

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

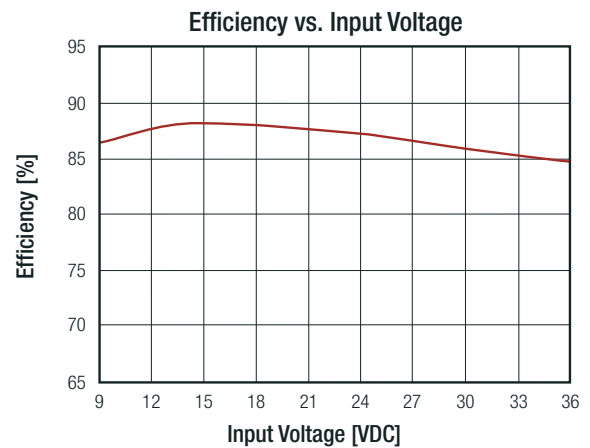
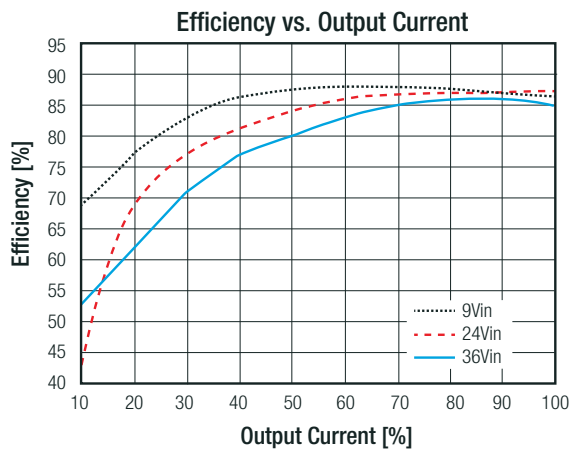
**BASIC CHARACTERISTICS**

Parameter	Condition		Min.	Typ.	Max.
Internal 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		8VDC	9VDC
	nom. Vin = 48VDC	DC-DC ON DC-DC OFF		16VDC	18VDC
Minimum Load			0%		
Start-up time	Power up ON/OFF CTRL			450ms 5ms	
ON/OFF CTRL <sup>(4)</sup> refer to "ON/OFF CTRL"	Positive Logic	DC-DC ON DC-DC OFF	Open or 3.0VDC < V <sub>CTRL</sub> < 12VDC Short or 0VDC < V <sub>CTRL</sub> < 1.2VDC		
Input Current of CTRL pin	drive current	I <sub>CTRL</sub>	-0.5mA		+0.5mA
Standby Current	DC-DC OFF	I <sub>in</sub>		2.5mA	
Internal Operating Frequency			360kHz	400kHz	440kHz
Output Ripple and Noise	20MHz BW			85mVp-p	
Input Reflected Ripple Current				20mA <sub>p-p</sub>	

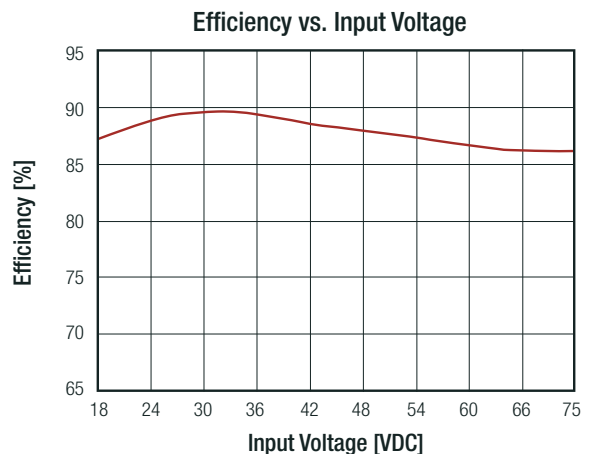
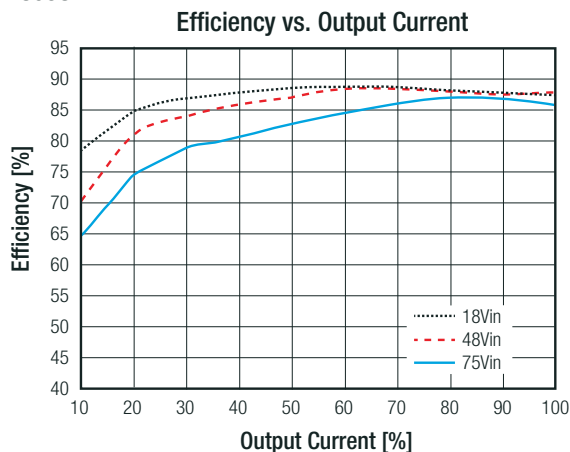
**Notes:**

Note4: The ON/OFF control pin voltage is referenced to -Vin pin

**RP12-2405SAW**

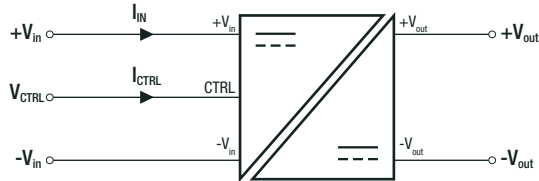


**RP12-4805SAW**



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

**ON/OFF CTRL**



Positive Logic    DC-DC ON    Open or 3.0VDC < V<sub>CTRL</sub> < 12VDC  
 DC-DC OFF    Short or 0VDC < V<sub>CTRL</sub> < 1.2VDC

**REGULATIONS**

Parameter	Condition		Value
Output Accuracy			±1.2%
Line Regulation	low line to high line, full load		±0.2%
Load Regulation	0% to 100% load	DIP24    Single Dual	±0.5% ±1.0%
		SMD    Single, 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	3.3Vout	3.9VDC
		5.1Vout	6.2VDC
		12Vout	15VDC
		15Vout	18VDC
Over Load Protection (OLP)	% of Iout rated		150% typ.
Isolation Voltage <sup>(5)</sup>	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			1500pF max.

**Notes:**

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage  
 Note6: This power module is not internally fused. An input line fuse must always be used

**ENVIRONMENTAL**

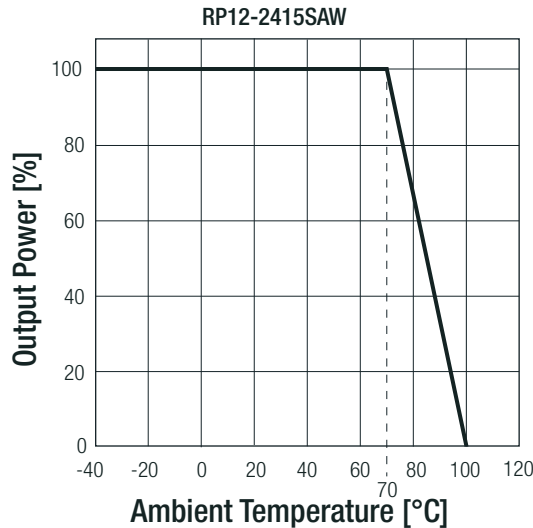
Parameter	Condition		Value
Operating Temperature Range	3.3Vout, ±5Vout	without derating	-40°C to +64°C
		with derating	-40°C to +105°C
	all others	without derating	-40°C to +70°C
		with derating	-40°C to +100°C
Maximum Case Temperature			+105°C
Temperature Coefficient			±0.02%/K max.
Thermal Impedance	@ natural convection 0.1m/s		20K/W
Operating Altitude			4000m

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

Parameter	Condition	Value
Operating Humidity	non-condensing	5% - 95% RH
Pullution Degree		PD2
Thermal Shock		according to MIL-STD-810F
Vibration		according to MIL-STD-810F
MTBF	MIL-HDBK-217F, G.B. Bellcore-TR-NWT-000332 (7)	2087 x 10 <sup>3</sup> hours 2350 x 10 <sup>3</sup> hours

**Derating Graph (8)**



**Notes:**

Note7: BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C (Ground Benign 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 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, 2014 C22.2 No. 60950-1-07, 2nd Edition, 2014
EAC	RU-AT.49.09571	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 (9)	±2kV	EN61000-4-4, Criteria A
Surge Immunity (9)	±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

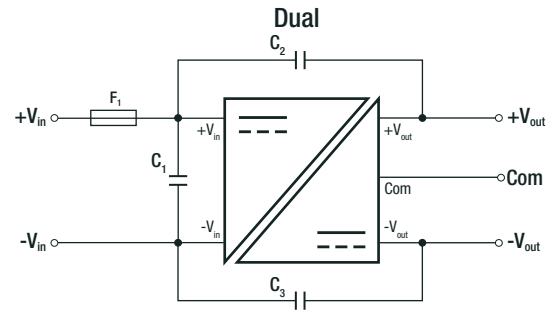
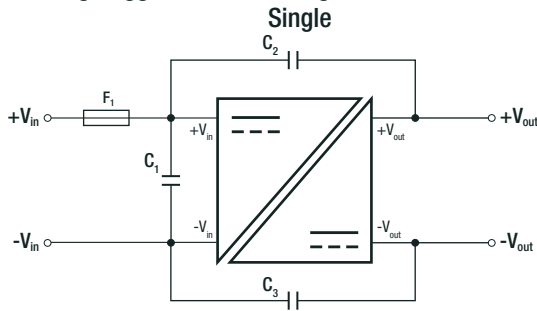
**Notes:**

Note9: 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

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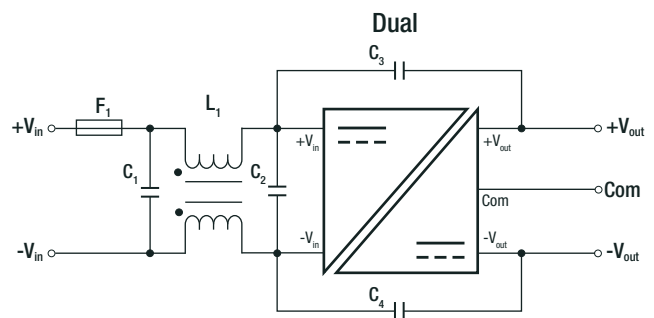
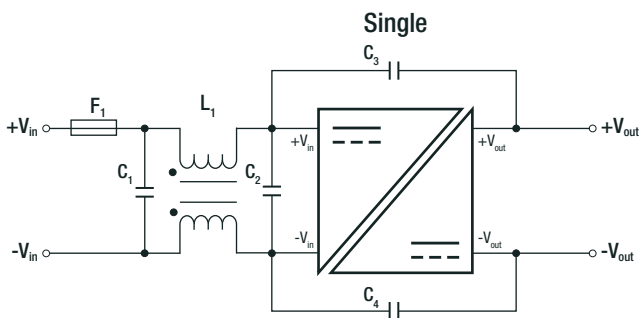
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

**EMC Filtering Suggestions according to EN55032**



**Component List Class A**

MODEL	C1	C2	C3
RP12-24xxS_DAW RP12-24xxS_DAW/SMD	3.3µF/50V, 1210 MLCC	N/A	1000pF/2kV, 1206 MLCC
RP12-48xxS_DAW RP12-48xxS_DAW/SMD	1.5µF/100V, 1812 MLCC	N/A	1000pF/2kV, 1206 MLCC



**Component List Class B**

MODEL	C1	C2	C3/C4	L1
RP12-24xxS_DAW RP12-24xxS_DAW/SMD	3.3µF/50V, 1812 MLCC	N/A	1000pF/2kV, 1206 MLCC	CMC: 325µH ref.: WE 744290321 or CMC-06
RP12-48xxS_DAW RP12-48xxS_DAW/SMD	2.2µF/100V, 1812 MLCC	2.2µF/100V, 1812 MLCC	1000pF/2kV, 1206 MLCC	CMC: 145µH ref.: WE 74482210002 or CMC-07

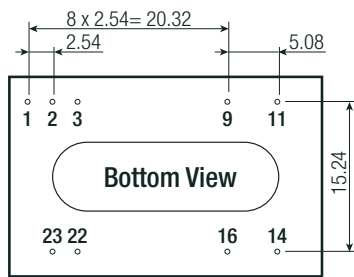
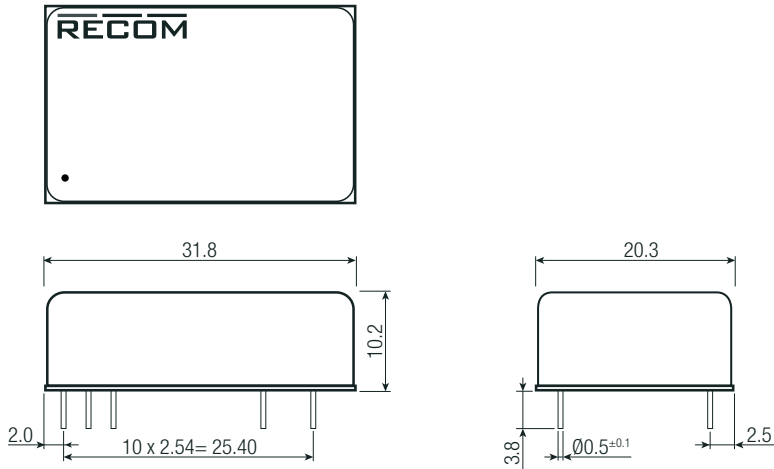
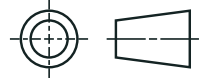
**DIMENSIONS AND PHYSICAL CHARACTERISTICS**

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

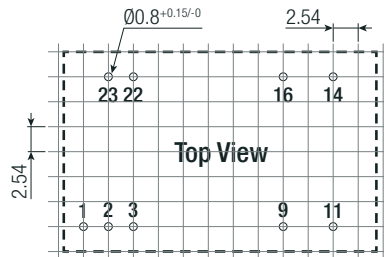
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Specifications (measured @ Ta= 25°C, nom. Vin, full load unless otherwise stated)

DIP24 Dimension Drawing (mm)



Recommended Footprint Details

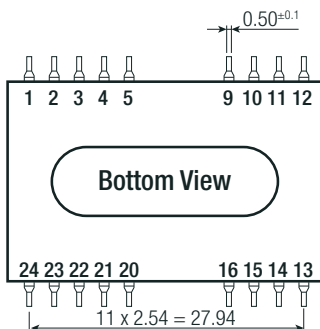
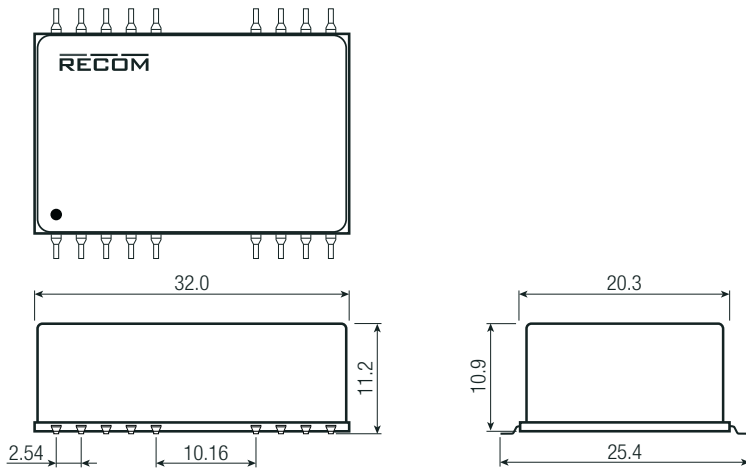


Pin Connections DIP24

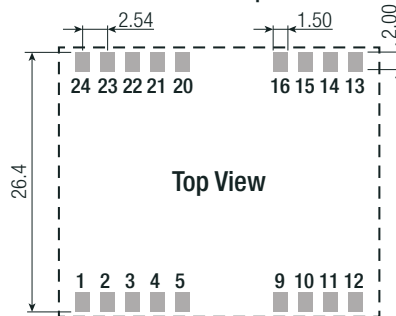
Pin #	Single	Dual
1	CTRL	CTRL
2	-Vin	-Vin
3	-Vin	-Vin
9	NC	Com
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Com
22	+Vin	+Vin
23	+Vin	+Vin

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)



Recommended Footprint Details



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 =  $\pm 0.25\text{mm}$

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

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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