

EPM25-1V 15 W

15 Watt isolated DC-DC converter



Product features

- 15 Watt isolated DC-DC converter
- Input voltage: 9 Vdc - 36 Vdc
18 Vdc - 75 Vdc
- Efficiency up to 90%
- Isolation voltage: 1.6 kVdc
- 1.0" x 1.0" package
- Operating ambient temperature from -40 °C to +105 °C
- No minimum load required
- EMI class A without external circuit
- Remote On/OFF
- IEC62368-1/ EN55032&35 certified

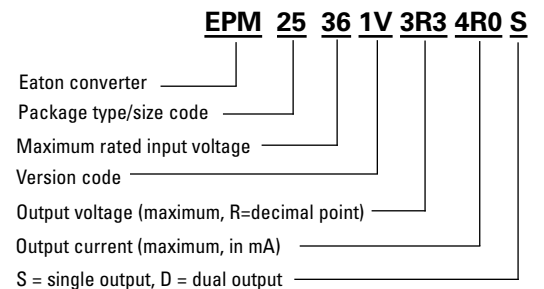
Applications

- Computing/telecom
- Distributed power architectures
- Servers and workstations
- LAN / WAN applications
- Data processing applications
- Industrial IoT equipment, sensors
- Power supply, battery backup
- Wireless TX/RX modules
- Renewable energy products

Environmental compliance



Ordering part number



Powering Business Worldwide

Specifications

	Parameter	Conditions	Minimum	Typical	Maximum	Unit
Input	Input filter			Pi type		
	Input voltage range	V _{in} = 24 Vdc	9		36	Vdc
		V _{in} = 48 Vdc	18		75	Vdc
	Input current @ no load	V _{in} = 24 Vdc		7		mA
		V _{in} = 48 Vdc		5		mA
	Start-up time	100% Load at Nominal V _{in}		20		ms
	Start-up voltage	V _{in} = 24 Vdc			9	Vdc
		V _{in} = 48 Vdc			18	Vdc
	UVLO	V _{in} = 24 Vdc		7.5		Vdc
		V _{in} = 48 Vdc		16		Vdc
	Input surge voltage (0.1 s max.)	V _{in} = 24 Vdc			50	Vdc
		V _{in} = 48 Vdc			100	Vdc
	Remote ON/OFF	DC-DC ON			Open or 3.5 - 15 Vdc	
DC-DC OFF				Short or 0 - 1.2 Vdc		
Input current (remote off mode)			2		mA	
Output	Efficiency			Selection guide		
	Minimum load		0			%
	Line regulation	Single output	-0.2		+0.2	%
		Dual output	-0.5		+0.5	%
	Load regulation (10-100% Load)	Single output	-0.5		+0.5	%
		Dual output	-1.0		+1.0	%
	Cross regulation		-5		+5	%
	Voltage accuracy		-1		+1	%
	Operating frequency	V _{out} = 3.3 Vdc		400		kHz
		others		350		kHz
	Ripple & noise ¹	V _{in} = 24 Vdc			60	mVp-p
V _{in} = 48 Vdc				100	mVp-p	
Voltage adjustability		-10		+10	%	
Environment	Operating temperature (with derating)		-40		+105	°C
	Storage temperature		-55		+125	°C
	Max. case temperature				110	°C
	Relative humidity		5		95	%RH
	Vibration				MIL-STD-202G	
Function	Isolation voltage 1 min., Input to Output		1.6			kVdc
	Isolation resistance		1000			MΩ
	Isolation capacitance			1200		pF
	MTBF (MIL-HDBK-217F)	+25 °C		1000		khours
	Short circuit protection			Continuous, automatic recovery		
	Overload protection	V _{in} = 24 Vdc			170	%
		V _{in} = 48 Vdc			190	%
	Certification				IEC62368-1/ EN55032&35	

Specifications

	Parameter	Conditions	Minimum	Typical	Maximum	Unit
Physical	Dimension			1.00 x 1.00 x 0.40 inch		
	Weight			17 g		
	Case material			metal case		
	Base material			FR4 PCB		
	Potting material			Silicone		
EMC	EMI	EN 55032		Class A without external circuit, Class B with external circuit		
	ESD	IEC 61000-4-2 Air ± 8 kV; Contact ± 6 kV		Criteria A		
	RS ²	IEC 61000-4-3, 3 V/m		Criteria A		
	EFT ²	IEC 61000-4-4, ± 2 kV		Criteria A		
	Surge ²	IEC 61000-4-5, ± 2 kV		Criteria A		
	CS ²	IEC 61000-4-6, 3 Vrms		Criteria A		
	PfMF	IEC 61000-4-8, 1 A/m		Criteria A		

1. The ripple & noise are measured with 1 μ F capacitor at 20 MHz BW.
2. Test with E-CAP 220 μ F/100 V at input terminal.
3. All specifications valid at nominal input, full load and +25 °C after warm-up time unless otherwise stated.
4. The product information and specifications are subject to change without prior notice.

