

# Features

# Switching Regulator

- Efficiency up to 94%, no need for heatsinks
- Pin compatible with LM78XX linears
- Low profile (L/W/H=11.5 x 7.55 x 10.2mm)
- Wide input range
- Short circuit protection, thermal shutdown
- Low ripple and noise
- IEC/EN60950-1 certified



## R-78-1.0

1.0 Amp  
SIP3  
Single Output



### Description

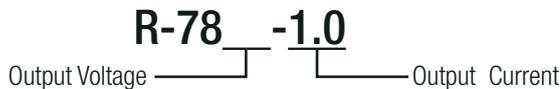
The R-78xx-1.0 series switching regulators are ideally suited to replace 1 Amp 78xx linear regulators and are pin compatible. Efficiencies of up to 94% mean that very little energy is wasted as heat so there is no need for any heat sinks with their additional space and mounting costs.

### Selection Guide

| Part Number | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [A] | Efficiency    |                |
|-------------|---------------------------|----------------------|--------------------|---------------|----------------|
|             |                           |                      |                    | @ min Vin [%] | @ max. Vin [%] |
| R-781.8-1.0 | 4.75 - 18                 | 1.8                  | 1.0                | 82            | 76             |
| R-782.5-1.0 | 4.75 - 18                 | 2.5                  | 1.0                | 87            | 81             |
| R-783.3-1.0 | 4.75 - 18                 | 3.3                  | 1.0                | 90            | 84             |
| R-785.0-1.0 | 6.5 - 18                  | 5.0                  | 1.0                | 94            | 89             |



### Model Numbering



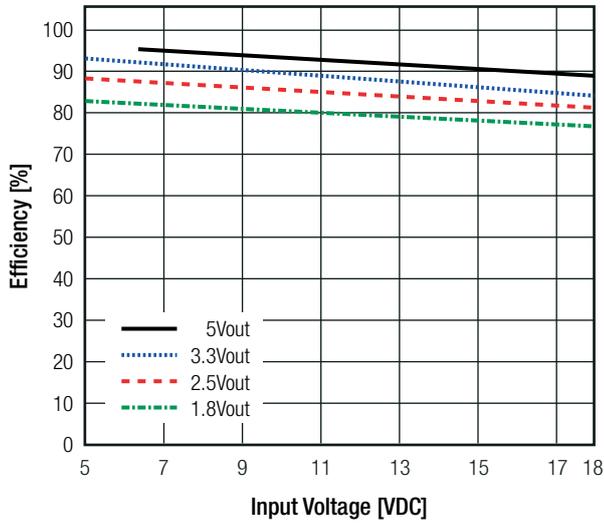
IEC/EN60950-1 certified  
EN55032 compliant

### Specifications (measured @ Ta= 25°C, 10% minimum load, unless otherwise stated)

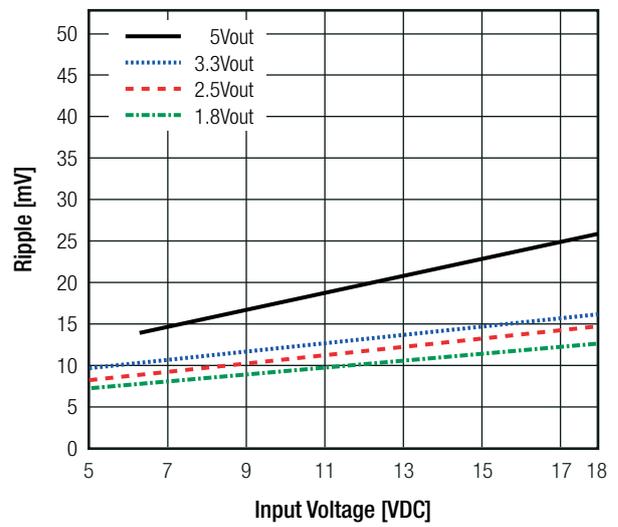
| BASIC CHARACTERISTICS   |   |        |         |         |
|---|---|--------|---------|---------|
| Parameter   | Condition                                     | Min.   | Typ.    | Max.    |
| Quiescent Current   | Vin = min. to max. at 0% load                 |        | 5mA     | 7mA     |
| Internal Power Dissipation  |   |        |         | 0.4W    |
| Minimum Load <sup>(1)</sup>   |   | 0%     |         |         |
| Internal Operating Frequency  |   | 280kHz | 350kHz  | 430kHz  |
| Output Ripple and Noise   | measured at 20MHz BW                          |        | 20mVp-p | 30mVp-p |
| Absolute Maximum Capacitive Load  | 1 second start up, no external components     |        |         | 220µF   |
|   | <1 second start up + diode protection circuit |        |         | 6800µF  |
| <b>Notes:</b><br>Note1: Operation under no load will not harm the converter, but specifications may not be met<br>A minimum load of 10mA is recommended |   |        |         |         |
| continued on next page  |   |        |         |         |

Specifications (measured @ Ta= 25°C, 10% minimum load, unless otherwise stated)

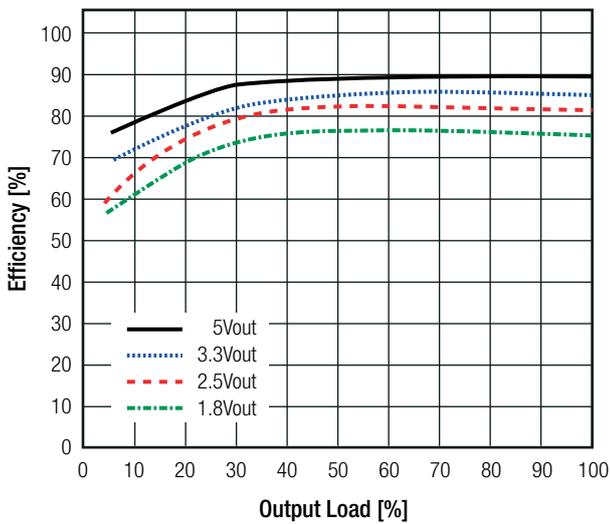
Efficiency vs. Vin (full load)



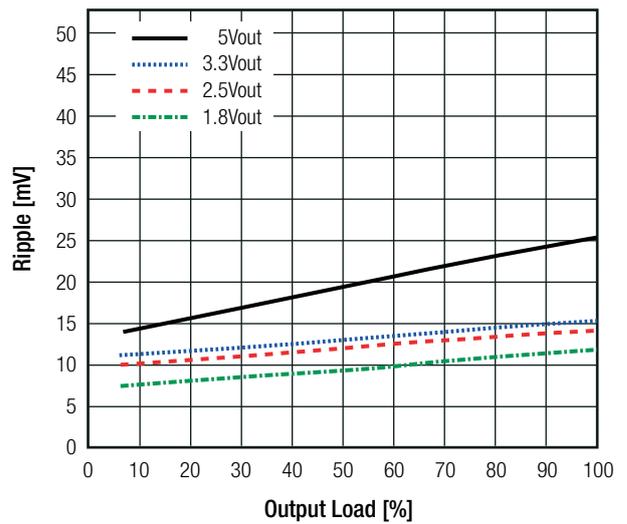
Ripple vs. Vin (full load)



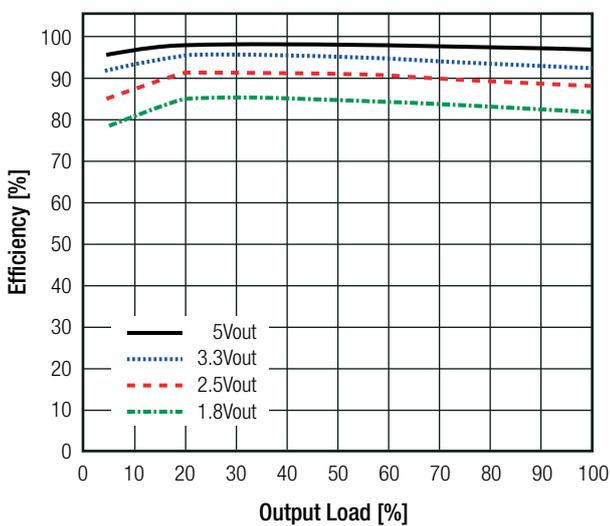
Efficiency vs. Load (max. Vin)



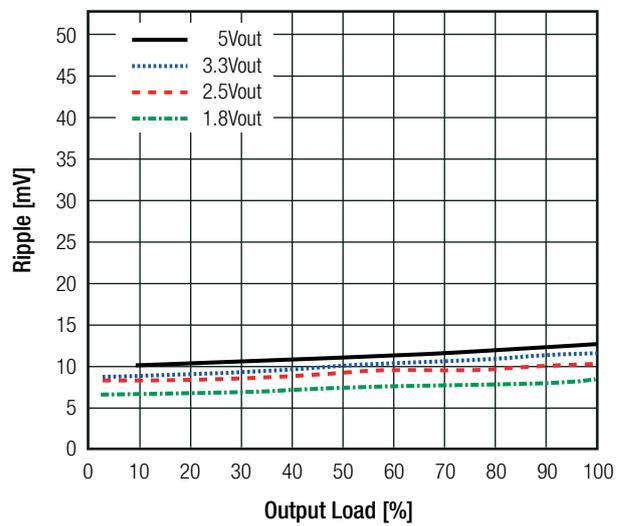
Ripple vs. Load (max. Vin)



