

Regulated Converters

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



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 ⁽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

Notes:

Note1: Maximum value at nominal input voltage and full load.

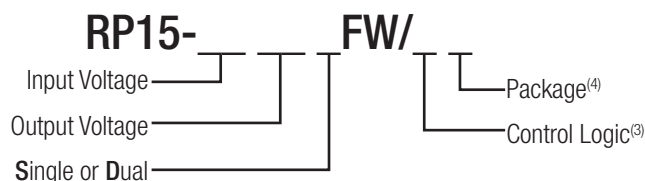
Note2: Test by minimum V_{in} and constant resistor load.



UL[®]
C **UL** US
E196683

UL60950-1 Certified

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, $\pm 5V$ 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

Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

BASIC CHARACTERISTICS

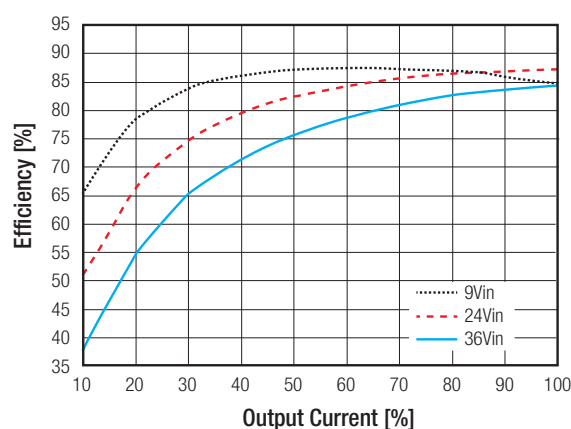
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range	nom. $V_{in} = 24\text{V}$ nom. $V_{in} = 48\text{V}$	9VDC 18VDC	24VDC 48VDC	36VDC 75VDC
Under Voltage Lockout (UVLO)	$V_{in} = 24\text{V}$ DC-DC ON DC-DC OFF		7.5VDC	9VDC
	$V_{in} = 48\text{V}$ DC-DC ON DC-DC OFF		15VDC	18VDC
Input Filter	Pi-type			
Input Reflected Ripple Current	nominal V_{in} and full load		20mA _{p-p}	
Input Surge Voltage	$V_{in} = 24\text{V}$, 100ms max. $V_{in} = 48\text{V}$, 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 0.1 μF /50V MLCC	Single: 3.3V _{out} , 5V _{out}	50mV _{p-p}	
		Single: 12V _{out} , 15V _{out}	75mV _{p-p}	
		Dual: all	75mV _{p-p}	
Remote ON/OFF ⁽⁵⁾	Positive Logic DC-DC ON DC-DC OFF	Open or $3.0\text{V} < V_r < 12\text{V}$ Short or $0\text{V} < V_r < 1.2\text{V}$		
	Negative Logic DC-DC ON DC-DC OFF	Short or $0\text{V} < V_r < 1.2\text{V}$ Open or $3.0\text{V} < V_r < 12\text{V}$		
Input current of Remote pin (CTRL)	DC-DC OFF		2.5mA	
	DC-DC ON	-0.5mA		+0.5mA

Notes:

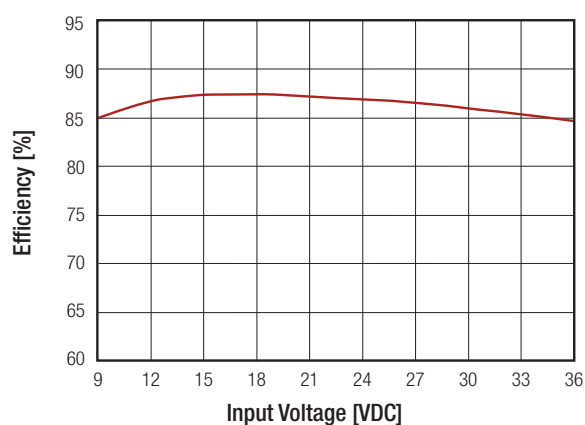
Note5: The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -V_{in} pin. If no suffix is specified, the control pin will be omitted.

RP15-2405SFW

Efficiency vs. Output Current



Efficiency vs. Input Voltage

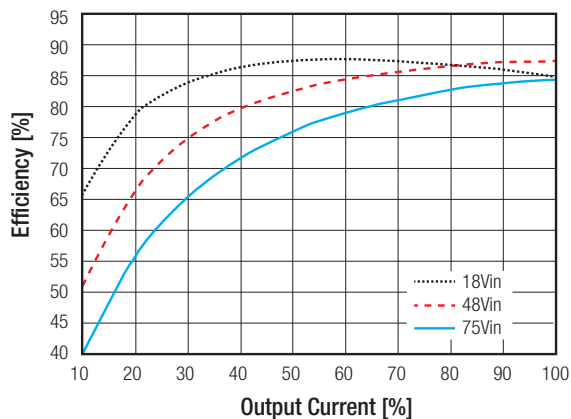


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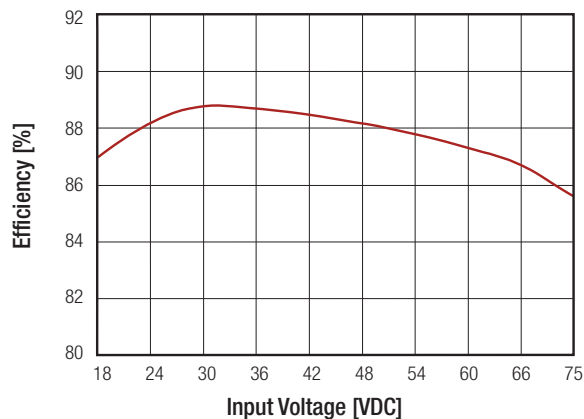
Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

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.

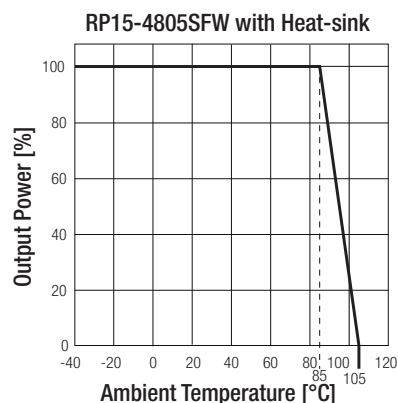
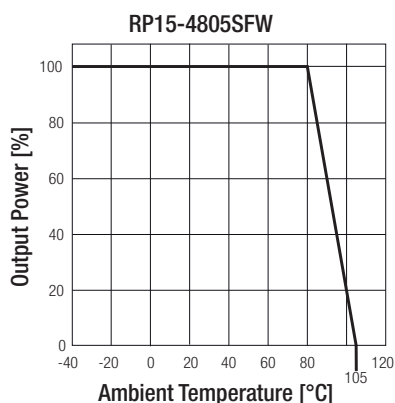
Notes:

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 ³ hours
	Bellcore TR-NWT-000332 ⁽⁷⁾	2350 x 10 ³ hours

Derating Graph⁽⁶⁾



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 ⁽⁹⁾	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 ⁽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

Notes:

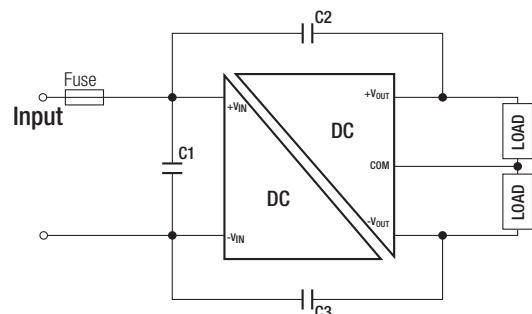
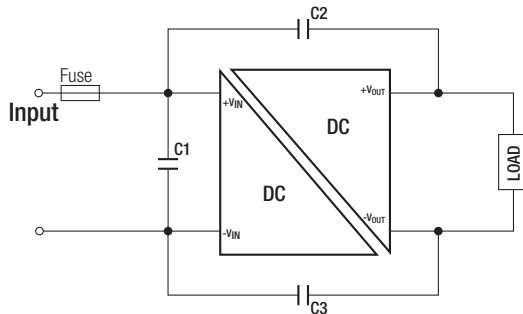
Note9: The standard modules meet EMI Class A or Class B with external components, see filter suggestions below.

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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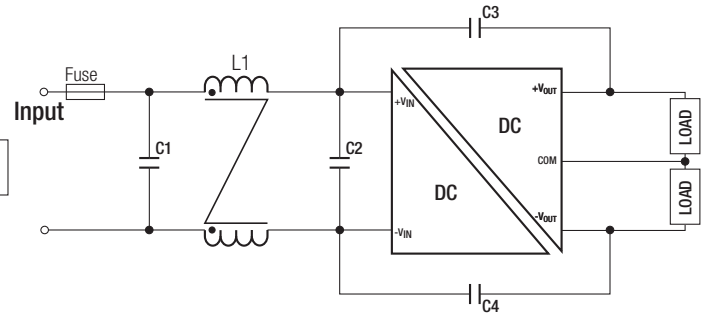
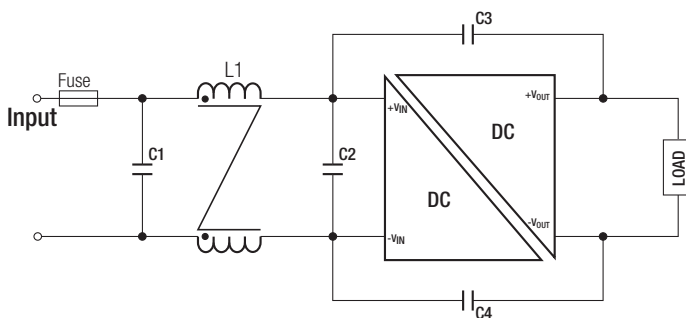
Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

EMI Filtering Class A



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

EMI Filtering Class B



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

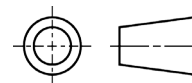
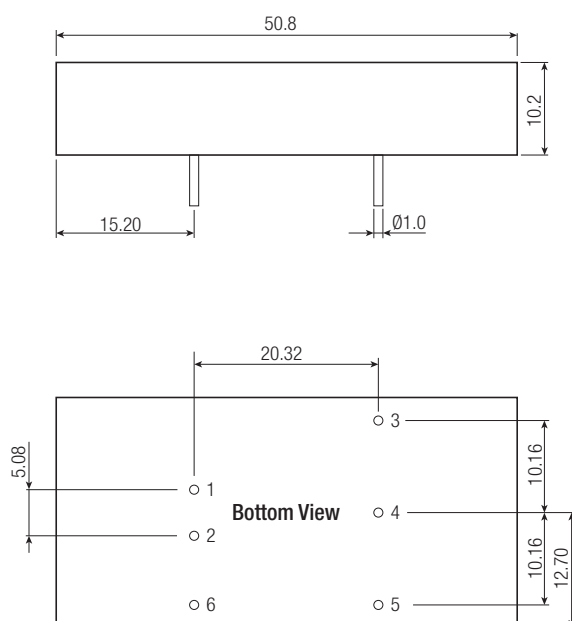
DIMENSIONS and PHYSICAL CHARACTERISTICS

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

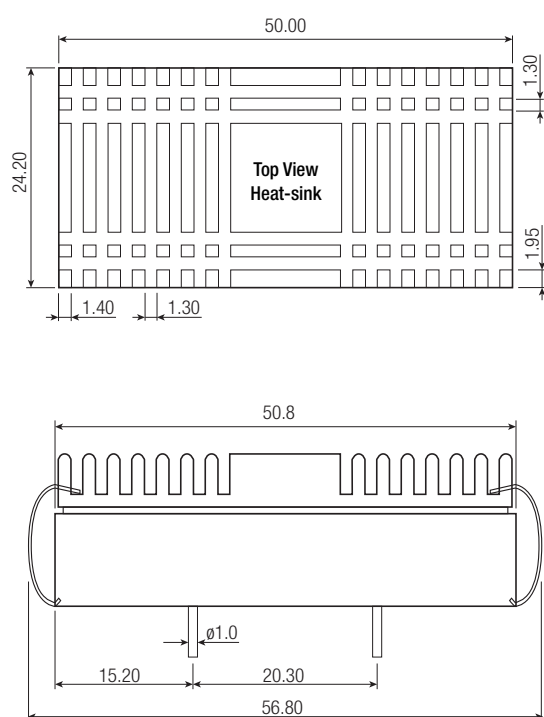
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Specifications measured at $T_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted

Dimension Drawing (mm)



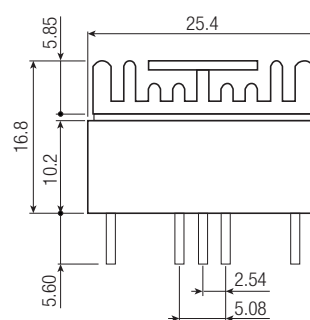
Dimension Drawing (mm) with Heat-sink



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 ± 0.25 mm
Pin Dimension Tolerance ± 0.1 mm
Tolerance: X.X ± 0.5 mm
X.XX ± 0.25 mm



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

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