

Features

- Wide 4:1 input voltage range
- 1.6kVDC isolation
- UL certified
- Efficiency up to 88%
- Six-sided continuous shield
- No minimum load required

Regulated Converter



RP15-FW

15 Watt
2" x 1"
Single and Dual Output

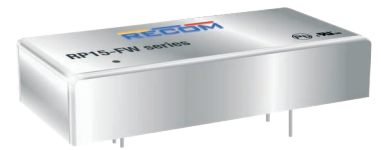


Description

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

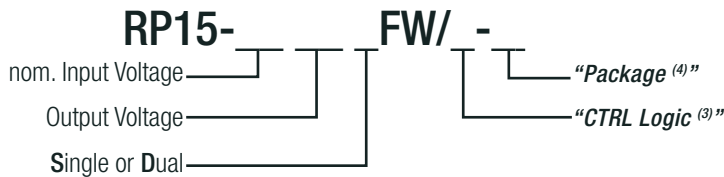


UL60950-1 certified

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

RP20-2405SFW/P = 24V input, 5V output, single, positive logic CTRL pin
 RP20-4812DFW/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

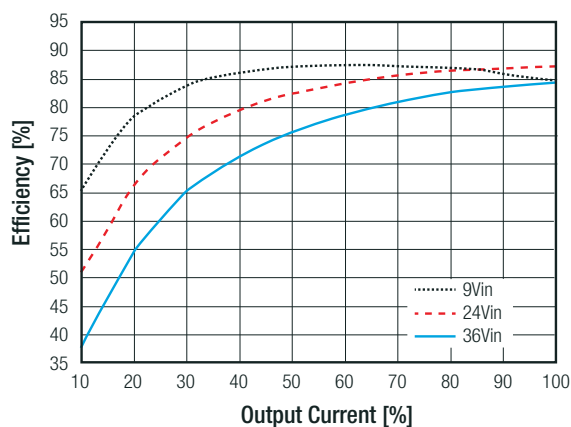
Parameter	Condition		Min.	Typ.	Max.
Input Filter					Pi-Type
Input Voltage Range	nom. Vin = 24VDC nom. Vin = 48VDC		9VDC 18VDC	24VDC 48VDC	36VDC 75VDC
Input Surge Voltage	100ms max.	nom. Vin = 24VDC nom. Vin = 48VDC			50VDC 100VDC
Under Voltage Lockout (UVLO)	nom. Vin = 24VDC	DC-DC ON DC-DC OFF		7.5VDC	9VDC
	nom. Vin = 48VDC	DC-DC ON DC-DC OFF		15VDC	18VDC
Input Reflected Ripple Current				20mA _{p-p}	
Minimum Load			0%		
Start-up Time	Power up			20ms	
ON/OFF CTRL ⁽⁵⁾	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.0VDC < V _{CTRL} < 12VDC Short or 0VDC < V _{CTRL} < 1.2VDC		
	Negative Logic	DC-DC ON DC-DC OFF	Short or 0VDC < V _{CTRL} < 1.2VDC Open or 3.0VDC < V _{CTRL} < 12VDC		
Input Current of CTRL pin	DC-DC ON		-0.5mA		+0.5mA
Standby Current	DC-DC OFF			2.5mA	
Internal Operating Frequency			360kHz	400kHz	440kHz
Ripple and Noise	measured at 20MHz BW with a 0.1µF/50V MLCC	3.3V _{out} , 5V _{out} 12V _{out} , 15V _{out}		50mV _{p-p} 75mV _{p-p}	
		±5V _{out} , ±12V _{out} , ±15V _{out}		75mV _{p-p}	

Notes:

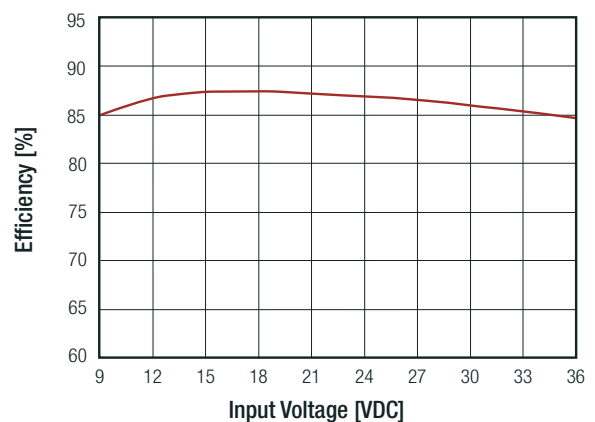
Note5: If no suffix is specified, the control pin will be omitted. If fitted, the ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin pin

RP15-2405SF

Efficiency vs. Output Current



Efficiency vs. Input Voltage full load

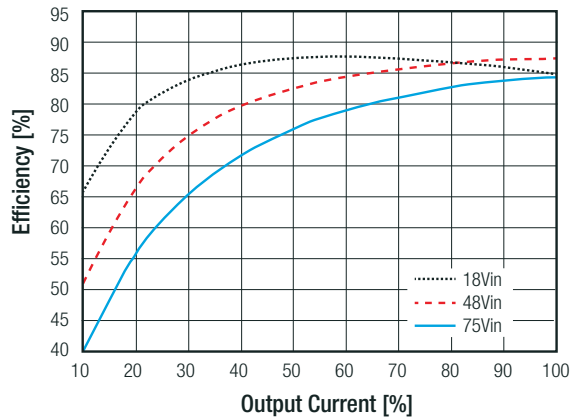


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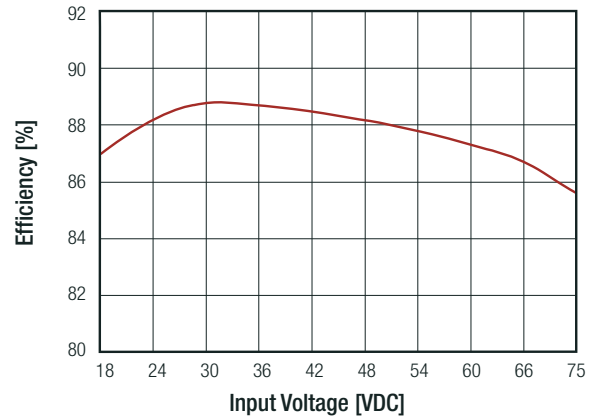
Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

RP20-4805FW

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	Single	±0.2%
		Dual	±0.5%
Load Regulation	0% to 100% load	Single	±0.5%
		Dual	±1.0%
Cross Regulation	asymmetrical 25%<>100% load		±5.0%
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	3.3V _{out}	3.9VDC
		5V _{out}	6.2VDC
		12V _{out}	15VDC
		15V _{out}	18VDC
Over Load Protection (OLP)	% I _{out} rated		150% typ.
Isolation Voltage ⁽⁶⁾	I/P to O/P		1.6kVDC/ 1 minute
	I/P to O/P to case		1.6kVDC/ 1 minute
Isolation Resistance	Viso= 500VDC		1GΩ min.
Isolation Capacitance			1500pF max.

Notes:

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

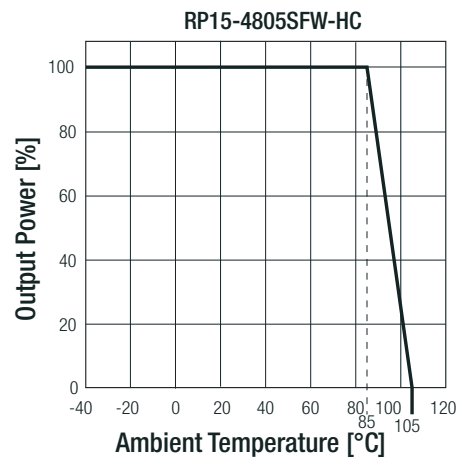
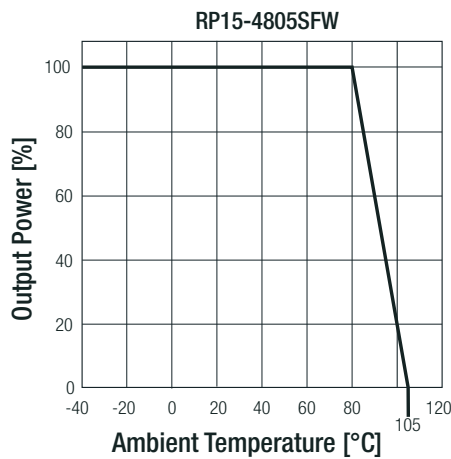
Note7: This power module is not internally fused. An input line fuse must always be used

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

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	without derating		-40°C to +80°C
	with derating		-40°C to +105°C
Maximum Case Temperature			+105°C
Temperature Coefficient			±0.02%/K max.
Thermal Impedance	@ natural convection	without heat-sink	12K/W
	0.1m/s	with heat-sink	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.		2430 x 10 ³ hours
	Bellcore TR-NWT-000332 ⁽⁸⁾		2350 x 10 ³ hours

Derating Graph ⁽⁹⁾



Notes:

- Note8: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground fixed and controlled environment)
 Note9: 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

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Condition	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1, 2nd Edition, 2011 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 (see filter suggestion below)	EN55032, Class A and 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 ⁽¹⁰⁾	±2kV	EN61000-4-4, Criteria B
Surge Immunity ⁽¹⁰⁾	±1kV	EN61000-4-5, Criteria A
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

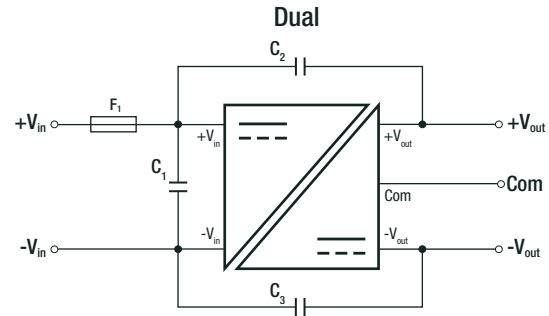
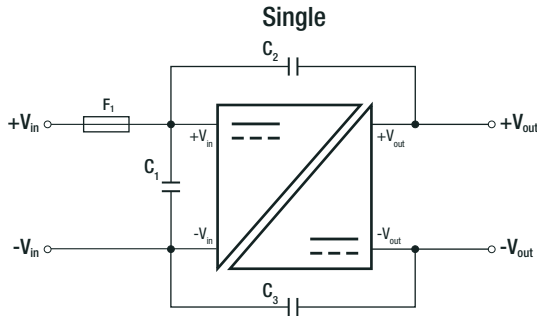
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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

Notes:

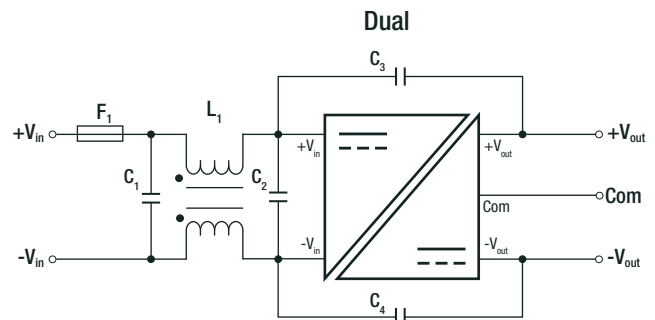
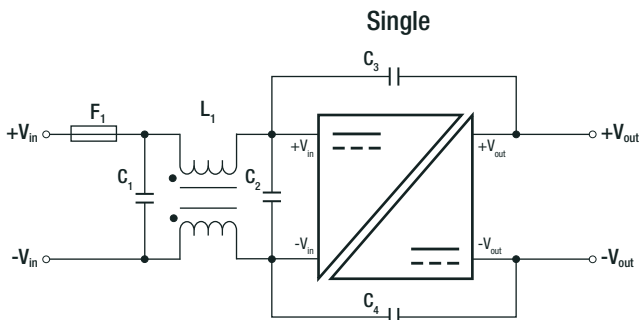
Note10 : An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5
 Recom suggests Nippon chemi-con KY series 220µF/100V

EMC Filtering Suggestions according to EN55032



Component List Class A

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



Component List Class B

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

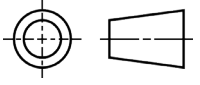
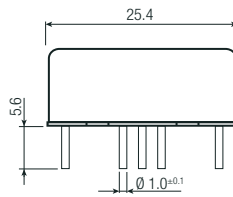
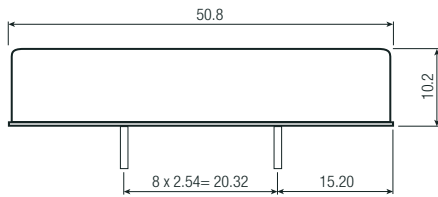
DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	nickel coated copper
	base	FR4 PCB
	potting	epoxy (UL94V-0)
Dimensions (LxWxH)	without Heat-sink	50.8 x 25.4 x 10.2mm
	with Heat-sink	56.8 x 25.4 x 16.8mm
Weight	without Heat-sink	27g
	with Heat-sink	37.89g

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

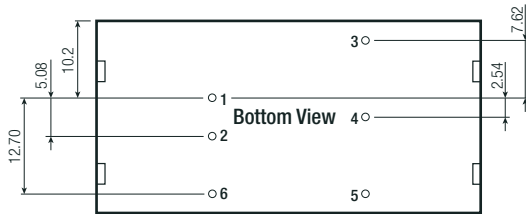
Dimension Drawing (mm)



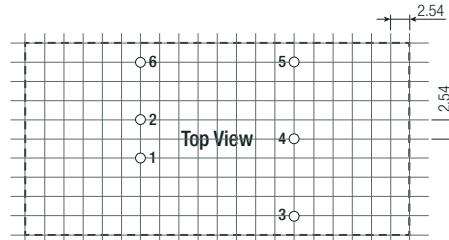
Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	no Pin	Com
5	-Vout	-Vout
6	CTRL ⁽³⁾	CTRL ⁽³⁾

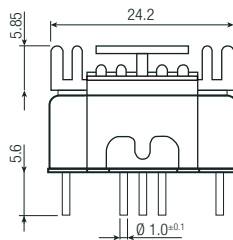
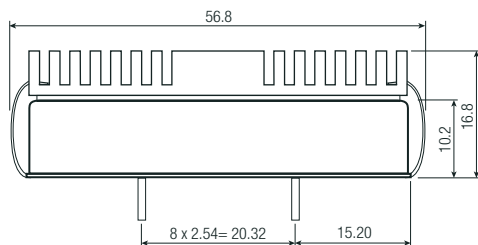
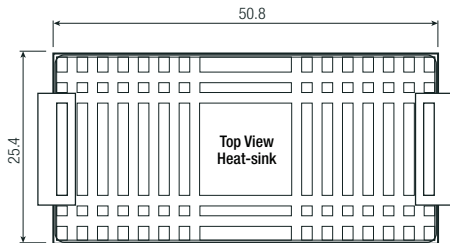
Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm



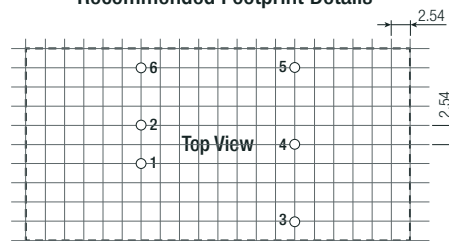
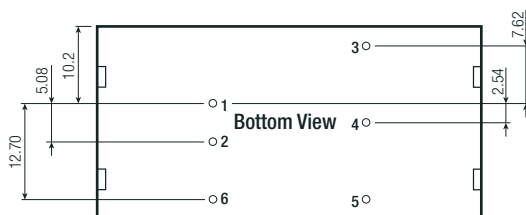
Recommended Footprint Details



Dimension Drawing with Heat-sink (mm)



Recommended Footprint Details



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

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