

Features

Unregulated Converters

- Low cost 1W converter
- Industry standard pinout
- SIP4 package
- 1kVDC isolation
- Efficiency up to 79%
- Wide operating temperature range -40°C to +85°C
- UL60950-1, CAN/CSA C22.2 No. 60950-1 certified

RECOM
DC/DC Converter

Description

The RFM DC/DC converter is typically used in cost sensitive general purpose power isolation and voltage matching applications. Despite its low cost, it is a fully specified converter with 1kVDC isolation, industrial operating temperature range of -40°C to +85°C without derating and UL/EN certifications.

RFM

1 Watt

SIP4

Single Output



Selection Guide

| Part Number | Input Voltage [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency ⁽¹⁾ typ. [%] | Max. Capacitive Load ⁽²⁾ [μF] |
|-------------|---------------------|----------------------|---------------------|------------------------------------|--|
| RFM-0505S | 5 | 5 | 200 | 79 | 470 |

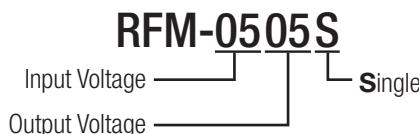
Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max. Cap Load is tested at nominal input and full resistive load



Model Numbering



UL60950-1 certified
CAN/CSA-C22.2 No 60950-1 certified
EN55032 compliant

Specifications (measured @ Ta= 25°C, nominal input voltage, full load and after warm-up)

BASIC CHARACTERISTICS

| Parameter | Condition | Min. | Typ. | Max. |
|--|-----------------------------|-------|---------------------|-----------|
| Internal Input Filter | | | | capacitor |
| Input Voltage Range | | | ±10% | |
| Input Current | max. load | | 250mA | |
| Quiescent Current | nom. Vin = 5VDC | | 25mA | 30mA |
| Minimum Load ⁽³⁾ | | 0% | | |
| Internal Operating Frequency | | 50kHz | 80kHz | 100kHz |
| Output Ripple and Noise ⁽⁴⁾ | 20MHz BW | | 50mVp-p | 100mVp-p |
| Reflected Back Ripple Current | 20MHz BW, no external choke | | 20mA _{p-p} | |

Notes:

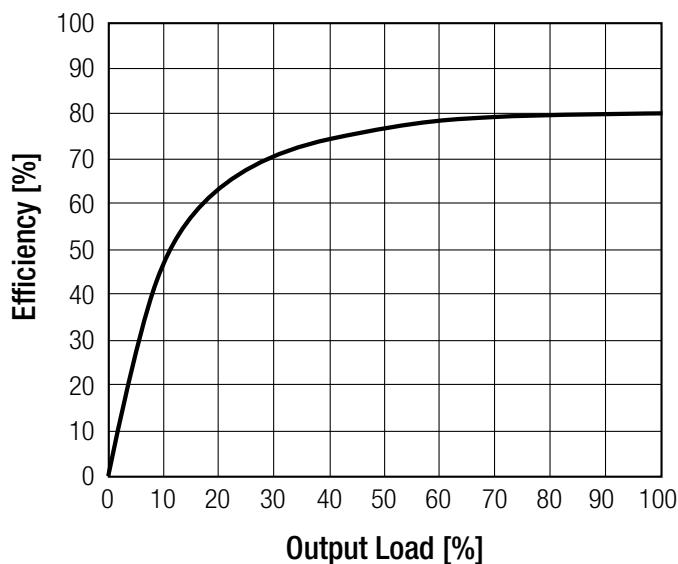
Note3: Operation below 10% load won't harm the converter, but specifications may not be met

Note4: Measurements are made with a 100nF MLCC across output (low ESR)

continued on next page

Specifications (measured @ $T_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm-up)

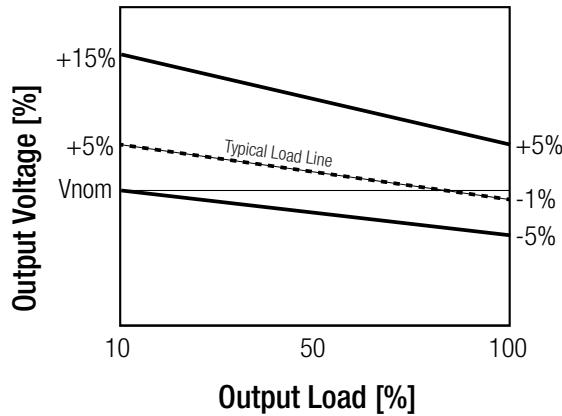
Efficiency vs. Load
(nominal $V_{in} = 5\text{VDC}$)



REGULATIONS

| Parameter | Condition | Values |
|-----------------|----------------------------------|-----------------------------------|
| Output Accuracy | | $\pm 5.0\%$ max. |
| Line Regulation | low line to high line, full load | $\pm 1.2\%$ typ. / $\pm 1\%$ max. |
| Load Regulation | 10% to 100% | $\pm 10\%$ typ. / $\pm 15\%$ max. |

Tolerance Envelope



PROTECTIONS

| Parameter | Condition | Value |
|----------------------------------|--------------|------------------------|
| Isolation Voltage ⁽⁵⁾ | I/P to O/P | tested for 1 second |
| Isolation Resistance | | $1\text{G}\Omega$ min. |
| Isolation Capacitance | | 75pF max. |
| Leakage Current | 500VAC, 50Hz | $1\mu\text{A}$ max. |
| Insulation Grade | | Functional |

Notes:

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

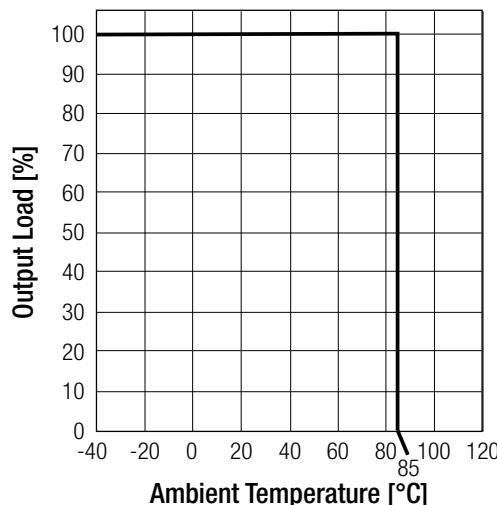
Specifications (measured @ $T_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm-up)

ENVIRONMENTAL

| Parameter | Condition | Value |
|-----------------------------|---|---|
| Operating Temperature Range | (@ natural convection 0.1m/s) (see graph) | -40°C to +85°C |
| Maximum Case Temperature | | +105°C |
| Temperature Coefficient | | $\pm 0.05\%/\text{°C}$ |
| Thermal Impedance | 0.1m/s, horizontal direction | 60°C/W |
| Operating Altitude | | 2000m |
| Operating Humidity | non-condensing | 95% RH max. |
| Pollution Degree | | PD2 |
| Vibration | | MIL-STD-202G |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C +85°C 20100 x 10 ³ hours 8700 x 10 ³ hours |

Derating Graph

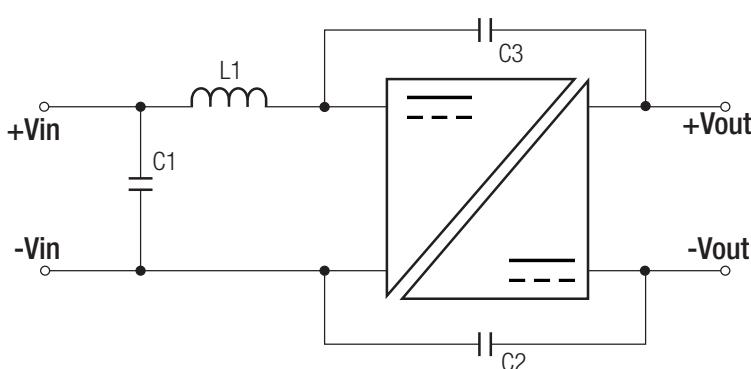
(@ Chamber and natural convection 0.1m/s)



SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report/File Number | Standard |
|--|---|---|
| Information Technology Equipment, General Requirements for Safety | E358085-A4 | UL60950-1, 2nd Edition, 2007 |
| | | CSA C22.2 No. 60950-1-07, 2nd Edition, 2007 |
| RoHS 2+ | | RoHS 10/10, 2015 |
| EMC Compliance | Condition | Standard / Criterion |
| Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement | with external filter (see below filter suggestion) | EN55032, Class A, B |

EMC Filtering - Suggestions for Class A and B



| Component List Class A | | | |
|------------------------|----|----|----|
| C1 | L1 | C2 | C3 |
| 6.8µF | - | - | - |

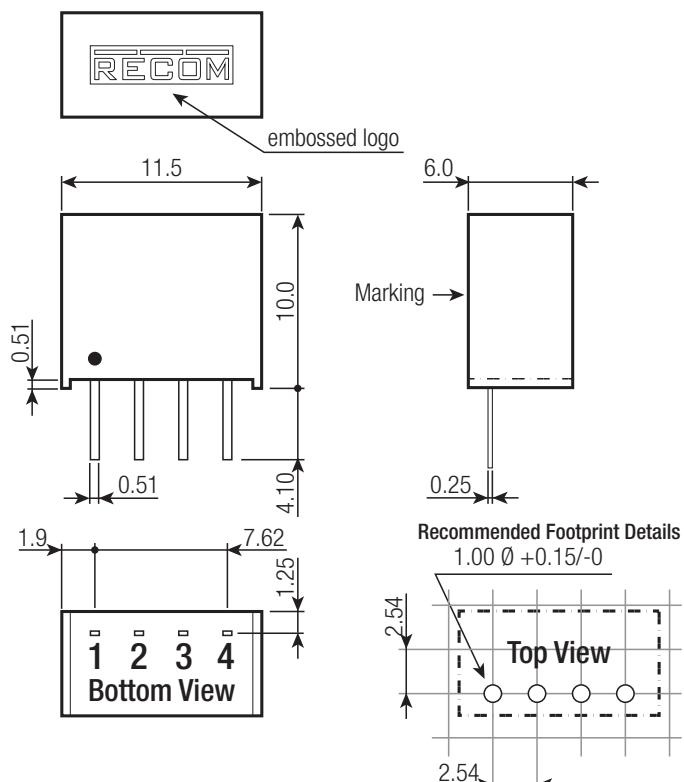
| Component List Class B | | |
|------------------------|------|-----------|
| C1 | L1 | C2 and C3 |
| 10µF | 22µH | 330pF/1kV |

Specifications (measured @ $T_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm-up)

DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|---------------------------|-----------------|---|
| Material | case potting | non-conductive black plastic (UL94 V-0) epoxy (UL94 V-2) |
| Package Dimension (LxWxH) | | 11.5 x 6.0 x 10.0mm |
| Package Weight | | 1.4g |

Dimension Drawing (mm)



Pin Connections

| Pin # | Function |
|-------|----------|
| 1 | -Vin |
| 2 | +Vin |
| 3 | -Vout |
| 4 | +Vout |

Tolerance: xx.x = $\pm 0.5\text{mm}$
xx.xx = $\pm 0.25\text{mm}$ Pin tolerance:
Thickness: $\pm 0.05\text{mm}$
Length: $+0.25/-0.50\text{mm}$

PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|------|----------------------|
| Packaging Dimension (LxWxH) | tube | 520.0 x 16.0 x 9.0mm |
| Packaging Quantity | | 42pcs |
| Storage Temperature Range | | -55°C to +125°C |
| Storage Humidity | | 5% - 95%, RH |

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