

Features

Switching Regulator

- Low cost switching regulator
- High start-up current capability
- Efficiency up to 95%
- Short circuit protection
- Pin compatible with 78 series regulators
- Non isolated DC-DC converter
- IEC/EN60950-1+ AM2 certified



R-78E-0.5

0.5 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 95% no heat-sink is required. The compact TO-220 compatible SIP3 package measures only 11.6 x 8.5 x 10.4mm, so it saves precious board space.

Selection Guide

| Part Number | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [A] | Efficiency ⁽¹⁾ | | Max. Capacitive Load ⁽²⁾ [µF] |
|--------------|---------------------------|----------------------|--------------------|---------------------------|---------------|--|
| | | | | @ min Vin [%] | @max. Vin [%] | |
| R-78E3.3-0.5 | 6-28 | 3.3 | 0.5 | 75 | 88 | 220 |
| R-78E5.0-0.5 | 7-28 | 5 | 0.5 | 82 | 92 | 220 |
| R-78E9.0-0.5 | 12-28 | 9 | 0.5 | 89 | 94 | 220 |
| R-78E12-0.5 | 15-28 | 12 | 0.5 | 92 | 95 | 220 |
| R-78E15-0.5 | 18-28 | 15 | 0.5 | 93 | 95 | 220 |

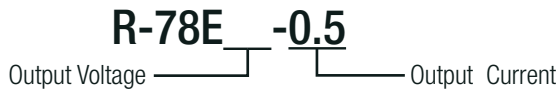
Notes:

- Note1: Efficiency is tested at nom. input voltage and full load
Note2: Max. Cap Load is tested by nominal input and full resistive load



IEC60950-1 certified
EN60950-1 certified

Model Numbering



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

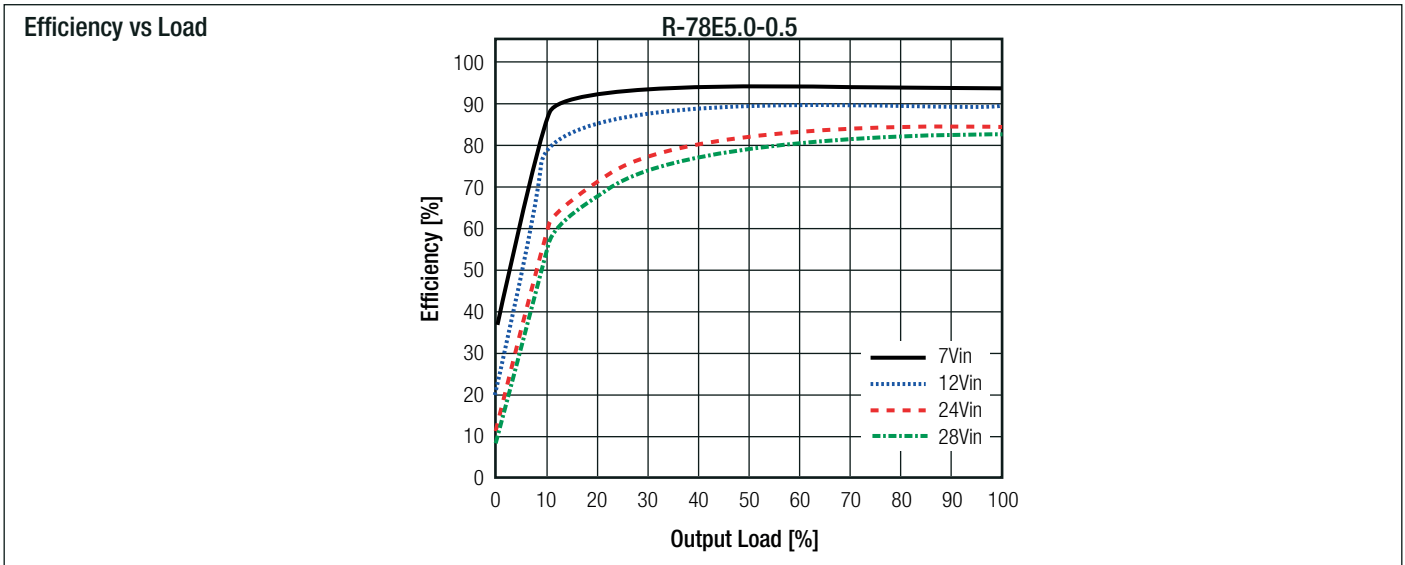
| BASIC CHARACTERISTICS | | | | | |
|--|------------------|---------------|------|---------|-------|
| Parameter | Condition | | Min. | Typ. | Max. |
| Input Voltage Range | nom. Vin = 24VDC | | 6VDC | 24VDC | 28VDC |
| Quiescent Current | | | | 1.5mA | |
| Minimum Load ⁽³⁾ | | | 2% | | |
| Internal Operating Frequency | | | | 570kHz | |
| Output Ripple and Noise ⁽⁴⁾ | 20MHz BW | 3.3, 5, 9Vout | | 50mVp-p | |
| | | 12, 15Vout | | 70mVp-p | |

Notes:

- Note3: recommend to use with more than 2% load, if not, the ripple of the product may exceeds the specification, but doesn't affect the reliability of the product
Note4: Measurements are made with a 100nF MLCC across output (low ESR)

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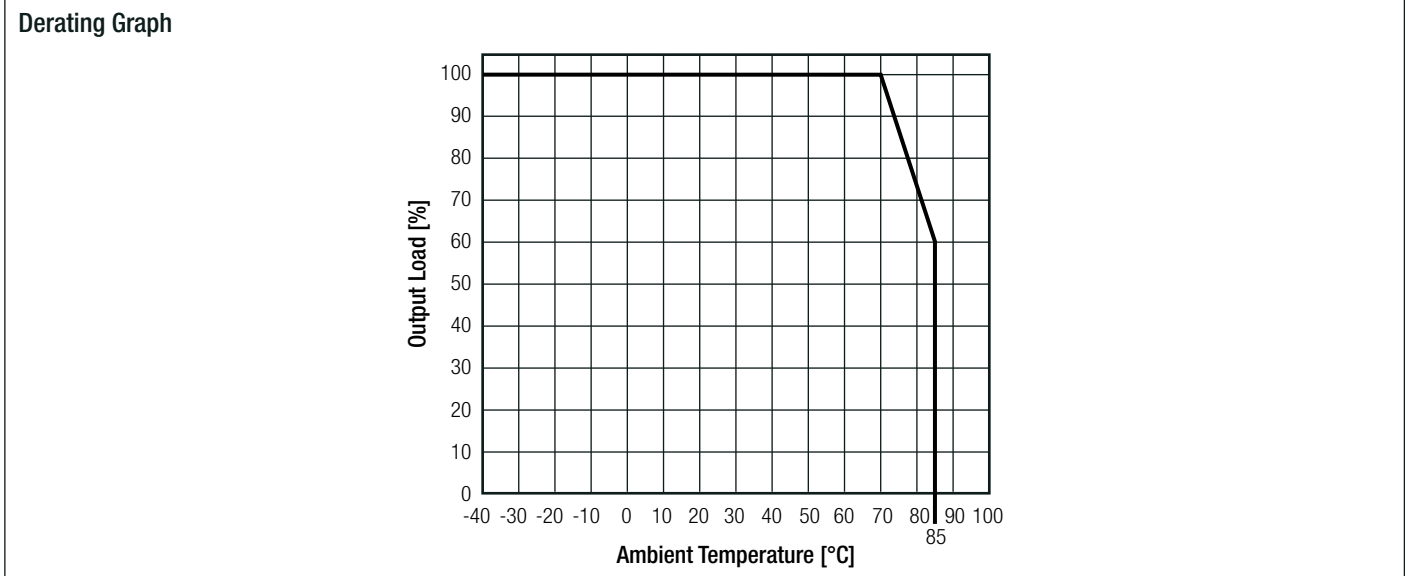
Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)



