

# Features

- Wide 4:1 input voltage range
- 1.6kVDC isolation
- UL60950-1 certified
- Efficiency up to 84%
- Six-sided continuous shield
- Fixed operating frequency

# Regulated Converter



## RP10-EW

10 Watt  
2" x 1"  
Single and Dual Output

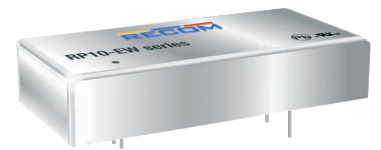


### Description

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 <sup>(1)</sup> Current [mA]	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	2500	226	76	6800
RP10-4805SEW <sup>(3,4)</sup>	18-75	5	2000	322	81	4700
RP10-4812SEW <sup>(3,4)</sup>	18-75	12	830	247	84	690
RP10-4815SEW <sup>(3,4)</sup>	18-75	15	670	249	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

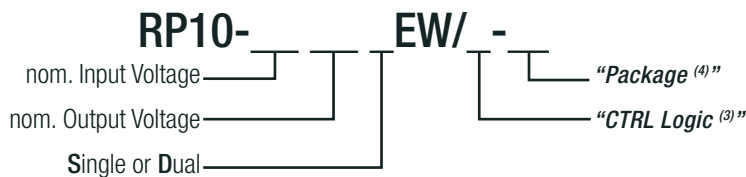


#### Notes:

- Note1: Maximum values at nominal input voltage and full load  
 Note2: Max. Cap load is tested at minimum input and constant resistive load

UL60950-1 certified  
EN55032 compliant

### Model Numbering



#### Notes:

- Note3: no suffix for standard part without CTRL pin  
 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 Heat-sink with clips

#### Ordering Examples

RP10-2405SEW/P = 24V input, 5V output, single, positive Logic CTRL pin  
 RP10-4805DEW/N-HC = 48V input, ±5V output, dual, negative Logic CTRL pin, Heat-sink premounted

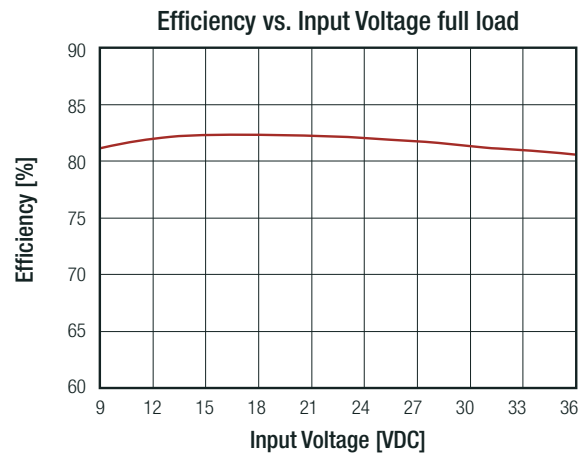
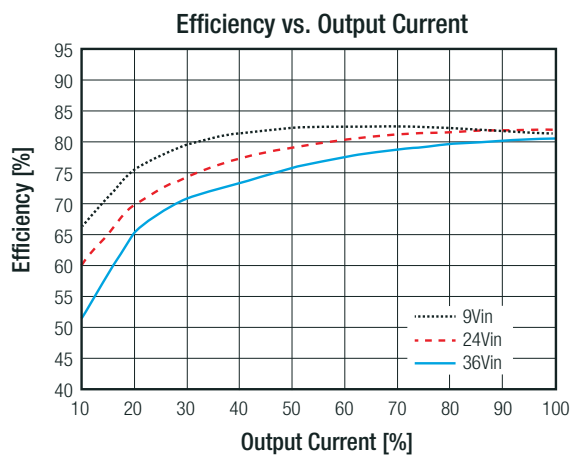
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Input Filter					Pi-Type
Input Voltage Range	nom. Vin = 24VDC nom. Vin = 48VDC		9VDC 18VDC	24VDC 48VDC	36VDC 75VDC
Input Surge Voltage	100ms max.	nom. Vin = 24VDC nom. Vin = 48VDC			50VDC 100VDC
Input Reflected Ripple Current <sup>(5)</sup>				30mA <sub>p-p</sub>	
Minimum Load <sup>(6)</sup>			10%		
Start-up Time	Power up			20ms	
ON/OFF CTRL <sup>(7)</sup>	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.5VDC < V <sub>CTRL</sub> < 12VDC Short or 0VDC < V <sub>CTRL</sub> < 1.2VDC		
	Negative Logic	DC-DC ON DC-DC OFF	Short or 0VDC < V <sub>CTRL</sub> < 1.2VDC Open or 3.5VDC < V <sub>CTRL</sub> < 12VDC		
Input Current of CTRL pin	DC-DC ON		-0.5mA		+1.0mA
Standby Current	DC-DC OFF			20mA	
Internal Operating Frequency			270kHz	300kHz	330kHz
Ripple and Noise	20MHz BW	Single Dual		50mV <sub>p-p</sub> 75mV <sub>p-p</sub>	

