

# Features

- 4:1 Wide Input Voltage Range
- 1.6kVDC Isolation
- UL Certified
- Efficiency up to 84%
- Fixed Operating Frequency
- Six-Sided Continuous Shield

# Regulated Converters



## RP10-EW

10 Watt  
2" x 1"  
Single & Dual  
Output



### Description

The RP10-EW series wide input range DC/DC converters are certified to UL 60950-1 and cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required. The industry standard 2" x 1" package meets military standards for thermal shock and vibration tolerance and is available with an optional remote on/off control pin.

### Selection Guide

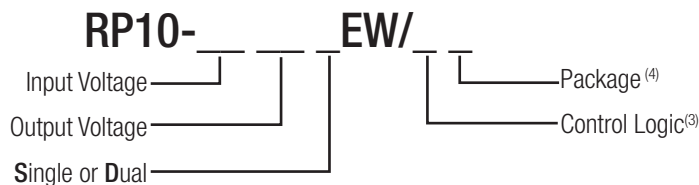
Part Number	Input Voltage Range (VDC)	Output Voltage (VDC)	Output Current (mA)	Input Current (mA) <sup>(1)</sup>	Efficiency <sup>(1)</sup> typ. (%)	Max. Capacitive Load <sup>(2)</sup> (µF)
RP10-243.3SEW <sup>(3,4)</sup>	9-36	3.3	2500	441	78	6800
RP10-2405SEW <sup>(3,4)</sup>	9-36	5	2000	521	80	4700
RP10-2412SEW <sup>(3,4)</sup>	9-36	12	830	494	84	690
RP10-2415SEW <sup>(3,4)</sup>	9-36	15	670	517	81	470
RP10-483.3SEW <sup>(3,4)</sup>	18-75	3.3	±333	30	76	6800
RP10-4805SEW <sup>(3,4)</sup>	18-75	5	2500	322	81	4700
RP10-4812SEW <sup>(3,4)</sup>	18-75	12	2000	595	84	690
RP10-4815SEW <sup>(3,4)</sup>	18-75	15	830	309	84	470
RP10-2405DEW <sup>(3,4)</sup>	9-36	±5	±1000	508	82	±680
RP10-2412DEW <sup>(3,4)</sup>	9-36	±12	±416	520	80	±330
RP10-2415DEW <sup>(3,4)</sup>	9-36	±15	±333	520	80	±110
RP10-4805DEW <sup>(3,4)</sup>	18-75	±5	±1000	254	82	±680
RP10-4812DEW <sup>(3,4)</sup>	18-75	±12	±416	267	78	±330
RP10-4815DEW <sup>(3,4)</sup>	18-75	±15	±333	257	81	±110



### Notes:

- Note1: Maximum value at nominal input voltage and full load.  
Note2: Test by minimum Vin and constant resistor load.

### Model Numbering



### Ordering Examples:

- RP10-1205SEW/P = 12V Input, 5V Output, Positive Logic CTRL pin fitted  
RP10-4805DEW-HC = 48V Input, 5V Output, No CTRL pin, Heatsink fitted

### Notes:

- Note3: add suffix "P" for CTRL function with Positive Logic (1=ON, 0=OFF)  
add suffix "N" for CTRL function with Negative Logic (0=ON, 1=OFF)  
Note4: add suffix -HC for premounted heatsink and clips



UL60950-1 Certified

**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

**BASIC CHARACTERISTICS**

Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range	nom. Vin = 24V nom. Vin = 48V	9VDC 18VDC	24VDC 48VDC	36VDC 75VDC
Under Voltage Lockout (UVLO)				none
Input Filter				Pi-Type
Input Reflected Ripple Current <sup>(5)</sup>	nominal Vin and full load		30mA <sub>p-p</sub>	
Input Surge Voltage	Vin = 24V, 100ms max. Vin = 48V, 100 ms max.			50VDC 100VDC
Start-up time	nominal Vin and constant resistor load		20ms	
Operating Frequency Range		270kHz	300kHz	330kHz
Minimum Load <sup>(6)</sup>	of full load	10%		
Ripple and Noise	20MHz bandwidth	Single Dual	50mV <sub>p-p</sub> 75mV <sub>p-p</sub>	
Remote ON/OFF <sup>(7)</sup>	Positive Logic	DC-DC ON DC-DC OFF		Open or 3.5V < Vr < 12V Short or 0V < Vr < 1.2V
	Negative Logic	DC-DC ON DC-DC OFF		Short or 0V < Vr < 1.2V Open or 3.5V < Vr < 12V
Input current of Remote pin (CTRL)		DC-DC OFF		20mA
		DC-DC ON	-0.5mA	1.0mA

