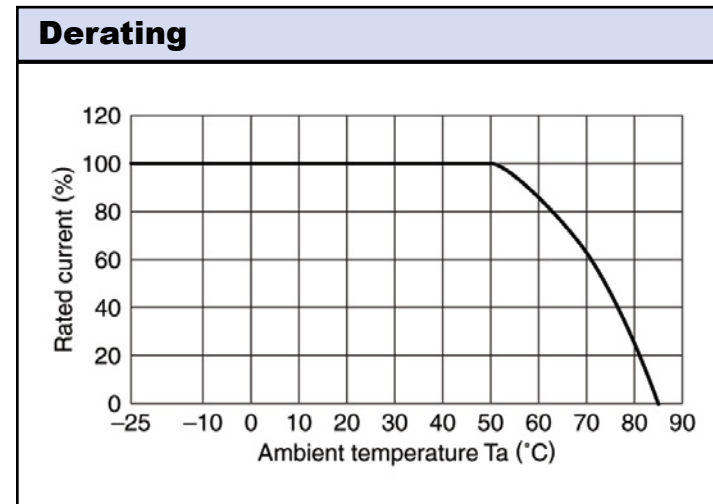
- ◆ Two Stage Filter for Better Performance
- ◆ Low Profile
- ◆ Conforms to UL and EN Safety Agency Certifications



**Key Market Segments & Applications**

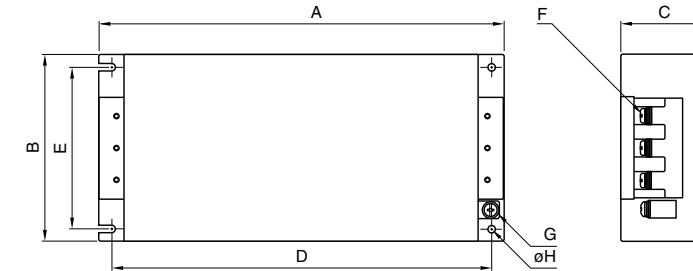


Specifications		RTHN-5006	RTHN-5010	RTHN-5020	RTHN-5030	RTHN-5040
Model						
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	6A	10A	20A	30A	40A
DC Resistance (total)	mΩ	290	120	50	25	20
Model		RTHN-5050	RTHN-5060	RTHN-5080	RTHN-5100	RTHN-5150
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	50A	60A	80A	100A	150A
DC Resistance (total)	mΩ	14	10	10	8	6
Model		RTHN-5200	RTHN-5250	RTHN-5300		
Rated Voltage (AC, DC)	V	500V Three phase				
Rated Current	A	200A	250A	300A		
DC Resistance (total)	mΩ	4	3	2		
Withstand Voltage	V	Terminals to Case: 2500VAC (1 Minute)				
Isolation Resistance	MΩ	100MΩ minimum (500VDC, 1 Minute)				
Leakage Current (max)	mA	6A to 300A Models: 2.5mA at 250VAC 60Hz, 5mA at 500VAC 60Hz 400A to 1000A Models: 17.5mA at 250VAC 60Hz, 35mA at 500VAC 60Hz				
Operating Temperature	°C	-25 to +85°C (Derate above 50°C, see derating curve)				
Storage Temperature	°C	-25 to +85°C				
Safety Agency Certifications	-	UL1283 (Up to 150A) & EN60939 (Up to 300A)				
Weight	g	700g to 18000g model dependant (See weights chart on website)				
Warranty	yr	5 Year				

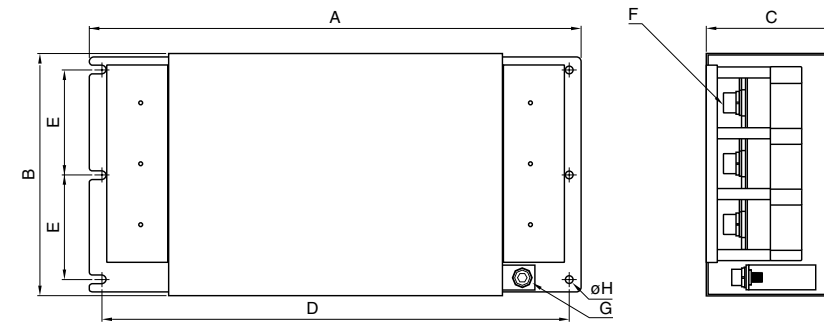


**Outline Drawing**

RTHN-5006/5010/5020/5030/5040/5050/5060/5080/5100/5150



RTHN-5200/5250/5300



Dimensions in mm

Part No.	A	B	C	D	E	F	G	φ H	Recommended clamping torque
RTHN-5006	210	95	50	195	78	M4	M4	4.5	M4 : 1.27N · m M5 : 2.5N · m M6 : 4.8N · m M8 : 7.64N · m M10 : 11.8N · m
RTHN-5010									
RTHN-5020									
RTHN-5030	240	105	55	225	85	M4	M4		
RTHN-5040									
RTHN-5050	300	128	68	280	102	M5	M4		
RTHN-5060									
RTHN-5080	430	161	85	410	135	M8	M6	6.5	
RTHN-5100									
RTHN-5150									
RTHN-5200	593	195	103	573	84.5	M10	M8		
RTHN-5250									
RTHN-5300									

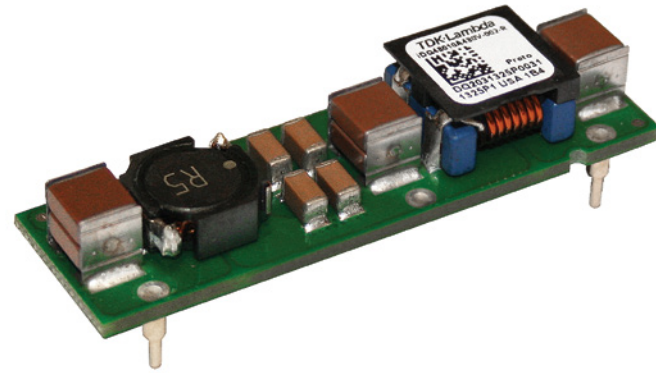
For Additional Information, please visit [us.tdk-lambda.com/lp/products/r-series.htm](http://us.tdk-lambda.com/lp/products/r-series.htm)



