

Features

- 2:1 Wide Input Voltage Range
- 1.6kVDC Isolation
- UL Certified
- Efficiency up to 87%
- Low Profile, 10.2mm Height
- Over Current Protection

Regulated Converters

RP08-A

8 Watt
DIP24/SMD
Single & Dual
Output

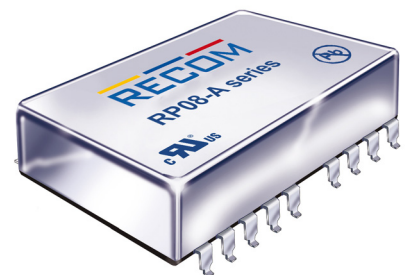
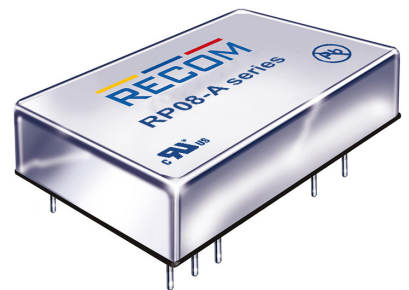


Description

The RP08-A series 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 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] |
|-----------------------------|---------------------------|----------------------|---------------------|-----------------------------------|------------------------------------|--|
| RP08-123.3SA ⁽³⁾ | 9-18 | 3.3 | 2000 | 688 | 80 | 3300 |
| RP08-1205SA ⁽³⁾ | 9-18 | 5 | 1500 | 753 | 83 | 1600 |
| RP08-1212SA ⁽³⁾ | 9-18 | 12 | 666 | 757 | 88 | 350 |
| RP08-1215SA ⁽³⁾ | 9-18 | 15 | 533 | 766 | 87 | 240 |
| RP08-243.3SA ⁽³⁾ | 18-36 | 3.3 | 2000 | 344 | 80 | 3300 |
| RP08-2405SA ⁽³⁾ | 18-36 | 5 | 1500 | 377 | 83 | 1600 |
| RP08-2412SA ⁽³⁾ | 18-36 | 12 | 666 | 387 | 86 | 350 |
| RP08-2415SA ⁽³⁾ | 18-36 | 15 | 533 | 392 | 85 | 240 |
| RP08-483.3SA ⁽³⁾ | 36-75 | 3.3 | 2000 | 172 | 80 | 3300 |
| RP08-4805SA ⁽³⁾ | 36-75 | 5 | 1500 | 188 | 83 | 1600 |
| RP08-4812SA ⁽³⁾ | 36-75 | 12 | 666 | 194 | 86 | 350 |
| RP08-4815SA ⁽³⁾ | 36-75 | 15 | 533 | 194 | 86 | 240 |
| RP08-1205DA ⁽³⁾ | 9-18 | ±5 | ±800 | 803 | 83 | ±1000 |
| RP08-1212DA ⁽³⁾ | 9-18 | ±12 | ±333 | 766 | 87 | ±160 |
| RP08-1215DA ⁽³⁾ | 9-18 | ±15 | ±267 | 785 | 85 | ±100 |
| RP08-2405DA ⁽³⁾ | 18-36 | ±5 | ±800 | 407 | 82 | ±1000 |
| RP08-2412DA ⁽³⁾ | 18-36 | ±12 | ±333 | 387 | 86 | ±160 |
| RP08-2415DA ⁽³⁾ | 18-36 | ±15 | ±267 | 393 | 85 | ±100 |
| RP08-4805DA ⁽³⁾ | 36-75 | ±5 | ±800 | 196 | 85 | ±1000 |
| RP08-4812DA ⁽³⁾ | 36-75 | ±12 | ±333 | 191 | 87 | ±160 |
| RP08-4815DA ⁽³⁾ | 36-75 | ±15 | ±267 | 192 | 87 | ±100 |



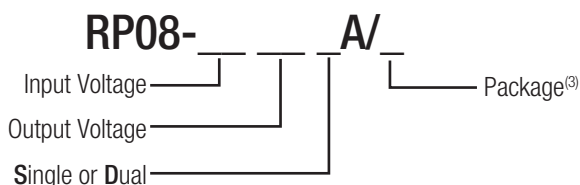
Notes:

