

# Features

- 4:1 Wide Input Voltage Range
- 1.6kVDC Isolation
- UL Certified
- Efficiency up to 88%
- Six-Sided Continuous Shield
- No Minimum Load Required

# Regulated Converters

## RP15-FW

15 Watt  
2" x 1"  
Single & Dual Output



### Description

The RP15-FW series wide range input 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

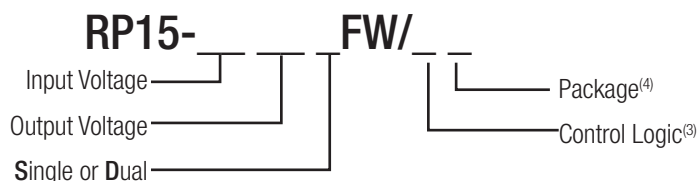
Part Number	Input Voltage Range (VDC)	Output Voltage (VDC)	Output Current (mA)	Input <sup>(1)</sup> Current (mA)	Efficiency <sup>(1)</sup> typ. (%)	Max. Capacitive Load <sup>(2)</sup> (µF)
RP15-243.3SFW <sup>(3,4)</sup>	9-36	3.3	4500	719	86	14700
RP15-2405SFW <sup>(3,4)</sup>	9-36	5	3000	718	87	7200
RP15-2412SFW <sup>(3,4)</sup>	9-36	12	1250	718	87	1250
RP15-2415SFW <sup>(3,4)</sup>	9-36	15	1000	718	87	800
RP15-483.3SFW <sup>(3,4)</sup>	18-75	3.3	4500	360	86	14700
RP15-4805SFW <sup>(3,4)</sup>	18-75	5	3000	355	88	7200
RP15-4812SFW <sup>(3,4)</sup>	18-75	12	1250	360	87	1250
RP15-4815SFW <sup>(3,4)</sup>	18-75	15	1000	360	87	800
RP15-2405DFW <sup>(3,4)</sup>	9-36	±5	±1500	718	87	±3600
RP15-2412DFW <sup>(3,4)</sup>	9-36	±12	±625	710	88	±625
RP15-2415DFW <sup>(3,4)</sup>	9-36	±15	±500	710	88	±400
RP15-4805DFW <sup>(3,4)</sup>	18-75	±5	±1500	355	88	±3600
RP15-4812DFW <sup>(3,4)</sup>	18-75	±12	±625	355	88	±625
RP15-4815DFW <sup>(3,4)</sup>	18-75	±15	±500	355	88	±400



### Notes:

- Note1: Maximum value at nominal input voltage and full load.  
Note2: Test by minimum Vin and constant resistor load.

### Model Numbering



### Ordering Examples

- RP15-2405SFW/P = 24V 4:1 Input, 5V Output, Positive Logic CTRL pin fitted  
RP15-4805DFW-HC = 48V 4:1 Input, ±5V Output, No CTRL pin, Heat-sink fitted

### Notes:

- Note3: Standard part is without suffixes and CTRL pin isn't fitted  
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 and clips



UL60950-1 Certified

**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

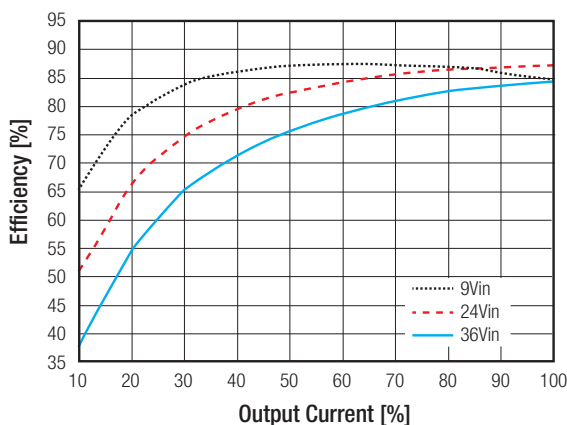
BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range	nom. Vin = 24V nom. Vin = 48V		9VDC 18VDC	24VDC 48VDC	36VDC 75VDC
Under Voltage Lockout (UVLO)	Vin = 24V	DC-DC ON DC-DC OFF		7.5VDC	9VDC
	Vin = 48V	DC-DC ON DC-DC OFF		15VDC	18VDC
Input Filter					Pi-type
Input Reflected Ripple Current	nominal Vin and full load			20mA <sub>p-p</sub>	
Input Surge Voltage	Vin = 24V, 100ms max. Vin = 48V, 100ms max.				50VDC 100VDC
Start-up time	Power up			20ms	
Operating Frequency Range			360kHz	400kHz	440kHz
Minimum Load	full load		0%		
Ripple and Noise	20MHz bandwidth with a 0.1µF/50V MLCC	Single: 3.3Vout, 5Vout		50mV <sub>p-p</sub>	
		Single: 12Vout, 15Vout		75mV <sub>p-p</sub>	
		Dual: all		75mV <sub>p-p</sub>	
Remote ON/OFF <sup>(5)</sup>	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.0V < Vr < 12V Short or 0V < Vr < 1.2V		
	Negative Logic	DC-DC ON DC-DC OFF	Short or 0V < Vr < 1.2V Open or 3.0V < Vr < 12V		
Input current of Remote pin (CTRL)	DC-DC OFF			2.5mA	
	DC-DC ON		-0.5mA		+0.5mA

**Notes:**

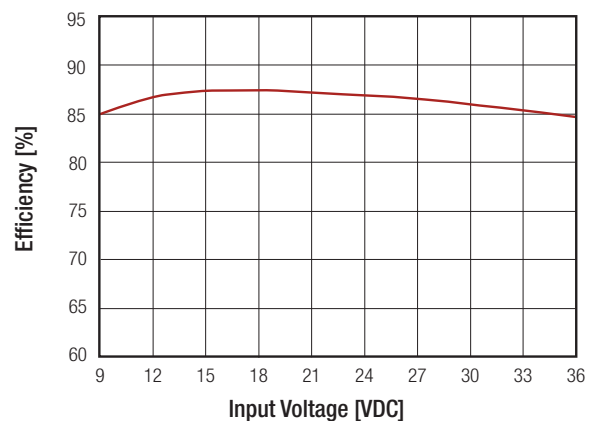
Note5: The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin pin. If no suffix is specified, the control pin will be omitted.

**RP15-2405SFW**

**Efficiency vs. Output Current**



**Efficiency vs. Input Voltage**

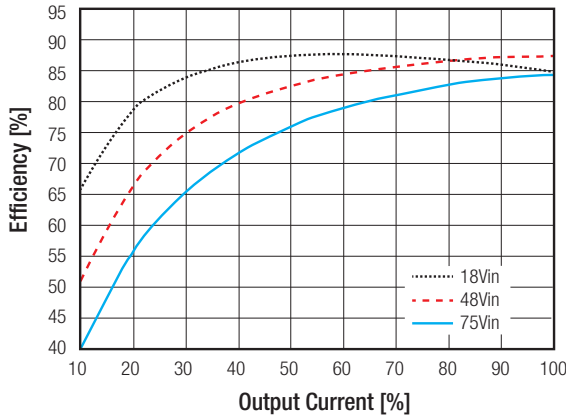


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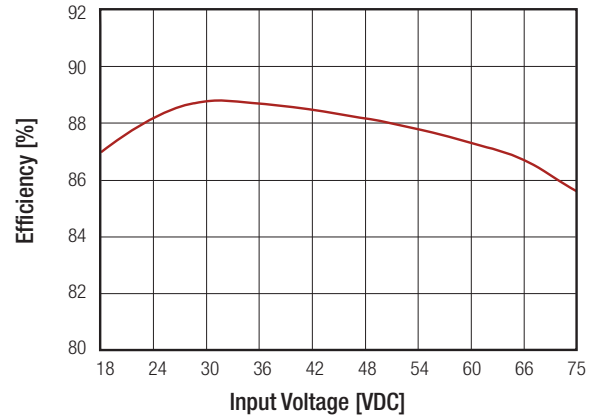
**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

**RP15-4805SFW**

**Efficiency vs. Output Current**



**Efficiency vs. Input Voltage**



**REGULATIONS**

Parameter	Condition	Value
Output Voltage Accuracy	full load and nominal Vin	±1%
Line Voltage Regulation	low line, high line at full load	Single ±0.2%
		Dual ±0.5%
Load Voltage Regulation	no load to full load	Single ±0.5%
		Dual ±1%
Cross Regulation	asymmetrical 25% <> 100% load	±5%
Transient Response recovery time	25% load step change	250µs typ.

**PROTECTIONS**

Parameter	Condition	Value	
Short Circuit Protection (SCP)		continuous, automatic recovery	
Over Voltage Protection (OVP)	Zener Diode Clamp	3.3Vout	3.9VDC
		5Vout	6.2VDC
		12Vout	15VDC
		15Vout	18VDC
Over Load Protection (OLP)	% of Iout rated	150% typ.	
Isolation Voltage	I/P to O/P	1.6kVDC/1 minute	
	I/P (O/P) to case	1.6kVDC/1 minute	
Isolation Resistance		1GΩ min.	
Isolation Capacitance		1500pF max.	

**Notes:**

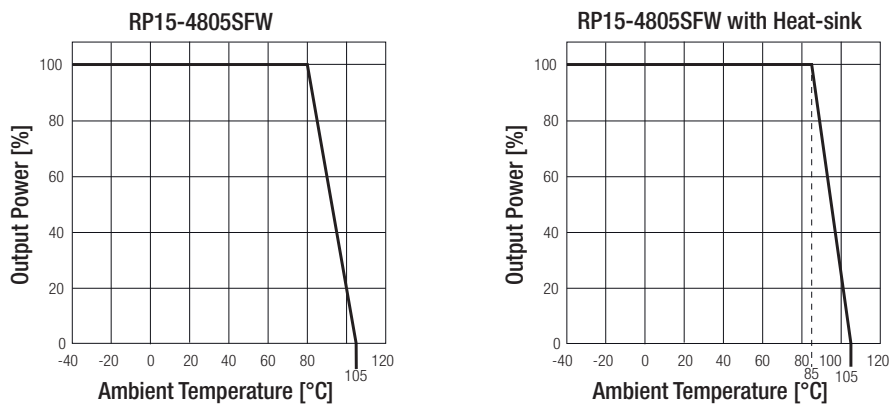
Note6: This power module is not internally fused. An input line fuse must always be used.

**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

## ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range	without derating	-40°C to +76°C
	with derating	-40°C to +105°C
Maximum Case Temperature		+105°C
Temperature Coefficient		±0.02%/°C max.
Thermal Impedance	Natural convection (20LFM)	12°C/Watt
	Natural convection (20LFM) with Heat-sink	10°C/Watt
Operating Humidity		5% - 95% RH
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
MTBF	MIL-HDBK-217F, Full Load	2430 x 10 <sup>3</sup> hours
	Bellcore TR-NWT-000332 <sup>(7)</sup>	2350 x 10 <sup>3</sup> hours

## Derating Graph<sup>(8)</sup>



### Notes:

Note7: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment).

Note8: 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 techsupportAT@recom-power.com.

## SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1 1st Ed.: 2003 C22.2 No. 60950 1st. Ed.: 2003
EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement <sup>(9)</sup>	with external filter	EN55022, Class A or B
ESD Electrostatic discharge immunity test	Air ±8kV and Contact ±6kV	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>(10)</sup>	±2kV	EN61000-4-4, Criteria B
Surge Immunity <sup>(10)</sup>	±1kV	EN61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10 Vr.m.s	EN61000-4-6, Criteria A

### Notes:

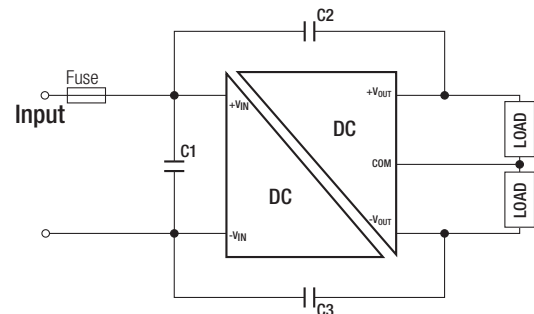
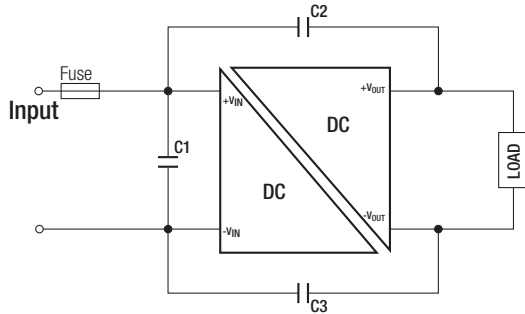
Note9: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below.

Note10: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Recom suggests: Nippon chemi-con KY series, 220µF/100V.

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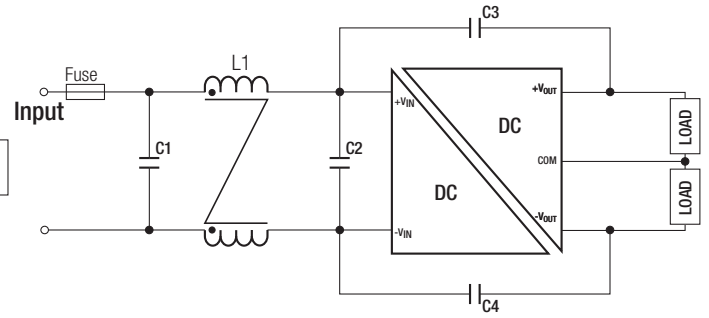
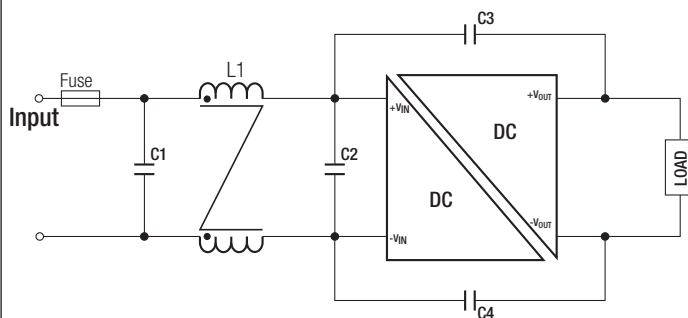
**Specifications** measured at Ta = 25°C, nominal input voltage, full load otherwise noted

### EMI Filtering Class A



MODEL	C1	C2	C3
RP15-24xxS_DFW	N/A	1000pF/2kV 1206 MLCC	1000pF/2kV 1206 MLCC
RP15-48xxS_DFW	1µF/100V 1210 MLCC	1000pF/2kV 1206 MLCC	1000pF/2kV 1206 MLCC

### EMI Filtering Class B



MODEL	C1	C2	C3/C4	L1
RP15-24xxS_DFW	2.2µF/50V 1812 MLCC	N/A	1000pF/2kV 1206 MLCC	CMC: 450µH ref.: WE 7448227005 ref.: CMC-05
RP15-48xxS_DFW	2.2µF/50V 1812 MLCC	2.2µF/50V 1812 MLCC	1000pF/2kV 1206 MLCC	CMC: 325µH ref.: WE 744290321 ref.: CMC-06

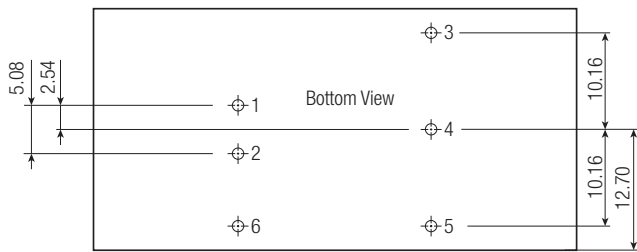
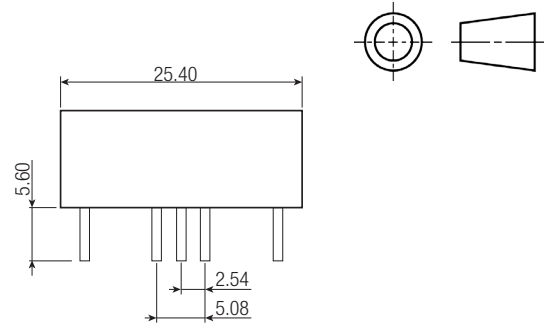
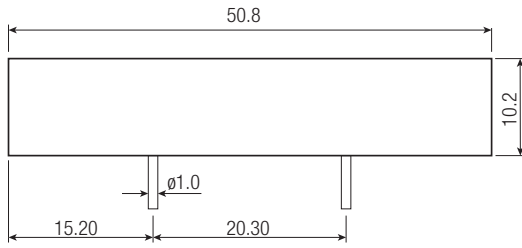
### DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case	Nickel coated copper
	Base	FR4 PCB
	Potting	Epoxy (UL94-V0)
Package Dimensions (LxWxH)	without Heat-sink	50.8 x 25.4 x 10.2mm
	with Heat-sink	56.8 x 25.4 x 16.8mm
Package Weight	without Heat-sink	27g
	with Heat-sink	37.89g

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Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

Dimension Drawing (mm)

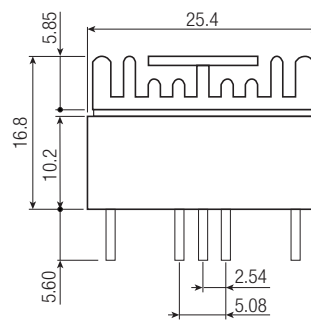
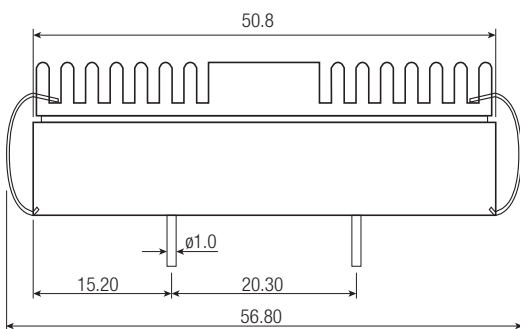
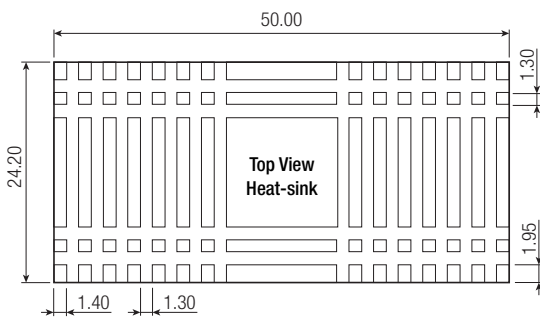


Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Com
5	-Vout	-Vout
6*	CTRL*	CTRL*

\* Optional. See Note 5  
Pin Pitch Tolerance  $\pm 0.25$  mm  
Pin Dimension Tolerance  $\pm 0.1$  mm  
Tolerance: X.X  $\pm 0.5$  mm  
X.XX  $\pm 0.25$  mm

Dimension Drawing (mm) with Heat-sink



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PACKAGING INFORMATION			
Parameter	Type		Value
Packaging Quantity	with derating	Tube	9 pcs.
	without derating	Tray	20 pcs.
Storage Temperature Range			-55°C to +125°C
Storage Humidity			5% - 95% RH