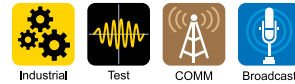
**10A, 75VDC EMI Filters**

**Features**

- ◆ Exceptional Differential Mode Performance
- ◆ Very Compact Size
- ◆ Minimal External Components Required\*



**Key Market Segments & Applications**



Specifications		
Model	iDQ48010A480V	
Rated Voltage	VDC	75VDC (100VDC for 100ms)
Rated Current	A	10A
Withstand Voltage	VDC	Terminals to Ground: 1500VDC
Leakage Current	mA	Not Applicable
DC Resistance	mΩ	Positive leg: 11.5, Negative leg: 6.5
Operating Temperature (1)	°C	-40 to +120 (see derating curve and measurement point)
Storage Temperature	°C	-55 to +125
Safety Agency Certification	-	TBA
Size (LxWxH)	mm	50 x 15 x 10.8mm
Weight (Typ)	g	11.3
Warranty	yrs	3

Notes:  
1) See full specification on website

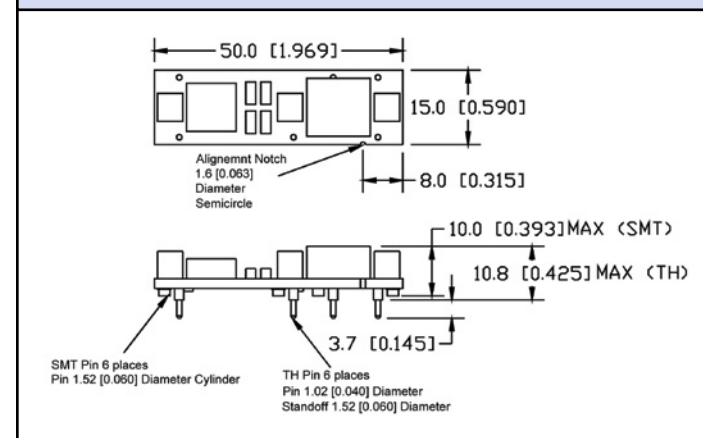
**Model Selector**

Model	Surface Mount	Through Hole Mount Pins	Pin 6 Populated*
iDQ48010A480V-001-R (2)	X		X
iDQ48010A480V-002-R		0.145"	
iDQ48010A480V-003-R (2)		0.145"	X

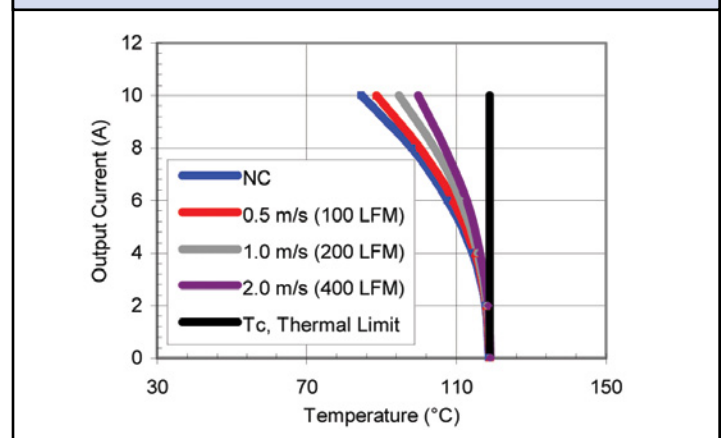
2) Contact factory for status

\* Additional capacitance can be placed between pin 3 and pin 6, and also between pin 4 and pin 3 to increase the common mode noise attenuation.

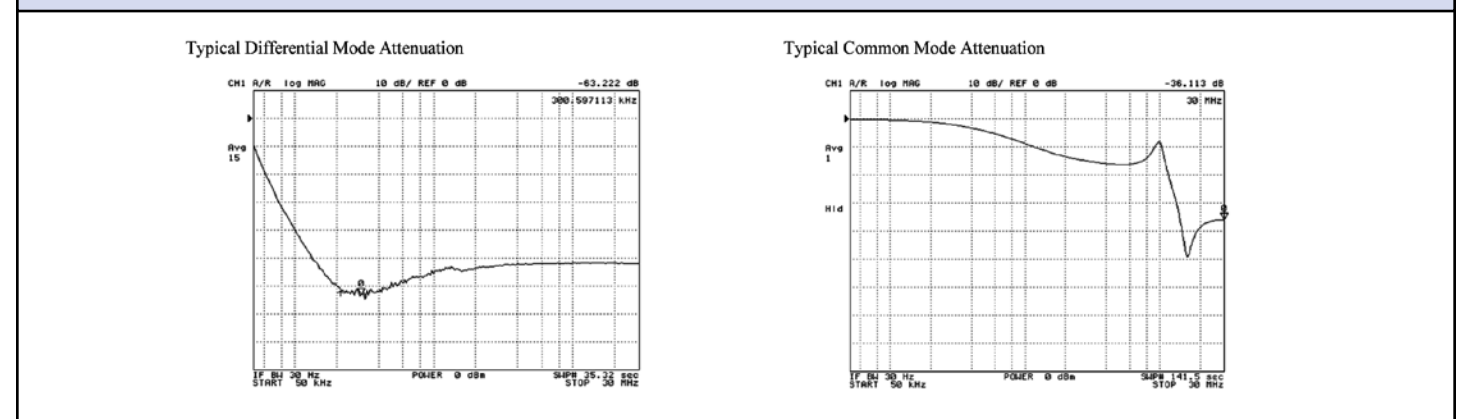
**Outline Drawing**



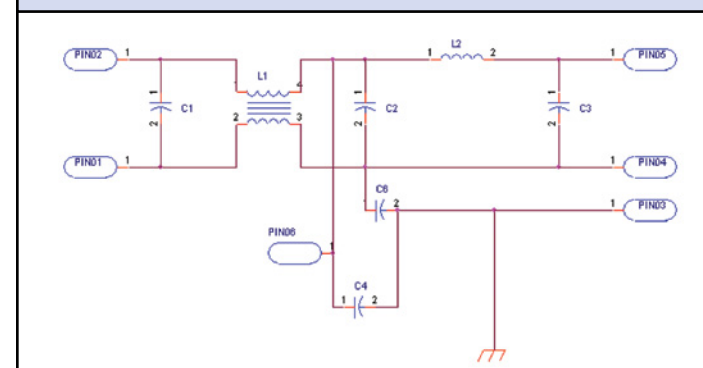
**Derating**



**Attenuation Characteristics**



**Circuit**



For Additional Information, please visit [us.tdk-lambda.com/lp/products/idq-series.htm](http://us.tdk-lambda.com/lp/products/idq-series.htm)



