

## Features

### Regulated Converters

- 8kVDC & 10kVDC Reinforced Isolation
- Industry Standard DIP24 Package
- 6W Regulated Output
- Continuous Short Circuit Protection
- Wide Input 2:1
- Medical Approved
- EN, CSA and CB Certificates
- 2 Pinout Options
- Control Pin Option
- Efficiency to 86%

### Description

The REC6 series uses a reinforced isolation transformer to offer exceptionally high isolation of 8kVDC (4kVAC/1 minute) or 10kVDC (5kVAC/1minute) making it suitable for HT monitoring circuits, mains power meters, IGBT isolated power supplies and other sophisticated industrial and medical applications. The isolation capacitance of only 20pF makes them also suitable for low leakage applications. The isolation transformer is recognized by CSA as reinforced isolated with a minimum internal clearance of 2.4mm and a minimum internal creepage clearance of 4.6mm. The REC6 is available in two industry-standard pinouts (= "/A" or "/C"). Remote on/off control is possible with the /CTRL option (A pinning only) and an optional undervoltage lockout function is also available (= "/X1"). The converters can deliver 140% rated power for short periods of time to cope with applications with large capacitive loads or high start up currents.

### Selection Guide

| Part Number<br>DIP24 | Input Voltage<br>(VDC)              | Output Voltage<br>(VDC) | Output Current<br>(mA) | Efficiency<br>(%) | Max Capacitive Load <sup>(1)</sup> |
|----------------------|-------------------------------------|-------------------------|------------------------|-------------------|------------------------------------|
| REC6-xx05SRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | 5                       | 1000                   | 80, 81, 82<br>77  | 6800µF                             |
| REC6-xx09SRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | 9                       | 667<br>555             | 81, 82, 83<br>80  | 6800µF                             |
| REC6-xx12SRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | 12                      | 500<br>417             | 82, 83, 84<br>82  | 6800µF                             |
| REC6-xx15SRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | 15                      | 400<br>333             | 84, 85, 86<br>83  | 6800µF                             |
| REC6-xx24SRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | 24                      | 250<br>208             | 83, 84, 85<br>82  | 4700µF                             |
| REC6-xx05DRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | ±5                      | ±500                   | 80, 81, 82<br>77  | ±2200µF                            |
| REC6-xx09DRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | ±9                      | ±335<br>±278           | 81, 82, 83<br>80  | ±2200µF                            |
| REC6-xx12DRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | ±12                     | ±250<br>±208           | 81, 82, 83<br>82  | ±2200µF                            |
| REC6-xx15DRW/R*      | 9 - 18, 18 - 36, 36 - 75<br>4.5 - 9 | ±15                     | ±200<br>±167           | 82, 83, 84<br>80  | ±2200µF                            |

R\* = R8 or R10 for 8kVDC or 10kVDC isolation.

Note 1: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

\* add suffix "/A" or "/C" for pinning options, see next page for details.

\* add suffix "/CTRL" for control pin option (A Pinning only)

\* add suffix "/X1" for Undervoltage Lockout

#### 2:1 Input

(REC6-S\_DRW/R8(R10))

xx = 4.5-9Vin = 05

xx = 9-18Vin = 12

xx = 18-36Vin = 24

xx = 36-75Vin = 48

#### Ordering Examples:

REC6-0512DRW/R8/A/CTRL = 5V Vin, ±12V Vout, 8kVDC isolation, pinout "A", control pin

REC6-4805SRW/R10/A = 48V Vin, 5V Vout, 10kVDC isolation, pinout "A"

REC6-1212DRW/R8/C/X1 = 12V Vin, ±12V Vout, 8kVDC isolation, pinout "C", UVL

REC6-0505SRW/R10/A/CTRL/X1 = 5V Vin, 5V Vout, 10kVDC isolation, pinout "A", control pin, UVL

## ECONOLINE

### DC/DC-Converter

with 3 year Warranty

RECOM

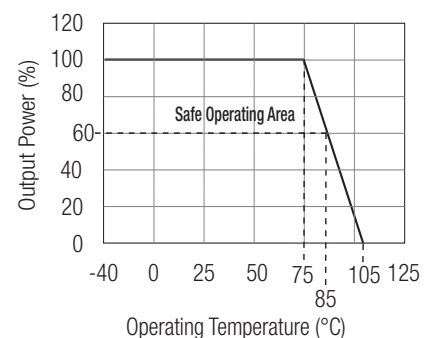
## 6 Watt DIP24 Reinforced Single & Dual Output