**Notes:**

- Note5: Simulated source impedance of 12μH. 12μH inductor in series with +Vin
- Note6: The RP10-EW series requires a minimum of 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: If no suffix is specified, pin6 will be absent.  
If fitted, the ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin pin

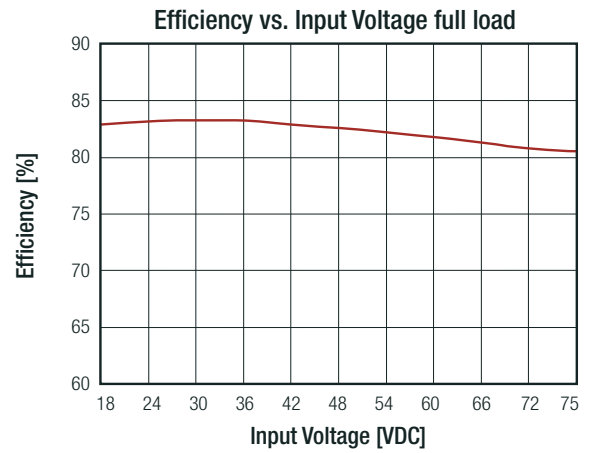
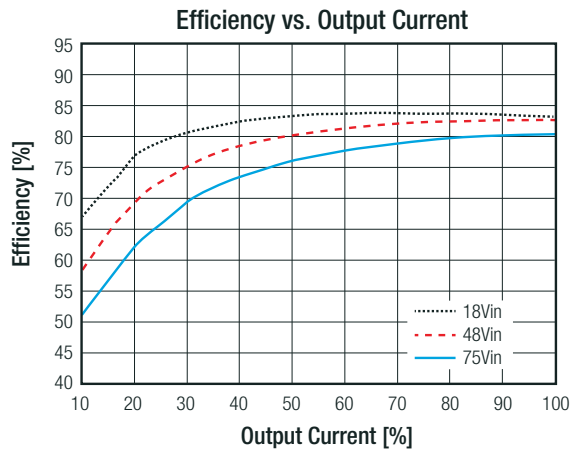
**RP10-2405SEW**



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**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

### RP20-4805SFW



### REGULATIONS

Parameter	Condition		Value
Output Accuracy			±1.0%
Line Regulation	low line to high line, full load		±0.2%
Load Regulation	0% to 100% load	Single	±0.5%
		Dual	±1.0%
Cross Regulation	asymmetrical 25%<>100% load		±5.0%
Transient Response Recovery Time	25% load step change		250µs typ.

### PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)			continuous, automatic recovery
Over Voltage Protection (OVP)	zener diode clamp	3.3Vout	3.9VDC
		5Vout	6.2VDC
		12Vout	15VDC
		15Vout	18VDC
Over Load Protection (OLP)	% Iout rated		150% typ.
Isolation Voltage <sup>(8)</sup>	I/P to O/P		1.6kVDC/ 1 minute
	I/P to O/P to case		1.6kVDC/ 1 minute
Isolation Resistance	Viso= 500VDC		1GΩ min.
Isolation Capacitance			300pF max.

#### Notes:

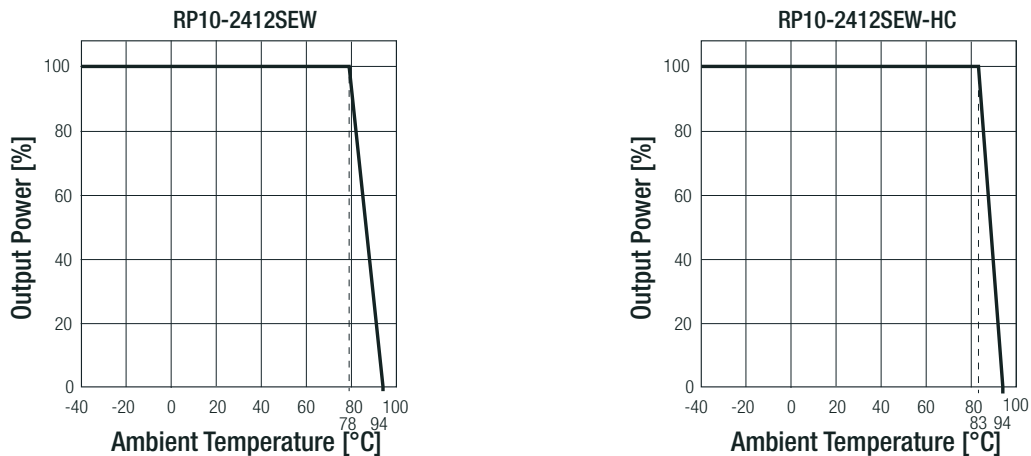
Note8: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note9: This power module is not internally fused. An input line fuse must always be used

