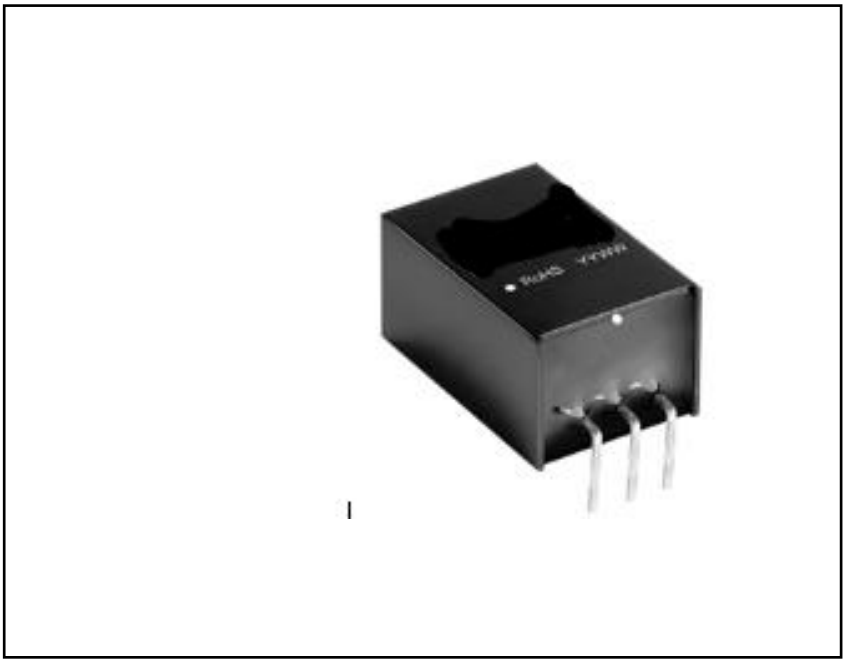
## FEATURES

- Input voltage upto 90Vdc
- Efficiency up to 93%
- Pin compatible with LMxx linear regulators (SIP-3)
- Excellent line/load regulation
- Operating temperature range - 40°C to +85°C
- No-load input current as low as 1.5mA
- Continuous short circuit protection
- EN 62368-1

# RS PRO Wide input switching regulator

**2369849, 2369851, 2369854**



RS Professionally Approved Products bring to you professional quality parts across all product categories. Our product range has been tested by engineers and provides a comparable quality to the leading brands without paying a premium price.

## Product Description

Non-isolated POL converter series with a 10:1 input voltage range provides a high efficiency drop-in replacement for LMxx Linear regulators. With an input range of up to 90V, this regulated, low loss, cost effective range of switching regulators provides a suitable solution for many battery and distributed power applications.

## General Specifications

| | |
|---|---|
| **Model** | Non Isolated ultra-wide input 500mA DC-DC converter |
| **Mounting Type** | PCB |
| **MTBF** | MIL-HDBK-217F@25°C > 2,000,000 hrs |
| **Applications** | Battery and distributed power systems |

| RS Stock# | Input Voltage (Vdc) | Output Voltage | Output Current (mA) Max | Full Load Efficiency % (Typ) Vin Min./Vin Max. | Capacitive Load (µF) Max. |
|---|---|---|---|---|---|
| 2369849 | 9…90 Vdc | 5V | 500mA | 87/75 | 100 |
| 2369851 | 18…90 Vdc | 12V | 500mA | 91/83 | |
| 2369854 | 36…90 Vdc | 24V | 300mA | 93/85 | |
| Note: * For input voltage exceeding 80 VDC, an input capacitor of 22uF/100V is required. | | | | | |

## Input Specifications

| **Input Specification** | | | | | |
|---|---|---|---|---|---|
| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
| No-load Input Current | Nominal input voltage | - | - | 1.5 | mA |
| Reverse Polarity at Input | | Avoid / Not protected | | | |
| Input Filter | | Capacitance filter | | | |

