

## Features

## Regulated Converters

- 10W in 2" x 1" Package
- 2kVDC and 3kVDC Isolation Options
- 2:1 or 4:1 Input Voltage Range
- Continuous Short Circuit Protection (power limiting)
- Synchronous Rectification on all Del outputs
- Full SMD internal design
- Remote Control Pin
- Efficiency to 87%

## Description

The REC10-xxxxS\_D/M -series offer single and dual regulated outputs in a 2"x1" package with 2kVDC or 3kVDC isolation options and are suitable for higher power industrial applications. Remote on/off control is standard. The converters can deliver 150% rated power for short periods of time to cope with applications with large capacitive loads or high start up currents.

## Selection Guide

| Part Number        | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency (typ.) (%) | Max. Cap. Load |
|--------------------|---------------------|----------------------|---------------------|-----------------------|----------------|
| REC10-xx3.3S/H*/M  | 9-18, 18-36, 36-75  | 3.3                  | 2000                | 83-84                 | 2200µF         |
| REC10-xx05S/H*/M   | 9-18, 18-36, 36-75  | 5                    | 2000                | 86-87                 | 2200µF         |
| REC10-xx12S/H*/M   | 9-18, 18-36, 36-75  | 12                   | 833                 | 85-86                 | 2200µF         |
| REC10-xx15S/H*/M   | 9-18, 18-36, 36-75  | 15                   | 667                 | 85-86                 | 2200µF         |
| REC10-xx05D/H*/M   | 9-18, 18-36, 36-75  | ±5                   | ±1000               | 82-83                 | ±1000µF        |
| REC10-xx12D/H*/M   | 9-18, 18-36, 36-75  | ±12                  | ±416                | 85-86                 | ±1000µF        |
| REC10-xx15D/H*/M   | 9-18, 18-36, 36-75  | ±15                  | ±333                | 85-86                 | ±1000µF        |
| REC10-xx3.3SZ/H*/M | 9-36, 18-75         | 3.3                  | 2000                | 82                    | 2200µF         |
| REC10-xx05SZ/H*/M  | 9-36, 18-75         | 5                    | 2000                | 86                    | 2200µF         |
| REC10-xx12SZ/H*/M  | 9-36, 18-75         | 12                   | 833                 | 85                    | 2200µF         |
| REC10-xx15SZ/H*/M  | 9-36, 18-75         | 15                   | 667                 | 86                    | 2200µF         |
| REC10-xx05DZ/H*/M  | 9-36, 18-75         | ±5                   | ±1000               | 82                    | ±1000µF        |
| REC10-xx12DZ/H*/M  | 9-36, 18-75         | ±12                  | ±416                | 85                    | ±1000µF        |
| REC10-xx15DZ/H*/M  | 9-36, 18-75         | ±15                  | ±333                | 86                    | ±1000µF        |

\* Standard is /H2 for 2kVDC isolation, use /H3 for 3kVDC Isolation

2:1

xx = 9-18Vin = 12,  
xx = 18-36Vin = 24,  
xx = 36-75Vin = 48

4:1

xx = 9-36Vin = 24,  
xx = 18-75Vin = 48

## Specifications (measured at T<sub>A</sub> = 25°C, nominal input voltage, full load and after warm-up)

|                                                                   |                     |            |
|-------------------------------------------------------------------|---------------------|------------|
| Input Voltage Range                                               | 2:1 or 4:1          |            |
| Input Filter                                                      | PI Network          |            |
| Output Voltage Accuracy (the Output 3.3V is ±1.2% max.)           | ±1.0% max.          |            |
| Line Voltage Regulation                                           | ±0.3% max.          |            |
| Load Voltage Regulation                                           | Single              | ±0.5% max. |
| (25% to 100% full load)                                           | Dual                | ±1.2% max. |
| Cross Regulation (100%: 25% to 100% full load)                    | ±5% max.            |            |
| Output Ripple and Noise (with 100n output capacitor and 20MHz BW) | 100mVp-p max.       |            |
| Start-up time (Nom. Vin at 100% Load)                             | 25ms typ.           |            |
| Operating Frequency (Full Load)                                   | 300kHz typ.         |            |
| Efficiency (Nom. Vin at 100% Load)                                | see Selection Guide |            |
| Minimum Load                                                      | 0%                  |            |
| Input Surge Voltage (100ms max.)                                  | 12V Input           | 36VDC      |
|                                                                   | 24V Input           | 50VDC      |
|                                                                   | 48V Input           | 100VDC     |

