

Features

- 4:1 wide input voltage range
- 1.6kVDC isolation
- UL/IEC/EN60950-1, EN50155 certified
- Efficiency up to 88%
- Protected outputs
- High input voltage range (110VDC)

Regulated Converter



RP08-AW

8 Watt
DIP24/SMD
 Single and Dual
 Output



Description

The RP08-AW series wide range input DC/DC converters are certified to UL60950-1 and cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required. The 24V and 110VDC input versions have been especially designed for railway applications. The DIP24 package is available in both pinned and SMD case styles and meets military standards for thermal shock and vibration tolerance.

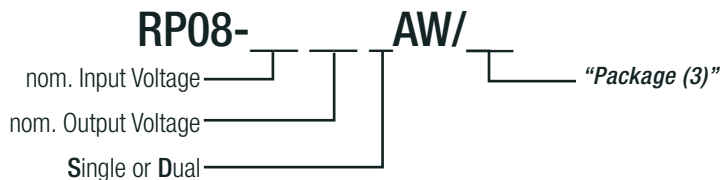
Selection Guide

| Part Number | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [mA] | Input ⁽¹⁾ Current [mA] | Efficiency ⁽¹⁾ typ. [%] | Max. Capacitive Load ⁽²⁾ [µF] |
|-------------------------------|---------------------------|----------------------|---------------------|-----------------------------------|------------------------------------|------------------------------------------|
| RP08-243.3SAW ⁽³⁾ | 9-36 | 3.3 | 2400 | 388 | 85 | 1330 |
| RP08-2405SAW ⁽³⁾ | 9-36 | 5 | 1600 | 383 | 87 | 1330 |
| RP08-2412SAW ⁽³⁾ | 9-36 | 12 | 666 | 387 | 86 | 288 |
| RP08-2415SAW ⁽³⁾ | 9-36 | 15 | 533 | 387 | 86 | 200 |
| RP08-483.3SAW ⁽³⁾ | 18-75 | 3.3 | 2400 | 194 | 85 | 1330 |
| RP08-4805SAW ⁽³⁾ | 18-75 | 5 | 1600 | 192 | 87 | 1330 |
| RP08-4812SAW ⁽³⁾ | 18-75 | 12 | 666 | 191 | 87 | 288 |
| RP08-4815SAW ⁽³⁾ | 18-75 | 15 | 533 | 189 | 88 | 200 |
| RP08-1103.3SAW ⁽³⁾ | 43-160 | 3.3 | 2400 | 86 | 84 | 1330 |
| RP08-11005SAW ⁽³⁾ | 43-160 | 5 | 1600 | 86 | 85 | 1330 |
| RP08-11012SAW ⁽³⁾ | 43-160 | 12 | 666 | 84 | 86 | 288 |
| RP08-11015SAW ⁽³⁾ | 43-160 | 15 | 533 | 85 | 86 | 200 |
| RP08-2405DAW ⁽³⁾ | 9-36 | ±5 | ±800 | 397 | 84 | ±900 |
| RP08-2412DAW ⁽³⁾ | 9-36 | ±12 | ±333 | 387 | 86 | ±133 |
| RP08-2415DAW ⁽³⁾ | 9-36 | ±15 | ±267 | 388 | 86 | ±90 |
| RP08-4805DAW ⁽³⁾ | 18-75 | ±5 | ±800 | 198 | 84 | ±900 |
| RP08-4812DAW ⁽³⁾ | 18-75 | ±12 | ±333 | 191 | 87 | ±133 |
| RP08-4815DAW ⁽³⁾ | 18-75 | ±15 | ±267 | 192 | 87 | ±90 |
| RP08-11005DAW ⁽³⁾ | 43-160 | ±5 | ±800 | 89 | 82 | ±900 |
| RP08-11012DAW ⁽³⁾ | 43-160 | ±12 | ±333 | 85 | 85 | ±133 |
| RP08-11015DAW ⁽³⁾ | 43-160 | ±15 | ±267 | 86 | 85 | ±90 |

Notes:

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

Model Numbering

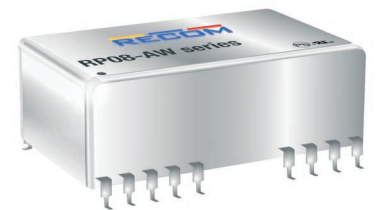


Notes:

- Note3: no suffix for standard DIP24 package
 add suffix "/SMD" for SMD package

Ordering Examples

- RP08-4805SAW/SMD = 48V Input, 5V Output, Single, SMD Package
- RP08-2405DAW = 24V Input, 5V Output, Dual, DIP24 Package



UL60950-1 certified
 IEC/EN60950-1 certified
 EN50155 certified
 EN50121-3-2 compliant
 EN55032 compliant



https://www.recom-power.com/pdf/Powerline_DC-DC/RSPxxx-168.pdf

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

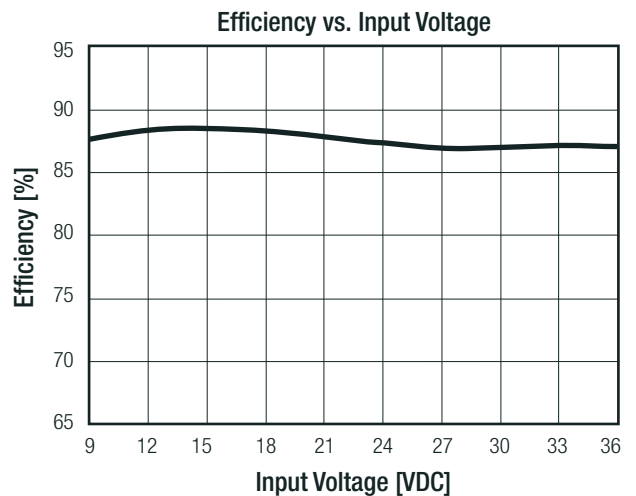
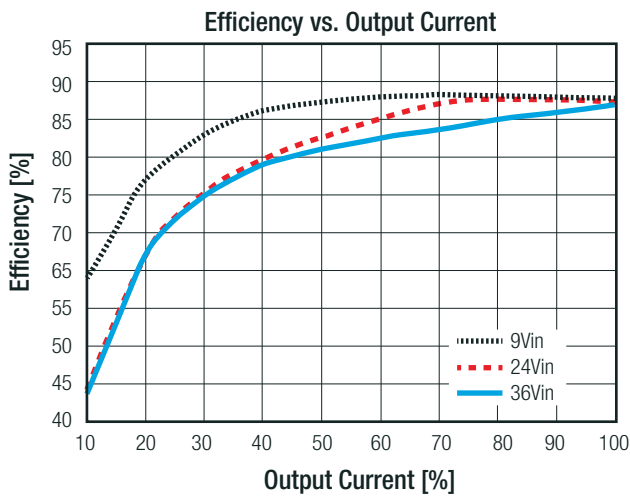
BASIC CHARACTERISTICS

| Parameter | Condition | | Min. | Typ. | Max. |
|--------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------|
| Input Filter | | | Pi-Type | | |
| Input Voltage Range | nom. Vin = 24VDC nom. Vin = 48VDC nom. Vin = 110VDC | | 9VDC 18VDC 43VDC | 24VDC 48VDC 110VDC | 36VDC 75VDC 160VDC |
| Input Surge Voltage | 100ms max. | nom. Vin = 24VDC nom. Vin = 48VDC nom. Vin = 110VDC | | | 50VDC 100VDC 170VDC |
| Under Voltage Lockout (UVLO) | nom. Vin = 24VDC | DC-DC ON DC-DC OFF | | 8VDC | 9VDC |
| | nom. Vin = 48VDC | DC-DC ON DC-DC OFF | | 16VDC | 18VDC |
| | nom. Vin = 110VDC | DC-DC ON DC-DC OFF | | 40VDC | 43VDC |
| Input Reflected Ripple Current | | | | 20mA _{p-p} | |
| Start-up time | Power up ON/OFF CTRL | | | 450ms 5ms | |
| Operating Frequency Range | | | 270kHz | 300kHz | 330kHz |
| Minimum Load | | | 0% | | |
| ON/OFF CTRL ⁽⁴⁾ | Positive Logic | DC-DC ON DC-DC OFF | Open or 3.0VDC < V _{CTRL} < 12VDC Short or 0VDC < V _{CTRL} < 1.2VDC | | |
| Input Current of CTRL pin | DC-DC ON | | -0.5mA | | +0.5mA |
| Standby Current | DC-DC OFF | | | 2.5mA | |
| Ripple and Noise | 20MHz BW | nom. Vin = 24VDC, 48VDC nom. Vin = 110VDC | | 50mV _{p-p} 75mV _{p-p} | |

Notes:

Note4: The ON/OFF control pin voltage is referenced to -Vin pin

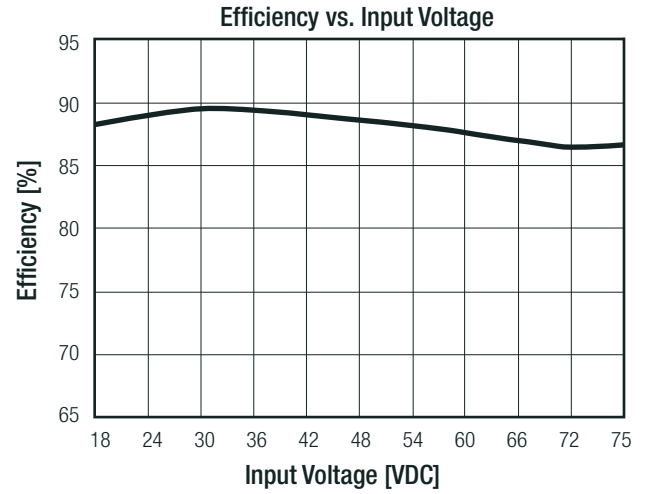
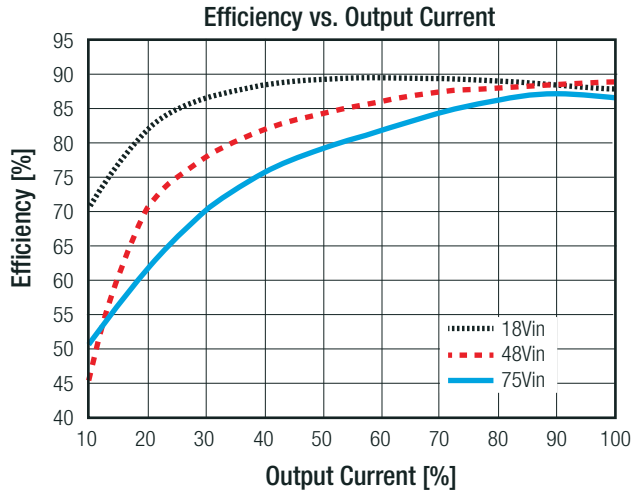
RP08-2405SAW



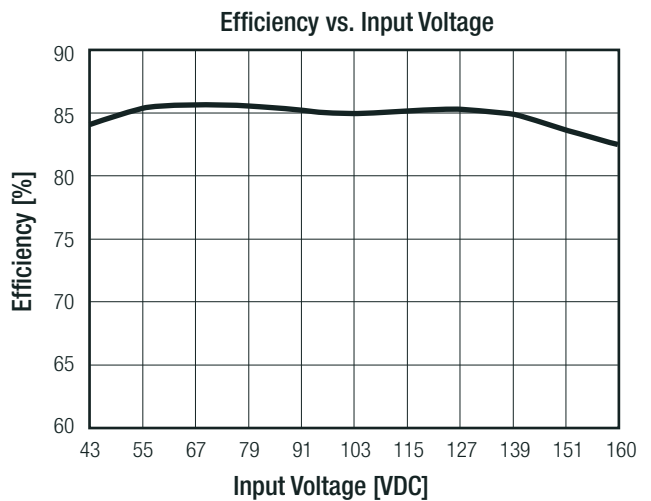
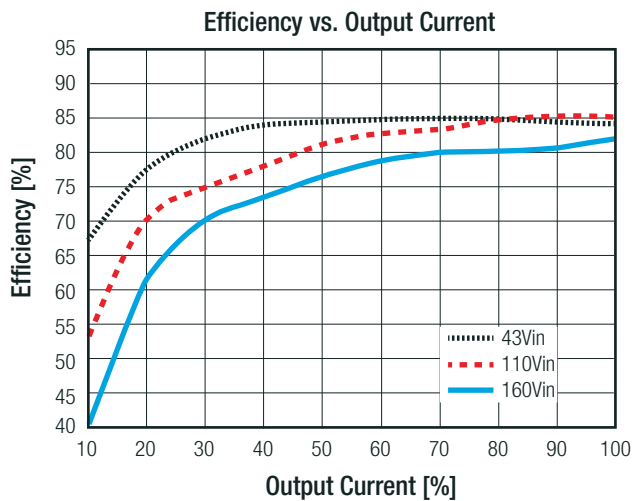
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

RP08-4805SAW



RP08-11005SAW



REGULATIONS

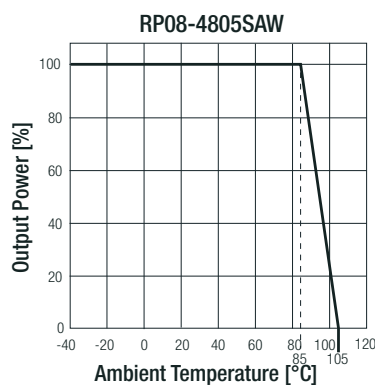
| Parameter | Condition | | | Value |
|----------------------------------|----------------------------------|-------|----------------|----------------|
| Output Accuracy | | | | ±1.0% |
| Line Regulation | low line to high line, full load | | | ±0.2% |
| Load Regulation | 0% to 100% load | DIP24 | Single Dual | ±0.5% ±1.0% |
| | | SMD | Single, Dual | ±1.0% |
| | 10% to 90% load | DIP24 | Single Dual | ±0.3% ±0.8% |
| | | SMD | Single, Dual | ±0.8% |
| Cross Regulation | asymmetrical 25%<->100% load | | | ±5.0% |
| Transient Response Recovery Time | 25% load step change | | | 250µs typ. |

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| PROTECTIONS | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------|--------------------------------------|
| Parameter | Condition | | Value |
| Short Circuit Protection (SCP) | | | continuous, automatic recovery |
| Over Voltage Protection (OVP) | Single Output | 3.3Vout | 3.9VDC typ. |
| | | 5Vout | 6.2VDC typ. |
| | | 12Vout | 15VDC typ. |
| | | 15Vout | 18VDC typ. |
| Over Load Protection (OLP) | % of Iout rated | | 150% typ. |
| Isolation Voltage ⁽⁶⁾ | DIP24 | I/P to O/P, I/P (O/P) to case | 1.6kVDC/1 minute |
| | SMD | I/P to O/P I/P (O/P) to case | 1.6kVDC/1 minute 1.0kVDC/1 minute |
| Isolation Resistance | Viso= 500VDC | | 1GΩ min. |
| Isolation Capacitance | | | 1500pF max. |
| Insulation Grade | | | functional |
| Notes: Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage Note6: This power module is not internally fused. An input line fuse must always be used Recom suggests: 24Vin=T2A; 48Vin=T1A; 110Vin=T0.5A slow blow | | | |

| ENVIRONMENTAL | | | |
|--------------------------------------------|---------------------------------------|--|--------------------------------------|
| Parameter | Condition | | Value |
| Operating Temperature Range ⁽⁷⁾ | without derating | | -40°C to +85°C |
| | with derating | | -40°C to +105°C |
| Maximum Case Temperature | | | +105°C |
| Temperature Coefficient | | | ±0.02%/K max. |
| Thermal Impedance | @ natural convection 0.1m/s | | 20K/W |
| Operating Altitude | | | 4000m |
| Operating Humidity | non-condensing | | 5% - 95% RH |
| Pollution Degree | | | PD2 |
| Shock | | | according to MIL-STD-810F |
| Thermal Shock | | | according to MIL-STD-810F |
| Vibration | | | according to MIL-STD-810F |
| Fire protection on railway vehicles | | | according to EN45545-2:2013 standard |
| MTBF | MIL-HDBK-217F, G.B. | | 2832 x 10 ³ hours |
| | Bellcore-TR-NWT-000332 ⁽⁸⁾ | | 2350 x 10 ³ hours |

Derating Graph ⁽⁹⁾



Notes:

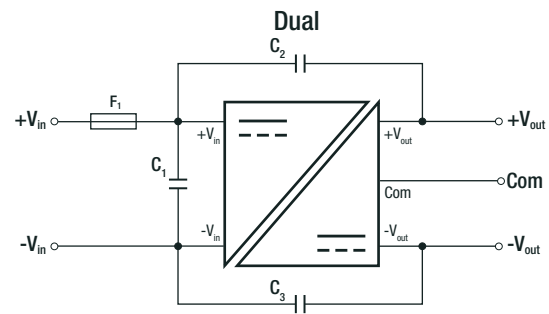
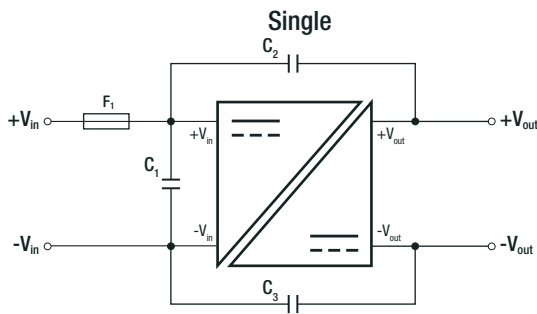
- Note7: Converter can meet the railway T2 and TX temperature requirement
- Note8: BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C (Ground Benign and controlled environment)
MIL-HDBK-217F, G.B., Notice 2, full load, 25°C, Ground Benign
- Note9: Derating graphs are valid only for the shown part numbers. If you need detailed derating-information about a part-number not shown here please contact RECOM Techsupport for detailed information

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| SAFETY AND CERTIFICATIONS | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Certificate Type (Safety) | Report / File Number | Standard |
| Information Technology Equipment, General Requirements for Safety | E196683 | UL60950-1, 2nd Edition, 2014 C22.2 No. 60950-1-07, 2nd Edition, 2014 |
| Information Technology Equipment, General Requirements for Safety (LVD) | TW1708010-001 | IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013 |
| EAC | RU-AT.49.09571 | TP TC 004/2011 |
| RoHS 2 | | RoHS-2011/65/EU + AM-2015/863 |
| Railways | Condition | Standard / Criterion |
| Railway Applications - Electrical Equipment used on rolling stock | 15A100701E-C | EN50155:2007 |
| Environmental testing Part 2-1: Tests – Test A: Cold | Temperature: -25°C, Dwell Time: 2 hours | EN60068-2-1:2007 |
| Environmental testing Part 2-2: Tests – Test B: Dry heat | Temperature: +70°C, Dwell Time: 6 hours | EN60068-2-2:2007 |
| Environmental testing Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle) | Temperature: +25 to +55°C Humidity: 90% to 100%RH Test Duration: 24 hours/cycle, 2 cycles | EN60068-2-30:2005 |
| Railway applications - Fire protection on railway vehicles Part2: Requirements for fire behaviour of materials and components | | EN45545-2:2013 |
| Fire hazard testing Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products | glow-wire test | EN60695-2-11 |
| Fire hazard testing Part 11-10: Test flames – 50 W horizontal and vertical flame test methods | vertical flame test | EN60695-11-10 |
| EMC Compliance Railway | Condition | Standard / Criterion |
| Railway applications - Electromagnetic compatibility | | EN50121-3-2:2006 |
| Industrial, scientific and medical equipment – Radio frequency disturbance characteristics – Limits and methods of measurement | | EN55011 |
| ESD Electrostatic discharge immunity test | Air ±2, 4, 8kV, Contact ±2, 4, 6kV | EN61000-4-2, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 20V/m (80-1000MHz) 10V/m (1400-2100MHz) 5V/m (2100-2500MHz) | EN61000-4-3, Criteria A |
| Fast Transient and Burst Immunity | DC Power Port: ±2kV | EN61000-4-4, Criteria A |
| Surge Immunity | DC Power Port: Line-Line ±0.5, 1kV DC Power Port: Line-Earth ±0.5, 1.2kV | EN61000-4-5, Criteria A |
| Immunity to conducted disturbances, induced by radio-frequency fields | DC Power Port 10V | EN61000-4-6, Criteria A |
| Power Magnetic Field Immunity | 100A/m continuous; 1000A/m 1s | EN61000-4-8, Criteria A |
| EMC Compliance Multimedia and IT | Condition | Standard / Criterion |
| Electromagnetic compatibility of multimedia equipment - Emission requirements | with external filter refer to “EMC Filtering Suggestions” | EN55032, Class A and B |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55024:2010 + A1:2015 |
| ESD Electrostatic discharge immunity test | Air ±2, 4, 8kV, Contact ±2, 4, 6kV | IEC61000-4-2:2008, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 20V/m (80-1000MHz) | IEC61000-4-3:2006+A1:2007 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity | DC Power Port: ±2kV | IEC61000-4-4:2012, Criteria A |
| Surge Immunity | DC Power Port: ±2kV | IEC61000-4-5:2014, Criteria A |
| Immunity to conducted disturbances, induced by radio-frequency fields | DC Power Port 10V | IEC61000-4-6:2013, Criteria A |
| Power Magnetic Field Immunity | 50Hz 100A 1min, 50Hz 1000A 1s | IEC61000-4-8:2009, Criteria A |
| <p>Notes:</p> <p>Note10: 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 24Vin, 48Vin=220µF/100V or 110Vin=150µF/200V</p> <p style="text-align: center;">continued on next page</p> | | |

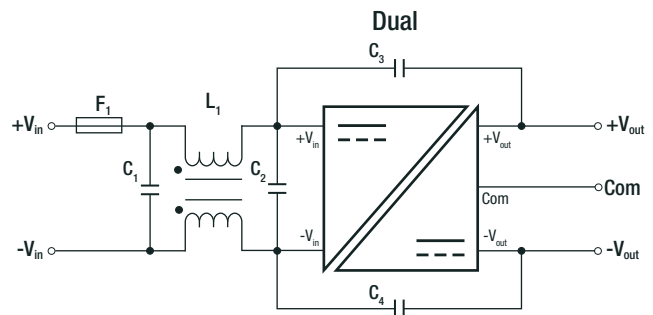
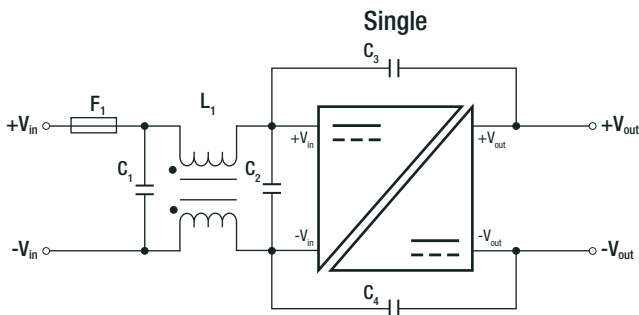
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

EMC Filtering Suggestions according to EN55032



Component List Class A

| MODEL | C1 | C2 | C3 |
|----------------------------------------|-----------------------|---------------------|-----------------------|
| RP08-24xxS_DAW RP08-24xxS_DAW/SMD | 1.0µF/50V, 1210MLCC | N/A | 1000pF/2kV, 1206 MLCC |
| RP08-48xxS_DAW RP08-48xxS_DAW/SMD | 0.47µF/100V, 1810MLCC | N/A | 1000pF/2kV, 1206 MLCC |
| RP08-110xxS_DAW RP08-110xxS_DAW/SMD | 1µF/250V, 1812 MLCC | 1µF/250V, 1812 MLCC | 1000pF/2kV, 1206 MLCC |



Component List Class B

| MODEL | C1 | C2 | C3/C4 | L1 |
|----------------------------------------|-----------------------|-----------------------|-----------------------|--------------------------------------------|
| RP08-24xxS_DAW RP08-24xxS_DAW/SMD | 4.7µF/50V, 1812 MLCC | N/A | 1000pF/2kV, 1206 MLCC | CMC: 325µH ref.: WE 744290321 or CMC-06 |
| RP08-48xxS_DAW RP08-48xxS_DAW/SMD | 1.5µF/100V, 1812 MLCC | 1.5µF/100V, 1812 MLCC | 1000pF/2kV, 1206 MLCC | CMC: 325µH ref.: WE 744290321 or CMC-06 |
| RP08-110xxS_DAW RP08-110xxS_DAW/SMD | 1µF/250V, 1812 MLCC | N/A | 1000pF/2kV, 1206 MLCC | CMC: 497µH ref.: WE 7448013501 |

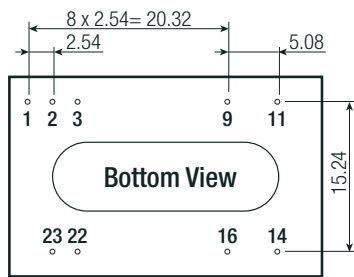
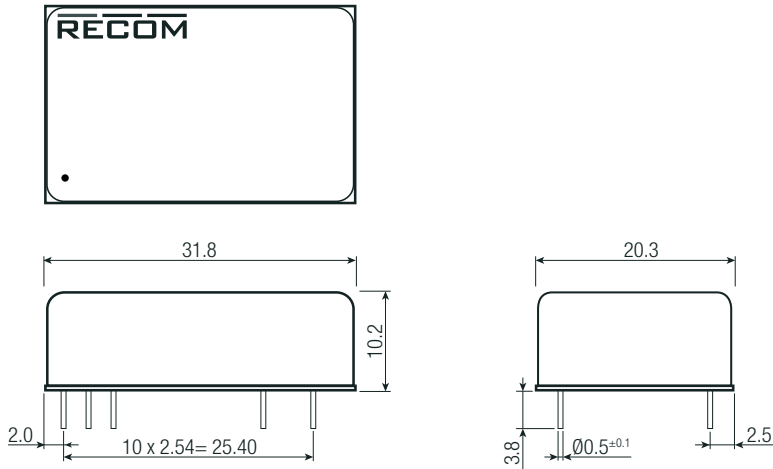
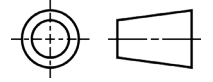
DIMENSIONS and PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|--------------------|---------|-----------------------------------------|
| Material | case | nickel coated copper |
| | base | non-conductive black plastic (UL94 V-2) |
| | potting | epoxy (UL94 V-0) |
| Dimensions (LxWxH) | DIP24 | 31.8 x 20.3 x 10.2mm |
| | SMD | 32.0 x 20.3 x 11.2mm |
| Weight | DIP24 | 18g |
| | SMD | 20g |

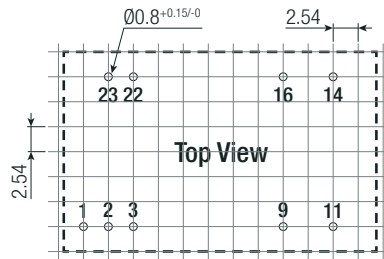
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

DIP24 Dimension Drawing (mm)



Recommended Footprint Details

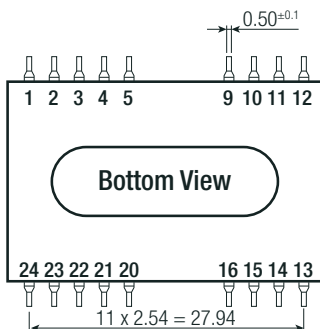
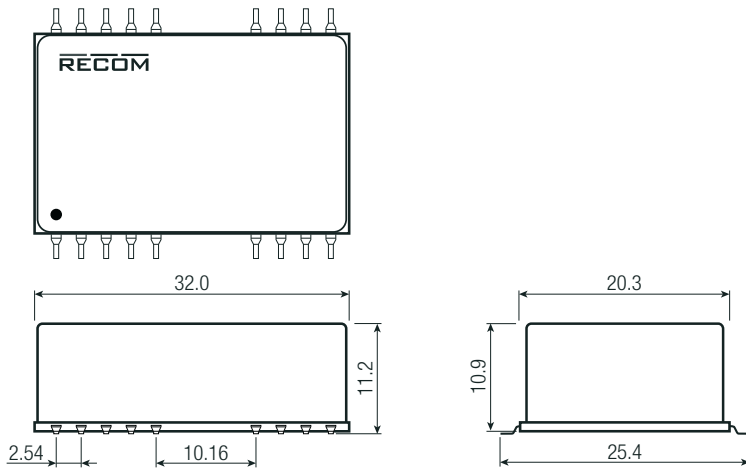


Pin Connections DIP24

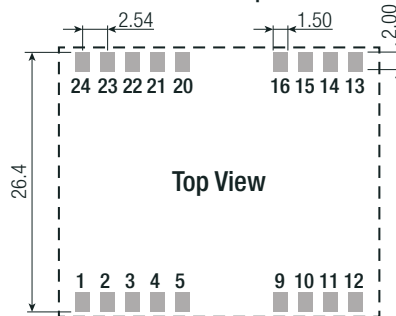
| Pin # | Single | Dual |
|-------|--------|-------|
| 1 | CTRL | CTRL |
| 2 | -Vin | -Vin |
| 3 | -Vin | -Vin |
| 9 | NC | Com |
| 11 | NC | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Com |
| 22 | +Vin | +Vin |
| 23 | +Vin | +Vin |

NC = No Connection
Pin Pitch Tolerance ±0.25mm
xx.x = ±0.5mm
xx.xx = ±0.25mm

SMD Dimension Drawing (mm)



Recommended Footprint Details



Pin Connections SMD

| Pin # | Single | Dual |
|--------|--------|-------|
| 1 | CTRL | CTRL |
| 2 | -Vin | -Vin |
| 3 | -Vin | -Vin |
| 9 | NC | Com |
| 11 | NC | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Com |
| 22 | +Vin | +Vin |
| 23 | +Vin | +Vin |
| Others | NC | NC |

NC = No Connection
Pin Pitch Tolerance ±0.25mm
xx.x = ±0.5mm
xx.xx = ±0.25mm

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| PACKAGING INFORMATION | | | |
|-----------------------------|----------------|-------|-----------------------|
| Parameter | Type | | Value |
| Packaging Dimension (LxWxH) | tube | DIP24 | 255.0 x 23.0 x 19.0mm |
| | | SMD | 255.0 x 32.0 x 16.0mm |
| Packaging Quantity | DIP24, SMD | | 7pcs |
| Storage Temperature Range | | | -55°C to +125°C |
| Storage Humidity | non-condensing | | 5% - 95% RH |

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