C22.2-No. 60950 Certified  
C22.2-601.1 Certified  
UL-60601.1 Certified

# REC6/R

## Derating-Graph (Ambient Temperature)



Refer to Application Notes

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

|                                                    |                                                                                                 |                                                              |                                                                             |                               |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------|
| Input Voltage Range                                |                                                                                                 |                                                              | 2:1                                                                         |                               |
| Output Voltage Accuracy                            |                                                                                                 |                                                              | ±2% max.                                                                    |                               |
| Line Regulation                                    | (HL-LL)                                                                                         |                                                              | ±0.3% max.                                                                  |                               |
| Load Regulation                                    | (for output load current change from 20% to 100%)                                               |                                                              | ±0.6% max.                                                                  |                               |
| Input Surge                                        | (1 minute)                                                                                      | 5V types                                                     | 16V max.                                                                    |                               |
|                                                    |                                                                                                 | 12V types                                                    | 25V max.                                                                    |                               |
|                                                    |                                                                                                 | 24V types                                                    | 50V max.                                                                    |                               |
|                                                    |                                                                                                 | 48V types                                                    | 100V max.                                                                   |                               |
| Undervoltage Lockout                               | (/X1 Versions)                                                                                  | 5V types                                                     | 3.5V typ. (±20%)                                                            |                               |
|                                                    |                                                                                                 | 12V types                                                    | 7V typ. (±20%)                                                              |                               |
|                                                    |                                                                                                 | 24V types                                                    | 15V typ. (±10%)                                                             |                               |
|                                                    |                                                                                                 | 48V types                                                    | 32V typ. (±10%)                                                             |                               |
| Output Ripple and Noise                            | (0,1 µF capacitor on output, 20MHz BW limited)                                                  |                                                              | 200mVp-p max.                                                               |                               |
| Transient Response                                 | (25% step change)                                                                               |                                                              | 1ms typ.                                                                    |                               |
| Switching Frequency                                | (Full load and nominal input voltage)                                                           |                                                              | 100kHz min. / 350kHz max.                                                   |                               |
| Input Filter                                       |                                                                                                 |                                                              | Pi Network                                                                  |                               |
| Capacitors                                         | All types                                                                                       |                                                              | MLCC capacitors only                                                        |                               |
| Minimum Load                                       | (Operation under no-load will not damage the converter, but it may not meet all specifications) |                                                              | 20% Full Load                                                               |                               |
| No Load Power Consumption                          |                                                                                                 |                                                              | 400mW max.                                                                  |                               |
| Isolation Voltage                                  | R8-Suffix                                                                                       | (tested for 1 second)                                        | 8000VDC                                                                     |                               |
|                                                    |                                                                                                 | (rated for 1 minute**)                                       | 4000VAC / 60Hz                                                              |                               |
| Isolation Voltage                                  | R10-Suffix                                                                                      | (tested for 1 second)                                        | 10000VDC                                                                    |                               |
|                                                    |                                                                                                 | (rated for 1 minute**)                                       | 5000VAC / 60Hz                                                              |                               |
| Isolation Capacitance                              |                                                                                                 |                                                              | 20pF typ.                                                                   |                               |
| Isolation Resistance                               |                                                                                                 |                                                              | 10 GΩ min.                                                                  |                               |
| Short Circuit Protection                           |                                                                                                 | (Max operating temp. = 50°C during short circuit conditions) | Continuous, Auto Restart                                                    |                               |
| Operating Temperature Range                        |                                                                                                 | (free air convection)                                        | -40°C to +75°C (see Graph)                                                  |                               |
| Case Temperature                                   |                                                                                                 |                                                              | 105°C max.                                                                  |                               |
| Storage Temperature Range                          |                                                                                                 |                                                              | -55°C to +125°C                                                             |                               |
| Relative Humidity                                  |                                                                                                 |                                                              | 95% RH                                                                      |                               |
| Case Material                                      |                                                                                                 |                                                              | Non-Conductive Plastic                                                      |                               |
| Potting Material                                   |                                                                                                 |                                                              | Silicone                                                                    |                               |
| Thermal Impedance                                  |                                                                                                 | Natural convection                                           | 20°C/W                                                                      |                               |
| Package Weight                                     |                                                                                                 |                                                              | 14g                                                                         |                               |
| Packing Quantity                                   |                                                                                                 |                                                              | 15 pcs per Tube                                                             |                               |
| MTBF (+25°C)<br>(+75°C)                            | } Detailed Information see<br>Application Notes chapter "MTBF"                                  | using MIL-HDBK 217F                                          | 953 x10 <sup>3</sup> hours                                                  |                               |
|                                                    |                                                                                                 | using MIL-HDBK 217F                                          | 234 x10 <sup>3</sup> hours                                                  |                               |
| EMC<br>(with 470µF//0.1µF capacitors across input) | Conducted Emissions                                                                             | EN55022                                                      | Class A                                                                     |                               |
|                                                    | Radiated Emissions                                                                              | EN55022                                                      | Class A                                                                     |                               |
| Reinforced Isolation                               | Transformer Creepage                                                                            | /R8 and /R10 Types                                           | 4.6 mm min.                                                                 |                               |
|                                                    | Transformer Clearance                                                                           | /R8 and /R10 Types                                           | 2.4 mm min.                                                                 |                               |
|                                                    | PCB Creepage & Clearance                                                                        | /R8 and /R10 Types                                           | 6.0 mm min.                                                                 |                               |
|                                                    | Optocoupler Creepage                                                                            | /R8 and /R10 Types                                           | 6.0 mm min.                                                                 |                               |
| External Creepage and Clearance                    | Plastic Case                                                                                    | Input <> Output pins                                         | 14.2 mm min.                                                                |                               |
| Certifications                                     | EN Medical Safety                                                                               |                                                              | Report: MDD1207051 + RM1207051<br>Medical Report + ISO14971 Risk Assessment | EN 60601-1 3rd Edition        |
|                                                    | IEC Medical Safety                                                                              |                                                              | CB-Report: CA-10168-A1-UL                                                   | IEC60601-1 3rd Edition        |
|                                                    | CSA                                                                                             | Medical Safety                                               | Report: 2202478                                                             | C22.2 601-1 2nd Ed.           |
|                                                    | UL                                                                                              | Medical Safety                                               | E314885-A4                                                                  | UL 60601-1 3rd Edition        |
|                                                    |                                                                                                 | General Safety                                               | Report: 2219431                                                             | C22.2 No. 60950-1-03          |
|                                                    | UL 60950-1 1st Ed.                                                                              |                                                              | Recognised as Reinforced Isolation                                          | Supplement to Report: 2219431 |