**MIL-COTS 20A, 40VDC Passive EMC Filters**

**Features**

- ◆ Filtering for Compliance to MIL-STD-461F
- ◆ Spike suppression per MIL-STD-1275D and RTCA/DO-160G
- ◆ High Differential and Common Mode Noise Attenuation
- ◆ -55 to 115°C Temperature Range (M grade)
- ◆ Standard or enhanced screening options
- ◆ Quarter Brick Size



**Key Market Segments & Applications**



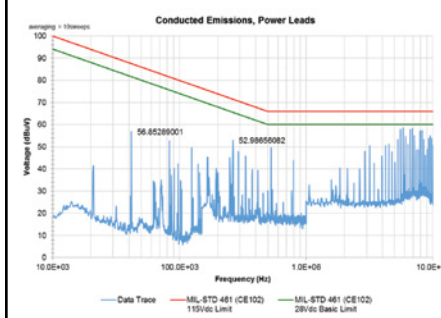
Preliminary Specifications		FQA
Model		FQA
Rated Voltage	VDC	40VDC
Rated Current	A	20A
Withstand Voltage	VDC	Terminals to Case: 2250VDC
Leakage Current	mA	Not Applicable
DC Resistance (total)	mΩ	12mΩ (typical)
Operating Baseplate Temperature	°C	Standard screening (-S): -40°C to +115°C, Enhanced screening (-M): -55°C to +115°C
Storage Temperature	°C	-65 to 125°C
Humidity (non condensing)	-	MIL-STD 883 Method 1004.7
Cooling	-	Conduction, convection or forced air
Vibration	-	MIL-STD-202G, Method 201A, Unpowered, sweep 1: 5 to 50 Hz at 0.5g, sweep 2: 50 to 500 Hz at 1.5g, three axis
Shock	-	MIL-STD-202G, Method 213B, Table 213-1, Test Condition I, Unpowered, 50G half sine 6ms, three axis
Safety Agency Certifications	-	IEC/EN/UL60950-1
Qualification Methods	-	Consistent with MIL-STD-883F and MIL-STD-202G
Weight	g	100g (Flanged version)
Size (L x W x H)	in (mm)	Flanged version: 2.39 x 2.2 x 0.5" (60.6 x 55.9 x 12.7) Non-flanged version: 2.39 x 1.54 x 0.5" (60.6 x 39 x 12.7)
Warranty	yrs	3 Years

Note: See Long form datasheet for full details, test methods of parameters and application notes.

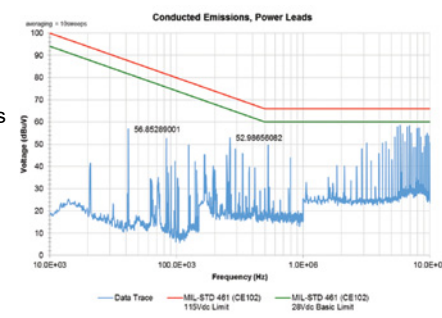
Model Selector	Flanged Baseplate	Non-Flanged Baseplate	Standard Screening (-S)	Enhanced Screening (-M)
FQA020ADC-007-S	X		X	
FQA020ADC-N07-S		X	X	
FQA020ADC-007-M	X			X

Screening	S-Grade (Standard Screening)	M-Grade (Enhanced Screening)
Operation		
Functional Test	Room and Hot Test	Cold, Room, and Hot Test
Burn in	Yes	Extended, 96 hour
Temperature Cycling	No	10 Cycles
Hi-Pot	2250VDC	2250VDC
Visual Inspection	Yes	Yes

**Preliminary Attenuation Characteristics**



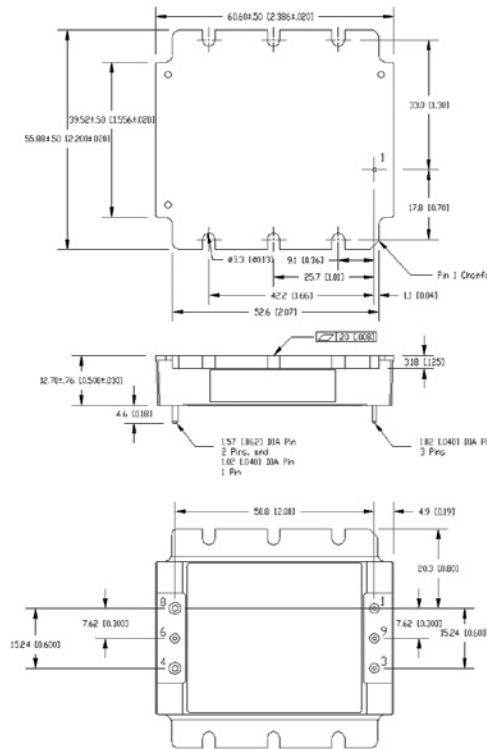
HQA2W120W280V-007-S typical conducted emissions with FQA filter module and 0.01uF common mode capacitors.



HQA2W120W120V-007-S typical conducted emissions with FQA filter module and 0.01uF common mode capacitors.

