

# Features

## Regulated Converters

- 60 Watts Regulated Output Power
- 2:1 Wide Input Voltage Range
- 1.6kVDC Isolation (Basic Insulation)
- Overload and Over Temperature Protection
- Six-Sided Shield
- No Derating to 40°C
- Standard 2" x 2" Package and Pinning
- Efficiency to 90 %
- Available as Power Module (RPM60-G)

## Description

The RP60-G series DC/DC converters deliver 60W of power in an industry standard 2" x 2" package, which also meets military standards for thermal shock and vibration tolerance. Sense pins allow the output voltage at the point of load to be tightly regulated and automatically compensate for any voltage drops that may occur across any connections.

## Selection Guide 24V and 48V Wide Input Types

| Part Number  | Input Range<br>VDC | Output Voltage<br>VDC | Output Current<br>mA | Input <sup>(5,4)</sup><br>Current<br>mA | Efficiency <sup>(5)</sup><br>% | Capacitive <sup>(6)</sup><br>Load max. |
|--------------|--------------------|-----------------------|----------------------|-----------------------------------------|--------------------------------|----------------------------------------|
| RP60-243.3SG | 18-36              | 3.3                   | 14000                | 100/2264                                | 89                             | 36000µF                                |
| RP60-2405SG  | 18-36              | 5                     | 12000                | 130/2941                                | 90                             | 20400µF                                |
| RP60-2412SG  | 18-36              | 12                    | 5000                 | 150/2907                                | 90                             | 3550µF                                 |
| RP60-2415SG  | 18-36              | 15                    | 4000                 | 150/2907                                | 90                             | 2300µF                                 |
| RP60-483.3SG | 36-75              | 3.3                   | 14000                | 80/1132                                 | 89                             | 36000µF                                |
| RP60-4805SG  | 36-75              | 5                     | 12000                | 90/1453                                 | 90                             | 20400µF                                |
| RP60-4812SG  | 36-75              | 12                    | 5000                 | 100/1453                                | 90                             | 3550µF                                 |
| RP60-4815SG  | 36-75              | 15                    | 4000                 | 100/1453                                | 90                             | 2300µF                                 |

\* no suffix for CTRL function with Positive Logic (1=ON, 0=OFF), this is standard

\* add /N for CTRL function with Negative Logic (0=ON, 1=OFF)

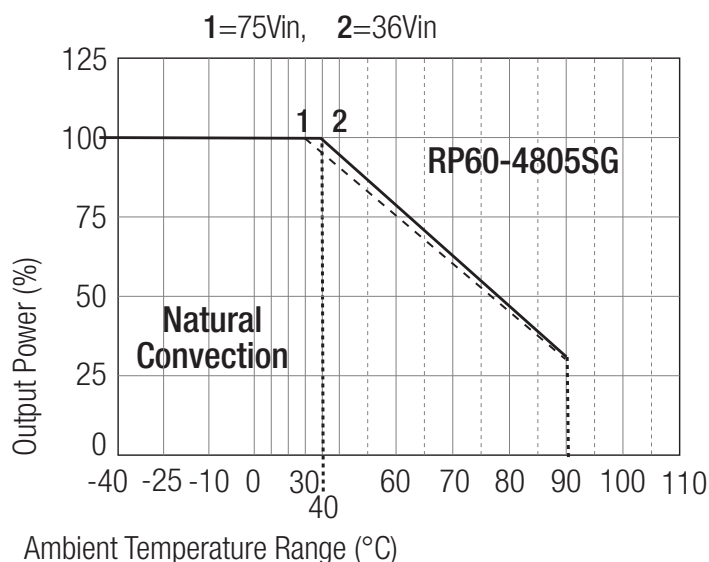
\* add suffix -HC for premounted heatsink and clips

## Ordering Examples

RP60-2405SG = 24V Input, 5V Output, Positive Logic CTRL pin.

RP20-4812SG/N-HC = 48V Input, 12V Output, Negative Logic CTRL pin, Heatsink fitted

## Derating Graph (Ambient Temperature)



Derating graphs are valid only for the shown part numbers. If you need detailed derating information about a part number not shown here please contact our technical customer service at [info@recom-development.at](mailto:info@recom-development.at)

# POWERLINE

## DC/DC-Converter

with 3 year Warranty

RECOM

60 Watt

2" x 2"

Single Output



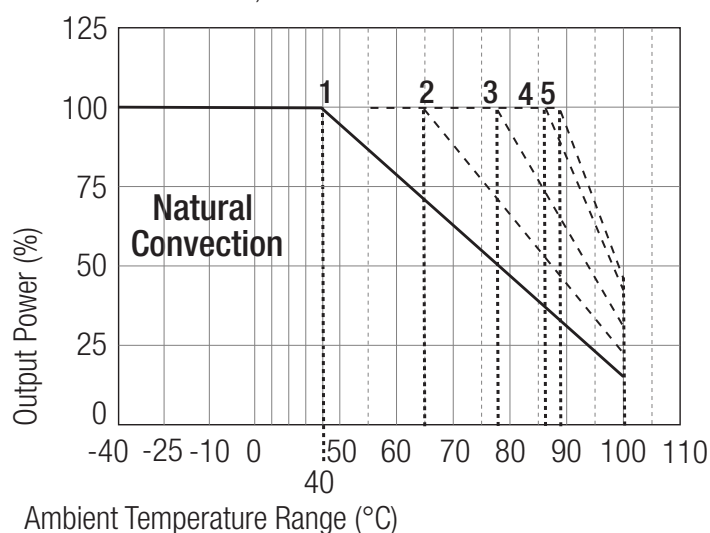
UL-60950-1 Certified  
E196683

RP60-G

## Derating Graph (Ambient Temperature)

### RP60-4805SG

1=Natural Convection, 2=200LFM, 3=300LFM,  
4=400LFM, 5=500LFM



## Specifications (typical at nominal input and 25°C unless otherwise noted)

|                                                                |                                     |                                     |                         |
|----------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------|
| Input Voltage Range                                            | 24V nominal input                   |                                     | 18-36VDC                |
|                                                                | 48V nominal input                   |                                     | 36-75VDC                |
| Undervoltage Protection                                        | 24V Input                           | DC-DC ON = 17VDC, DC-DC OFF = 15VDC |                         |
|                                                                | 48V Input                           | DC-DC ON = 34VDC, DC-DC OFF = 32VDC |                         |
| Input Filter                                                   |                                     |                                     | Pi Type                 |
| Input Voltage Variation dv/dt                                  | (Complies with ETS300 132 part 4.4) |                                     | 5V/ms max               |
| Input Surge Voltage (100 ms max.)                              | 24V Input                           | 50VDC                               |                         |
|                                                                | 48V Input                           | 100VDC                              |                         |
| Input Reflected Ripple (nominal Vin and full load)(see Note 3) |                                     |                                     | 20mA <sub>p-p</sub>     |
| Start Up Time (nominal Vin and constant resistor load)         |                                     |                                     | 20ms max.               |
| Remote ON/OFF (see Note 7)                                     | Positive logic - Standard           | DC-DC ON                            | Open or 3V < Vr < 12V   |
|                                                                |                                     | DC-DC OFF                           | Short or 0V < Vr < 1.2V |
|                                                                | Negative logic - /N Option          | DC-DC ON                            | Short or 0V < Vr < 1.2V |
|                                                                |                                     | DC-DC OFF                           | Open or 3V < Vr < 12V   |
| Remote Pin Drive Current                                       | Nominal Vin                         |                                     | -0.5 -1.0mA             |
| Remote OFF input current                                       | Nominal Vin                         |                                     | 4mA                     |
| Output Power                                                   |                                     |                                     | 60W max.                |
| Output Voltage Accuracy (full Load and nominal Vin)            |                                     |                                     | ±1%                     |

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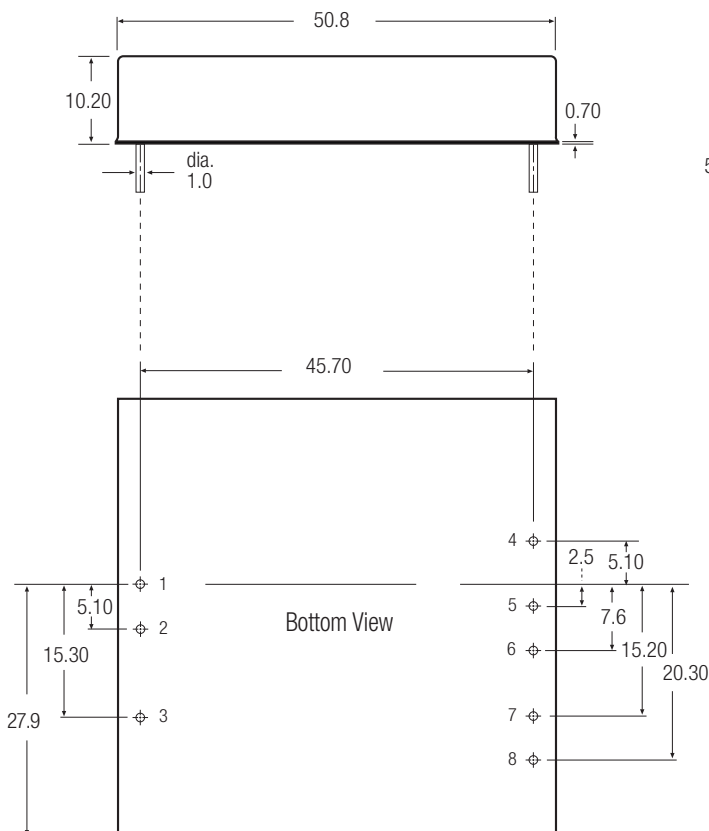
**Specifications, cont.** (typical at nominal input and 25°C unless otherwise noted)

|                                                             |                                        |                                                                    |
|-------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------|
| Voltage Adjustability (see Note 1)                          |                                        | ±10%                                                               |
| Line Regulation                                             | LL to HL at Full Load                  | ±0.2%                                                              |
| Load Regulation (see Note 3)                                | 0% to 100% Load                        | ±0.5%                                                              |
| Temperature Coefficient                                     |                                        | ±0.02%/°C max.                                                     |
| Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output) | 3.3,5V<br>12,15V                       | 75mVp-p<br>100mVp-p                                                |
| Transient Response (25% load step change)                   |                                        | 250µs                                                              |
| Over Voltage Protection                                     | 3.3 Vout                               | 3.7-5.4V                                                           |
| Zener diode clamp (only single)                             | 5 Vout                                 | 5.6-7.0V                                                           |
|                                                             | 12 Vout                                | 13.7-17.5V                                                         |
|                                                             | 15 Vout                                | 16.8-20.5V                                                         |
| Over Load Protection (% of full load at nominal Vin)        |                                        | 150% max.                                                          |
| Undervoltage Lockout                                        |                                        | See Application Notes                                              |
| Short Circuit Protection                                    |                                        | Hiccup, automatic recovery                                         |
| Efficiency                                                  |                                        | see „Selection Guide“ table                                        |
| Isolation Voltage (rated for one minute)                    |                                        | 1600VDC                                                            |
| Isolation Resistance                                        |                                        | 1 GΩ min.                                                          |
| Isolation Capacitance                                       |                                        | 1500pF max.                                                        |
| Operating Frequency                                         |                                        | 300kHz typ.                                                        |
| Designed to meet Safety Standards                           |                                        | IEC60950-1, UL60950-1, EN60950-1                                   |
| Operating Temperature Range                                 |                                        | -40°C to +40°C(without derating)<br>-40°C to +100°C(with derating) |
| Maximum Case Temperature                                    |                                        | 110°C                                                              |
| Storage Temperature Range                                   |                                        | -55°C to +125°C                                                    |
| Over Temperature Protection                                 |                                        | 120°C typ.                                                         |
| Thermal Impedance (see Note 11)                             | Without Heat-Sink<br>With Heat-Sink    | 10.5°C/Watt<br>8.4°C/Watt                                          |
| Thermal Shock                                               |                                        | MIL-STD-810D                                                       |
| Vibration                                                   |                                        | 10-55Hz, 10G, 30 Min. along X, Y and Z                             |
| Relative Humidity                                           |                                        | 5% to 95% RH                                                       |
| Case Material                                               |                                        | Nickel plated copper                                               |
| Base Material                                               |                                        | Non-conductive black plastic FR4                                   |
| Potting Material                                            |                                        | Epoxy (UL94-V0)                                                    |
| Conducted Emissions (see Notes 9, 10)                       | EN55022                                | Class A                                                            |
| Radiated Emissions                                          | EN55022                                | Class A                                                            |
| ESD                                                         | EN61000-4-2                            | Perf. Criteria B                                                   |
| Radiated Immunity                                           | EN61000-4-3                            | Perf. Criteria A                                                   |
| Fast Transient                                              | EN61000-4-4                            | Perf. Criteria B                                                   |
| Surge                                                       | EN61000-4-5                            | Perf. Criteria B                                                   |
| Conducted Immunity                                          | EN61000-4-6                            | Perf. Criteria A                                                   |
| Weight                                                      |                                        | 60g                                                                |
| Packing Quantity                                            | Refer to App Notes for tube dimensions | 4 pcs per Tube                                                     |
| Dimensions                                                  |                                        | 50.8 x 50.8 x 10.2mm                                               |
| MTBF (see Note 2)                                           | Belcore TR-NWT-00332                   | 1093 x 10 <sup>3</sup> hours                                       |
|                                                             | MIL-STD-217F                           | 1096 x 10 <sup>3</sup> hours                                       |

## Notes :

1. Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +sense should be connected to its corresponding +OUTPUT and likewise the -sense should be connected to its corresponding -OUTPUT.
2. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).
3. No minimum loading on the output is required to maintain specified regulation. Operation under no-load condition will not damage these devices
4. Maximum value at nominal input voltage and no load.
5. Typical value at nominal input voltage and full load.
6. Test by minimum Vin and constant resistive load.
7. The ON/OFF control pin voltage is referenced to the negative input (-Vin).
- To order negative logic ON/OFF control add the suffix-N (Example: RP60-4805SG-N).
8. Heat sink is optional and P/N: 7G-0026-C. Powerline DC/DC Converters can be ordered with pre-mounted heatsinks including antivibration fixing clips (add suffix -HC). See Application Notes for heatsink details.
9. The RP60-SG series meets EN55022 Class A with an external capacitor across the input pins (24Vin:6.8μF/50V MLCC, 48Vin:2x2,2μF/100V MLCC)
10. See application notes for Class B common mode filter suggestion.
11. Vertical orientation and natural convection.

## Package Style and Pinning (mm)



Output can be externally trimmed by using the method shown below.  
See Application Notes for more details.

