

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Input Filter			Pi-Type		
Input Voltage Range	nom. Vin = 12VDC nom. Vin = 24VDC nom. Vin = 48VDC		9VDC 18VDC 36VDC	12VDC 24VDC 48VDC	18VDC 36VDC 75VDC
Input Surge Voltage	100ms max.	nom. Vin = 12VDC nom. Vin = 24VDC nom. Vin = 48VDC			36VDC 50VDC 100VDC
Under Voltage Lockout (UVLO)	nom. Vin = 12VDC	DC-DC ON DC-DC OFF		8VDC	9VDC
	nom. Vin = 24VDC	DC-DC ON DC-DC OFF		16VDC	18VDC
	nom. Vin = 48VDC	DC-DC ON DC-DC OFF		33VDC	36VDC
Input Reflected Ripple Current ⁽⁴⁾				20mA _{p-p}	
Start-up time	Power up ON/OFF CTRL			450ms 5ms	
Operating Frequency Range			360kHz	400kHz	440kHz
Minimum Load ⁽⁵⁾			10%		
ON/OFF CTRL ⁽⁶⁾	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.0VDC < V _{CTRL} < 12VDC Short or 0VDC < V _{CTRL} < 1.2VDC		
Input Current of CTRL pin	DC-DC ON		-0.5mA		+0.5mA
Standby Current	DC-DC OFF			2.5mA	
Ripple and Noise	20MHz BW, with 1μF MLCC on output			85mV _{p-p}	

Notes:

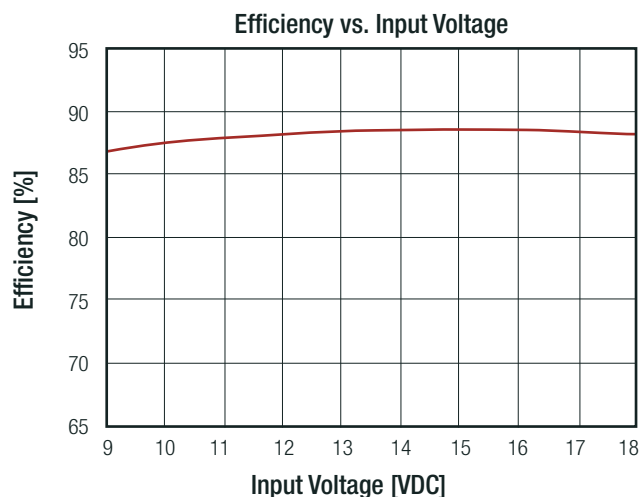
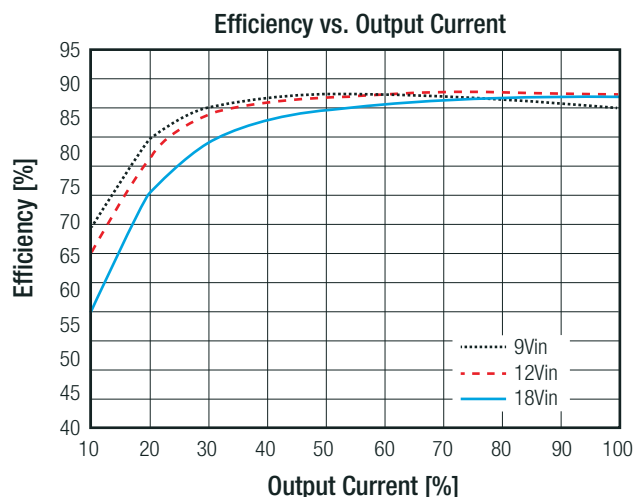
Note4: Simulated source impedance of 12μH. 12μH inductor in series with +Vin

Note5: The RP12 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

Note6: The pin voltage is referenced to -Vin pin

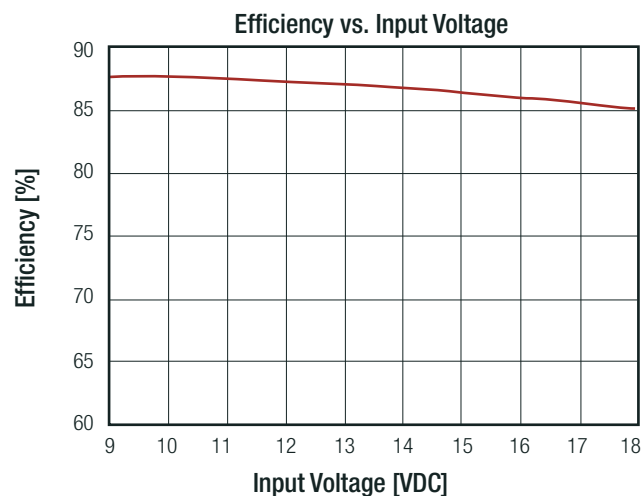
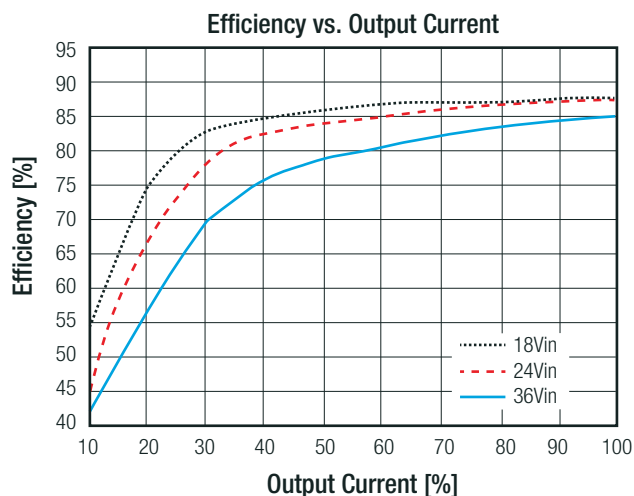
RP12-1205SA



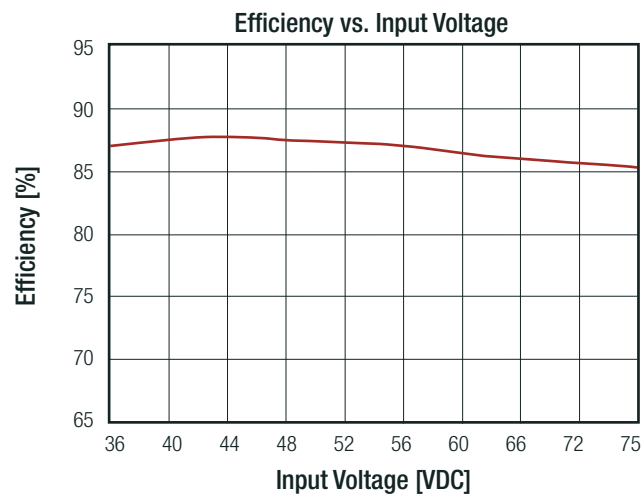
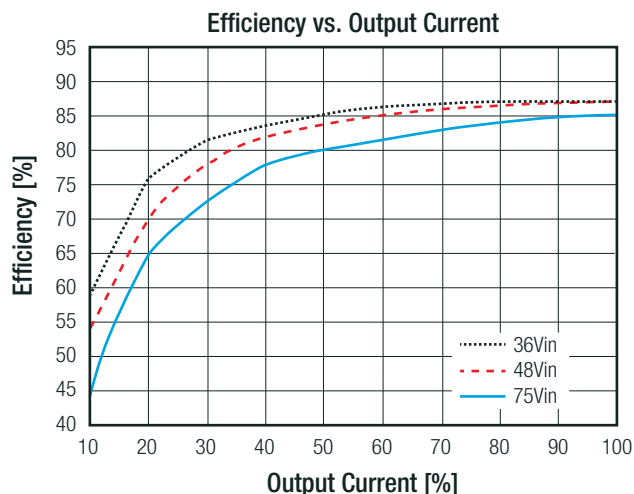
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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

RP12-2405SA



RP12-4805SA



REGULATIONS

Parameter	Condition		Value
Output Accuracy			±1.2%
Line Regulation	low line to high line, full load	Single Dual	±0.2% ±0.5%
Load Regulation	Single (0% to 100% load)	DIP24 SMD	±0.5% ±1.0%
	Dual (0% to 100% load)	DIP24, SMD	±1.0%
Cross Regulation	asymmetrical 25%<>100% load		±5.0%
Transient Response Recovery Time	25% load step change		250µs

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PROTECTIONS

Parameter	Condition		Value
Short Circuit Protection (SCP)			continuous, automatic recovery
Over Voltage Protection (OVP)	zener diode clamp	3.3Vout 5.1Vout 12Vout 15Vout	3.9VDC 6.2VDC 15VDC 18VDC
Over Load Protection (OLP)	% of lout rated		150% typ.
Isolation Voltage ⁽⁷⁾	DIP24	I/P to O/P; I/P (O/P) to case	1.6kVDC/1 minute
	SMD	I/P to O/P I/P (O/P) to case	1.6kVDC/1 minute 1.0kVDC/1 minute
Isolation Resistance	Viso= 500VDC		1GΩ min.
Isolation Capacitance			1200pF max.

Notes:

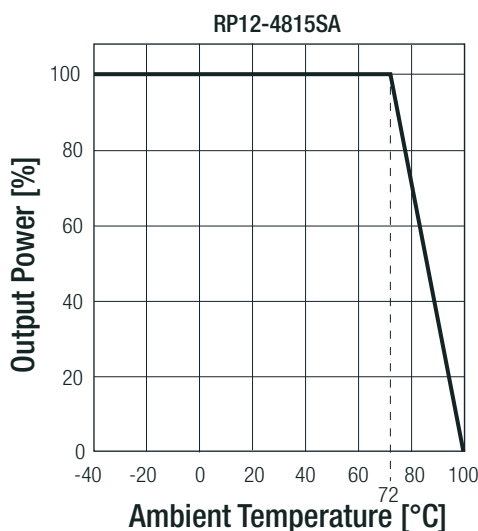
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note8: This power module is not internally fused. An input line fuse must always be used

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	3.3Vout, ±5Vout	without derating with derating	-40°C to +65°C -40°C to +100°C
	all others	without derating with derating	-40°C to +72°C -40°C to +100°C
Maximum Case Temperature			+100°C
Temperature Coefficient			±0.02%/K max.
Thermal Impedance	@ natural convection 0.1m/s		20K/W typ.
Operating Altitude			4000m
Operating Humidity	non-condensing		5% - 95% RH
Pollution Degree			PD2
Shock			according to MIL-STD-810F
Vibration			according to MIL-STD-810F
MTBF	MIL-HDBK-217F, G.B. BELLCORE TR-NWT-000332 ⁽⁹⁾		2064 x 10 ³ hours 2750 x 10 ³ hours

Derating Graph ⁽¹⁰⁾



Notes:

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

Note10: 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

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SAFETY AND CERTIFICATIONS

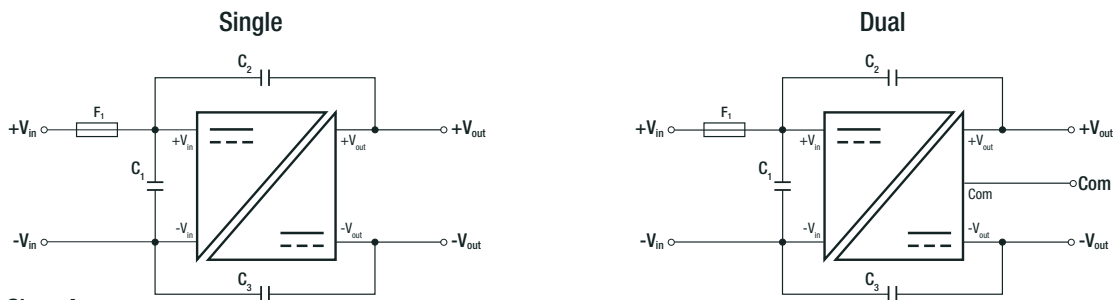
Certificate Type (Safety)	Condition	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1, 2nd Edition, 2014 C22.2 No. 60950-1-07, 2nd Edition, 2014
EAC	AT.AB49.B.09571	TP TC 004/2011
RoHS 2		RoHS-2011/65/EU + AM-2015/863

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 A
Radiated, radio-frequency, electromagnetic field immunity test	10 V/m	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity ⁽¹¹⁾	±2kV	EN61000-4-4, Criteria A
Surge Immunity ⁽¹¹⁾	±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

Notes:

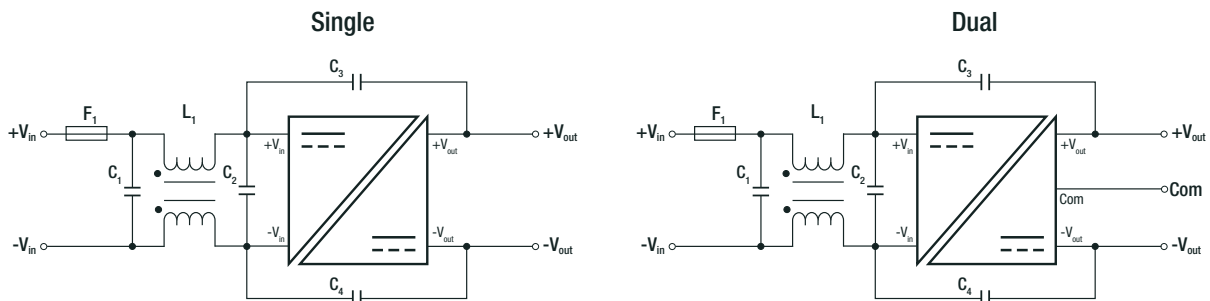
Note11: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5
Recom suggests Nippon chemi-con KY series 220µF/100V

EMC Filtering Suggestions according to EN55032



Component List Class A

MODEL	C1	C2/C3
RP12-12xxS_DA, RP12-12xxS_DA/SMD	6.8µF/50V, 1210 MLCC	1000pF/2kV, 1206 MLCC
RP12-24xxS_DA, RP12-24xxS_DA/SMD	4.7µF/50V, 1210 MLCC	1000pF/2kV, 1206 MLCC
RP12-48xxS_DA, RP12-48xxS_DA/SMD	2.2µF/100V, 1812 MLCC	1000pF/2kV, 1206 MLCC



Component List Class B

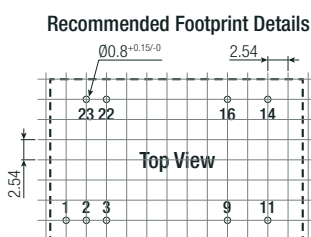
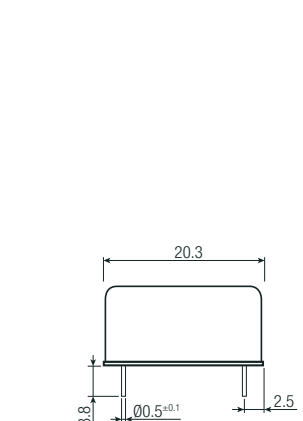
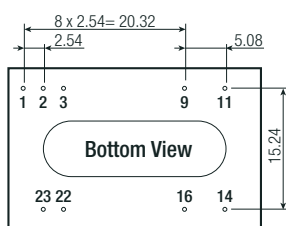
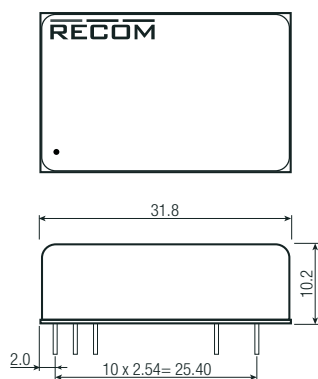
MODEL	C1	C2	C3/C4	L1
RP12-12xxS_DA RP12-12xxS_DA/SMD	3.3µF/50V, 1812 MLCC	N/A	1000pF/2kV, 1206 MLCC	CMC :325µH ref: WE 744290321 or CMC-06
RP12-24xxS_DA RP12-24xxS_DA/SMD	4.7µF/50V, 1812 MLCC	N/A	1000pF/2kV, 1206 MLCC	CMC: 325µH ref: WE 744290321 or CMC-06
RP12-48xxS_DA RP12-48xxS_DA/SMD	2.2µF/100V, 1812 MLCC	2.2µF/100V, 1812 MLCC	1000pF/2kV, 1206 MLCC	CMC: 325µH ref: WE 744290321 or CMC-06

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DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	nickel coated copper
	base	non-conductive black plastic
	potting	epoxy (UL94-V0)
Dimensions (LxWxH)	DIP24	31.8 x 20.3 x 10.2mm
	SMD	32.0 x 20.3 x 11.2mm
Weight	DIP24	18g
	SMD	20g

DIP24 Dimension Drawing (mm)

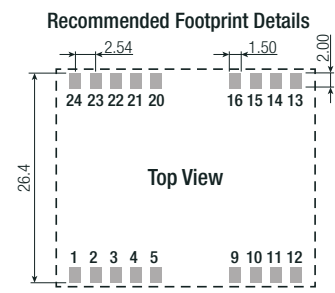
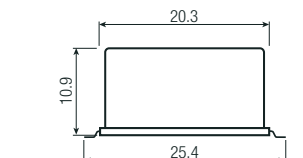
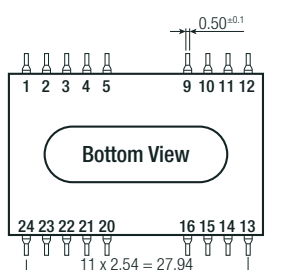
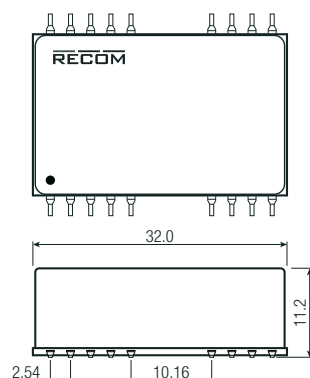


Pin Connections DIP24

Pin #	Single	Dual
1	CTRL	CTRL
2	-Vin	-Vin
3	-Vin	-Vin
9	NC	Com
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
22	+Vin	+Vin
23	+Vin	+Vin

NC = No Connection
Pin Pitch Tolerance $\pm 0.25\text{mm}$
xx.x = $\pm 0.5\text{mm}$
xx.xx = $\pm 0.25\text{mm}$

SMD Dimension Drawing (mm)



Pin Connections SMD

Pin #	Single	Dual
1	CTRL	CTRL
2	-Vin	-Vin
3	-Vin	-Vin
9	NC	Com
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
22	+Vin	+Vin
23	+Vin	+Vin
Others	NC	NC

NC = No Connection
Pin Pitch Tolerance $\pm 0.25\text{mm}$
xx.x = $\pm 0.5\text{mm}$
xx.xx = $\pm 0.25\text{mm}$

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PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube	DIP24	255.0 x 23.0 x 19.0mm
		SMD	255.0 x 32.0 x 16.0mm
Packaging Quantity	DIP24, SMD		7pcs
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		5% - 95% RH

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