

## Features

- Ultraminiature 25.4 x 25.4 x 9.9mm Package
- 15 Watts Output Power
- Single and Dual Outputs
- 1.6kVDC Isolation
- Fixed Operating Frequency
- Six-Sided Continuous Shield
- Industry Standard Pinout
- Remote On/Off and Trim pins
- Efficiency to 89%

## Description

The RP15-SA series are ultraminiature power DC/DC converters in a case half the size of industry standard 15W converters. Despite their small size, the RP15-SA converters are fully specified devices with output currents up to 4 Amps, no minimum load, 1600VDC isolation and low ripple/noise figures. The outputs are also fully protected against short circuits, overcurrent and overvoltage. The RP15-SA series will find many uses in applications where board space and/or board height is at a premium.

## Selection Guide 24V and 48V Input Types

| Part Number    | Input Range VDC | Output Voltage VDC | Output Current mA | Input Current mA | Efficiency <sup>(2)</sup> % | Capacitive <sup>(3)</sup> Load max. |
|----------------|-----------------|--------------------|-------------------|------------------|-----------------------------|-------------------------------------|
| RP15-123.3SA** | 9-18            | 3.3                | 4000              | 120/1375         | 84                          | 12000µF                             |
| RP15-1205SA**  | 9-18            | 5                  | 3000              | 90/1524          | 88                          | 6000µF                              |
| RP15-1212SA**  | 9-18            | 12                 | 1300              | 30/1605          | 86                          | 1000µF                              |
| RP15-1215SA**  | 9-18            | 15                 | 1000              | 30/1506          | 88                          | 660µF                               |
| RP15-243.3SA** | 18-36           | 3.3                | 4000              | 50/671           | 86                          | 12000µF                             |
| RP15-2405SA**  | 18-36           | 5                  | 3000              | 65/763           | 88                          | 6000µF                              |
| RP15-2412SA**  | 18-36           | 12                 | 1300              | 20/783           | 87                          | 1000µF                              |
| RP15-2415SA**  | 18-36           | 15                 | 1000              | 20/744           | 88                          | 660µF                               |
| RP15-483.3SA** | 36-75           | 3.3                | 4000              | 25/336           | 86                          | 12000µF                             |
| RP15-4805SA**  | 36-75           | 5                  | 3000              | 35/372           | 88                          | 6000µF                              |
| RP15-4812SA**  | 36-75           | 12                 | 1300              | 12/387           | 88                          | 1000µF                              |
| RP15-4815SA**  | 36-75           | 15                 | 1000              | 12/372           | 88                          | 660µF                               |
| RP15-1205DA**  | 9-18            | ±5                 | ±1500             | 30/1543          | 85                          | ±3000µF                             |
| RP15-1212DA**  | 9-18            | ±12                | ±625              | 30/1506          | 87                          | ±520µF                              |
| RP15-1215DA**  | 9-18            | ±15                | ±500              | 30/1488          | 88                          | ±330µF                              |
| RP15-2405DA**  | 18-36           | ±5                 | ±1500             | 15/772           | 85                          | ±3000µF                             |
| RP15-2412DA**  | 18-36           | ±12                | ±625              | 15/744           | 88                          | ±520µF                              |
| RP15-2415DA**  | 18-36           | ±15                | ±500              | 25/744           | 88                          | ±330µF                              |
| RP15-4805DA**  | 36-75           | ±5                 | ±1500             | 12/386           | 85                          | ±3000µF                             |
| RP15-4812DA**  | 36-75           | ±12                | ±625              | 15/368           | 89                          | ±520µF                              |
| RP15-4815DA**  | 36-75           | ±15                | ±500              | 20/372           | 88                          | ±330µF                              |

\*\* Standard part is without suffixes and Trim and CTRL pins are not fitted.