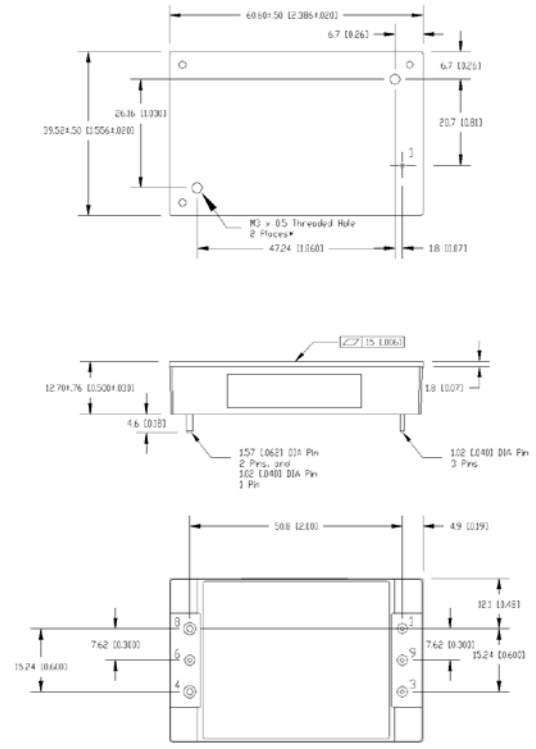
**Outline Drawing**

007 option (flange baseplate)



**Outline Drawing**

N07 option (non flange baseplate)



**Pinout**

Pin	Function	Pin	Function
1	Vin +	6	Common mode out*
2	Not populated	7	Not populated
3	Vin -	8	Vout +
4	Vout -	9	Common mode In*
5	Not populated		

\* In a typical application pin 6 would be connected to the Vout-/ground plane and pin 9 to chassis/ground for EMI measurement

For Additional Information, please visit [us.tdk-lambda.com/lp/products/fq-series.htm](http://us.tdk-lambda.com/lp/products/fq-series.htm)



**PRELIMINARY**

**MIL-COTS 20A, 40VDC Transient & EMI Filter**

**Features**

- ◆ High Differential and Common Mode Noise Attenuation for MIL-STD-461F
- ◆ Spike and Surge Suppression per MIL-STD-1275D,E
- ◆ Spike and Surge Suppression per RTCA/DO-160 section 16-18 & MIL-HDBK-704-8 (A-F)
- ◆ -55 to 115°C Temperature Range (M grade)
- ◆ Remote on/off
- ◆ Overvoltage and Overcurrent Protection
- ◆ Encapsulated for Harsh Environments
- ◆ Standard or Enhanced Screening Options
- ◆ Quarter Brick Size

**Key Market Segments & Applications**



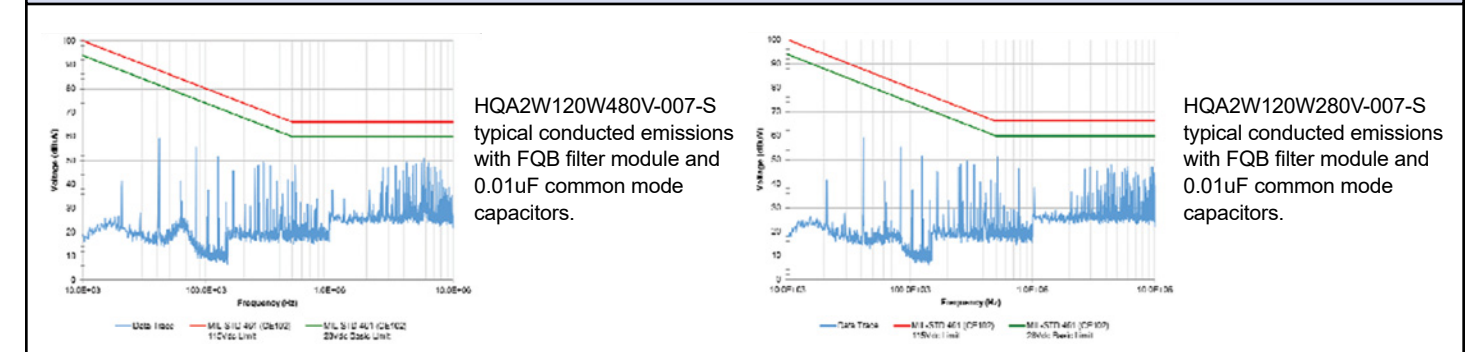
Preliminary Specifications		FQB
Model		FQB
Rated Voltage	VDC	40VDC
Rated Current	A	20A
Input Voltage Spike Supression (Vin 28V, 280W)	V	Typically 5V deviation for a ±250V, 100µs, 15mJ surge per MIL-STD-1275 B,D Typically 5V deviation for a ±600V, 10µs, 50Ω source impedance per RTCA/DO-160G 47V maximum output with a 60V, 550ms surge per MIL-HDBK-704A (Po = 280W) 47V maximum output with an 80V, 80ms surge per MIL-HDBK-704A (Po = 280W) 47V maximum output with an 100V, 50ms surge per MIL-STD-1275D,E (Po = 280W) 47V maximum output with an 174V, 350ms surge per DEF-STAN 61-5 Part 6, (Po < 75W)
Input Voltage Surge Supression (Vin 28V)	-	47V maximum output with a 60V, 550ms surge per MIL-HDBK-704A (Po = 280W) 47V maximum output with an 80V, 80ms surge per MIL-HDBK-704A (Po = 280W) 47V maximum output with an 100V, 50ms surge per MIL-STD-1275D,E (Po = 280W) 47V maximum output with an 174V, 350ms surge per DEF-STAN 61-5 Part 6, (Po < 75W)
Standby Input Current (typical)	mA	1.5mA. Vin = 28V, Input On/Off = off
Off-load Input Current (typical)	mA	3mA. Vin = 28V
Overcurrent Protection	-	Limits the output current, with timed shutdown to allow module to cool. Auto restart.
Input Under & Over Voltage Protection	-	Module will shut down if an input or over voltage condition occurs. Auto recovery.
Reverse Polarity Protection	-	Internal series MOSFET is held in an off state to avoid reverse current flow
Remote On/Off	-	Module off when Pin 2 is connected to Pin 3 (-Vin)
DC Good / Fault Signal	-	Open collector signal, low = Good.
Withstand Voltage	VDC	Terminals to Case: 2250VDC
Leakage Current	mA	Not Applicable
DC Resistance (total)	mΩ	30mΩ (typical)
Operating Baseplate Temperature	°C	Standard screening (-S): -40°C to +115°C, Enhanced screening (-M): -55°C to +115°C. See long form datasheet for derating curves
Storage Temperature	°C	-65 to 125°C
Humidity (non condensing)	-	MIL-STD 883 Method 1004.7
Cooling	-	Conduction, convection or forced air
Vibration	-	MIL-STD-202G, Method 201A, Unpowered, sweep 1: 5 to 50 Hz at 0.5g, sweep 2: 50 to 500 Hz at 1.5g, three axis
Shock	-	MIL-STD-202G, Method 213B, Table 213-1, Test Condition I, Unpowered, 50G half sine 6ms, three axis
Safety Agency Certifications	-	IEC/EN/UL60950-1
Qualification Methods	-	Consistent with MIL-STD-883F and MIL-STD-202G
Weight	g	100g (Flanged version)
Size (L x W x H)	in(mm)	Flanged version: 2.39 x 2.2 x 0.5" (60.6 x 55.9 x 12.7) Non-flanged version: 2.39 x 1.54 x 0.5" (60.6 x 39 x 12.7)
Warranty	yrs	3 Years

Model Selector	Flanged Baseplate	Non-Flanged Baseplate	Standard Screening (-S)	Enhanced Screening (-M)
FQB020ADC-007-S	X		X	
FQB020ADC-N07-S		X	X	
FQB020ADC-007-M	X			X
FQB020ADC-N07-M		X		X

**Screening**

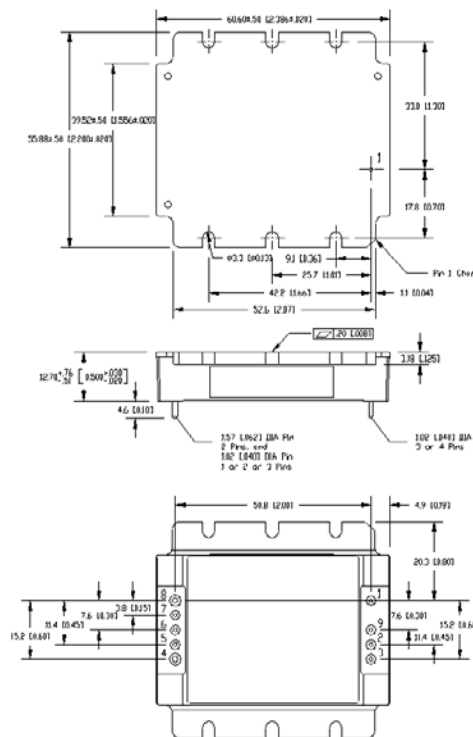
Operation	Standard Screening (-S)	Enhanced Screening (-M)
Functional Test	Room Temperature	Cold, Room, and Hot Test
Burn In	Yes	Extended, 96 hour
Temperature Cycling	No	10 Cycles
Hi-Pot	2250VDC	2250VDC
Visual Inspection	Yes	Yes

**Preliminary Attenuation Characteristics**



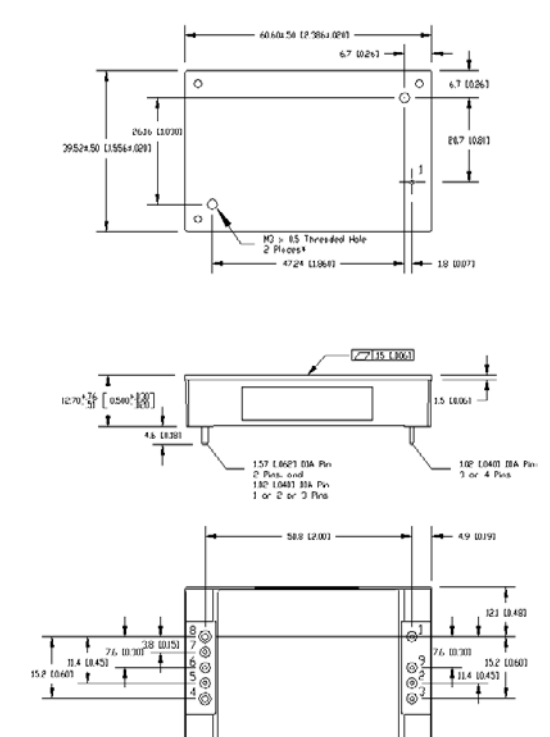
**Outline Drawing**

**007 option (flange baseplate)**



**Outline Drawing**

**N07 option (non flange baseplate)**



**Pinout**

Pin	Function	Pin	Function
1	Vin +	6	Common mode out*
2	On/Off	7	DC Good / Fault
3	Vin -	8	Vout +
4	Vout -	9	COM (IN)*
5	No connection		

\* In a typical application pin 6 would be connected to the Vout-/ground plane and pin 9 to chassis/ground for EMI measurement

