

## Features

- Ultraminiature Open Frame SMD
- 15 Watts Output Power
- 2:1 Input Voltage Range
- Single Outputs
- 2.25kVDC Isolation
- Fixed Operating Frequency
- Optional Remote On/Off and Trim pins
- Efficiency to 88%

## Description

The RP15-SOF series are SMD open frame ultraminiature power DC/DC converters in a case half the size of industry standard 15W converters. The converters use solder ball pins to enable SMD mounting and can be reflow soldered. Despite their small size, these converters are fully specified devices with output currents up to 3.5 Amps, no minimum load, 2250VDC isolation and low ripple/noise figures. The outputs are also fully protected against short circuits, overcurrent and overvoltage. The RP15-SOF series will find many uses in telecommunications and other demanding applications where cost, board space 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 <sup>(1)</sup> Current mA | Efficiency <sup>(2)</sup> % | Capacitive <sup>(3)</sup> Load max. |
|-----------------|-----------------|--------------------|-------------------|---------------------------------|-----------------------------|-------------------------------------|
| RP15-243.3SOF** | 18-36           | 3.3                | 3500              | 20/587                          | 86                          | 1000µF                              |
| RP15-2405SOF**  | 18-36           | 5                  | 3000              | 20/753                          | 87                          | 1000µF                              |
| RP15-2412SOF**  | 18-36           | 12                 | 1250              | 15/753                          | 87                          | 330µF                               |
| RP15-2415SOF**  | 18-36           | 15                 | 1000              | 15/744                          | 88                          | 220µF                               |
| RP15-483.3SOF** | 36-75           | 3.3                | 3500              | 15/297                          | 85                          | 1000µF                              |
| RP15-4805SOF**  | 36-75           | 5                  | 3000              | 15/377                          | 87                          | 1000µF                              |
| RP15-4812SOF**  | 36-75           | 12                 | 1250              | 10/377                          | 87                          | 330µF                               |
| RP15-4815SOF**  | 36-75           | 15                 | 1000              | 10/372                          | 88                          | 220µF                               |

\*\* 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

## Ordering Examples

RP15-2405SOF = 24 Input, 5V Output, No CTRL or trim connections

RP15-2412SOF/P = 24V Input, 12V Output, Positive logic. CTRL and trim SMD pins fitted

## POWERLINE

DC/DC-Converter

with 3 year Warranty

RECOM

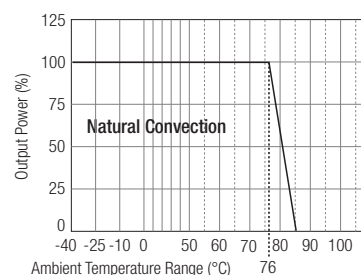
## 15 Watt Single Output Open Frame SMD



UL-60950-1 Certified  
E196683

## RP15-SOF

## Derating-Graph (Ambient Temperature) RP15-4805SOF



Derating graphs are valid only for the shown part number. 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)

Refer to Application Notes

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

|                                                                   |                      |                                       |
|-------------------------------------------------------------------|----------------------|---------------------------------------|
| Input Voltage Range                                               | 24V nominal input    | 18-36VDC                              |
|                                                                   | 48V nominal input    | 36-75VDC                              |
| Input Filter                                                      |                      | Pi Type                               |
| Input Surge Voltage (100 ms max.)                                 | 24V Input            | 50VDC                                 |
|                                                                   | 48V Input            | 100VDC                                |
| Input Reflected Ripple (nominal Vin and full load) <sup>(4)</sup> |                      | 30mA <sub>p-p</sub> typ.              |
| Start Up Time (nominal Vin and constant resistor load)            |                      | 30ms max.                             |
| Optional Remote ON/OFF <sup>(5)</sup><br>Negative logic (/N)      | DC-DC ON             | Short or 0V < Vr < 1.2V               |
|                                                                   | DC-DC OFF            | Open or 3.0V < Vr < 15V               |
| Positive logic (/P)                                               | DC-DC ON             | Open or 3.0V < Vr < 15V               |
|                                                                   | DC-DC OFF            | Short or 0V < Vr < 1.2V               |
| Remote Pin drive current                                          | Nominal Vin          | -0.5mA~1.0mA                          |
| Remote OFF input current                                          | Nominal Vin          | 20mA max.                             |
| 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%                                 |
| Load Regulation (0% to full load)                                 | Single               | ±0.2%                                 |
| Ripple and Noise (20MHz bandwidth, with 1µF MLCC on output)       | 3.3, 5V Outputs      | 75mV <sub>p-p</sub>                   |
|                                                                   | Others               | 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                                          |                      | Hiccup, automatic recovery            |
| Efficiency                                                        |                      | see „Selection Guide“ table           |
| Isolation Voltage (rated for one minute)                          | Basic Isolation      | 2225VDC                               |
| Isolation Resistance                                              |                      | 1 GΩ min.                             |
| Isolation Capacitance                                             |                      | 1000pF typ.                           |
| Operating Frequency                                               | 3.3V , 5V            | 270kHz typ.                           |
|                                                                   | All others           | 400kHz typ.                           |
| Operating Temperature Range                                       |                      | -40°C to +85°C (with derating)        |
| Storage Temperature Range                                         |                      | -55°C to +125°C                       |
| Thermal Shock                                                     |                      | MIL-STD-810F                          |
| Vibration                                                         |                      | 10-55Hz, 2G, 30 Min. along X, Y and Z |
| Relative Humidity                                                 |                      | 5% to 95% RH                          |
| Base Material                                                     |                      | FR4 PCB                               |
| Weight                                                            |                      | 10.5g                                 |