\* add suffix /P for CTRL function with positive logic (1=ON, 0=OFF) including trim pin for single output

\* add suffix /N for CTRL function with negative logic (0=ON, 1=OFF) including trim pin for single output

\* add suffix -HC for premounted heatsink and clips

## Ordering Examples

RP15-2405SA/P = 24V Input, 5V Output, Positive Logic CTRL pin and Trim pin fitted

RP15-4805DA-HC = 48V Input, ±5V Output, Heatsink fitted

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 support service at [info@recom-development.at](mailto:info@recom-development.at)

## POWERLINE

### DC/DC-Converter

with 3 year Warranty

RECOM

## 15 Watt Single & Dual Output

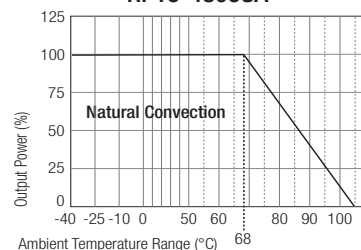


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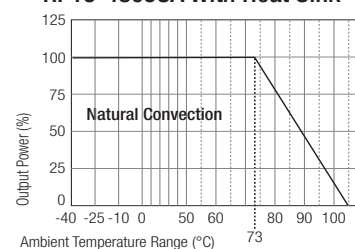
## RP15-A

## Derating-Graph (Ambient Temperature)

RP15-4805SA



RP15-4805SA With Heat Sink



Refer to Application Notes

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

|                                                                   |                        |                                |
|-------------------------------------------------------------------|------------------------|--------------------------------|
| Input Voltage Range                                               | 12V nominal input      | 9-18VDC                        |
|                                                                   | 24V nominal input      | 18-36VDC                       |
|                                                                   | 48V nominal input      | 36-75VDC                       |
| Input Filter                                                      |                        | Pi Type                        |
| Input Surge Voltage (100 ms max.)                                 | 12V Input              | 36VDC                          |
|                                                                   | 24V Input              | 50VDC                          |
|                                                                   | 48V Input              | 100VDC                         |
| Input Reflected Ripple (nominal Vin and full load) <sup>(4)</sup> |                        | 30mA <sub>p-p</sub>            |
| Start Up Time (nominal Vin and constant resistor load)            |                        | 30ms max.                      |
| Optional Remote ON/OFF <sup>(5)</sup><br>(Negative logic)         | DC-DC ON               | Short or 0V < Vr < 1.2V        |
|                                                                   | DC-DC OFF              | Open or 3.0V < Vr < 15V        |
| Remote Pin drive current                                          | Nominal Vin            | -0.5mA~1.0mA                   |
| Remote OFF input current                                          | Nominal Vin            | 2.5mA typ.                     |
| Output Voltage Accuracy (full Load and nominal Vin)               |                        | ±1%                            |
| Optional Output Trim <sup>(5)</sup>                               |                        | ±10%                           |
| Minimum Load                                                      |                        | 0%                             |
| Line Regulation (low line, high line at full load)                | Single                 | ±0.2%                          |
|                                                                   | Dual                   | ±0.5%                          |
| Load Regulation (0% to full load)                                 | Single                 | ±0.2%                          |
|                                                                   | Dual                   | ±1%                            |
| Cross Regulation (Asymmetrical 25% <> 100% load)                  | Dual Output            | ±5%                            |
| Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output)       | Single 3.3, 5V Outputs | 75mV <sub>p-p</sub>            |
|                                                                   | Others                 | 100mV <sub>p-p</sub>           |
|                                                                   | Dual                   | 100mV <sub>p-p</sub>           |
| Temperature Coefficient                                           |                        | ±0.02%/°C max.                 |
| Transient Response                                                | 25% load step change   | 250µs                          |
| Over Voltage Protection                                           | 3.3V                   | 3.7-5.4V                       |
| Zener diode clamp (only single)                                   | 5V                     | 5.4-7.0V                       |
|                                                                   | 12V                    | 13.5-19.6V                     |
|                                                                   | 15V                    | 16.8-20.5V                     |
| Over Load Protection (% of full load at nominal Vin)              |                        | 150% typ                       |
| Undervoltage Lockout                                              |                        | See Application Notes          |
| Short Circuit Protection                                          |                        | Continuous, automatic recovery |
| Efficiency                                                        |                        | see „Selection Guide“ table    |
| Isolation Voltage (rated for one minute)                          |                        | 1600VDC                        |
| Isolation Resistance                                              | 500VAC                 | 1 GΩ min.                      |
| Isolation Capacitance                                             |                        | 1000pF max                     |
| Operating Frequency                                               |                        | 400kHz typ.                    |
| Operating Temperature Range                                       |                        | -40°C to +85°C (with derating) |
| Maximum Case Temperature                                          |                        | +105°C                         |
| Storage Temperature Range                                         |                        | -55°C to +125°C                |