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

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%/K max.
Thermal Impedance	@ natural convection 0.1m/s	without heat-sink with heat-sink
		12K/W 10K/W
Operating Humidity	non-condensing	5% - 95% RH
Thermal Shock		according to MIL-STD-810F
Vibration		according to MIL-STD-810F
MTBF	MIL-HDBK-217F, G.B.	3342 x 10 <sup>3</sup> hours
	Bellcore TR-NWT-000332 <sup>(10)</sup>	1976 x 10 <sup>3</sup> hours

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



**Notes:**

- 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 RECOM Techsupport for detailed information

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Condition	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1, 2nd Edition, 2011 CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2011
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS 2		RoHS-2011/65/EU + AM-2015/863
EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter refer to "EMC Filtering Suggestions"	EN55032, Class A and B
ESD Electrostatic discharge immunity test	Air ±8kV and Contact ±6kV	EN61000-4-2, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	10 V/m	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity <sup>(12)</sup>	±2kV	EN61000-4-4, Criteria B
Surge Immunity <sup>(12)</sup>	±2kV	EN61000-4-5, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	10 Vr.m.s	EN61000-4-6, Criteria A
Power Magnetic Field Immunity	100A/m continuous; 1000A/m 1s	EN61000-4-8, Criteria A

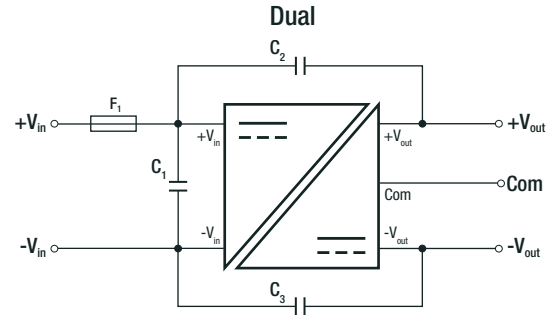
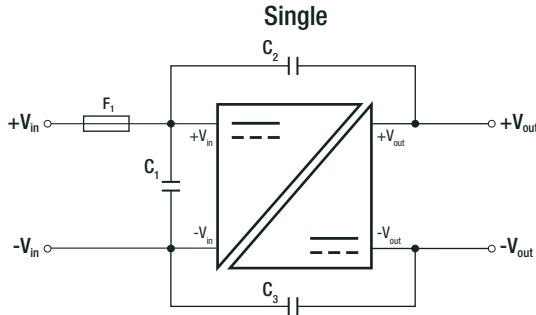
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### Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

#### Notes:

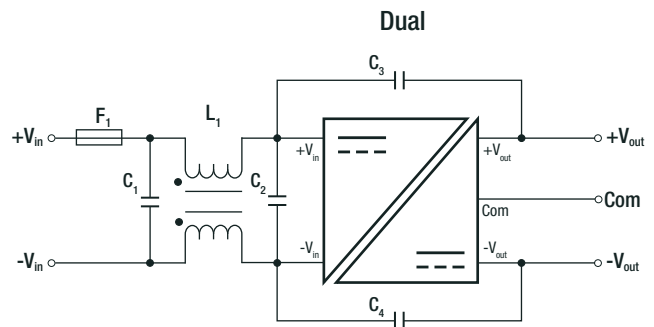
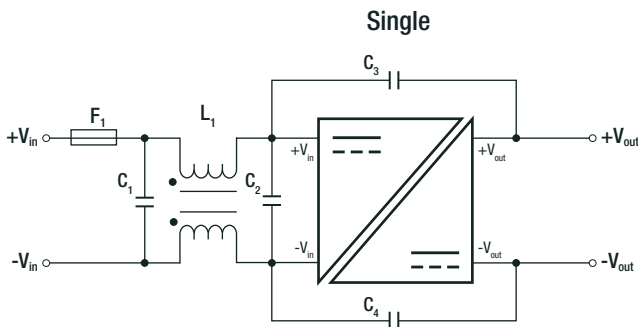
Note12: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5  
 Recom suggests Nippon chemi-con KY series 220µF/100V

#### EMC Filtering Suggestions according to EN55032



#### Component List Class A

MODEL	C1	C2	C3
RP10-24xxSEW	1µF/50V	1000pF/2kV	1000pF/2kV
RP10-24xxDEW	1210 MLCC	1808 MLCC	1808 MLCC
RP10-48xxSEW	1.5µF/100V	1000pF/2kV	1000pF/2kV
RP10-48xxDEW	1812 MLCC	1808 MLCC	1808 MLCC