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



UL60950-1 Certified

Model Numbering



Ordering Examples

- RP08-4805SA/SMD = 48V Input, 5V Output, Single, SMD Package
RP08-1205DA = 12V Input, 5V Output, Dual, DIP24 Package

Notes:

- Note3: no suffix for standard package (DIP24), add suffix „SMD“ for SMD package

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

| BASIC CHARACTERISTICS | | | | |
|------------------------------------|---|------------------------|-------------------------|--|
| Parameter | Condition | Min. | Typ. | Max. |
| Input Voltage Range | nom. Vin = 12V nom. Vin = 24V nom. Vin = 48V | 9VDC 18VDC 36VDC | 12VDC 24VDC 48VDC | 18VDC 36VDC 75VDC |
| Under Voltage Lockout (UVLO) | | | | none |
| Input Filter | | | | Pi-Type |
| Input Reflected Ripple Current | nominal Vin and full load | | 20mA _{p-p} | |
| Input Surge Voltage | Vin = 12V, 100ms max. Vin = 24V, 100ms max. Vin = 48V, 100ms max. | | | 36VDC 50VDC 100VDC |
| Start-up time | Power up Remote ON/OFF | | 700ms 5ms | |
| Operating Frequency Range | | 270kHz | 300kHz | 330kHz |
| Minimum Load ⁽⁴⁾ | full load | 10% | | |
| Ripple and Noise | 20MHz Bandwidth | | 50mV _{p-p} | |
| Remote ON/OFF ⁽⁵⁾ | Positive Logic | DC-DC ON DC-DC OFF | | Open or $3.0\text{V} < V_r < 12\text{V}$ Short or $0\text{V} < V_r < 1.2\text{V}$ |
| Input current of Remote pin (CTRL) | | DC-DC OFF | 2.5mA | |
| | | DC-DC ON | -0.5mA | +0.5mA |

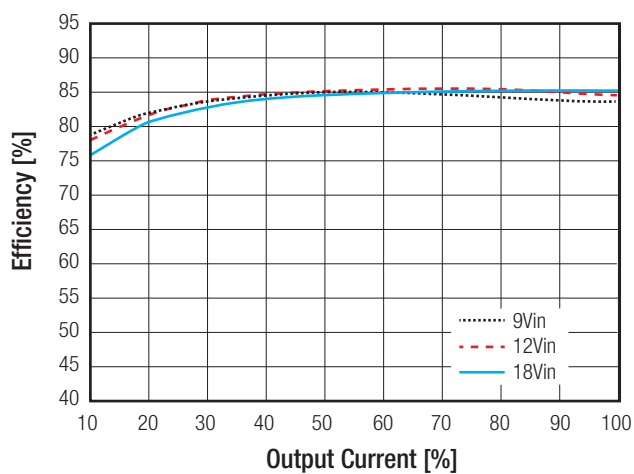
Notes:

Note4: The RP08 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.

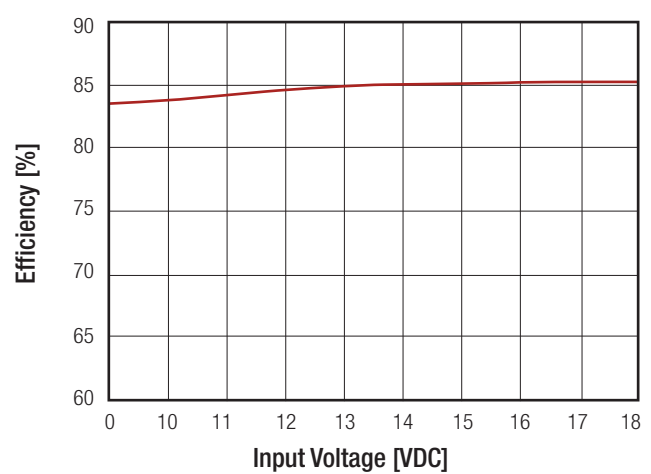
Note5: The ON/OFF control pin voltage is referenced to -Vin pin.

RP08-1205SA

Efficiency vs. Output Current



Efficiency vs. Input Voltage

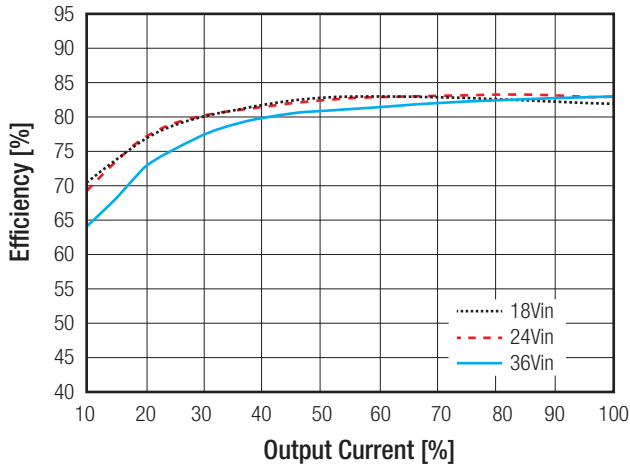


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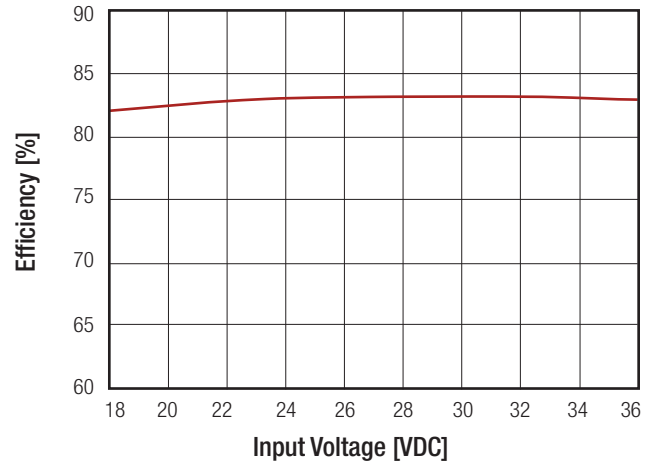
Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

RP08-2405SA

Efficiency vs. Output Current

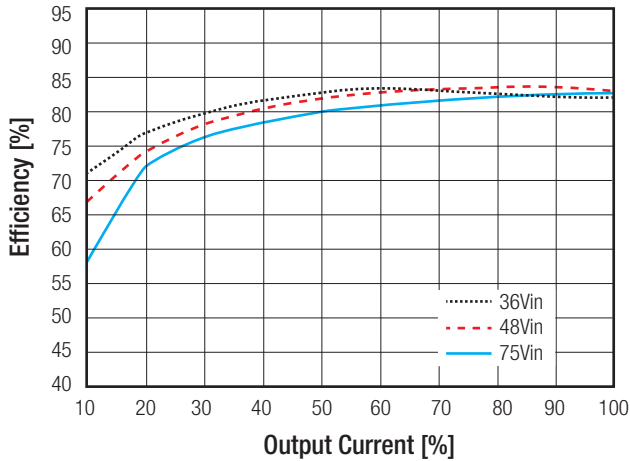


Efficiency vs. Input Voltage

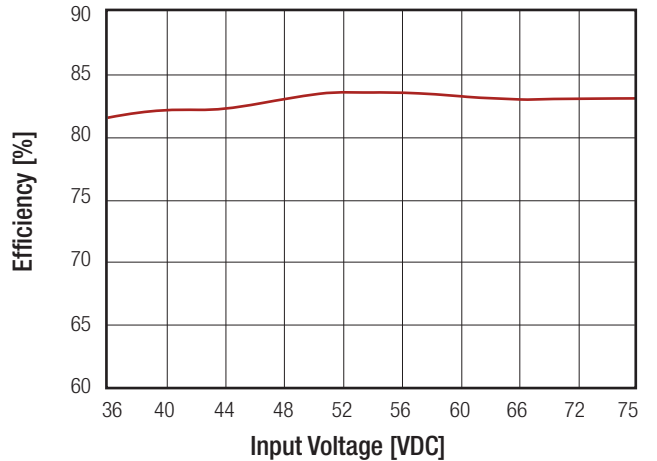


RP08-4805SA

Efficiency vs. Output Current



Efficiency vs. Input Voltage



REGULATIONS

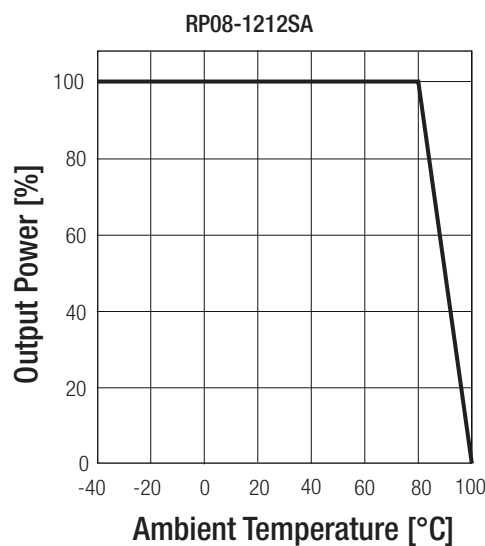
| Parameter | Condition | | Value |
|----------------------------------|------------------------------|--------------|--------------|
| Output Voltage Accuracy | | | ±1.0% max. |
| Line Voltage Regulation | low line to high line | | ±0.2% max. |
| Load Voltage Regulation | Single (0% to 100% load) | DIP24 SMD | ±0.5% ±1% |
| | Dual (0% to 100% load) | DIP24, SMD | ±1% |
| Cross Regulation | asymmetrical 25%<->100% load | | ±5% |
| Transient Response recovery time | 25% load step change | | 200µs typ. |

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

| PROTECTIONS | | |
|---|--|--------------------------------------|
| Parameter | Condition | Value |
| Short Circuit Protection (SCP) | | continuous, automatic recovery |
| Over Load Protection (OLP) | % of Iout rated | 150% typ. |
| Isolation Voltage | DIP24 I/P to O/P I/P (O/P) to case | 1.6kVDC/1 minute 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 | 500VDC | 1GΩ min. |
| Isolation Capacitance | | 300pF max. |
| <p>Notes: Note6: This power module is not internally fused. An input line fuse must always be used.</p> | | |

| ENVIRONMENTAL | | |
|-----------------------------|---------------------------------------|------------------------------|
| Parameter | Condition | Value |
| Operating Temperature Range | without derating | -40°C to +80°C |
| | with derating | -40°C to +100°C |
| Maximum Case Temperature | | +100°C |
| Temperature Coefficient | | ±0.02%/°C max. |
| Thermal Impedance | Natural convection (20LFM) | 20°C/Watt typ. |
| Operating Humidity | non-condensing | 5% - 95% RH |
| Shock | | MIL-STD-810F |
| Vibration | | MIL-STD-810F |
| MTBF | MIL-HDBK-217F | 3543 x 10 ³ hours |
| | BELLCORE TR-NWT-000332 ⁽⁷⁾ | 3165 x 10 ³ hours |

Derating Graph⁽⁸⁾



Notes:

Note7: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).

Note8: 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.

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

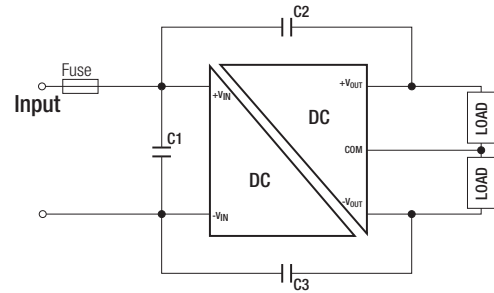
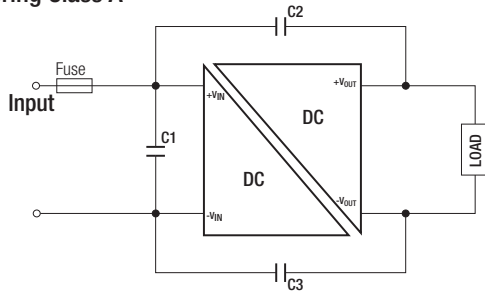
| SAFETY AND CERTIFICATIONS | | |
|--------------------------------|---------------------------|---|
| Certificate Type | Report / File Number | Standard |
| UL General Safety | E196683 | UL60950-1 1st Ed.: 2003 C22.2 No. 60950 1st. Ed.: 2003 |
| EMC Compliance | Condition | Standard / Criterion |
| EMI Standard ⁽⁹⁾ | with external filter | EN55022, Class A or B |
| ESD | Air ±8kV and Contact ±6kV | EN61000-4-2, Criteria A |
| Radiated Immunity | 10 V/m | EN61000-4-3, Criteria A |
| Fast Transient ⁽¹⁰⁾ | ±2kV | EN61000-4-4, Criteria A |
| Surge | ±1kV | EN61000-4-5, Criteria A |
| Conducted Immunity | 10 Vr.m.s | EN61000-4-6, Criteria A |

Notes:

Note9: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below.

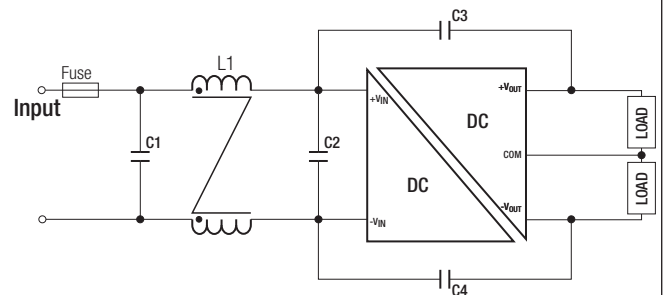
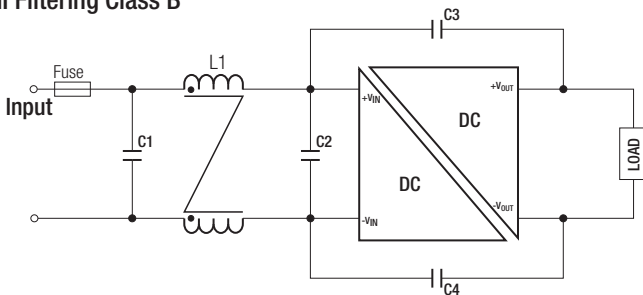
Note10: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The suggested capacitor: Nippon chemi-con KY series 200µF/100V.

EMI Filtering Class A



| MODEL | C1 | C2/C3 |
|------------------|-----------|------------|
| RP08-12xxS_D | 4.7µF/25V | 1000pF/2kV |
| RP08-12xxS_D/SMD | 1210 MLCC | 1206 MLCC |
| RP08-24xxS_D | N/A | 1000pF/2kV |
| RP08-24xxS_D/SMD | N/A | 1206 MLCC |
| RP08-48xxS_D | N/A | 1000pF/2kV |
| RP08-48xxS_D/SMD | N/A | 1206 MLCC |

EMI Filtering Class B



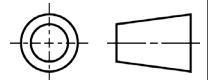
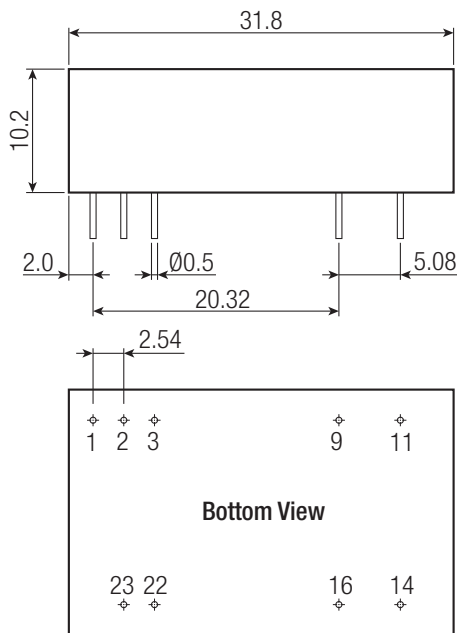
| MODEL | C1 | C2 | C3/C4 | L1 |
|------------------|------------|------------|------------|-------------------|
| RP08-12xxS_D | 4.7µF/25V | N/A | 1000pF/2kV | CMC :325µH |
| RP08-12xxS_D/SMD | 1210 MLCC | N/A | 1206 MLCC | ref: WE 744290321 |
| RP08-24xxS_D | 6.8µF/50V | N/A | 1000pF/2kV | ref.: CMC-06 |
| RP08-24xxS_D/SMD | 1812 MLCC | N/A | 1206 MLCC | CMC: 325µH |
| RP08-48xxS_D | 2.2µF/100V | 2.2µF/100V | 1000pF/2kV | ref: WE 744290321 |
| RP08-48xxS_D/SMD | 1812 MLCC | 1812 MLCC | 1206 MLCC | 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) | DIP24 | 31.8 x 20.3 x 10.2mm |
| | SMD | 32.0 x 20.5 x 11.2mm |
| Package Weight | DIP24 | 16g |
| | SMD | 18g |