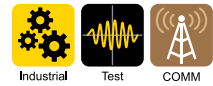
## 50A 48VDC EMI Filters

### Features

- ◆ High Attenuation
- ◆ Stud Terminal Connection
- ◆ Compact Size

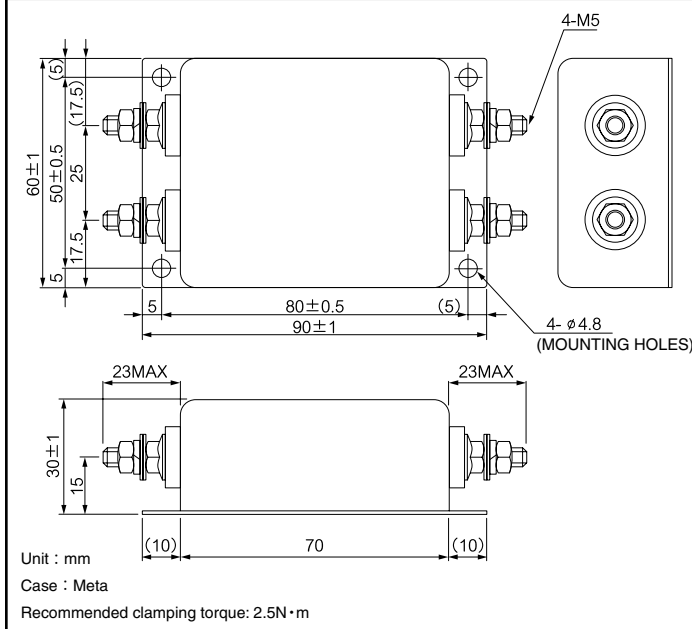


### Key Market Segments & Applications

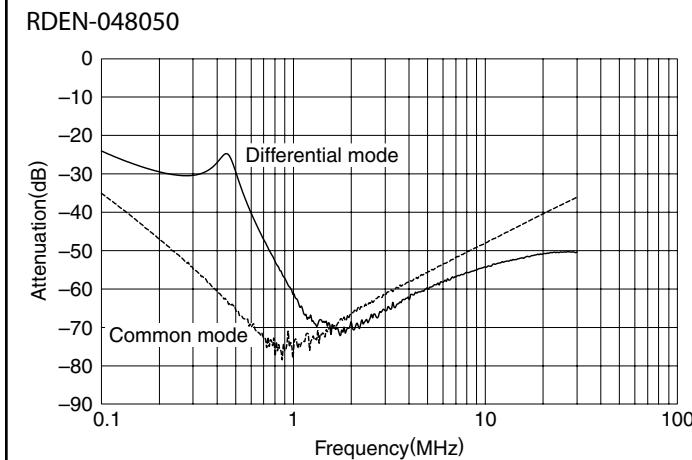


Specifications		RDEN-048050
Model		RDEN-048050
Rated Voltage	VDC	48VDC (76VDC Max)
Rated Current	A	50A
Withstand Voltage	VDC	Terminals to Case: 1500VDC 60s
Isolation Resistance	MΩ	500MΩ minimum at 500VDC for 1 minute
Leakage Current	mA	Not Applicable
DC Resistance	mΩ	3
Operating Temperature	°C	-30 to +85 (see derating curve)
Storage Temperature	°C	-30 to +85
Safety Agency Certification	-	UL/CSA60950-1, EN60939
Weight (Typ)	g	310
Warranty	yrs	1 Year

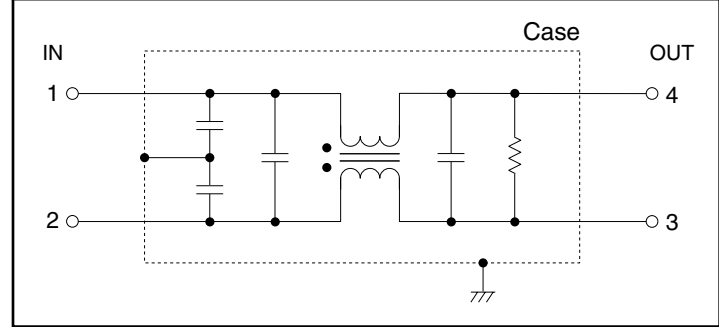
### Outline Drawing



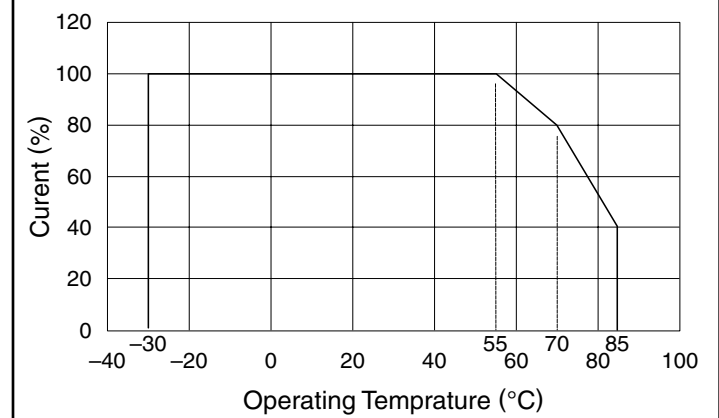
### Attenuation Characteristics



### Circuit



### Derating



For Additional Information, please visit  
[us.tdk-lambda.com/lp/products/rden-series.htm](http://us.tdk-lambda.com/lp/products/rden-series.htm)



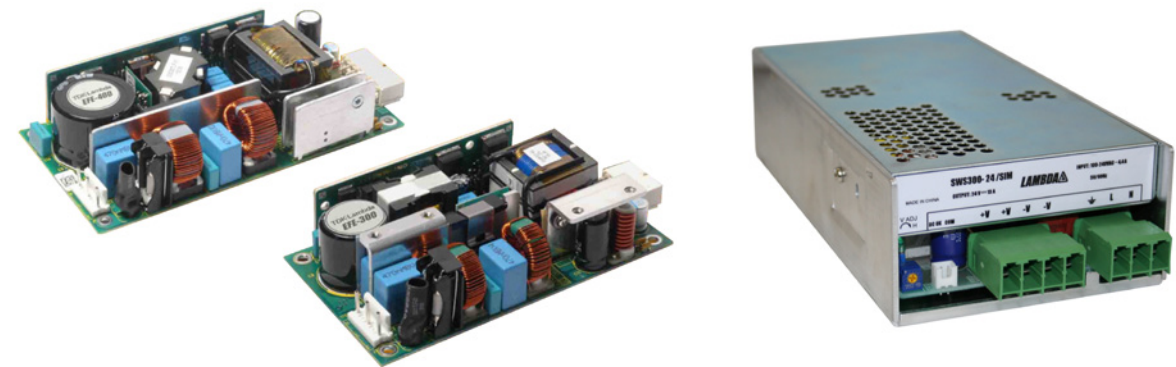


**Features**

- ◆ Technical draft
- ◆ Field-proven technology from our standard products
- ◆ Careful component selection
- ◆ Design Verification Test (DVT)
- ◆ Approvals (Safety, EMC, Environment and etc...)

**Modified Standard (Low Complexity)**

- ◆ A slight modification (electrical or physical) to a Standard / Existing TDK-Lambda product.
- ◆ The product retains the inherent reliability of the product from which it was modified.
- ◆ Examples include Input/Output connector, signal, output voltage, or paint changes, reduced leakage current, and addition of test points or indicator lights.



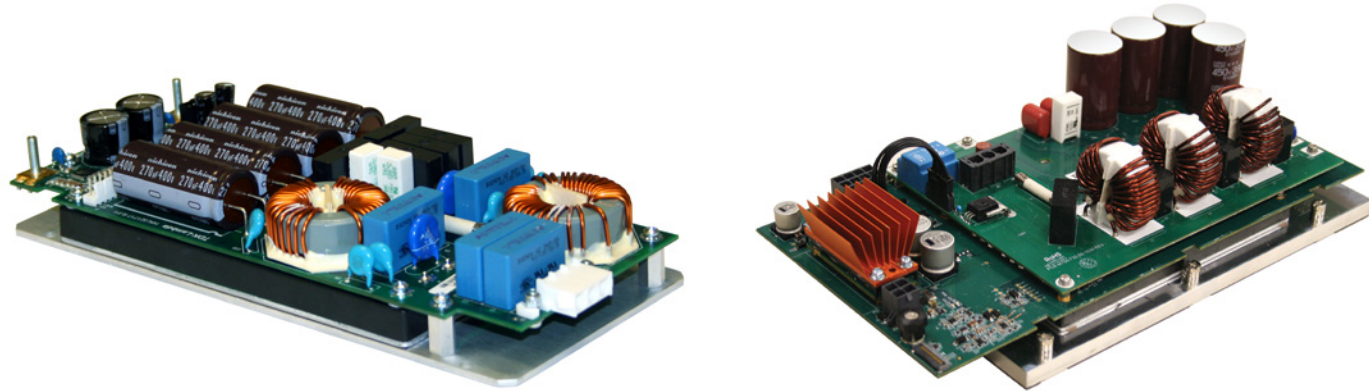
**Value-Added (Medium Complexity)**

- ◆ A customized power solution which builds added circuitry or packaging around a Standard/ Existing TDK-Lambda Power Supply to meet exact specifications.
- ◆ Any TDK-Lambda supply may be used as a starting point and these customized solutions also retain the proven reliability of the product from which it was modified.
- ◆ Examples include custom racks or enclosures, special wire harnesses, switches, fuses, fans, or heat sinks, and additional functionality to a standard product.



**Brick-on-Board (Medium Complexity)**

- ◆ A customized power solution which builds added circuitry around Standard / Existing TDK-Lambda PCB Power Modules.
- ◆ Oftentimes, custom enclosures are built around the brick-on-board power supply.
- ◆ These high reliability customized solutions are built around TDK-Lambda's industry leading power modules and designs have fast turnaround times.

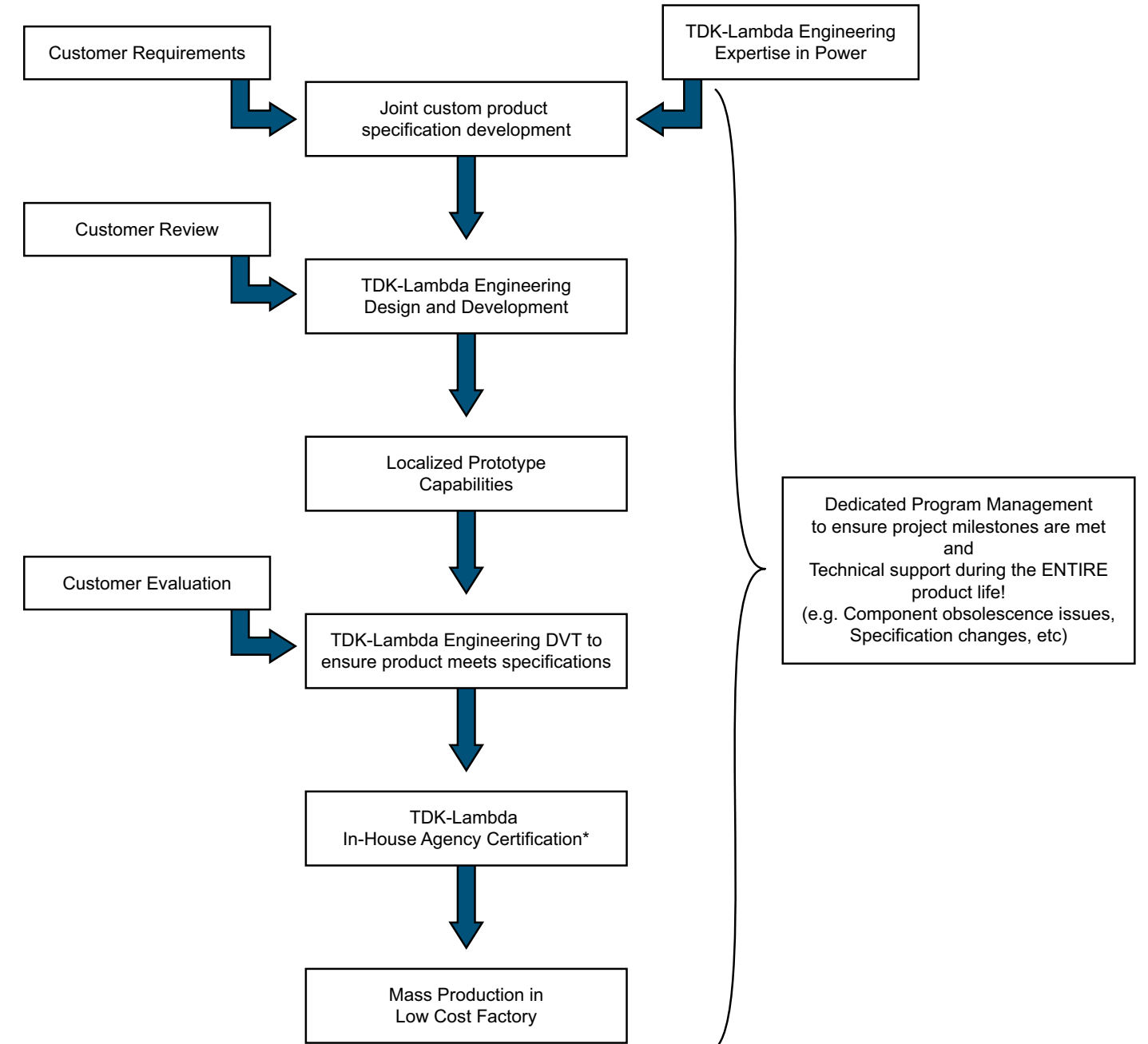


**Full Custom (High Complexity)**

- ◆ A power supply designed "from scratch" electrically using discrete components to meet the customer's unique set of requirements.
- ◆ Designs may build upon existing circuitry, but packaging is typically unique.
- ◆ Examples include multiple input/output, high power density, high technology, severe temperature range, or very low noise.