## Output Specifications

| Output Specification | | | | | | |
|---|---|---|---|---|---|---|
| Item | Operating Conditions | | Min | Typ. | Max | Unit |
| Voltage Accuracy | 10%-100%, input voltage range | 3.3V output | - | ±3.5 | ±4.5 | % |
| | | Others | - | ±2 | ±3 | |
| Linear Regulation | Full load, input voltage range | 3.3, 5 and 6.5V outputs | - | ±0.6 | ±1.5 | |
| | | 12 and 15V outputs | - | ±0.6 | ±2.0 | |
| | | 24V output | - | ±1.2 | ±2.5 | |
| Load Regulation | Nominal input voltage,10% -100% load | | - | ±1.0 | ±2.0 | |
| Ripple & Noise* | 20MHz bandwidth, nominal input voltage, full load | | - | 40 | 80 | mVp-p |
| Temperature Coefficient | Operating temperature -40℃ to +85℃ | | - | - | ±0.03 | %/℃ |
| Transient Response Deviation | Nominal input voltage, 25% load step change | | - | ±0.4 | ±1.5 | % |
| Transient Recovery Time | Nominal input voltage, 25% load step change | | - | 0.2 | 1 | ms |
| Short-circuit Protection | Nominal input voltage | | Continuous, self-recovery | | | |
| Note: * The “parallel cable” method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information; | | | | | | |

## General Specifications

| Item | Operating Conditions | Min | Typ | Max. | Unit |
|---|---|---|---|---|---|
| Operating Temperature | See Fig.1, Fig.2. | -40 | - | +85 | ℃ |
| Storage Temperature | | -55 | - | +125 | |
| Pin Soldering Resistance Temperature | Soldering spot is 1.5mm away from case for 10 seconds | - | - | +300 | |
| Storage Humidity | Non-condensing | 5 | - | 95 | %RH |
| Switching Frequency* | Full load, nominal input voltage | - | 300 | - | kHz |
| MTBF | MIL-HDBK-217F@25℃ | 2000 | - | - | k hours |
| Note: *Different output voltage with different switching frequency. | | | | | |

## EMC Specifications

| | | | |
|---|---|---|---|
| Emissions | CE | CISPR32/EN55032 CLASS B (see Fig. 6-② for recommended circuit) | |
| | RE | CISPR32/EN55032 CLASS B (see Fig. 6-② for recommended circuit) | |
| Immunity | ESD | IEC/EN 61000-4-2 Contact ±4kV perf. | Criteria B |
| | RS | IEC/EN 61000-4-3 10V/m perf. | Criteria B |
| | EFT | IEC/EN 61000-4-4 100kHz ±1kV (see Fig. 6-① for recommended circuit) perf. | Criteria B |
| | Surge | IEC/EN 61000-4-5 line to line ±1kV (see Fig. 6-① for recommended circuit) perf. | Criteria B |
| | CS | IEC/EN 61000-4-6 3Vr.m.s perf. | Criteria B |

## Typical Performance Curves

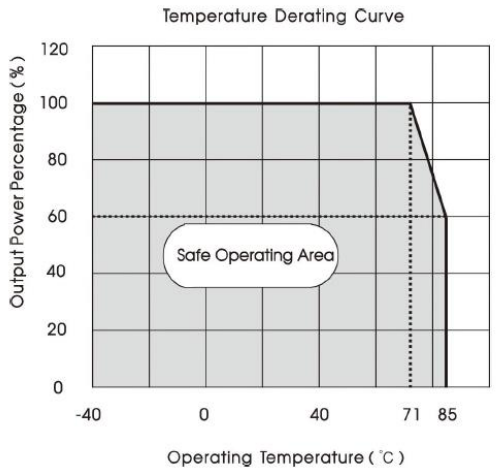



Fig 1. 3.3V, 5V,6.5V,12V,15V

24V (Vin=36V~60V)

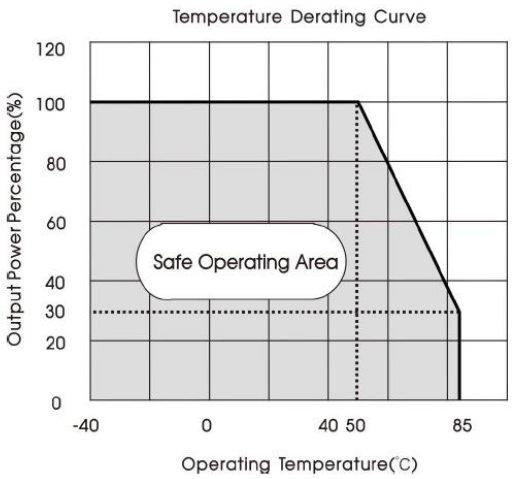



Fig2 24V (Vin≥60V)

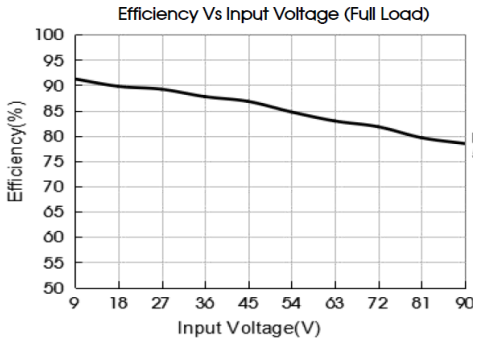



Fig.3

5V output

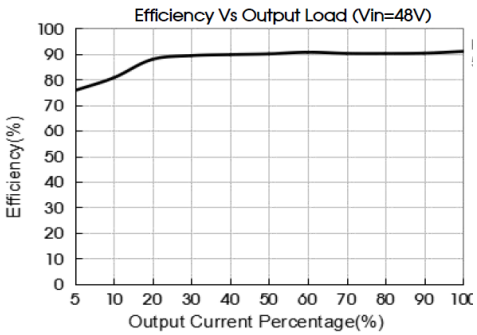



Fig.4

5V output

## Design Reference

### Typical application

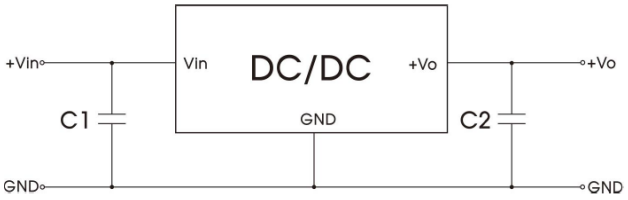



Fig. 5

| Output | C1 (ceramic capacitor) | C2 (ceramic capacitor) |
|---|---|---|
| 3.3 VDC | 10μF/10V | 22μF/10V |
| 5 VDC | | 22μF/10V |
| 12 VDC | | 22μF/10V |
| 24 VDC | | 10μF/10V |

**Table 1**

Notes:
1. The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module.
2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead.
3. Converter cannot be used for hot swap and with output in parallel.

