

## Features

## Regulated Converter

- 2:1 input voltage range
- 1.6kVDC isolation
- UL certified
- Efficiency up to 88%
- Six-sided continuous shield
- Fixed operating frequency

**RECOM**  
DC/DC Converter

## RP15-F

15 Watt

2" x 1"

Single and Dual Output



**UL**  
E196683



UL60950-1 certified

## Description

The RP15-F series DC/DC converters are certified to UL 60950-1 and to cUL 60950-1. This makes them ideal for all telecom and industrial applications where approved safety standards are required. The industry standard 2" x 1" package meets military standards for thermal shock and vibration tolerance.

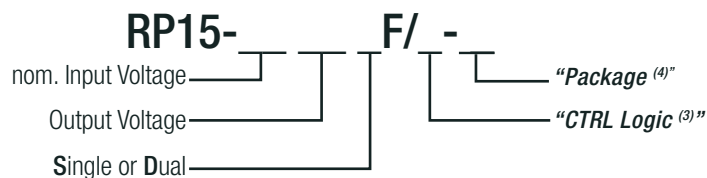
## Selection Guide

| Part Number                   | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [mA] | Input <sup>(1)</sup> Current [mA] | Efficiency <sup>(1)</sup> typ. [%] | Max. Capacitive Load <sup>(2)</sup> [μF] |
|-------------------------------|---------------------------|----------------------|---------------------|-----------------------------------|------------------------------------|------------------------------------------|
| RP15-123.3SF <sup>(3,4)</sup> | 9-18                      | 3.3                  | 4000                | 1392                              | 79                                 | 10200                                    |
| RP15-1205SF <sup>(3,4)</sup>  | 9-18                      | 5                    | 3000                | 1524                              | 82                                 | 7050                                     |
| RP15-1212SF <sup>(3,4)</sup>  | 9-18                      | 12                   | 1250                | 1453                              | 86                                 | 1035                                     |
| RP15-1215SF <sup>(3,4)</sup>  | 9-18                      | 15                   | 1000                | 1453                              | 86                                 | 705                                      |
| RP15-243.3SF <sup>(3,4)</sup> | 18-36                     | 3.3                  | 4000                | 688                               | 80                                 | 10200                                    |
| RP15-2405SF <sup>(3,4)</sup>  | 18-36                     | 5                    | 3000                | 744                               | 84                                 | 7050                                     |
| RP15-2412SF <sup>(3,4)</sup>  | 18-36                     | 12                   | 1250                | 735                               | 85                                 | 1035                                     |
| RP15-2415SF <sup>(3,4)</sup>  | 18-36                     | 15                   | 1000                | 735                               | 85                                 | 705                                      |
| RP15-483.3SF <sup>(3,4)</sup> | 36-75                     | 3.3                  | 4000                | 340                               | 81                                 | 10200                                    |
| RP15-4805SF <sup>(3,4)</sup>  | 36-75                     | 5                    | 3000                | 377                               | 83                                 | 7050                                     |
| RP15-4812SF <sup>(3,4)</sup>  | 36-75                     | 12                   | 1250                | 359                               | 87                                 | 1035                                     |
| RP15-4815SF <sup>(3,4)</sup>  | 36-75                     | 15                   | 1000                | 363                               | 86                                 | 705                                      |
| RP15-1205DF <sup>(3,4)</sup>  | 9-18                      | ±5                   | ±1500               | 1506                              | 83                                 | ±1020                                    |
| RP15-1212DF <sup>(3,4)</sup>  | 9-18                      | ±12                  | ±625                | 1453                              | 86                                 | ±495                                     |
| RP15-1215DF <sup>(3,4)</sup>  | 9-18                      | ±15                  | ±500                | 1488                              | 84                                 | ±165                                     |
| RP15-2405DF <sup>(3,4)</sup>  | 18-36                     | ±5                   | ±1500               | 744                               | 84                                 | ±1020                                    |
| RP15-2412DF <sup>(3,4)</sup>  | 18-36                     | ±12                  | ±625                | 727                               | 86                                 | ±495                                     |
| RP15-2415DF <sup>(3,4)</sup>  | 18-36                     | ±15                  | ±500                | 727                               | 86                                 | ±165                                     |
| RP15-4805DF <sup>(3,4)</sup>  | 36-75                     | ±5                   | ±1500               | 368                               | 85                                 | ±1020                                    |
| RP15-4812DF <sup>(3,4)</sup>  | 36-75                     | ±12                  | ±625                | 355                               | 88                                 | ±495                                     |
| RP15-4815DF <sup>(3,4)</sup>  | 36-75                     | ±15                  | ±500                | 359                               | 87                                 | ±165                                     |

### Notes:

- Note1: Maximum values at nominal input voltage and full load  
Note2: Max. Cap load is tested at minimum input and constant resistive load

## Model Numbering



### Notes:

- Note3: no suffix for standard part without CTRL pin  
add suffix “P” for CTRL function with positive logic (1=ON, 0=OFF)  
add suffix “N” for CTRL function with negative logic (0=ON, 1=OFF)  
Note4: add suffix “-HC” for premounted Heat-sink with clips

### Ordering Examples

RP15-2405SF/P = 24V input, 5V output, single, positive logic CTRL pin  
RP15-4812DF/N-HC = 48V input, ±12V output, dual, negative logic CTRL pin, Heat-sink premounted

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

**BASIC CHARACTERISTICS**

| Parameter                                     | Condition                                                |                                                          | Min.                                                                                     | Typ.                                       | Max.                     |
|-----------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------|
| Input Filter                                  |                                                          |                                                          |                                                                                          |                                            | Pi-Type                  |
| Input Voltage Range                           | nom. Vin = 12VDC<br>nom. Vin = 24VDC<br>nom. Vin = 48VDC |                                                          | 9VDC<br>18VDC<br>36VDC                                                                   | 12VDC<br>24VDC<br>48VDC                    | 18VDC<br>36VDC<br>75VDC  |
| Input Surge Voltage                           | 100ms max.                                               | nom. Vin = 12VDC<br>nom. Vin = 24VDC<br>nom. Vin = 48VDC |                                                                                          |                                            | 36VDC<br>50VDC<br>100VDC |
| Input Reflected Ripple Current <sup>(5)</sup> |                                                          |                                                          |                                                                                          | 20mA <sub>p-p</sub>                        |                          |
| Minimum Load <sup>(6)</sup>                   |                                                          |                                                          | 10%                                                                                      |                                            |                          |
| Start-up Time                                 | Power up                                                 |                                                          |                                                                                          | 20ms                                       |                          |
| ON/OFF CTRL <sup>(7)</sup>                    | Positive Logic                                           | DC-DC ON<br>DC-DC OFF                                    | Open or 3.5VDC < V <sub>CTRL</sub> < 12VDC<br>Short or 0VDC < V <sub>CTRL</sub> < 1.2VDC |                                            |                          |
|                                               | Negative Logic                                           | DC-DC ON<br>DC-DC OFF                                    | Short or 0VDC < V <sub>CTRL</sub> < 1.2VDC<br>Open or 3.5VDC < V <sub>CTRL</sub> < 12VDC |                                            |                          |
| Input Current of CTRL pin                     | DC-DC ON                                                 |                                                          | -0.5mA                                                                                   |                                            | +1.0mA                   |
| Standby Current                               | DC-DC OFF                                                |                                                          |                                                                                          | 20mA                                       |                          |
| Internal Operating Frequency                  | Single                                                   |                                                          | 450kHz                                                                                   | 500kHz                                     | 550kHz                   |
|                                               | Dual                                                     |                                                          | 270kHz                                                                                   | 300kHz                                     | 330kHz                   |
| Ripple and Noise                              | 20MHz BW                                                 | Single<br>Dual                                           |                                                                                          | 50mV <sub>p-p</sub><br>75mV <sub>p-p</sub> |                          |

**Notes:**

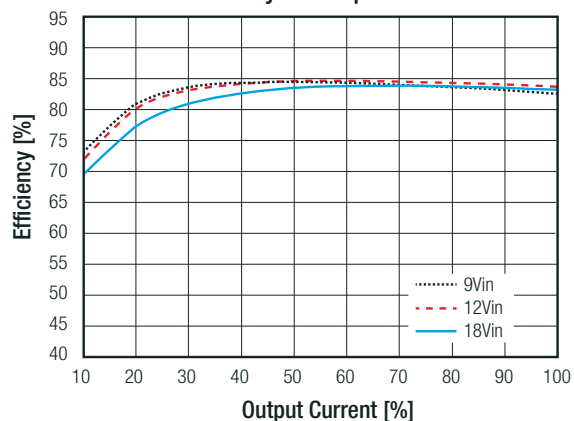
Note5: Simulated source impedance of 12μH. 12μH inductor in series with +Vin

Note6: The RP15-F series requires a minimum of 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification

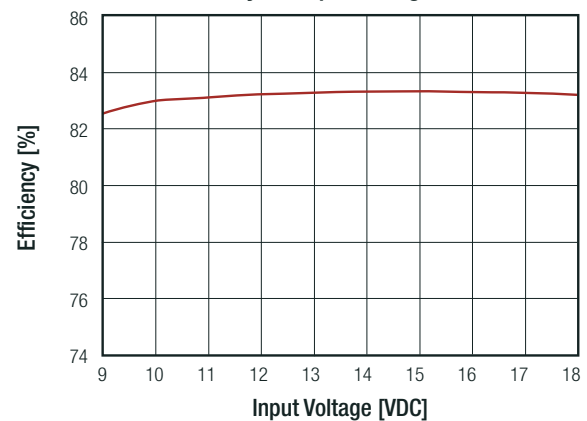
Note7: If no suffix is specified, the control pin will be omitted. If fitted, the ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin pin

**RP15-1205SF**

**Efficiency vs. Output Current**



**Efficiency vs. Input Voltage full load**

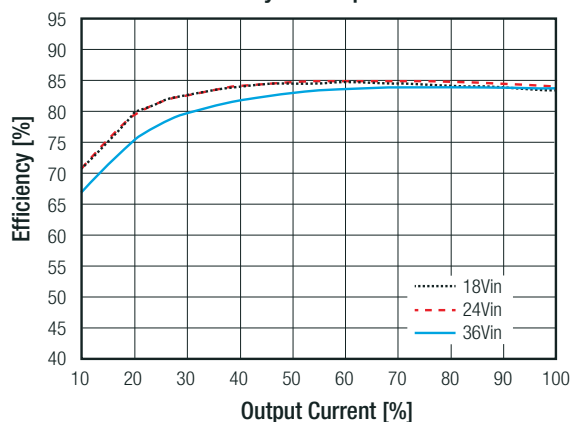


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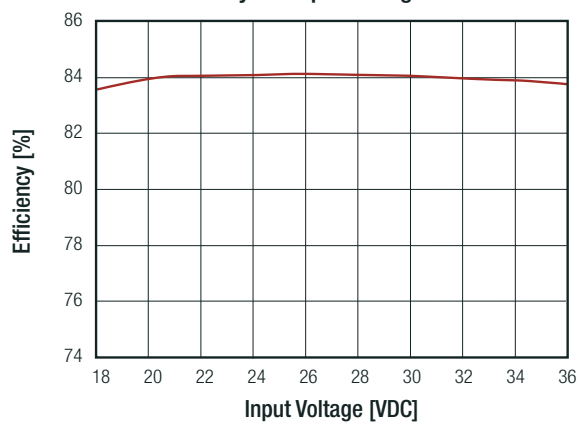
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

**RP15-2405SF**

Efficiency vs. Output Current

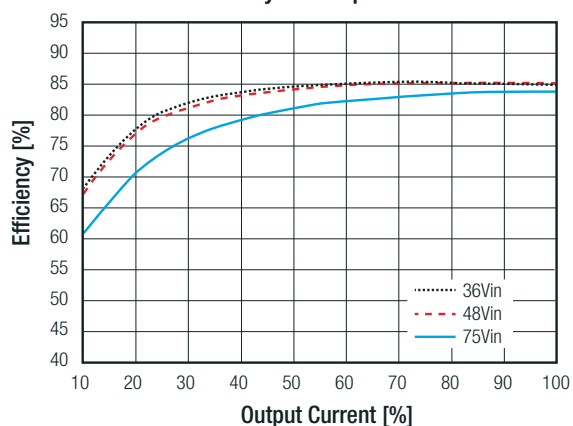


Efficiency vs. Input Voltage full load

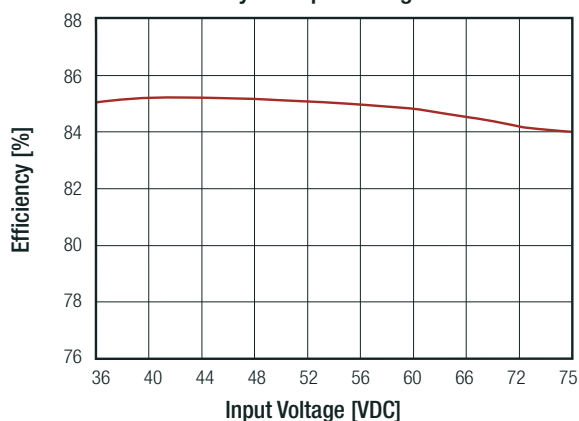


**RP15-4805SF**

Efficiency vs. Output Current



Efficiency vs. Input Voltage full load



**REGULATIONS**

| Parameter                        | Condition                        |        | Value      |
|----------------------------------|----------------------------------|--------|------------|
| Output Accuracy                  |                                  |        | ±1.0%      |
| Line Regulation                  | low line to high line, full load |        | ±0.5%      |
| Load Regulation                  | 10% to 100% load                 | Single | ±0.5%      |
|                                  |                                  | Dual   | ±0.1%      |
| Cross Regulation                 | asymmetrical 25%<>100% load      |        | ±5.0%      |
| Transient Response Recovery Time | 25% load step change             |        | 250µs typ. |

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

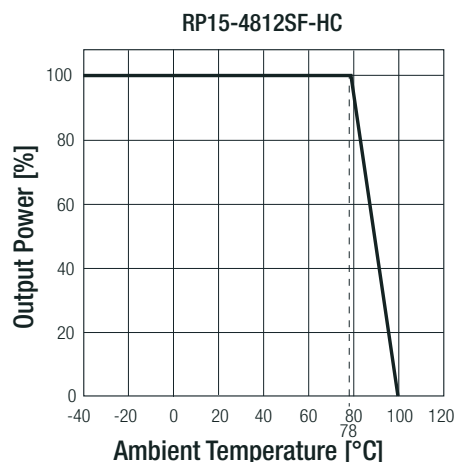
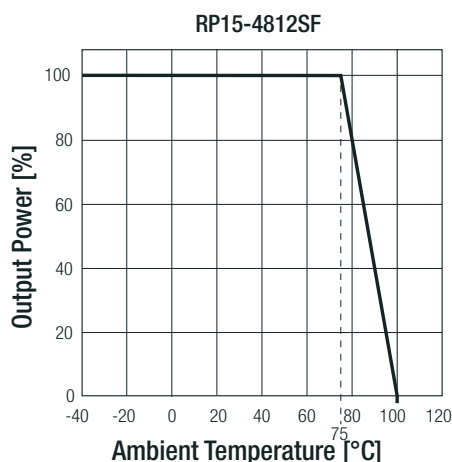
**PROTECTIONS**

| Parameter                                                                                | Condition                        |                                      | Value                                  |
|------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------|----------------------------------------|
| Short Circuit Protection (SCP)                                                           |                                  |                                      | continuous, automatic recovery         |
| Over Voltage Protection (OVP)                                                            | zener diode clamp                | 3.3Vout<br>5Vout<br>12Vout<br>15Vout | 3.9VDC<br>6.2VDC<br>15VDC<br>18VDC     |
| Over Load Protection (OLP)                                                               | % of lout rated                  |                                      | 150% typ.                              |
| Isolation Voltage <sup>(8)</sup>                                                         | I/P to O/P<br>I/P to O/P to case |                                      | 1.6kVDC/ 1 minute<br>1.6kVDC/ 1 minute |
| Isolation Resistance                                                                     | Viso= 500VDC                     |                                      | 1GΩ min.                               |
| Isolation Capacitance                                                                    |                                  |                                      | 300pF typ.                             |
| <b>Notes:</b>                                                                            |                                  |                                      |                                        |
| Note8: For repeat Hi-Pot testing, reduce the time and/or the test voltage                |                                  |                                      |                                        |
| Note9: This power module is not internally fused. An input line fuse must always be used |                                  |                                      |                                        |

**ENVIRONMENTAL**

| Parameter                   | Condition                                                     |                                     | Value                                                        |
|-----------------------------|---------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------|
| Operating Temperature Range | without derating<br>with derating                             |                                     | -40°C to +75°C<br>-40°C to +100°C                            |
| Maximum Case Temperature    |                                                               |                                     | +100°C                                                       |
| Temperature Coefficient     |                                                               |                                     | ±0.02%/K max.                                                |
| Thermal Impedance           | @ natural convection<br>0.1m/s                                | without heat-sink<br>with heat-sink | 12K/W<br>10K/W                                               |
| Operating Humidity          | non-condensing                                                |                                     | 5% - 95% RH                                                  |
| Operating Altitude          |                                                               |                                     | 2000m                                                        |
| Thermal Shock               |                                                               |                                     | according to MIL-STD-810F                                    |
| Vibration                   |                                                               |                                     | according to MIL-STD-810F                                    |
| MTBF                        | MIL-HDBK-217F, G.B.<br>Bellcore TR-NWT-000332 <sup>(10)</sup> |                                     | 2318 x 10 <sup>3</sup> hours<br>2041 x 10 <sup>3</sup> hours |

**Derating Graph<sup>(11)</sup>**



**Notes:**

Note10: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment)

Note11: 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 RECOM Techsupport for detailed information

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

**SAFETY AND CERTIFICATIONS**

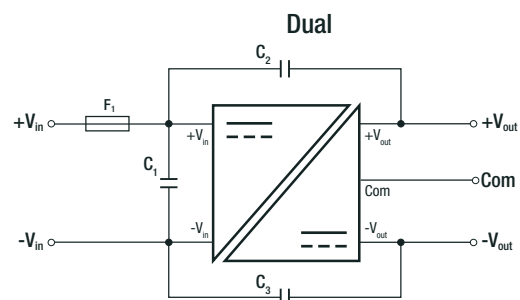
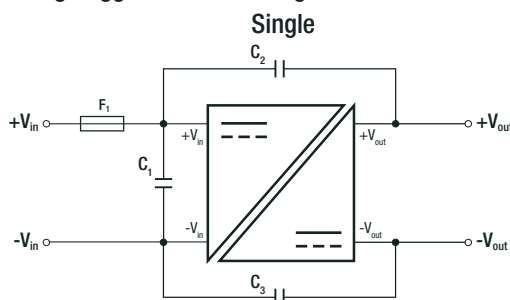
| Certificate Type (Safety)                                         | Condition      | Standard                                                                        |
|-------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------|
| Information Technology Equipment, General Requirements for Safety | E196683        | UL60950-1, 2nd Edition, 2011<br>CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2011 |
| EAC                                                               | RU-AT.49.09571 | TP TC 004/2011                                                                  |
| RoHS2                                                             |                | RoHS-2011/65/EU + AM-2015/863                                                   |

| EMC Compliance                                                                | Condition                                             | Standard / Criterion    |
|-------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------|
| Electromagnetic compatibility of multimedia equipment - Emission requirements | with external filter<br>(see filter suggestion below) | EN55032, Class A and B  |
| ESD Electrostatic discharge immunity test                                     | Air $\pm 8\text{kV}$ and Contact $\pm 6\text{kV}$     | EN61000-4-2, Criteria B |
| Radiated, radio-frequency, electromagnetic field immunity test                | 10 V/m                                                | EN61000-4-3, Criteria A |
| Fast Transient and Burst Immunity <sup>(12)</sup>                             | $\pm 2\text{kV}$                                      | EN61000-4-4, Criteria B |
| Surge Immunity <sup>(12)</sup>                                                | $\pm 1\text{kV}$                                      | EN61000-4-5, Criteria B |
| Immunity to conducted disturbances, induced by radio-frequency fields         | 10 Vr.m.s                                             | EN61000-4-6, Criteria A |
| Power Magnetic Field Immunity                                                 | 100A/m continuous; 1000A/m 1s                         | EN61000-4-8, Criteria A |

**Notes:**

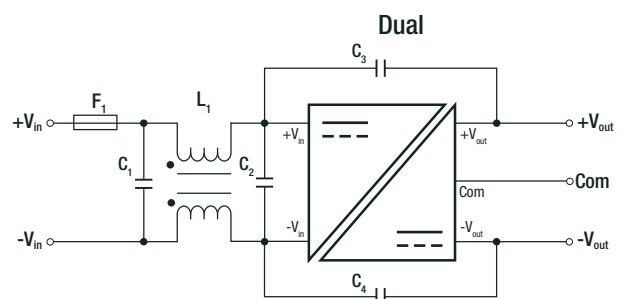
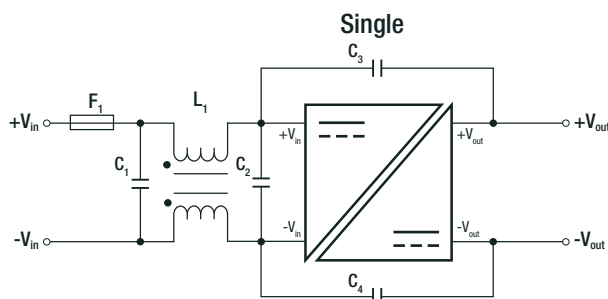
Note12: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5  
Recom suggests Nippon chemi-con KY series 220 $\mu\text{F}$ /100V

**EMC Filtering Suggestions according to EN55032**



**Component List Class A**

| MODEL                    | C1                                 | C2                    | C3                    |
|--------------------------|------------------------------------|-----------------------|-----------------------|
| RP15-12xxSF, RP15-12xxDF | 6.8 $\mu\text{F}$ /50V, 1812 MLCC  | 1000pF/2kV, 1808 MLCC | 1000pF/2kV, 1808 MLCC |
| RP15-24xxSF, RP15-24xxDF | 2.2 $\mu\text{F}$ /50V, 1812 MLCC  | 1000pF/2kV, 1808 MLCC | 1000pF/2kV, 1808 MLCC |
| RP15-48xxSF, RP15-48xxDF | 1.5 $\mu\text{F}$ /100V, 1812 MLCC | 1000pF/2kV, 1808 MLCC | 1000pF/2kV, 1808 MLCC |



**Component List Class B**

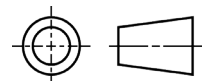
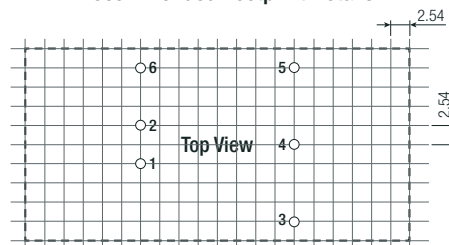
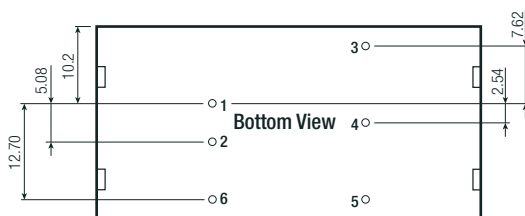
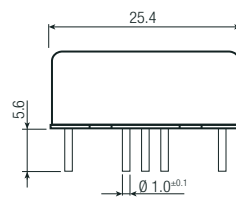
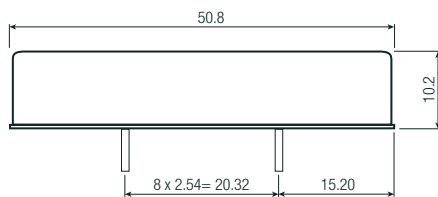
| MODEL                      | C1                                   | C2                                   | C3/C4                   | L1                                                        |
|----------------------------|--------------------------------------|--------------------------------------|-------------------------|-----------------------------------------------------------|
| RP15-12xxSF<br>RP15-12xxDF | 4.7 $\mu\text{F}$ /50V<br>1812 MLCC  | N/A                                  | 1000pF/2kV<br>1808 MLCC | CMC: 325 $\mu\text{H}$<br>ref.: WE 744290321 ref.: CMC-06 |
| RP15-24xxSF<br>RP15-24xxDF | 3.3 $\mu\text{F}$ /50V<br>1812 MLCC  | N/A                                  | 1000pF/2kV<br>1808 MLCC | CMC: 325 $\mu\text{H}$<br>ref.: WE 744290321 ref.: CMC-06 |
| RP15-48xxSF<br>RP15-48xxDF | 2.2 $\mu\text{F}$ /100V<br>1812 MLCC | 2.2 $\mu\text{F}$ /100V<br>1812 MLCC | 1000pF/2kV<br>1808 MLCC | CMC: 325 $\mu\text{H}$<br>ref.: WE 744290321 ref.: CMC-06 |

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

**DIMENSIONS and PHYSICAL CHARACTERISTICS**

| Parameter          | Type                                | Value                                                                   |
|--------------------|-------------------------------------|-------------------------------------------------------------------------|
| Material           | case<br>base<br>potting             | nickel coated copper<br>non-conductive black plastic<br>epoxy (UL94V-0) |
| Dimensions (LxWxH) | without Heat-sink<br>with Heat-sink | 50.8 x 25.4 x 10.2mm<br>56.8 x 25.4 x 16.8mm                            |
| Weight             | without Heat-sink<br>with Heat-sink | 27g<br>37.89g                                                           |

**Dimension Drawing (mm)**



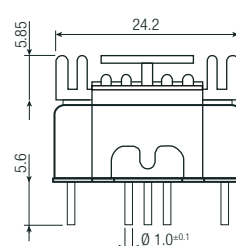
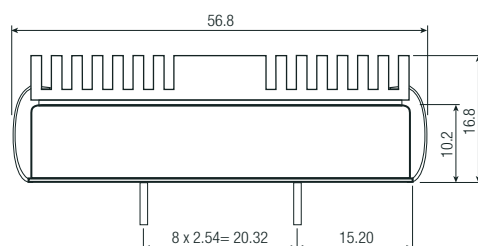
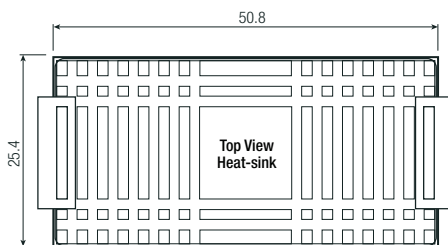
**Pinning Information**

| Pin # | Single              | Dual                |
|-------|---------------------|---------------------|
| 1     | +Vin                | +Vin                |
| 2     | -Vin                | -Vin                |
| 3     | +Vout               | +Vout               |
| 4     | no Pin              | Com                 |
| 5     | -Vout               | -Vout               |
| 6     | CTRL <sup>(3)</sup> | CTRL <sup>(3)</sup> |

Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm

**Recommended Footprint Details**

**Dimension Drawing with Heat-sink (mm)**



**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

**PACKAGING INFORMATION**

| Parameter                   | Type           |                   | Value                  |
|-----------------------------|----------------|-------------------|------------------------|
| Packaging Dimension (LxWxH) | tube           | without heat-sink | 255.0 x 54.0 x 22.0mm  |
|                             | tray           | with heat-sink    | 302.5 x 222.0 x 20.0mm |
| Packaging Quantity          | tube           | without heat-sink | 9pcs                   |
|                             | tray           | with heat-sink    | 20pcs                  |
| Storage Temperature Range   |                |                   | -55°C to +125°C        |
| Storage Humidity            | non-condensing |                   | 5% - 95% RH            |

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.



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Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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