

Features

Switching Regulator

- Efficiency up to 91%, no need for heatsinks
- Pin-out compatible with LM78XX linears
- Low profile (L*W*H=11.6*8.5*10.4mm)
- Wide input range (7V - 28V)
- Short circuit protection
- IEC/EN60950-1 + AM2 certified



R-78E-1.0

1.0 Amp
SIP3
Single Output



Description

The R-78E series is a switching regulator module that has been designed to offer all the advantages of a switching regulator (high efficiency, wide input range, accurate output voltage regulation) but with a low cost for production quantities. Due to the R-78E's high efficiency of up to 91% at an output voltage of 5V/1A at the output, no heat sink is required. The compact TO-220 compatible SIP3 package measures only 11.6 x 8.5 x 10.4 mm, so it saves precious board space. The warranty is 3 years.

Selection Guide

| Part Number | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [A] | Efficiency ⁽¹⁾ typ @ min Vin. [%] | Max. Capacitive Load ⁽²⁾ [µF] |
|--------------|---------------------------|----------------------|--------------------|--|--|
| R-78E3.3-1.0 | 7 - 28 | 3.3 | 1.0 | 87 | 220 |
| R-78E5.0-1.0 | 8 - 28 | 5.0 | 1.0 | 91 | 220 |

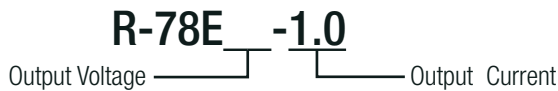
Notes:

Note1: Efficiency is tested at nom. input voltage and full load

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



Model Numbering



IEC60950-1 certified
EN60950-1 certified

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

| BASIC CHARACTERISTICS | | | | |
|--|------------------|------|--------|----------|
| Parameter | Condition | Min. | Typ. | Max. |
| Input Voltage Range | nom. Vin = 24VDC | 7VDC | 24VDC | 28VDC |
| Input Current | min. Vin | | | 1000mA |
| Quiescent Current | | | 1.5mA | |
| Internal Operating Frequency | Vin= 12VDC | | 330kHz | |
| Output Ripple and Noise ⁽³⁾ | 20MHz BW | | | 120mVp-p |

Notes:

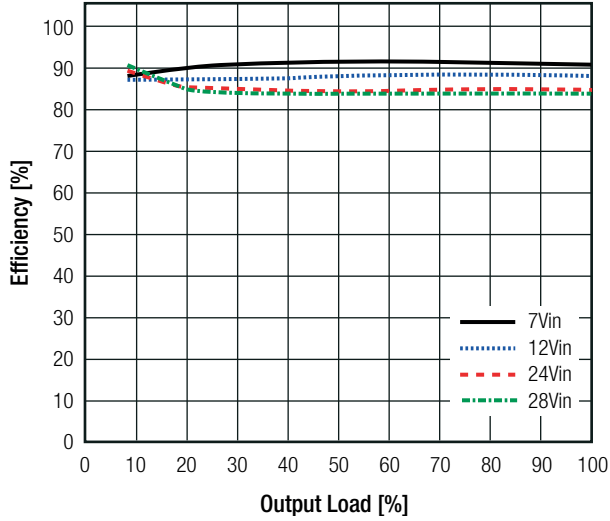
Note3: Measurements are made with a 100nF MLCC across output (low ESR)

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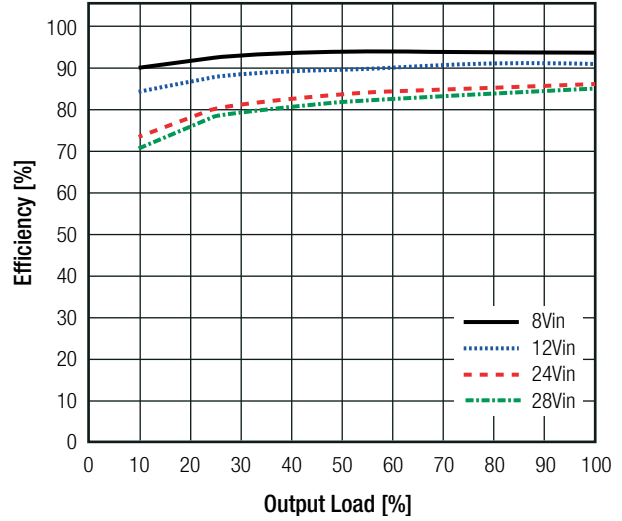
Specifications (measured at Ta= 25°C, full load, nominal input voltage and after warm-up)

Efficiency vs. Load

R-78E3.3-1.0



R-78E5.0-1.0



REGULATIONS

| Parameter | Condition | Value |
|-----------------|----------------------------------|-------------------------|
| Output Accuracy | | ±3.0% typ. / ±5.0% max. |
| Line Regulation | low line to high line, full load | ±1.0% max. |
| Load Regulation | typ Vin. and 10% to 100% load | ±1.5% max. |

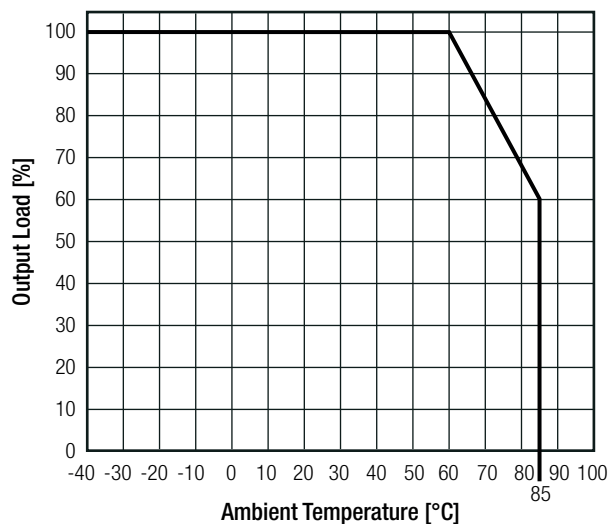
PROTECTIONS

| Parameter | Condition | Value |
|--------------------------------|-----------|--------------------|
| Short Circuit Protection (SCP) | | automatic recovery |
| Over Current Protection (OCP) | 100% = 1A | 200% Load |