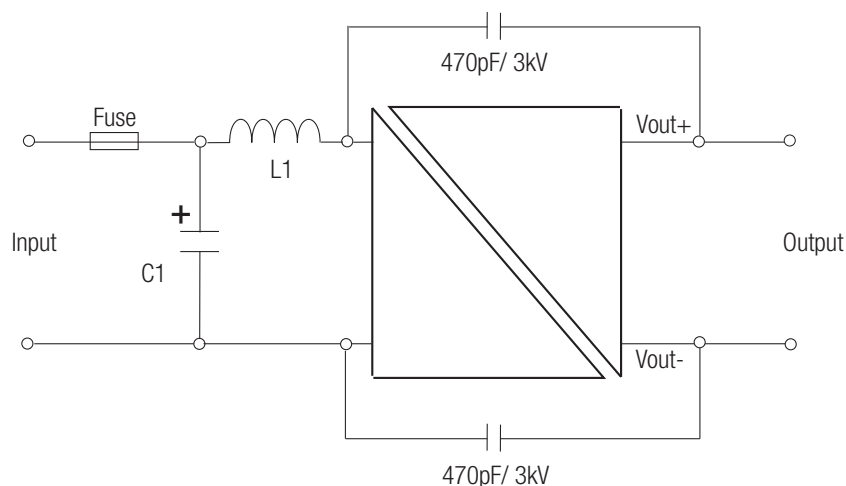
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**Specifications** (typical at nominal input and 25°C unless otherwise noted)

|                                    |                                         |                                                              |
|------------------------------------|-----------------------------------------|--------------------------------------------------------------|
| Packing Quantity                   | Refer to App Notes for tube dimensions  | 20 pcs per Tube<br>120 pcs per Reel                          |
| Dimensions                         |                                         | 27.9 x 23.9 x 8.5mm                                          |
| Conducted Emissions <sup>(6)</sup> | EN55022                                 | Class A/B                                                    |
| Radiated Emissions                 | EN55022                                 | Class A/B                                                    |
| Radiated Immunity                  | EN61000-4-3                             | Perf. Criteria A                                             |
| Fast Transient <sup>(7)</sup>      | EN61000-4-4                             | Perf. Criteria A                                             |
| Surge <sup>(7)</sup>               | EN61000-4-5                             | Perf. Criteria A                                             |
| Conducted Immunity                 | EN61000-4-6                             | Perf. Criteria A                                             |
| MTBF <sup>(8)</sup>                | Bellcore TR-NWT-000332<br>MIL-HDBK 217F | 2200 x 10 <sup>3</sup> hours<br>1314 x 10 <sup>3</sup> hours |

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

## Class A Filter



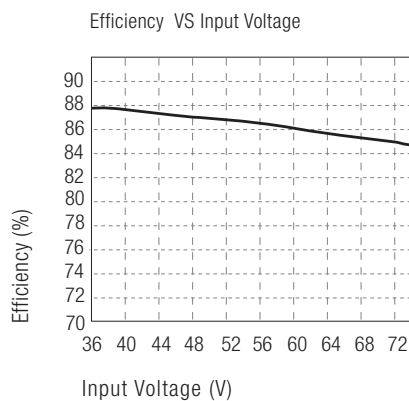
Vin=24V: C1=6.8μF/50V 1812 MLCC, L1 = 10μH, 1.4A, 100mOhm, 0504 SMD  
Vin=48V: C1= 2.2μF/100V 1812 MLCC, L1 = 10μH, 1.4A, 100mOhm, 0504 SMD

**Notes :**

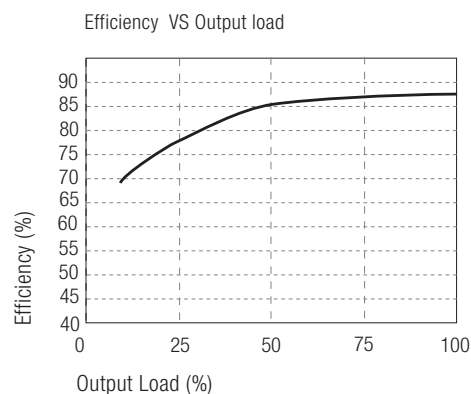
- Values at nominal input voltage and no load/full load.
- Typical Value at nominal input voltage and full load.
- Test by minimum Vin and constant resistor load.
- Simulated source impedance of 12μH. 12μH inductor in series with +Vin.
- If no suffix is specified, the control pin will be omitted. If fitted, 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. RP15-2405SOF/P).  
Negative logic ON/OFF is marked with suffix-N (eg. RP15-2405SOF/N).
- Meets Class A with external components shown above. Will meet Class B with external common mode filter (see Application Notes)
- Requires external capacitor to meet EN61000-4-5: 220μF/100V, low ESR (48mOhm)
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C.  
MIL-HDBK 217F Notice 2. Ta = 25°C, full load, (Ground, Benign, controlled environment).

## Typical Characteristics

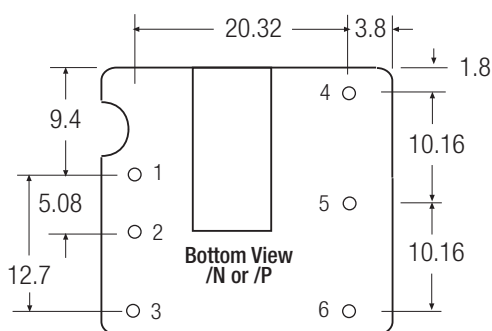
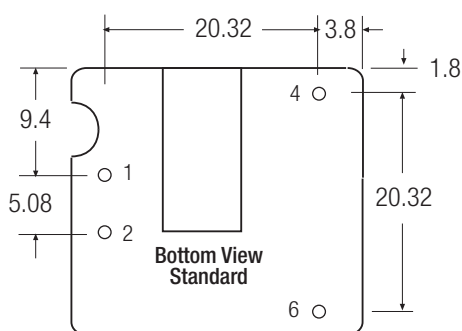
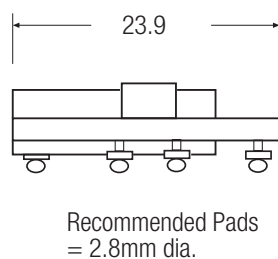
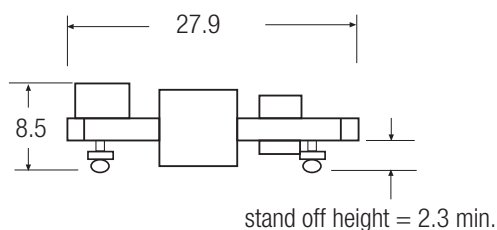
### RP15-4805SOF



### RP15-4805SOF



## Package Style and Pinning (mm)



### Pin Connections

| Pin # | Standard | /P or /N |
|-------|----------|----------|
| 1     | +Vin     | +Vin     |
| 2     | -Vin     | -Vin     |
| 3     | no pin   | CTRL     |
| 4     | +Vout    | +Vout    |
| 5     | no pin   | Trim     |
| 6     | -Vout    | -Vout    |

PCB Tolerance  $\pm 0.5$  mm  
SMD Pin Pitch Tolerance  $\pm 0.25$  mm

## External Output Trimming (optional)

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