Selection guide

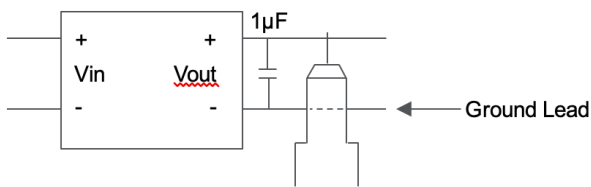
Part number	Input voltage (Vdc)	Output voltage (Vdc)	Output current @ full load (mA)	Efficiency ¹ minimum	Efficiency ¹ typical	Capacitive load ² maximum (μF)
EPM25361V-3R3-4R0S	9-36 Nominal 24	3.3	4000	84.00%	85.00%	12000
EPM25361V-05R-3R0S	9-36 Nominal 24	5	3000	87.00%	88.00%	6400
EPM25361V-12R-1R2S	9-36 Nominal 24	12	1250	87.50%	88.50%	1200
EPM25361V-15R-1R0S	9-36 Nominal 24	15	1000	88.00%	89.00%	900
EPM25361V-24R-R62S	9-36 Nominal 24	24	625	88.50%	89.50%	240
EPM25361V-12R-R62D	9-36 Nominal 24	±12	±625	86.00%	87.00%	±520
EPM25751V-3R3-4R0S	18-75 Nominal 48	3.3	4000	84.00%	85.00%	12000
EPM25751V-05R-3R0S	18-75 Nominal 48	5	3000	87.00%	88.00%	6400
EPM25751V-12R-1R2S	18-75 Nominal 48	12	1250	88.00%	89.00%	1200
EPM25751V-15R-1R0S	18-75 Nominal 48	15	1000	88.50%	89.50%	900
EPM25751V-24R-R62S	18-75 Nominal 48	24	625	89.00%	90.00%	240
EPM25751V-12R-R62D	18-75 Nominal 48	±12	±625	88.50%	89.50%	±520

1. Efficiency is nominal input voltage and full load @ +25 °C.

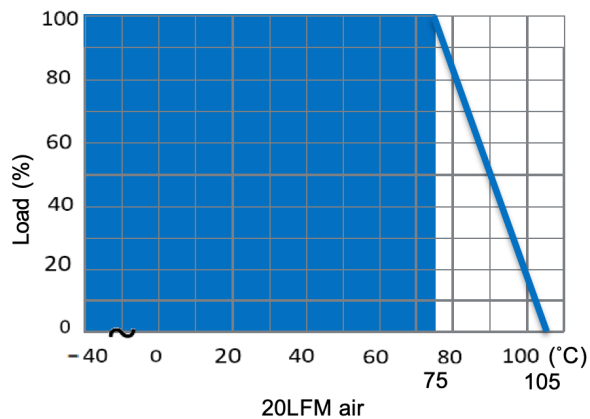
2. Capacitive load is tested at minimum input voltage and a constant resistive load.

3. All specifications valid at nominal input voltage, full load and +25 °C after warm-up time unless otherwise stated.

Measure method

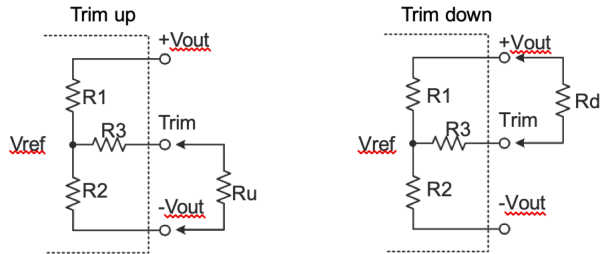


Derating curve



Application information

Single external output voltage trimming



Formula for trim resistor:

$$\text{UP: } R_u = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_0' - V_{ref}} \cdot R_1$$

$$\text{DOWN: } R_d = \frac{bR_1}{R_1 - b} - R_3 \quad b = \frac{V_0' - V_{ref}}{V_{ref}} \cdot R_2$$

1. Ru, Rd is mean trim resistor, please check the formula.
2. a & b: user define parameter
3. V_0' is mean trim up/down voltage.
4. Value for R1, R2, R3 and V_{ref} Refer to the table below.

Output voltage	R1	R2	R3	Vref
3.3 V	16.6 kΩ	10 kΩ	52.3 kΩ	1.24 V
5 V	10.0 kΩ	10 kΩ	35.7 kΩ	2.5 V
12 V	38.1 kΩ	10 kΩ	48.7 kΩ	2.5 V
15 V	50.1 kΩ	10 kΩ	51.0 kΩ	2.5 V
24 V	86.32 kΩ	10 kΩ	73.2 kΩ	2.5 V

Trim up

3R3-04RS

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63
Ru (kΩ)	542.61	252.19	152.31	101.77	71.25	50.82	36.19	25.2	16.63	9.77

05R-3R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5
Ru (kΩ)	464.3	214.3	130.97	89.3	64.3	47.63	35.73	26.8	19.86	14.3

12R-1R2S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.2
Ru (kΩ)	953.93	394.32	235.63	160.64	116.95	88.35	68.17	53.17	41.58	32.36

15R-1R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5
Ru (kΩ)	951.00	404.45	243.71	166.83	121.76	92.14	71.20	55.60	43.53	33.92

24R-R62S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4
Ru (kΩ)	1275.55	466.3	263.99	172.03	119.48	85.48	61.67	44.08	30.55	19.82

Trim down

3R3-4R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97
Rd (kΩ)	1019.29	461.68	281.91	193.13	140.21	105.07	80.05	61.31	46.77	35.14

05R-3R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5
Rd (kΩ)	454.3	204.3	120.97	79.3	54.3	37.63	25.73	16.8	9.86	4.3

12R-1R2S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8
Rd (kΩ)	2415.98	1282.64	855.8	631.82	493.84	400.32	332.74	281.63	241.62	209.45

15R-1R0S

trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5
Rd (kΩ)	3484.63	1829.68	1219.96	902.9	708.58	577.28	482.62	411.15	355.27	310.38

24R-R62S

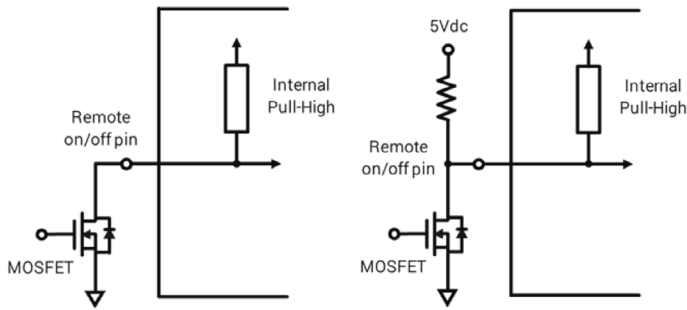
trim (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6
Rd (kΩ)	5661.68	3166.88	2168.96	1631.62	1295.78	1066	898.88	771.87	672.08	591.6

CTRL pin setting

Remote ON/OFF	DC-DC ON	Open or 3.5 - 15 Vdc
	DC-DC OFF	Short or 0 - 1.2 Vdc

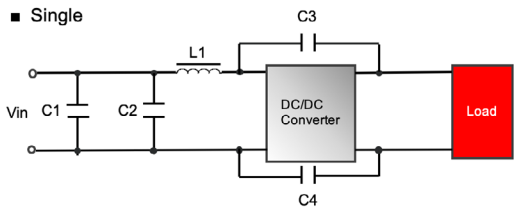
If not using CTRL function, leave CTRL pin floating.

If using CTRL pin to control module to turn on and off; use either external circuit as shown below.

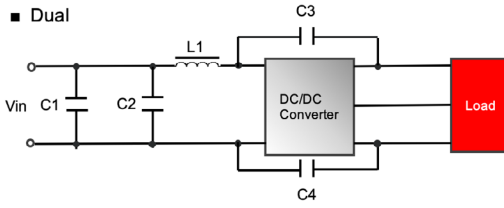


EMC filtering circuit

■ Single

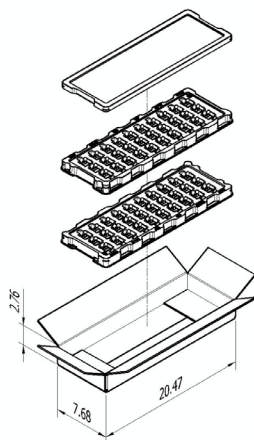


■ Dual

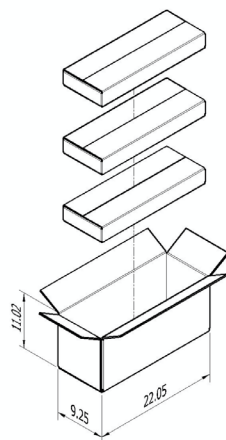


Class B	C1	C2	L1	C3	C4
24 Vin	2.2 μ F	2.2 μ F	4.7 μ H	1500 pF	1500 pF
48 Vin	2.2 μ F	2.2 μ F	4.7 μ H	1500 pF	1500 pF