ENVIRONMENTAL

| Parameter | Condition | Value |
|-----------------------------|--|------------------------------|
| Operating Temperature Range | natural convection and with derating (see graph) | -40°C to +85°C |
| Humidity | non-condensing | 95%, RH max. |
| MTBF | according to MIL-HDBK-217F, G.B. +25°C | 3875 x 10 ³ hours |

Derating Graph



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

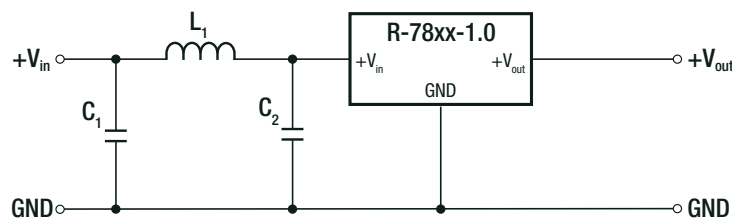
SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report / File Number | Standard |
|---|----------------------|---|
| Information Technology Equipment, General Requirements for Safety | 1603123 | IEC60950-1:2005, 2nd Edition + AM 2:2013 EN60950-1:2006 + AM2:2013 |
| EAC | RU-AT.49.09571 | TP TC 004/2011 |
| RoHS 2+ | | RoHS 2011/65/EU + AM2015/863 |

EMC Compliance

| EMC Compliance | Condition | Standard / Criterion |
|---|---|------------------------|
| Electromagnetic compatibility of multimedia equipment - Emission requirements | with external filter (see filter suggestion below) | EN55032, Class A and B |

EMC Filter Suggestion according to EN55032



Component List Class A

| MODEL | C1 | C2 | L1 |
|--------------|-----------|-----------|------------|
| R-78E3.3-1.0 | 10µF | 10µF | 12µH choke |
| R-78E5.0-1.0 | 100V MLCC | 100V MLCC | RLS-126 |

Component List Class B

| MODEL | C1 | C2 | L1 |
|--------------|-----------|-----------|------------|
| R-78E3.3-1.0 | 10µF | 2.2µF | 68µH choke |
| R-78E5.0-1.0 | 100V MLCC | 100V MLCC | RLS-686 |

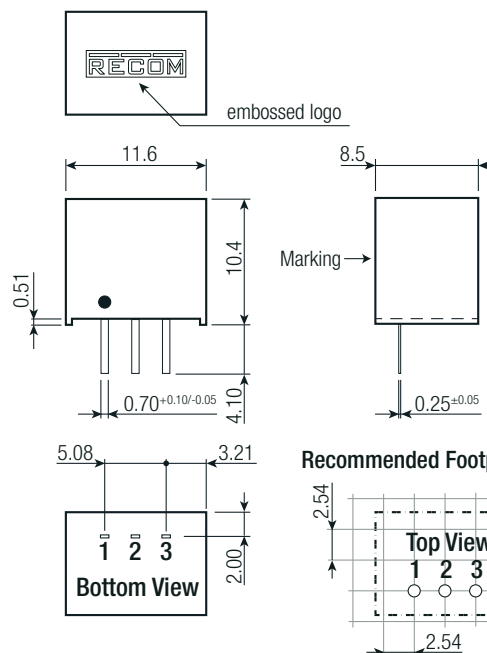
Notes:

Note4: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

DIMENSION and PHYSICAL CHARACTERISTICS

| Parameter | Condition | Value |
|---------------------------|-----------------|--|
| Material | case potting | non-conductive black plastic, (UL94 V-0) silicone, (UL94 V-0) |
| Package Dimension (LxWxH) | | 11.6 x 8.5 x 10.4mm |
| Package Weight | | 2g typ. |

Dimension Drawing (mm)



Pin Connections

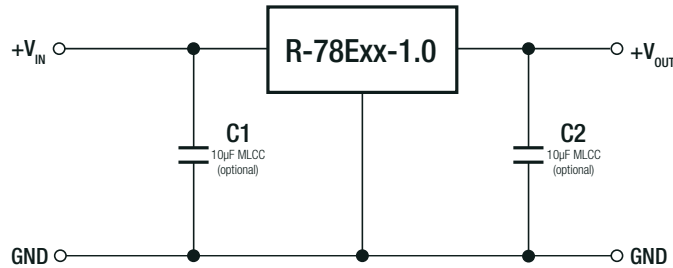
| Pin # | Function |
|-------|----------|
| 1 | +Vin |
| 2 | GND |
| 3 | +Vout |

Tolerance: xx.x= ±0.50mm
xx.xx= ±0.25mm

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

INSTALLATION AND APPLICATION

Standard Application



To protect the converter during power-up, use soft start power supply.

Notes:

Note5: The R-78Exx-1.0 can not be used as positive to negative converter

PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|------|-----------------------|
| Packaging Dimension (LxWxH) | tube | 520.0 x 11.2 x 18.2mm |
| Packaging Quantity | | 42pcs |
| Storage Temperature Range | | -55°C to +125°C |

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