**Notes:**

Note5: Simulated source impedance of 12μH. 12μH inductor in series with +Vin.

Note6: The RP10 (W) series required a minimum 10% loading on the output to maintain specified regulation.

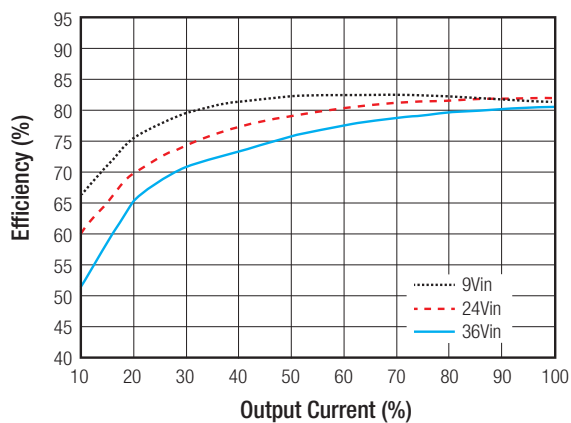
Operation under no-load condition will not damage these devices, however they may not meet all listed specification.

Note7: The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin pin.

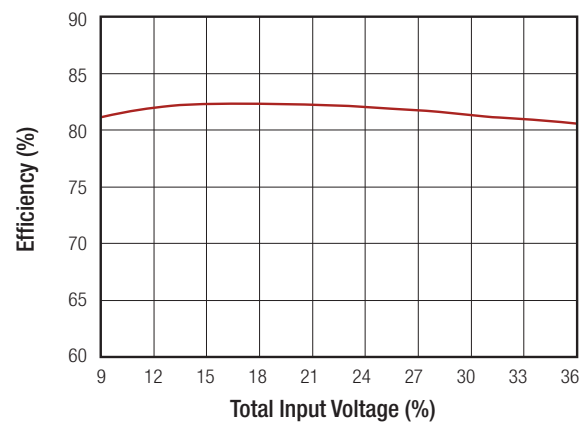
If no suffix is specified, the control pin will be omitted.

**RP10-2405SEW**

**Efficiency vs. Output Current**



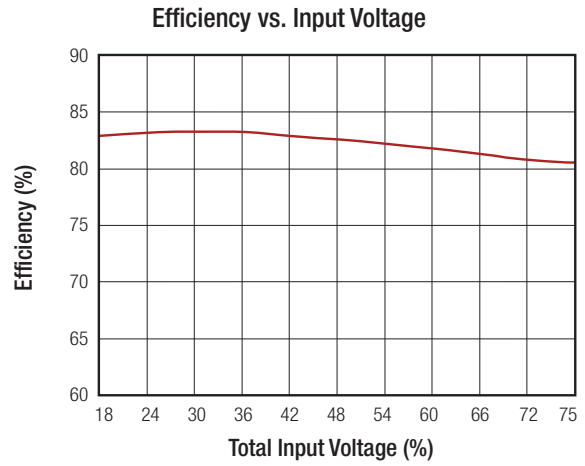
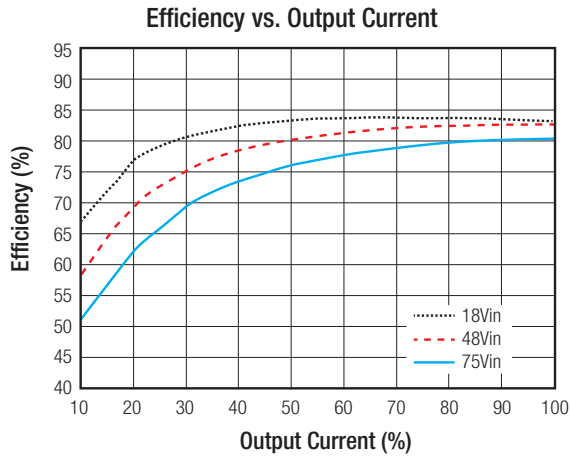
**Efficiency vs. Input Voltage**