Efficiency vs. Load (min. Vin)



Ripple vs. Load (min. Vin)



**Specifications** (measured @ Ta= 25°C, 10% minimum load, unless otherwise stated)

| REGULATIONS        |                                  |                          |
|--------------------|----------------------------------|--------------------------|
| Parameter          | Condition                        | Value                    |
| Output Accuracy    | 100% load                        | ±2.0% typ / ±3.0% max.   |
| Line Regulation    | low line to high line, 100% load | ±0.2% typ. / ±0.4% max.  |
| Load Regulation    | 10% to 100% load                 | ±0.4% typ. / ±0.6% max.  |
| Transient Response | 100% <-> 50% load                | ±85mV typ. / ±100mV max. |

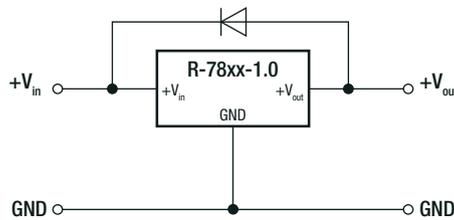
| PROTECTIONS                    |                 |                                |
|--------------------------------|-----------------|--------------------------------|
| Parameter                      | Condition       | Value                          |
| Short Circuit Protection (SCP) |                 | continuous, automatic recovery |
| Short Circuit Input Current    | nom. Vin= 12VDC | 100mA max.                     |

**Optional Diode Protection Circuit**

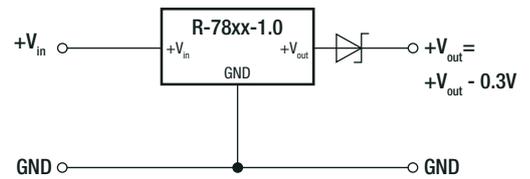
Add a blocking diode to Vout if current can flow backwards into the output, as this can damage the converter when it is powered down.

The diode can either be fitted across the device if the source is low impedance or fitted in series with the output (recommended).

**Optional Protection 1:**

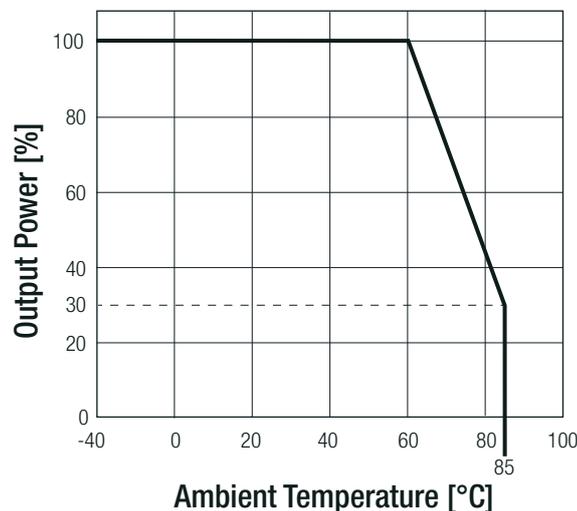


**Optional Protection 2:**



| ENVIRONMENTAL               |                                  |                |   |
|-----------------------------|----------------------------------|----------------|---|
| Parameter                   | Condition                        |                | Value   |
| Operating Temperature Range | with derating (see graph)        |                | -40°C to +85°C  |
| Maximum Case Temperature    |                                  |                | +100°C  |
| Temperature Coefficient     |                                  |                | ±0.015%/K   |
| Thermal Impedance           | 0.1 m/s, vertical                |                | 70K/W   |
| Operating Altitude          |                                  |                | 2000m   |
| Operating Humidity          | non-condensing                   |                | 95% RH max.   |
| Pollution Degree            |                                  |                | PD2   |
| MTBF                        | according to MIL-HDBK-217F, G.B. | +25°C<br>+71°C | 13338 x 10 <sup>3</sup> hours<br>3880 x 10 <sup>3</sup> hours |