### EMC solution-recommended circuit

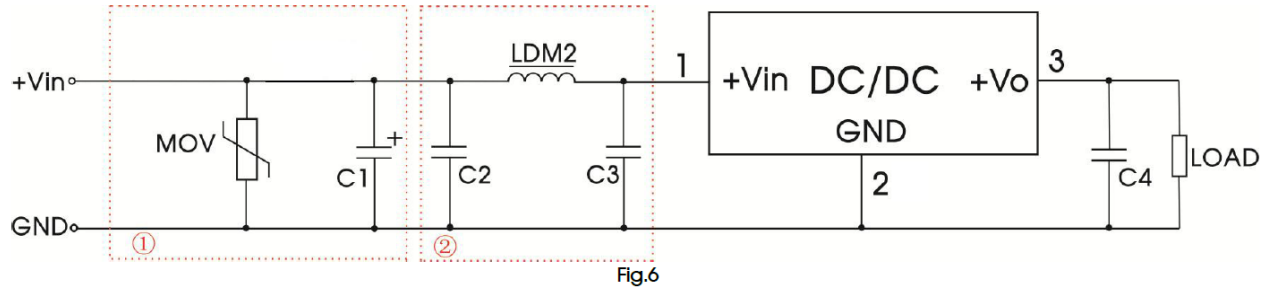


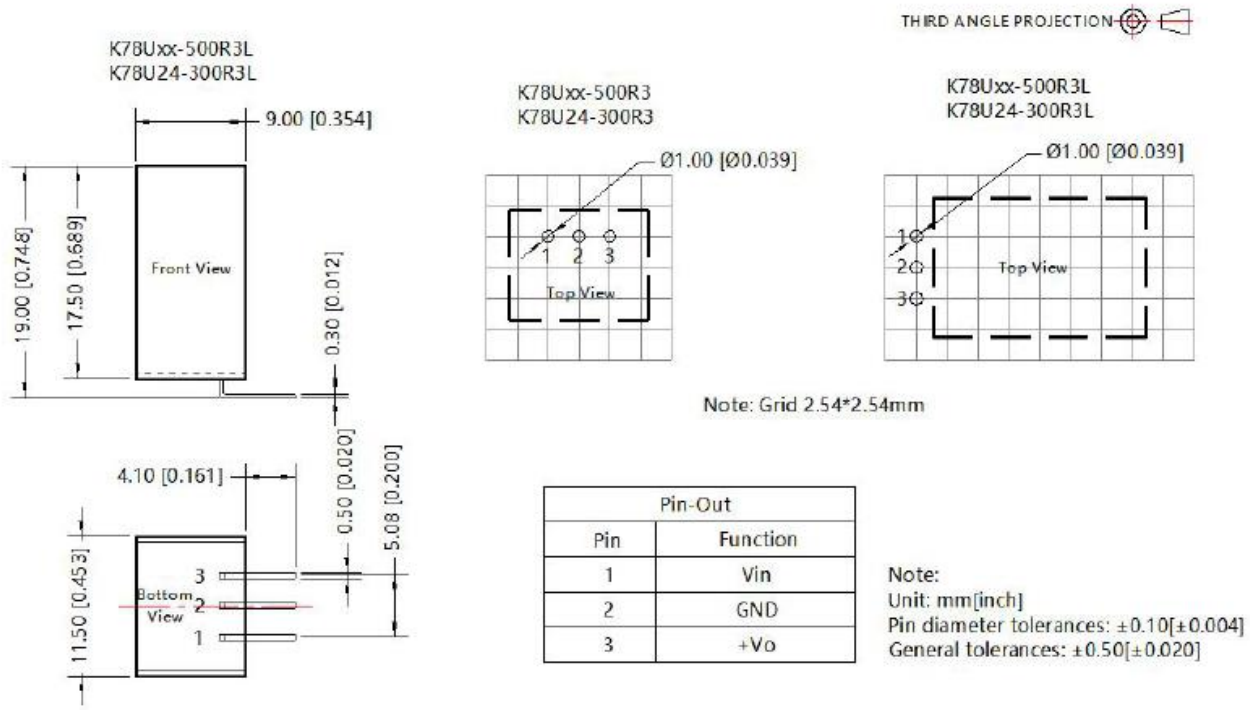

Fig.6

| MOV | C1 | C2 | LDM2 | C3 | C4 |
|---|---|---|---|---|---|
| S20K30 | 680μF /100V | 4.7μF/100V | 120μH | 4.7μF/100V | 10μF/50V |

## Mechanical Specifications

| | |
|---|---|
| **Case material** | Black plastic; flame-retardant and heat-resistant (UL94 V-0) |
| **Dimensions** | 19.00 x 11.50 x 9.00 mm |
| **Weight** | 3.8g(typ.) |
| **Cooling Method** | Free air convection |

## Dimensions and recommended layout




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | Vin |
| 2 | GND |
| 3 | +Vo |

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

## Additional Information

| | |
|---|---|
| **Custom Tariff Number** | 85044090 |

1. The maximum capacitive load offered were tested at nominal input voltage and full load
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal
3. All index testing methods in this datasheet are based on our company corporate standards
4. Products are related to laws and regulations: see "Features" and "EMC"
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations.