

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 ⁽¹⁾ Current [mA] | Efficiency ⁽¹⁾ typ. [%] | Max. Capacitive Load ⁽²⁾ [µF] |
|--------------------------------|---------------------------|----------------------|---------------------|-----------------------------------|------------------------------------|--|
| RP10-243.3SEW ^(3,4) | 9-36 | 3.3 | 2500 | 441 | 78 | 6800 |
| RP10-2405SEW ^(3,4) | 9-36 | 5 | 2000 | 521 | 80 | 4700 |
| RP10-2412SEW ^(3,4) | 9-36 | 12 | 830 | 494 | 84 | 690 |
| RP10-2415SEW ^(3,4) | 9-36 | 15 | 670 | 517 | 81 | 470 |
| RP10-483.3SEW ^(3,4) | 18-75 | 3.3 | 2500 | 226 | 76 | 6800 |
| RP10-4805SEW ^(3,4) | 18-75 | 5 | 2000 | 322 | 81 | 4700 |
| RP10-4812SEW ^(3,4) | 18-75 | 12 | 830 | 247 | 84 | 690 |
| RP10-4815SEW ^(3,4) | 18-75 | 15 | 670 | 249 | 84 | 470 |
| RP10-2405DEW ^(3,4) | 9-36 | ±5 | ±1000 | 508 | 82 | ±680 |
| RP10-2412DEW ^(3,4) | 9-36 | ±12 | ±416 | 520 | 80 | ±330 |
| RP10-2415DEW ^(3,4) | 9-36 | ±15 | ±333 | 520 | 80 | ±110 |
| RP10-4805DEW ^(3,4) | 18-75 | ±5 | ±1000 | 254 | 82 | ±680 |
| RP10-4812DEW ^(3,4) | 18-75 | ±12 | ±416 | 267 | 78 | ±330 |
| RP10-4815DEW ^(3,4) | 18-75 | ±15 | ±333 | 257 | 81 | ±110 |

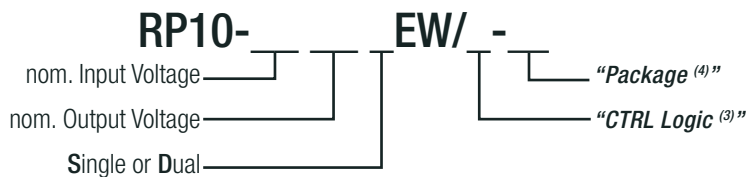


Notes:

- 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

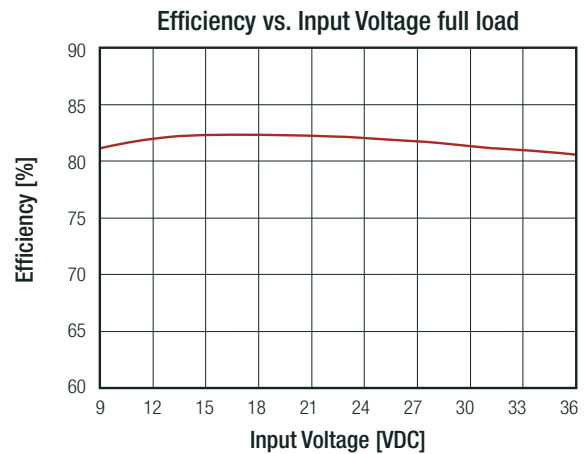
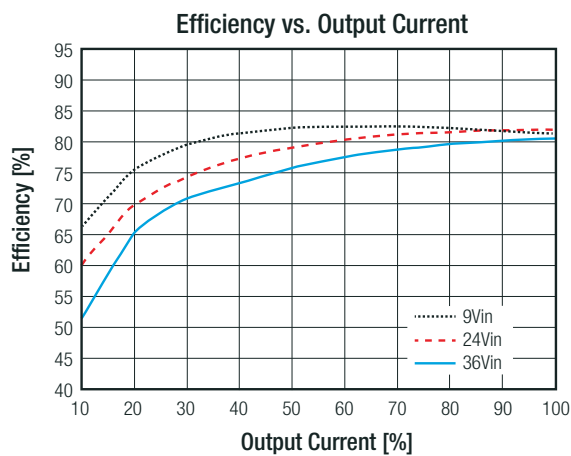
Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

| 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 ⁽⁵⁾ | | | | 30mA _{p-p} | |
| Minimum Load ⁽⁶⁾ | | | 10% | | |
| Start-up Time | Power up | | | 20ms | |
| ON/OFF CTRL ⁽⁷⁾ | Positive Logic | DC-DC ON DC-DC OFF | Open or 3.5VDC < V _{CTRL} < 12VDC Short or 0VDC < V _{CTRL} < 1.2VDC | | |
| | Negative Logic | DC-DC ON DC-DC OFF | Short or 0VDC < V _{CTRL} < 1.2VDC Open or 3.5VDC < V _{CTRL} < 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 _{p-p} 75mV _{p-p} | |

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

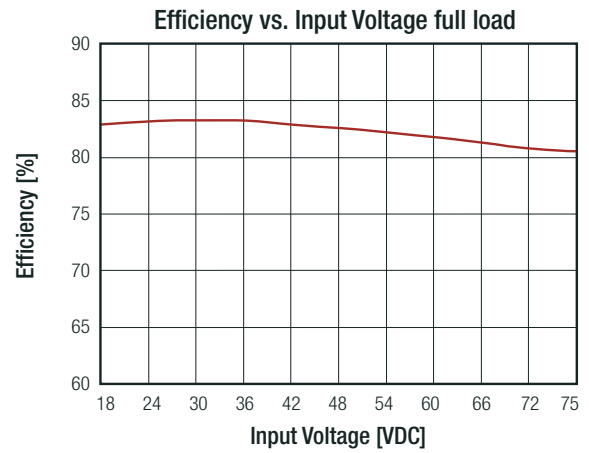
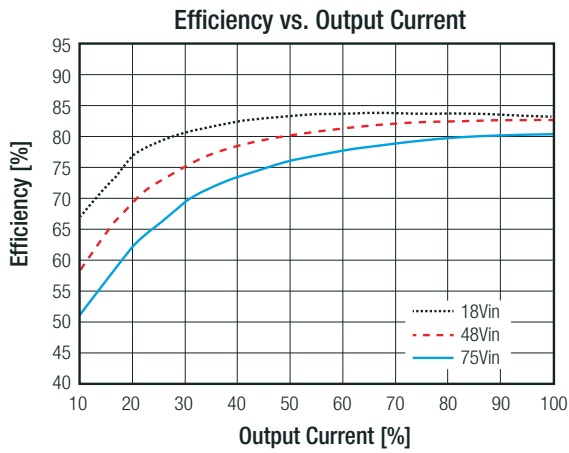
RP10-2405SEW



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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 Dual | ±0.5% ±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 5Vout 12Vout 15Vout | 3.9VDC 6.2VDC 15VDC 18VDC |
| Over Load Protection (OLP) | % Iout rated | | 150% typ. |
| Isolation Voltage (8) | I/P to O/P I/P to O/P to case | | 1.6kVDC/ 1 minute 1.6kVDC/ 1 minute |
| Isolation Resistance | Viso= 500VDC | | 1GΩ min. |
| Isolation Capacitance | | | 300pF max. |

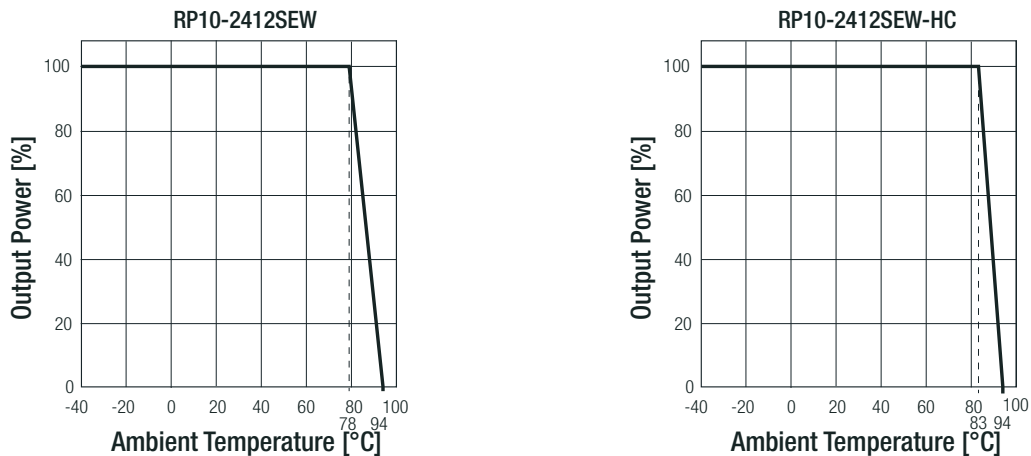
Notes:

- 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 ³ hours |
| | Bellcore TR-NWT-000332 ⁽¹⁰⁾ | 1976 x 10 ³ hours |

Derating Graph ⁽¹¹⁾



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 ⁽¹²⁾ | ±2kV | EN61000-4-4, Criteria B |
| Surge Immunity ⁽¹²⁾ | ±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 |

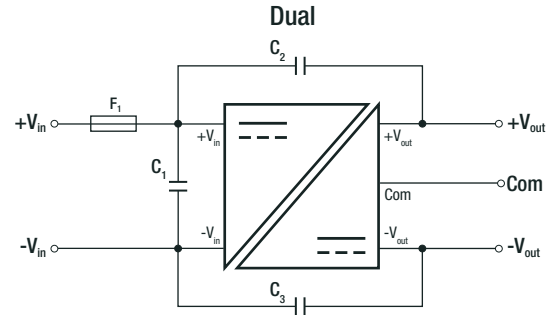
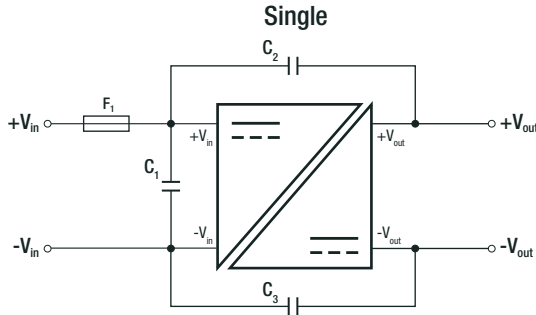
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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

Notes:

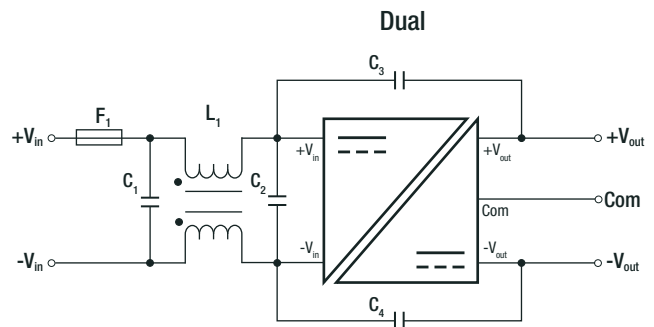
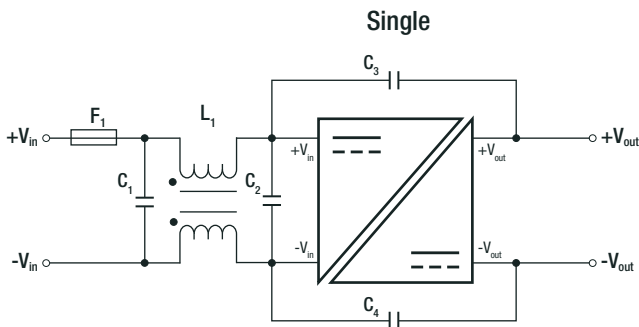
Note12: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5
Recom suggests Nippon chemi-con KY series 220µF/100V

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 |

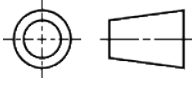
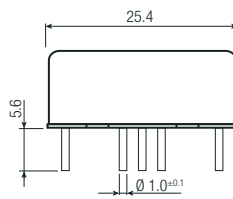
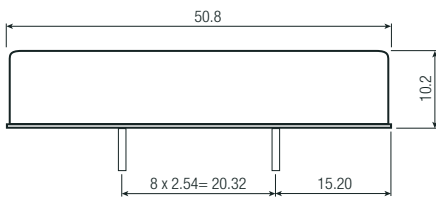
DIMENSIONS and PHYSICAL CHARACTERISTICS

| 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)

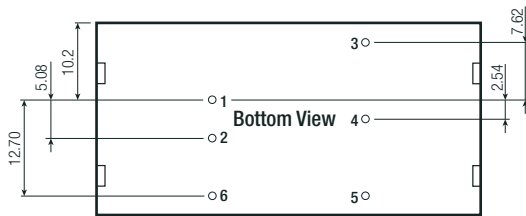
Dimension Drawing (mm)



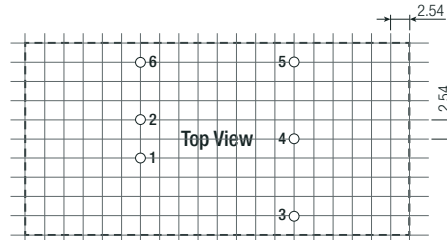
Pinning Information

| Pin # | Single | Dual |
|-------|---------------------|---------------------|
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | +Vout | +Vout |
| 4 | no Pin | Com |
| 5 | -Vout | -Vout |
| 6 | CTRL ⁽³⁾ | CTRL ⁽³⁾ |

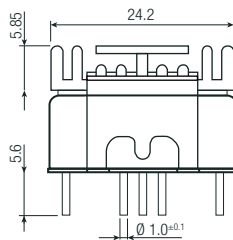
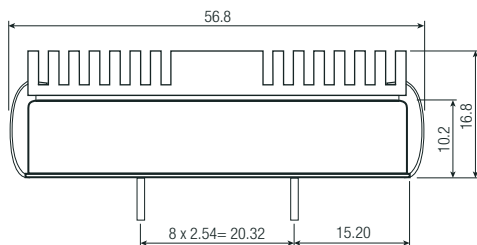
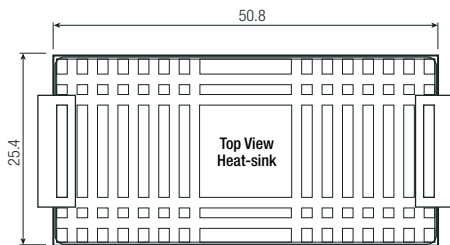
Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm



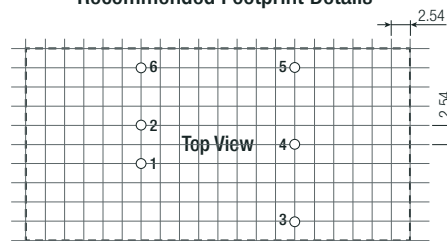
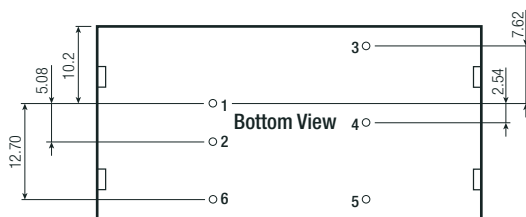
Recommended Footprint Details



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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