continued on next page

## ECONOLINE

DC/DC-Converter

with 3 year Warranty

# RECOM

## 10 Watt 2" x 1" Single & Dual Output



**EN-60950-1 Certified**  
**EN-60601-1 Certified**  
**UL-60950-1 Certified**

# REC10/M

\*\*Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

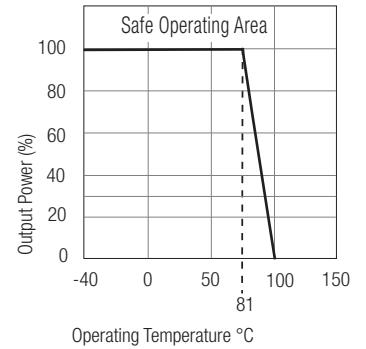
Refer to Application Notes

**Specifications cont.** (measured at  $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

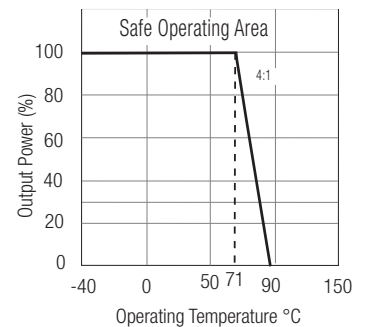
|                             |                                                           |                                                                       |                               |
|-----------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------|
| Isolation Voltage           | H2-Suffix                                                 | (tested for 1 second)                                                 | 2000VDC                       |
|                             |                                                           | (rated for 1 minute)                                                  | 1000VAC / 60Hz                |
|                             | H3-Suffix                                                 | (tested for 1 second)                                                 | 3000VDC                       |
|                             |                                                           | (rated for 1 minute)                                                  | 1500VAC / 60Hz                |
| Under Voltage Lockout (2:1) | 12V Input                                                 | DC-DC on 8.3VDC, DC-DC off 7.9VDC                                     |                               |
|                             | 24V Input                                                 | DC-DC on 17.4VDC, DC-DC off 16.7VDC                                   |                               |
|                             | 48V Input                                                 | DC-DC on 35.7VDC, DC-DC off 34.3VDC                                   |                               |
| Under Voltage Lockout (4:1) | 24V Input                                                 | DC-DC on 8.3VDC, DC-DC off 7.9VDC                                     |                               |
|                             | 48V Input                                                 | DC-DC on 17.4VDC, DC-DC off 16.7VDC                                   |                               |
| Isolation Capacitance       |                                                           |                                                                       | 1200pF typ.                   |
| Isolation Resistance        |                                                           |                                                                       | 1 G $\Omega$ min.             |
| Overload Protection         |                                                           |                                                                       | 150% typ.                     |
| Short Circuit Protection    |                                                           |                                                                       | Continuous, Auto Restart      |
| Operating Temperature Range | 4:1                                                       |                                                                       | -40°C to +71°C (see Graph)    |
| (free air convection)       | 2:1                                                       |                                                                       | -40°C to +81°C (see Graph)    |
| Storage Temperature Range   |                                                           |                                                                       | -55°C to +105°C               |
| Remote On/Off               | DC/DC ON                                                  | Open or $3.5\text{V} < V_r < 12\text{V}$                              |                               |
|                             | DC/DC OFF                                                 | Short or $0\text{V} < V_r < 1.2\text{V}$                              |                               |
| Temperature Coefficient     |                                                           |                                                                       | $\pm 0.05\%$ max.             |
| Relative Humidity           |                                                           |                                                                       | 95% RH                        |
| Case Material               |                                                           | Nickel Plated Metal with Non-Conductive Base                          |                               |
| Thermal Impedance           | Natural convection                                        |                                                                       | 12°C/W                        |
| Maximum Case Temperature    |                                                           |                                                                       | 100°C                         |
| Vibration                   |                                                           | 10-55Hz, 2G, 30mins along X,Y & Z                                     |                               |
| Package Weight              |                                                           |                                                                       | 27g                           |
| Packing Quantity            |                                                           |                                                                       | 10 pcs per Tube               |
| MTBF (+25°C)                | Detailed Information see Application Notes chapter "MTBF" | using MIL-HDBK 217F                                                   | >1000 x 10 <sup>3</sup> hours |
| (+71°C)                     |                                                           | using MIL-HDBK 217F                                                   | >250 x 10 <sup>3</sup> hours  |
| <b>Certifications</b>       |                                                           |                                                                       |                               |
| EN General Safety           | Report: SPCLVD1211033-2                                   | EN60950-1:2006 + A12:2011                                             |                               |
| UL General Safety           | Report: E224736                                           | UL 60950-1 1st Ed.<br>C22.2 No. 60950-1-03                            |                               |
| EN Medical Safety           | Report: MDD12060585 + RM1206085                           | IEC/EN 60601-1 3rd Edition; Medical Report + ISO14971 Risk Assessment |                               |

## Derating-Graph (Ambient Temperature)

### 2:1 Converters

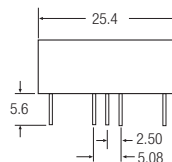
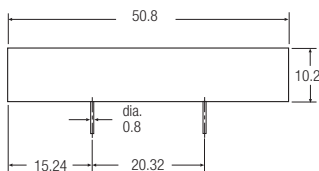


### 4:1 Converters



Note: Refer to Application Notes for EMC Class B Filter suggestion

## Package Style and Pinning (mm)

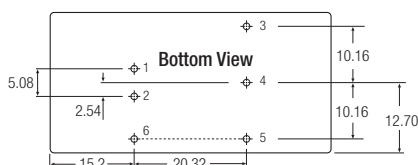


### Pin Connections

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | +Vin   | +Vin  |
| 2     | -Vin   | -Vin  |
| 3     | +Vout  | +Vout |
| 4     | No Pin | Com   |
| 5     | -Vout  | -Vout |
| 6     | CTRL   | CTRL  |

XX.X  $\pm 0.5$  mm  
XX.XX  $\pm 0.35$  mm

### 2" x 1" Package



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