continued on next page

**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

**RP10-4805SEW**



**REGULATIONS**

Parameter	Condition		Value
Output Voltage Accuracy			±1%
Load Voltage Regulation	0% to 100% load	Single	±0.5%
		Dual	±1.0%
Line Voltage Regulation	low line to high line, full load		±0.2%
Cross Regulation	asymmetrical 25% <-> 100% load		±5%
Transient Response recovery time	25% load step change		250µs

**PROTECTIONS**

Parameter	Condition		Value
Short Circuit Protection (SCP)			Continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp	5Vout	6.2VDC
		12Vout	15VDC
		15Vout	18VDC
Over Load Protection (OLP)	%of lout rated		150% typ.
Isolation Voltage	I/P to O/P		1.6kVDC/1 minute
	I/P (O/P) to case		1.6kVDC/1 minute
Isolation Resistance	500VDC		1GΩ min.
Isolation Capacitance			300pF max.

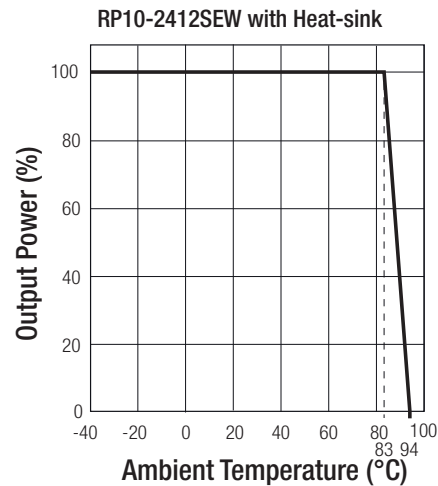
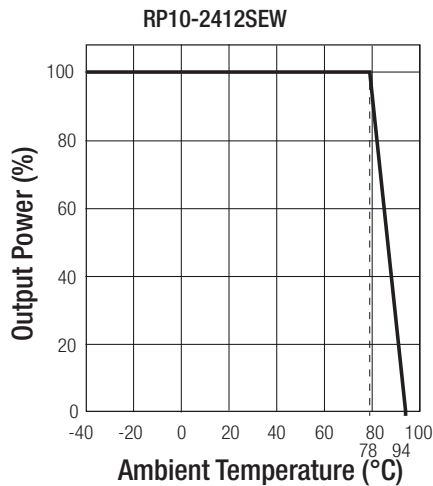
**Notes:**

Note8: This power module is not internally fused. An input line fuse must always be used.

**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	without derating	-40°C to +78°C
	with derating	-40°C to +94°C
Maximum Case Temperature		+105°C
Temperature Coefficient		±0.02%/°C max.
Thermal Impedance <sup>(9)</sup>	Natural convection (20LFM)	12°C/Watt
	Natural convection (20LFM) with heatsink	10°C/Watt
Operating Humidity	non-condensing	5% - 95% RH
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
MTBF	MIL-HDBK-217F, Full Load	3342 x 10 <sup>3</sup> hours
	Bellcoe TR-NWT-000332 <sup>(10)</sup>	1976 x 10 <sup>3</sup> hours

**Derating Graph<sup>(11)</sup>**



**Notes:**

- Note9: Heatsink is optional and P/N 7G-0020C. Powerline DC/DC Converters can be ordered with pre-mounted heatsinks including antivibration fixing clips (add suffix -HC). See application notes for further details.
- Note10: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment).
- Note11: Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a part-number not shown here please contact our technical support service at techsupportAT@recom-power.com

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
UL General Safety	E196683	UL60950-1 1st Ed.: 2003 C22.2 No. 60950 1st. Ed.: 2003
EMC Compliance	Condition	Standard / Criterion
EMI Standard <sup>(12)</sup>	with external filter	EN55022, Class A or B
ESD	Air ±8kV and Contact ± 6kV	EN61000-4-2, Criteria B
Radiated Immunity	10 V/m	EN61000-4-3, Criteria A
Fast Transient <sup>(13)</sup>	±2kV	EN61000-4-4, Criteria B
Surge <sup>(13)</sup>	±2kV	EN61000-4-5, Criteria B
Conducted Immunity	10 Vr.m.s	EN61000-4-6, Criteria A

continued on next page

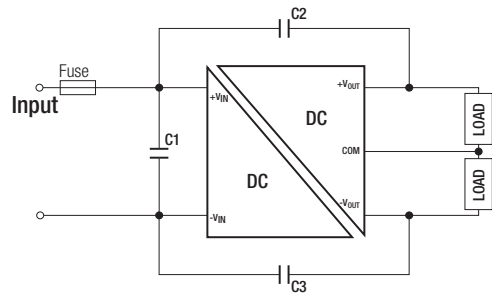
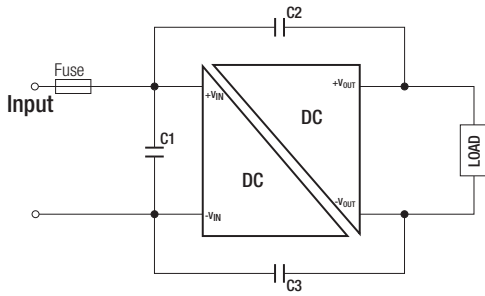
**Specifications** measured at  $T_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted

**Notes:**

Note12: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below.

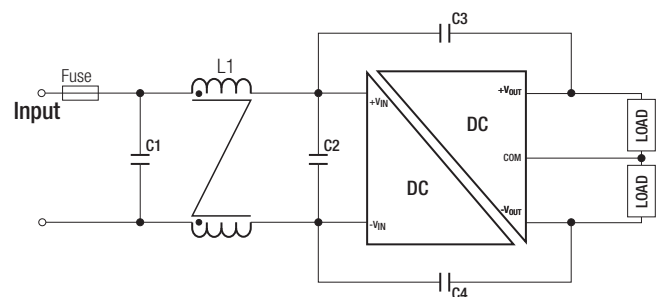
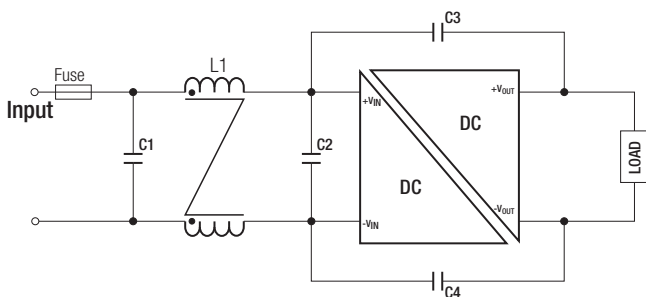
Note13: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Recom suggests: Nippon chemi-con KY series, 220 $\mu\text{F}$ /100V

**EMC Filtering Class A**



MODEL	C1	C2	L1
RP10-24xxS_DEW	1 $\mu\text{F}$ /50V 1210 MLCC	1000pF/2kV 1808 MLCC	1000pF/2kV 1808 MLCC
RP10-48xxS_DEW	1.5 $\mu\text{F}$ /100V 1812 MLCC	1000pF/2kV 1808 MLCC	1000pF/2kV 1808 MLCC

**EMC Filtering Class B**



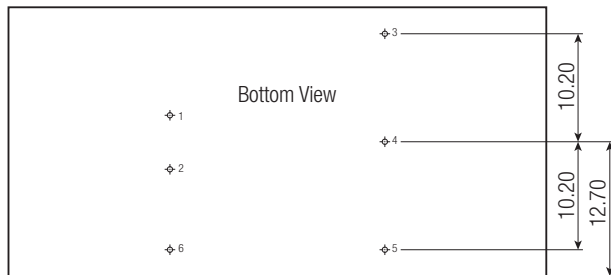
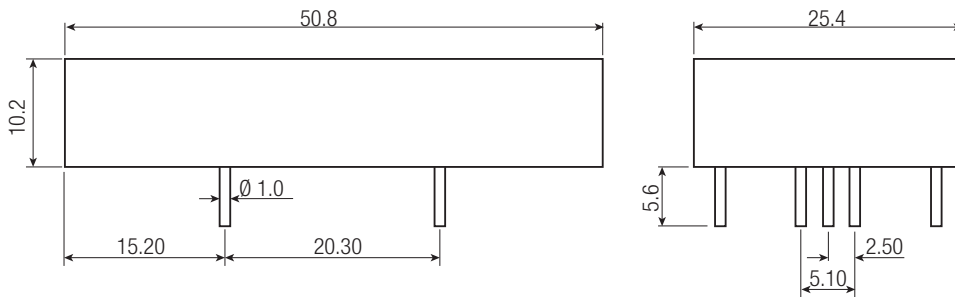
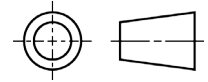
MODEL	C1	C2	C3/C4	L1
RP10-24xxS_DEW	2.2 $\mu\text{F}$ /50V 1812 MLCC	N/A	1000pF/2kV 1808 MLCC	CMC: 325 $\mu\text{H}$ ref: WE 744290321 ref.: CMC-06
RP10-48xxS_DEW	2.2 $\mu\text{F}$ /50V 1812 MLCC	2.2 $\mu\text{F}$ /100V 1812 MLCC	1000pF/2kV 1808 MLCC	CMC: 325 $\mu\text{H}$ ref: WE 744290321 ref.: CMC-06

**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

**DIMENSIONS and PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	Case	Nickel coated copper
	Base	Non-conductive black plastic
	Potting	Epoxy (UL94-V0)
Package Dimensions (LxWxH)		50.8 x 25.4 x 10.2mm
Package Weight	without Heat-sink	27g
	with Heat-sink	37.89g

**Dimension Drawing (mm)**

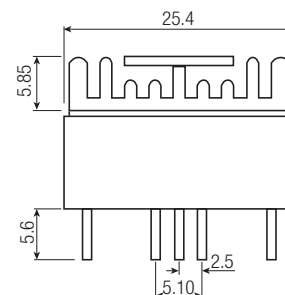
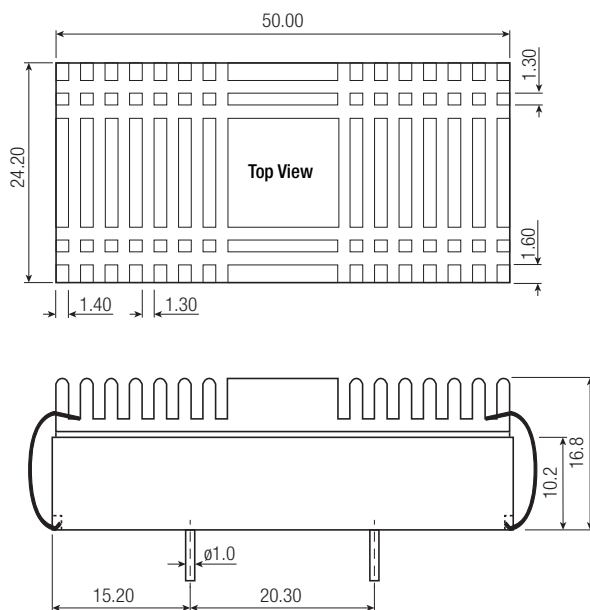


**Pin Connections**

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Com
5	-Vout	-Vout
6*	CTRL*	CTRL*

\*optional see Note7  
Pin Pitch Tolerance ±0.25mm  
XX.X ± 0.5mm  
XX.XX ± 0.25mm

**Dimension Drawing (mm) with Heat-sink**



**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Quantity	without Heat-sink	9pcs.
	with Heat-sink	20pcs.
Storage Temperature Range		-55°C to +125°C
Storage Humidity		5% - 95% RH

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.