Packaging- Inches



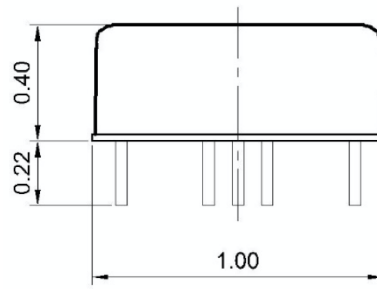
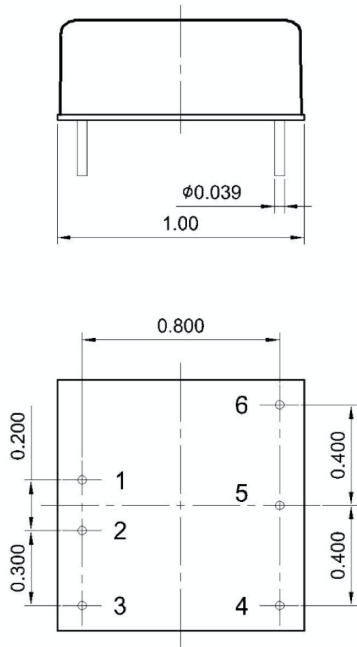
Unit:inch



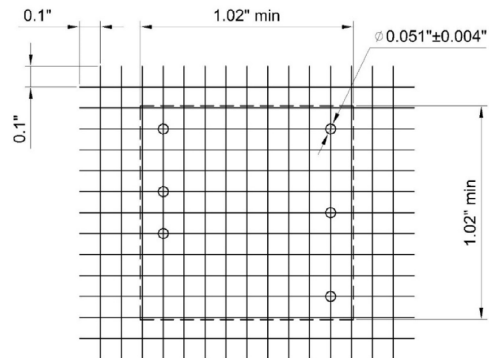
Box accommodates
2 tray 60 converters per box

Carton accommodates
3 boxes 180 converters per carton

Dimensions - inches



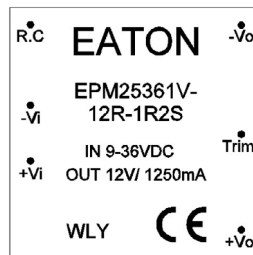
Recommended PCB layout



Unit: inch
PIN tolerance: ± 0.004
Tolerance: X.XX ± 0.02 X.XXX ± 0.01

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL	CTRL
4	-Vout	-Vout
5	Trim	Common
6	+Vout	+Vout

Marking



WLY = lot code

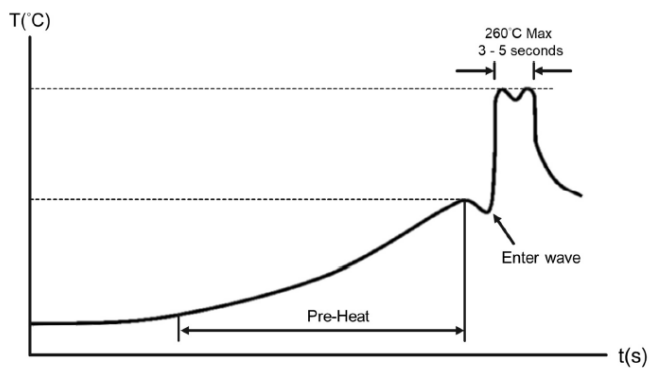
General information

Storage and handling

The shelf life will be a minimum of 36 months, when stored at the following conditions: < +40 °C, < 90% RH.

Wave solder profile

The wave solder profile is measured based on lead temperature. The recommended PCB pre-heat temperature is +80 °C to +100 °C, and the preheat rate of 1.5 to 2.5 °C/sec. The underside PCB temperature at the last pre-heat zone should be approximately +150 °C. The internal temperature of the solder parts should not exceed +210 °C. The duration of solder dwell time should be between 3 to 5 seconds, and not to exceed 10 seconds at a temperature of +260 °C maximum.



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