**Process Flow**

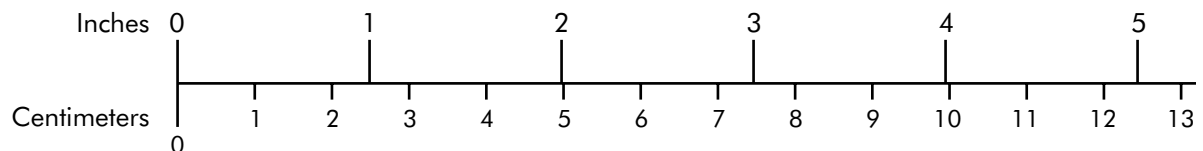


\* For Modified Standard Products. New designs will be tested by external agencies.

# TDK-Lambda Conversion Factors & Equations

English & Metric Conversions	
English to Metric	Multiply English Unit by:
inch to millimeter (mm)	25.4
inch to centimeter (cm)	2.54
foot to meter (m)	0.3048
ounce (oz) to gram (gm)	28.35
pound (lb) to kilogram (kg)	0.45
Metric to English	Multiply Metric Unit by:
millimeter (mm) to inch	0.03937
centimeter (cm) to inch	0.3937
Meter (m) to foot (ft)	3.2808
gram (gm) to ounce (oz)	0.0353
kilogram (kg) to pound (lb)	2.2

## Inches to Centimeters (cm) Conversion



## Air Flow Conversions

1m/s (meters per second)= 3.28 feet per second = 196.85 LFM (linear feet per minute)

## Weight Conversions

453.6 grams = 16 ounces = 1 pound

## Rack Height Units

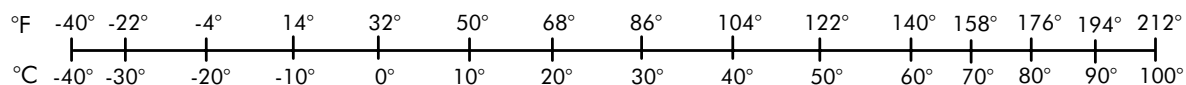
1U = 1.75 inch = 44.45mm

2U = 3.50 inch = 88.90mm

## Fahrenheit - Celsius Temperature Conversions

$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32^{\circ}}{1.8} \quad ^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32^{\circ}$$

## Conversion Formulas



## DC Circuit Equations

$$V = IR \quad I = \frac{V}{R} \quad R = \frac{V}{I} \quad P = IV \quad P = \frac{V^2}{R} \quad P = I^2R$$

V = Voltage (in volts)      R = Resistance (in ohms)

I = Current (in amperes)      P = Power (in watts)





## Ilfracombe Plant (U.K.)

Manufacturing and R&D  
Modular (Vega, Alpha, NV) & DC-DC power supplies



## Nagaoka (Japan)

Manufacturing & R&D  
AC-DC, DC-DC & custom power supplies



## Senai Plant (Malaysia)

Manufacturing  
AC-DC, DC-DC power modules & custom products



## Wuxi Plant (China)

Manufacturing and R&D  
AC-DC Converters, filters & custom products



## Kuantan Plant (Malaysia)

Manufacturing  
AC-DC Converters & custom products



## Karmiel Plant (Israel)

Manufacturing & R&D  
AC-DC & programmable products

CCG.....	160	iCH.....	200
CC-E.....	152	iDQ.....	234
CM4.....	68	IEH.....	166
CN-A24.....	172	iHG.....	188
CN-A110.....	168	iJA.....	204
CPFE1000FI.....	42	iJB.....	206
CSS500.....	34	iJC.....	208
CSW65.....	18	iQE.....	170
CUS30M/60M.....	94	iQG.....	184
CUS100ME.....	102	iQL.....	176
CUS150M.....	104	KAS.....	82
CUS200M.....	108	KM.....	90
CUS200LD.....	22	KPSA.....	84
CUS250LD.....	26	KMSA.....	92
CUS350M.....	30	KWSA.....	86
CUS400M.....	32	LS.....	14
CUS1500M.....	48	LS200.....	24
CUT35.....	98	LZSA.....	38
CUT75.....	100	NV175.....	106
DPX.....	124	NV350/700.....	62
DRB15-100.....	122	PAF600F.....	190
DRB120-480.....	128	PAH300/450.....	186
DRF120-960.....	126	PFE300SA/500F/1000FA.....	112
DRL10-100.....	120	PFH500F.....	116
DT62-80D.....	136	PHA-280.....	174
DT100/150D.....	140	PXC-M03.....	154
DTM65-C8.....	132	PXC-M06.....	156
DTM110-C.....	138	PXC-M10.....	158
DTM110-C8.....	142	PXE.....	162
DTM65-D.....	134	PXF.....	164
DTM250-D.....	144	QM.....	70
DTM300-D.....	146	RDEN.....	240
EZA11K.....	192	RFE1600.....	50
GQA120.....	180	RFE2500.....	54
GXE600.....	40	RSEV.....	228
HFE1600.....	76	RSHN.....	226
HFE2500.....	78	RTAN.....	230
HQA85.....	178	RTHN.....	232
HQA120.....	182	RWS-B.....	20
HWS15A-150A/A.....	12	RWS1000/1500-B.....	44
HWS300-1500.....	28	RWS1000/1500-B/ME.....	46
HWS/HD.....	16	TPS3000.....	56
HWS1800T.....	52	TPS4000.....	58
FQA.....	236	Vega.....	64
FQB.....	238	Vega-Lite.....	66
i3A.....	202	XMS500.....	36
i6A.....	212	ZWS10-30B.....	88
i6A4W.....	214	ZWS50-150BAF.....	96
i6AN.....	196	ZWS240RC-24.....	110
i7C.....	216	ZWS300BAF.....	114
IAH.....	210	Z+.....	220
iBH.....	198	Z+ HV.....	222



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