continued on next page

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

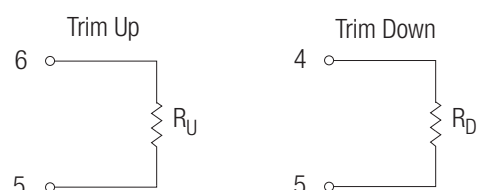
|                                    |                                        |                                        |
|------------------------------------|----------------------------------------|----------------------------------------|
| Thermal Impedance <sup>(6)</sup>   | Natural convection                     | 18.2°C/Watt                            |
|                                    | Natural convection with Heat Sink      | 15.8°C/Watt                            |
| Thermal Shock                      |                                        | MIL-STD-810F                           |
| Vibration                          |                                        | 10-55Hz, 10G, 30 Min. along X, Y and Z |
| Relative Humidity                  |                                        | 5% to 95% RH                           |
| Case Material                      |                                        | Nickel plated copper                   |
| Base Material                      |                                        | FR4 PCB                                |
| Potting Material                   |                                        | Epoxy (UL94-V0)                        |
| Conducted Emissions <sup>(7)</sup> | EN55022                                | Class A                                |
| Radiated Emissions                 | EN55022                                | Class A                                |
| ESD                                | EN61000-4-2                            | Perf. Criteria A                       |
| Radiated Immunity                  | EN61000-4-3                            | Perf. Criteria A                       |
| Fast Transient                     | EN61000-4-4                            | Perf. Criteria A                       |
| Surge <sup>(8)</sup>               | EN61000-4-5                            | Perf. Criteria A                       |
| Conducted Immunity                 | EN61000-4-6                            | Perf. Criteria A                       |
| Weight                             |                                        | 15g                                    |
| Packing Quantity                   | Refer to App Notes for tube dimensions | 8 pcs per Tube                         |
| Dimensions                         |                                        | 25.4 x 25.4 x 9.9mm                    |
| MTBF <sup>(9)</sup>                | Bellcore TR-NWT-000332                 | 1330 x 10 <sup>3</sup> hours           |
|                                    | MIL-HDBK 217F                          | 1600 x 10 <sup>3</sup> hours           |

**Notes :**

- Values at nominal input voltage and no load/full load.
- Typical Value at nominal input voltage and full load.
- Test by minimum  $V_{in}$  and constant resistor load.
- Simulated source impedance of 12 $\mu$ H. 12 $\mu$ H inductor in series with + $V_{in}$ .
- The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to negative input.  
Positive logic ON/OFF is marked with suffix-P (eg. RP15-2405SA/P)  
Negative logic ON/OFF is marked with suffix-N (eg. RP15-2405SA/N).  
If no suffix is specified, the control pin will be omitted.
- Optional Heat-sink P/N is 7G-0047-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.
- Meets Class A with external input capacitors shown below. Will meet Class B with external common mode filter (see Application Notes)
- Requires external capacitor to meet EN61000-4-5: 220 $\mu$ F/100V, low ESR (48mOhm)
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C.  
MIL-HDBK 217F Notice 2.  $T_a = 25^\circ\text{C}$ , full load, (Ground, Benign, controlled environment).

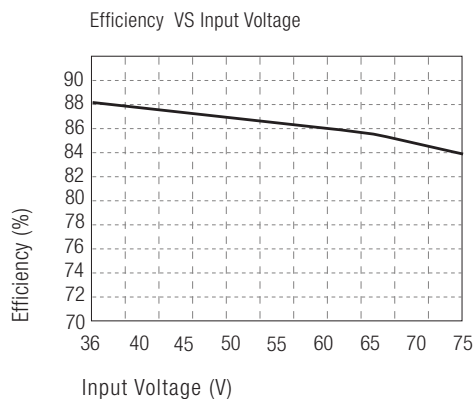
## External Output Trimming (optional)

With suffix /CTRL, the output can be externally trimmed by using the method shown here.  
See Application Notes for details

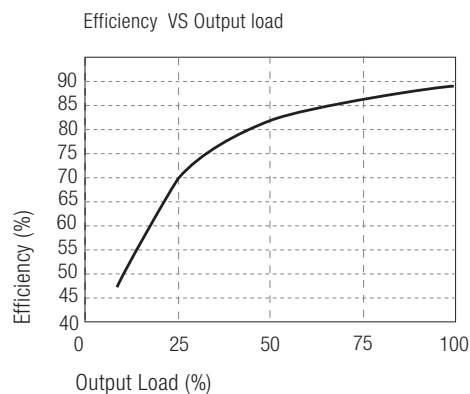


## Typical Characteristics

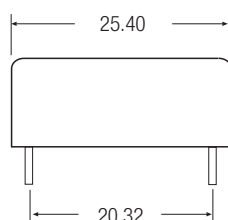
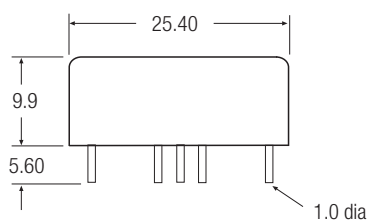
### RP15-4805SA



### RP15-4805SA



## Package Style and Pinning (mm)

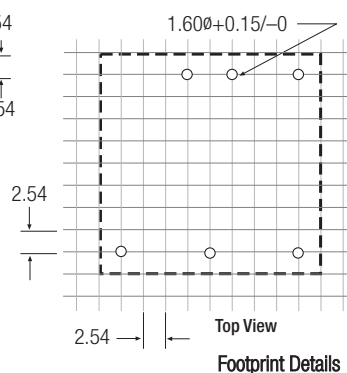
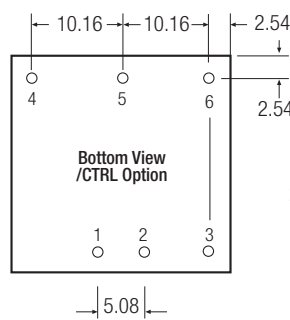
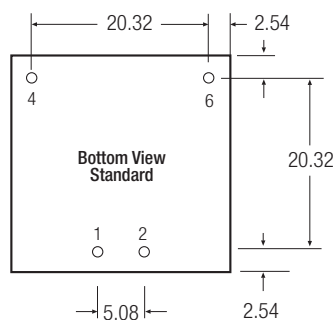


### Pin Connections

| Pin # | Single | Single/<br>P or /N | Dual   | Dual/<br>P or /N |
|-------|--------|--------------------|--------|------------------|
| 1     | +Vin   | +Vin               | +Vin   | +Vin             |
| 2     | -Vin   | -Vin               | -Vin   | -Vin             |
| 3     | no pin | CTRL               | no pin | CTRL             |
| 4     | +Vout  | +Vout              | +Vout  | +Vout            |
| 5     | no pin | Trim               | Com    | Com              |
| 6     | -Vout  | -Vout              | -Vout  | -Vout            |

Case Tolerance  $\pm 0.5$  mm

Pin Pitch Tolerance  $\pm 0.25$  mm



RP15-A

## EMC Filtering - For Class B filter suggestion, see Application Notes

### Class A Filter

Vin=12V: C1=10 $\mu$ F/25V 1812 MLCC, C2 omitted.

Vin=24V: C1=6.8 $\mu$ F/50V 1812 MLCC, C2 omitted.

Vin=48V: C1, C2 = 2.2 $\mu$ F/100V 1812 MLCC