DIP Dimension Drawing (mm)

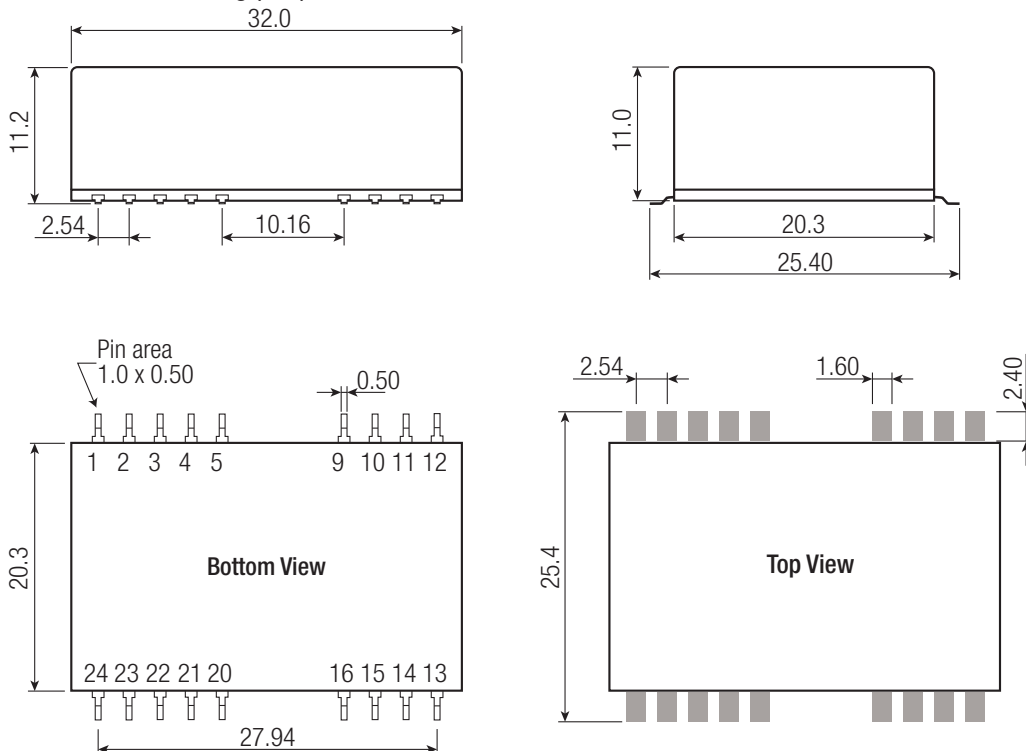


Pin Connections

| 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 |

Pin Pitch Tolerance $\pm 0.25\text{mm}$
 Pin Dimension Tolerance $\pm 0.1\text{mm}$
 XX.X $\pm 0.5\text{mm}$
 XX.XX $\pm 0.25\text{mm}$
 NC = No Connection

SMD Dimension Drawing (mm)



Pin Connections

| 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 |

Pin Pitch Tolerance $\pm 0.25\text{mm}$
 Pin Dimension Tolerance $\pm 0.1\text{mm}$
 XX.X $\pm 0.5\text{mm}$
 XX.XX $\pm 0.25\text{mm}$
 NC = No Connection

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

| PACKAGING INFORMATION | | |
|---------------------------|------|-----------------|
| Parameter | Type | Value |
| Packaging Quantity | | 7pcs. |
| Storage Temperature Range | | -55°C to +125°C |
| Storage Humidity | | 5% - 95% RH |