**Derating Graph**



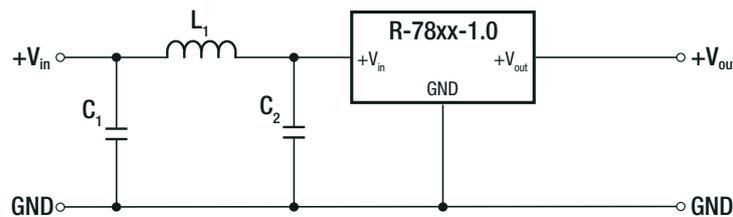
**Specifications** (measured @ Ta= 25°C, 10% minimum load, unless otherwise stated)

**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<br>EN60950-1:2006 + AM 2:2013 |
| EAC   | RU-AT.49.09571       | TP TC 004/2011   |
| RoHS 2+   |                      | RoHS 2011/65/EU + AM2015/863   |

| EMC Compliance  | Condition   | Standard / Criterion    |
|---|---|-------------------------|
| Electromagnetic compatibility of multimedia equipment - Emission requirements | with external filter<br>(see filter suggestion below) | EN55032, Class A and B  |
| ESD Electrostatic discharge immunity test                                     | Contact $\pm 6kV$                                     | EN61000-4-2, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test                | 3V/m  | EN61000-4-3, Criteria A |
| Fast Transient and Burst Immunity   | $\pm 1.0kV$   | EN61000-4-4, Criteria A |
| Immunity to conducted disturbances, induced by radio-frequency fields         | 3V  | EN61000-4-6, Criteria A |
| Power Magnetic Field Immunity   | 50Hz, 3A/m  | EN61000-4-8, Criteria A |

**EMC Filter Suggestion according to EN55032**



**Component List Class A**

| MODEL       | C1         | L1                |
|-------------|------------|-------------------|
| R-783.3-1.0 | 10 $\mu$ F | 3.9 $\mu$ H choke |
| R-785.0-1.0 | 100V MLCC  | RLS-397           |

**Component List Class B**

| MODEL       | C1         | C2          | L1                |
|-------------|------------|-------------|-------------------|
| R-783.3-1.0 | 10 $\mu$ F | 2.2 $\mu$ F | 5.6 $\mu$ H choke |
| R-785.0-1.0 | 100V MLCC  | 100V MLCC   | RLS-567           |

**Notes:**

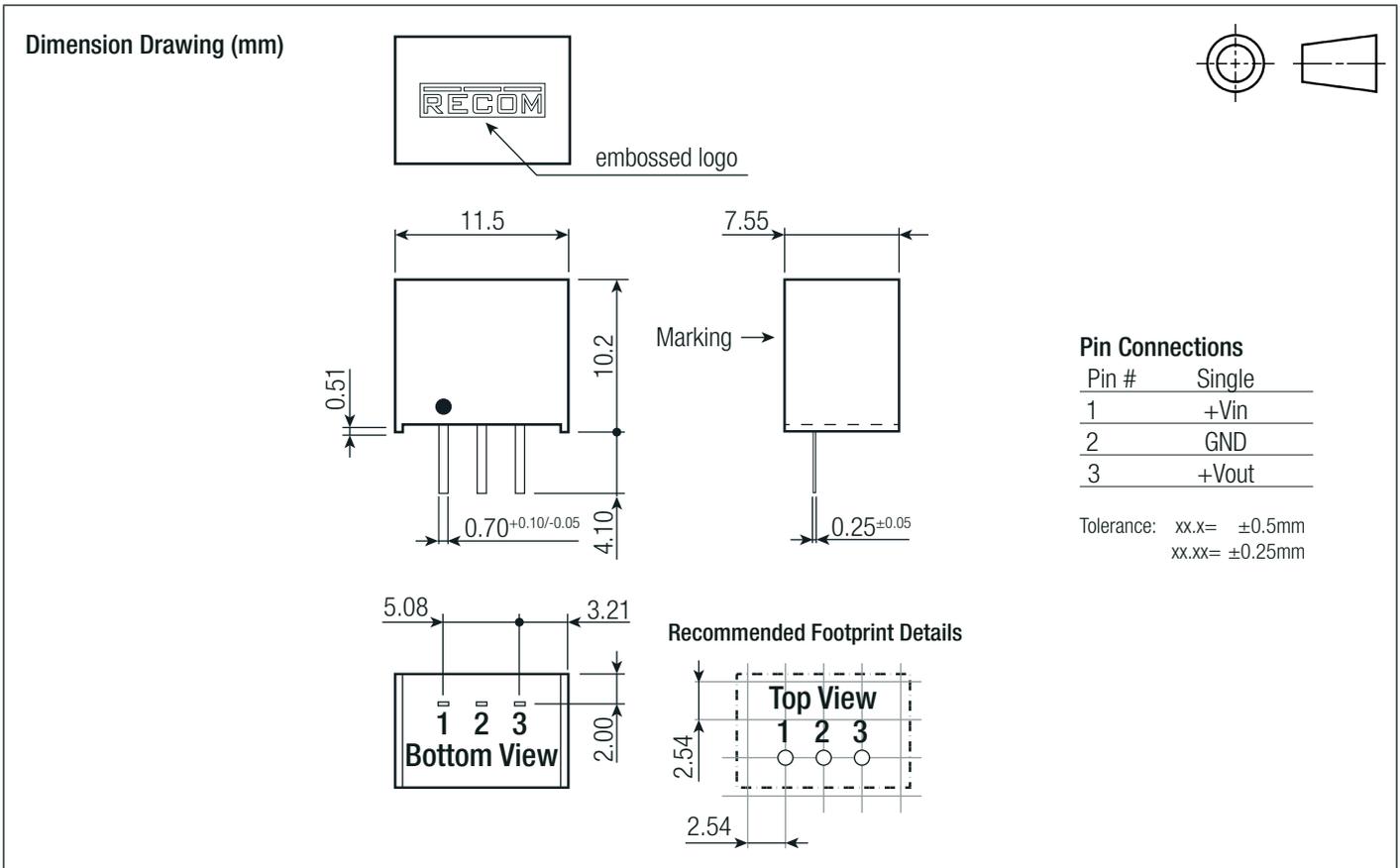
Note2: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

**DIMENSION AND PHYSICAL CHARACTERISTICS**

| Parameter                 | Type                   | Value   |
|---------------------------|------------------------|---|
| Material                  | case<br>potting<br>PCB | non-conductive black plastic, (UL94 V-0)<br>silicone, (UL94 V-0)<br>FR4, (UL94 V-0) |
| Package Dimension (LxWxH) |                        | 11.5 x 7.55 x 10.2mm  |
| Package Weight            |                        | 1.9g typ.   |

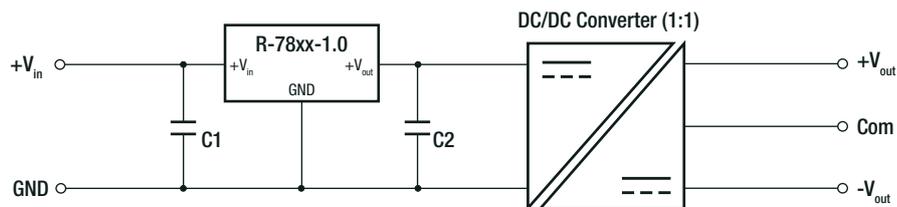
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Specifications (measured @ Ta= 25°C, 10% minimum load, unless otherwise stated)



## INSTALLATION AND APPLICATION

### High Efficiency, Isolated, Dual Unregulated Output



C1: optional

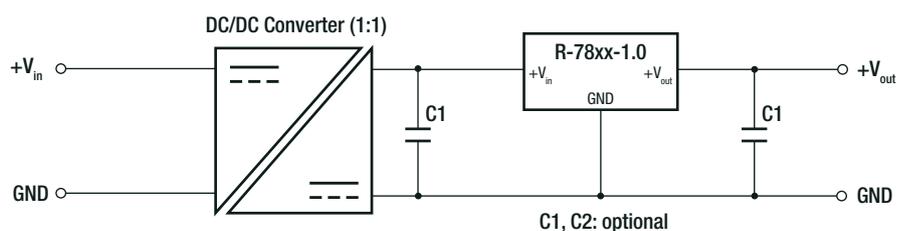
C2: required (further decoupling filtering may be necessary between the two converters)

- Medical grade isolated dual outputs

- Wide input range 6.5V to 18V

- High efficiency, suitable for 12V battery powered devices

### Isolated (up to 6kVDC), Wide Input Range Regulated Output



C1, C2: optional

- High isolation voltage

- Improved load / line Regulation

- Wide input voltage

- Point-of-load architecture

**Specifications** (measured @ Ta= 25°C, 10% minimum load, unless otherwise stated)

| PACKAGING INFORMATION       |      |                      |
|-----------------------------|------|----------------------|
| Parameter                   | Type | Value                |
| Packaging Dimension (LxWxH) | tube | 520.0 x 9.3 x 16.5mm |
| Packaging Quantity          | tube | 42pcs                |
| Storage Temperature Range   |      | -55°C to +125°C      |
| Storage Humidity            |      | 95% RH max.          |

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- Работу по проектам и поставку образцов.
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- Входной контроль качества.
- Наличие сертификата ISO.

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- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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