#### Component List Class B

MODEL	C1	C2	C3/C4	L1
RP10-24xxSEW	2.2µF/50V	N/A	1000pF/2kV	CMC: 325µH
RP10-24xxDEW	1812 MLCC		1808 MLCC	ref: WE 744290321 ref.: CMC-06
RP10-48xxSEW	2.2µF/50V	2.2µF/100V	1000pF/2kV	CMC: 325µH
RP10-48xxDEW	1812 MLCC	1812 MLCC	1808 MLCC	ref: WE 744290321 ref.: CMC-06

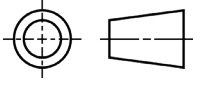
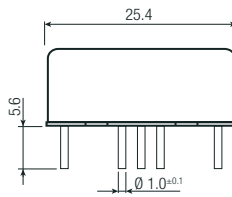
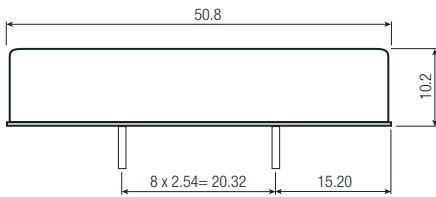
#### DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	nickel coated copper
	base	non-conductive black plastic
	potting	epoxy (UL94 V-0)
Dimensions (LxWxH)	without Heat-sink	50.8 x 25.4 x 10.2mm
	with Heat-sink	56.8 x 25.4 x 16.8mm
Weight	without Heat-sink	27g
	with Heat-sink	37.89g

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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

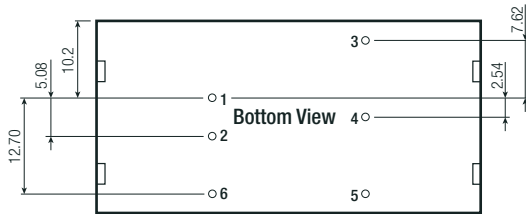
### Dimension Drawing (mm)



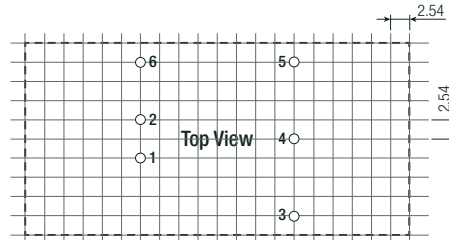
### Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	no Pin	Com
5	-Vout	-Vout
6	CTRL <sup>(3)</sup>	CTRL <sup>(3)</sup>

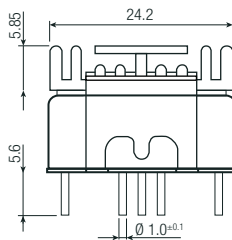
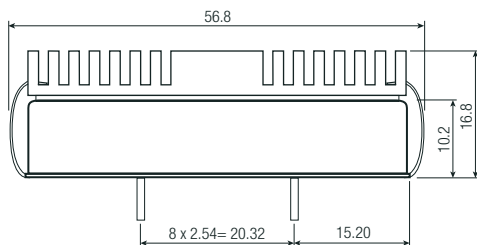
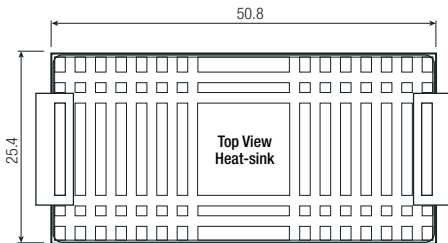
Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm



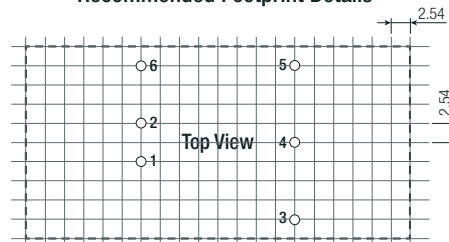
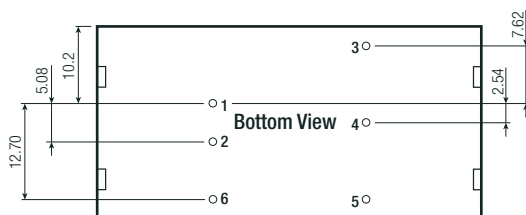
### Recommended Footprint Details



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



### Recommended Footprint Details



**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

PACKAGING INFORMATION			
Parameter	Type		Value
Packaging Dimension (LxWxH)	tube	without heat-sink	255.0 x 54.0 x 22.0mm
	tray	with heat-sink	302.5 x 222.0 x 20.0mm
Packaging Quantity	tube	without heat-sink	9pcs
	tray	with heat-sink	20pcs
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		5% - 95% RH

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