| REGULATIONS | | |
|-----------------|----------------------------------|------------|
| Parameter | Condition | Value |
| Output Accuracy | | ±3.0% typ. |
| Line Regulation | low line to high line, full load | ±0.5% typ. |
| Load Regulation | 10% to 100% load | ±1.0% typ. |

| PROTECTIONS | | |
|--------------------------------|-----------|--------------------------------|
| Parameter | Condition | Value |
| Short Circuit Protection (SCP) | | continuous, automatic recovery |

| ENVIRONMENTAL | | |
|-----------------------------|--|--|
| Parameter | Condition | Value |
| Operating Temperature Range | natural convection and with derating (see graph) | -40°C to +85°C |
| Maximum Case Temperature | | 100°C |
| Vibration | | 10-55Hz, 2G, 30min along X,Y,Z |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C: 7976 x 10 ³ hours +70°C: 2182 x 10 ³ hours |



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

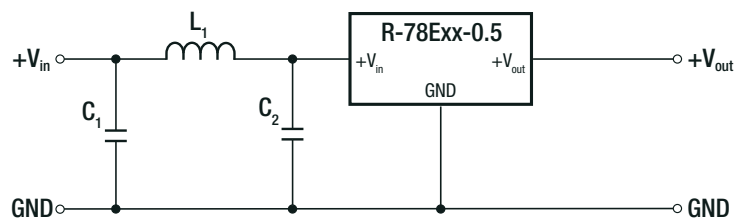
SAFETY AND CERTIFICATIONS

| 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 | L1 |
|--------------|----------|-------------|
| R-78E3.3-0.5 | 4.7µF | 3.9µH choke |
| R-78E15-0.5 | 50V MLCC | RLS-397 |

Component List Class B

| MODEL | C1 | C2 | L1 |
|--------------|-----------|----------|------------|
| R-78E3.3-0.5 | 10µF | 4.7µF | 12µH choke |
| R-78E15-0.5 | 100V MLCC | 50V MLCC | RLS-126 |

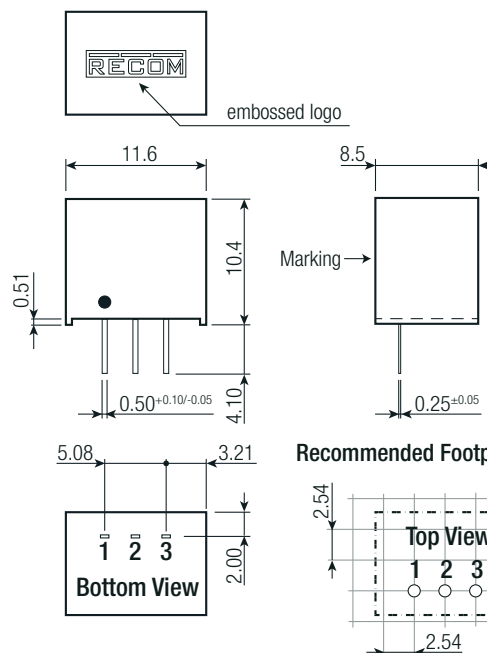
Notes:

Note5: 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

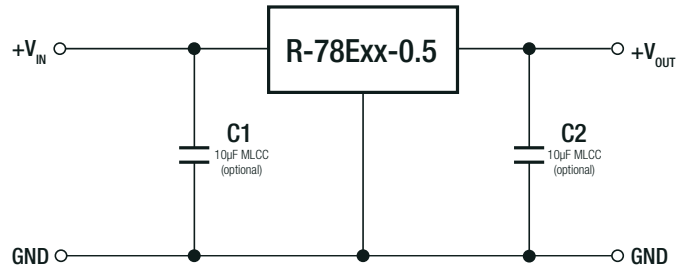
| Pin # | Function |
|-------|----------|
| 1 | +Vin |
| 2 | GND |
| 3 | +Vout |

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

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

INSTALLATION AND APPLICATION

Standard Application



Notes:

Note6: The R-78Exx-0.5 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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