\*\*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.

### Efficiency vs Load

REC6-xx05SRW/R\*  
REC6-xx05DRW/R\*



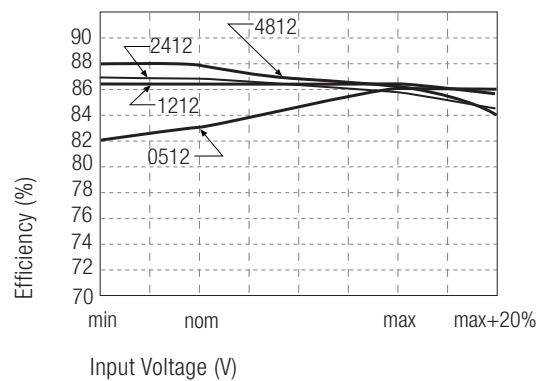
### Efficiency vs Vin



REC6-xx12SRW/R\*



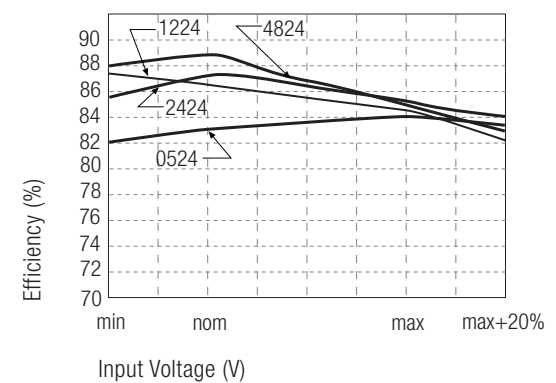
### Efficiency VS Input Voltage



REC6-xx24SRW/R\*  
REC6-xx12DRW/R\*



### Efficiency VS Input Voltage



**"A" Pinning  
/R8 & /R10**



**Recommended Footprint Details**



**Pin Connections**

| Pin #      | Single | Dual  |
|------------|--------|-------|
| 1 (option) | CTRL   | CTRL  |
| 2          | -Vin   | -Vin  |
| 11         | NC     | -Vout |
| 14         | +Vout  | +Vout |
| 16         | -Vout  | Com   |
| 22         | +Vin   | +Vin  |
| 23         | +Vin   | +Vin  |

NC = No Connection

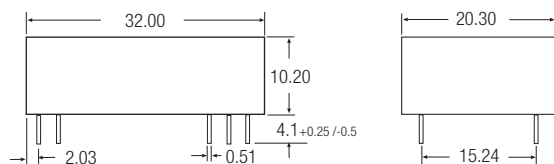
XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

**CTRL Option**

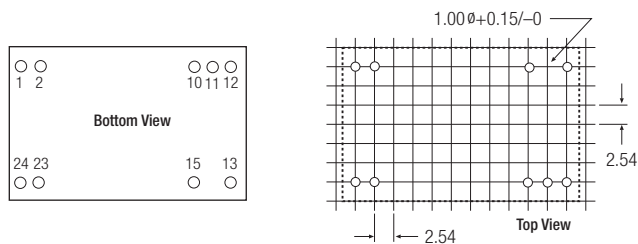
ON = Open or  $0V < V_{ctrl} < 1.2V$   
OFF =  $2.2V < V_{ctrl} < 12V$



**"C" Pinning  
/R8 & /R10**



**Recommended Footprint Details**



**Pin Connections**

| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | +Vin   | +Vin  |
| 2     | +Vin   | +Vin  |
| 10    | NC     | Com   |
| 11    | NC     | Com   |
| 12    | -Vout  | NC    |
| 13    | +Vout  | -Vout |
| 15    | NC     | +Vout |
| 23    | -Vin   | -Vin  |
| 24    | -Vin   | -Vin  |

NC = No Connection

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm