Features

Regulated Converters

- 4:1 Wide Input Voltage Range
- 1.6kVDC Isolation
- UL Certified
- Efficiency up to 91%
- Six-Sided Continuous Shield
- No Minimum Load Required

RECOM
DC/DC Converter

RP10-AW

10 Watt 1“x1“ Single & Dual Output

3 YEAR Warranty

Description

The RP10-AW series are wide input voltage range 1”x1” power DC/DC converters. Despite their small size, the RP10-AW converters are fully specified devices with built-in Class B EMC filters, no minimum load, 1600VDC isolation, under-voltage lockout and low ripple/noise figures. The outputs are fully protected against short circuits, overcurrent and overvoltage and can be trimmed over a +/-10% range. The RP10-AW series will find many uses in applications where board space is at a premium as no external components are required.



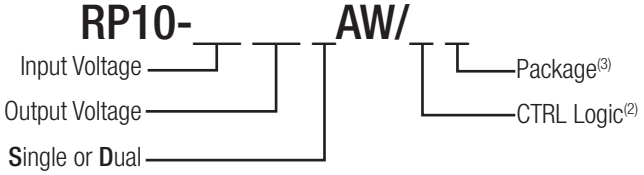
Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Input[1] Current [mA]	Efficiency[1] typ. [%]	Max. Capacitive Load [µF]
RP10-243.3SAW[2,3]	9-36	3.3	3000	485	85	3500
RP10-2405SAW[2,3]	9-36	5	2000	479	87	2500
RP10-2412SAW[2,3]	9-36	12	830	461	90	430
RP10-2415SAW[2,3]	9-36	15	670	460	91	350
RP10-2424SAW[2,3]	9-36	24	416	462	90	125
RP10-483.3SAW[2,3]	18-75	3.3	3000	243	85	3500
RP10-4805SAW[2,3]	18-75	5	2000	239	87	2500
RP10-4812SAW[2,3]	18-75	12	830	231	90	430
RP10-4815SAW[2,3]	18-75	15	670	233	90	350
RP10-4824SAW[2,3]	18-75	24	416	231	90	125
RP10-2405DAW[2,3]	9-36	±5	±1000	479	87	±1440
RP10-2412DAW[2,3]	9-36	±12	±416	467	89	±250
RP10-2415DAW[2,3]	9-36	±15	±333	468	89	±180
RP10-4805DAW[2,3]	18-75	±5	±1000	239	87	±1440
RP10-4812DAW[2,3]	18-75	±12	±416	234	89	±250
RP10-4815DAW[2,3]	18-75	±15	±333	234	89	±180

Notes:

Note1: at nominal input voltage and full load.

Model Numbering



Ordering Examples

RP10-2405SAW/P = 24V Input, 5V Output, Positive Logic CTRL pin and Trim pin fitted
RP10-4805DAW/XC-HC = 48V Input, ±5V Output, without CTRL pin, with fitted Heat-sink
RP10-2415SAW/N = 24V Input, 5V Output, Negative Logic CTRL pin and Trim pin fitted

Notes:

Note2: standard part is with suffix “P” for positive logic (1=ON, 0=OFF) and trim pin
add suffix “N” instead for negative logic (0=ON, 1=OFF) and trim pin
or add suffix “XC” instead for no CTRL pin

Note3: add suffix “-HC” for premounted Heat-sink with clamps

RoHS 6 compliant
REACH compliant
c UL us E196683

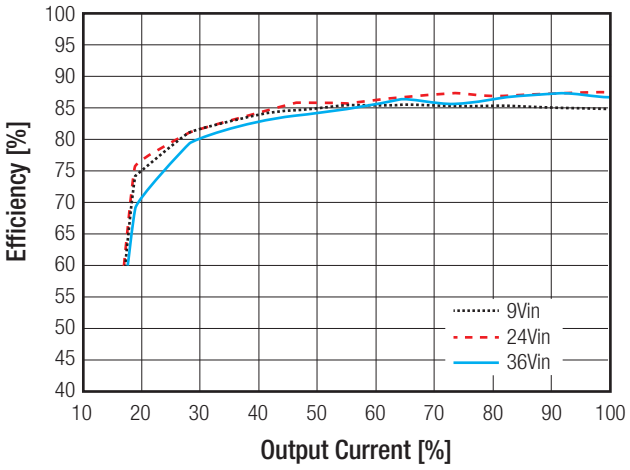
UL60950-1 Certified

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

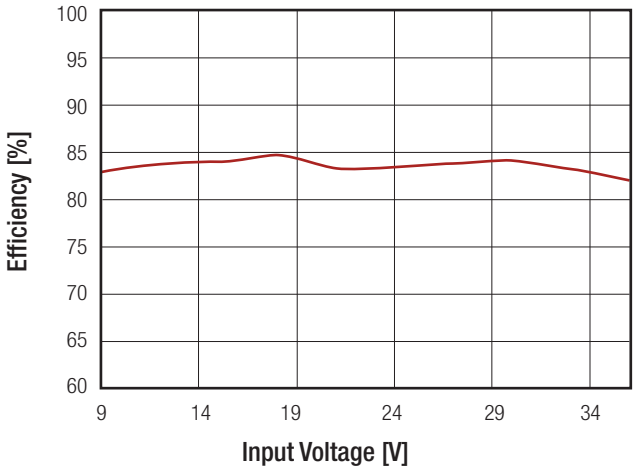
BASIC CHARACTERISTICS					
Parameter	**Condition**		**Min.**	**Typ.**	**Max.**
Input Voltage Range	nom. Vin = 24V nom. Vin = 48V		9VDC 18VDC	24VDC 48VDC	36VDC 75VDC
Under Voltage Lockout (UVLO)	Vin = 24V	DC-DC ON DC-DC OFF		 8VDC	9VDC
	Vin = 48V	DC-DC ON DC-DC OFF		 16VDC	18VDC
Input Filter					Pi-Type
Input Reflected Ripple Current	nominal Vin and full load			30mAp-p	
Input Surge Voltage	Vin = 24V, 1s max. Vin = 48V, 1s max.				50VDC 100VDC
Start-up time	Power up Remote ON/OFF				30ms 30ms
Operating Frequency Range			297kHz	330kHz	363kHz
Minimum Load	of full load		0%		
Optional Power	output voltage trimmed up 10% output voltage trimmed up 20%				11W 12W
Ripple and Noise	measured by 20MHz bandwidth with a 10µF/25V X7R 1206 MLCC	3.3Vout, 5Vout 12Vout, 15Vout		40mVp-p 60mVp-p	
	measured by 20MHz bandwidth with a 1µF/50V X7R 1206 MLCC	24Vout		60mVp-p	
Remote ON/OFF	Positive Logic	DC-DC ON DC-DC OFF			Open or 3.0 < Vr < 15VDC Short or 0 < Vr < 1.2VDC
	Negative Logic	DC-DC ON DC-DC OFF			Short or 0 < Vr < 1.2VDC Open or 3.0 < Vr < 15VDC
Input current of Remote pin (CTRL)		DC-DC OFF		2.5mA	
		DC-DC ON	-0.5 mA		1.0mA

RP10-2405SA

Efficiency vs. Output Current



Efficiency vs. Input Voltage



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

REGULATION

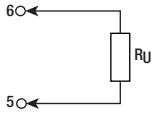
Parameter	Condition		Value
Output Voltage Accuracy			±1%
Voltage Adjustability	Single	3.3Vout, 12Vout Others	±10% -10% to +20%
Line Voltage Regulation	low line to high line	Single Dual	±0.2% ±0.5%
Load Voltage Regulation	0% to 100% load	Single Dual	±0.2% ±1.0%
	10% to 90% load	Single Dual	±0.1% ±0.8%
Cross Regulation	asymmetrical 25%<>100% load		±5%
Transient Response recovery time	25% load step change		250µs typ.

External Output Trimming

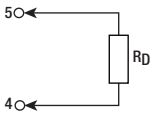
Output Voltage Trimming

Single output Powerline converters offer the feature of trimming the output voltage over a certain range around the nominal value by using external trim resistors. No general equation can be given for calculating the trim resistors, but the following trimtables give typical values for chosing these trimming resistors. If voltages between the given trim points are required, extrapolate between the two nearest given values to work out the resis tor required or use a variable resistor to set the output voltage.

TRIM UP



TRIM DOWN



RP10-xx3.3SAW

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.63	Volts
R_U =	385.07	191.51	126.99	94.73	75.37	62.47	53.25	46.34	40.96	36.66	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout =	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.97	Volts
R_D =	116.72	54.78	34.13	23.81	17.62	13.49	10.54	8.32	6.60	5.23	KOhms

RP10-xx05SAW

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.4	5.45	5.50	Volts
R_U =	253.45	125.70	83.12	61.82	49.05	40.53	34.45	29.89	26.34	23.50	KOhms
Trim up	11	12	13	14	15	16	17	18	19	20	%
Vout =	5.55	5.60	5.65	5.70	5.75	5.80	5.85	5.90	5.95	6.00	Volts
R_U =	21.18	19.24	17.60	16.20	14.98	13.92	12.98	12.14	11.39	10.73	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout =	4.95	4.90	4.85	4.80	4.75	4.70	4.65	4.60	4.55	4.50	Volts
R_D =	248.34	120.59	78.01	56.71	43.94	35.42	29.34	24.78	21.23	18.39	KOhms

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

RP10-xx12SAW

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20	Volts
R_U =	203.22	99.06	64.33	46.97	36.56	29.61	24.65	20.93	18.04	15.72	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout =	11.88	11.76	11.64	11.52	11.40	11.28	11.16	11.04	10.92	10.8	Volts
R_D =	776.56	380.72	248.78	182.81	143.22	116.83	97.98	83.85	72.85	64.06	KOhms

RP10-xx15SAW

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50	Volts
R_U =	161.56	78.22	50.45	36.56	28.22	22.67	18.70	15.72	13.41	11.56	KOhms
Trim up	11	12	13	14	15	16	17	18	19	20	%
Vout =	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	18.00	Volts
R_U =	10.04	8.78	7.71	6.80	6.00	5.31	4.69	4.15	3.66	3.22	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout =	14.85	14.70	14.55	14.40	14.25	14.10	13.95	13.80	13.65	13.50	Volts
R_D =	818.22	401.56	262.67	193.22	151.56	123.78	103.94	89.06	77.48	68.22	KOhms

RP10-xx24SA

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	24.24	24.48	24.72	24.96	25.20	25.44	25.68	25.92	26.16	26.40	Volts
R_U =	570.33	278.67	181.44	132.83	13.67	84.22	70.33	59.92	51.82	45.33	KOhms
Trim up	11	12	13	14	15	16	17	18	19	20	%
Vout =	26.64	26.88	27.12	27.36	27.60	27.84	28.08	28.32	28.56	28.80	Volts
R_U =	40.03	35.61	31.87	28.67	25.89	23.46	21.31	19.41	17.70	16.17	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout =	23.76	23.52	23.28	23.04	22.80	22.56	22.32	22.08	21.84	21.60	Volts
R_D =	4947.67	2439.33	1603.22	1185.17	934.33	767.11	647.67	558.08	488.41	432.67	KOhms

PROTECTION

Parameter	Condition		Value
Short Circuit Protection (SCP)			continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp	3.3Vout	3.7 - 5.4V
		5Vout	6.3 - 7.4V
		12Vout	13.5 - 19.6V
		15Vout	18.3 - 22.0V
		24Vout	29.1 - 32.5V
Over Load Protection (OLP)	Hiccup Mode		150% typ.
Isolation Voltage	I/P to O/P		1.6kVDC/1 minute
	I/P (O/P) to case		1.0kVDC/1 minute
Isolation Resistance	tested with 500VDC		1GΩ min.
Isolation Capacitance			1500pF max.

Notes:

Note4: This power module is not internally fused. An input line fuse must always be used.

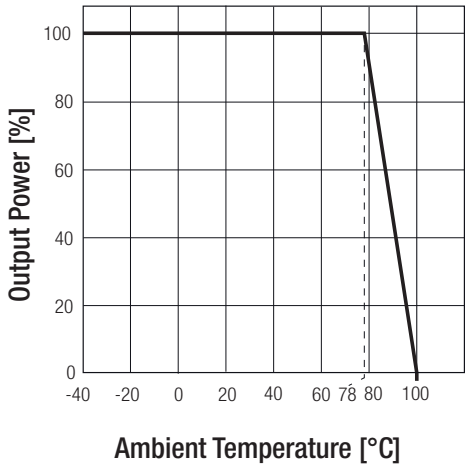
Specifications measured at Ta = 25°C, nominal input voltage, full load otherwise noted

ENVIRONMENTAL

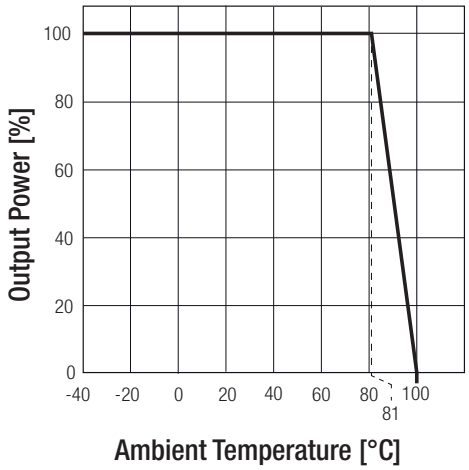
Parameter	Condition	Value
Operating Temperature Range	without derating with derating	-40°C to +78°C -40°C to +100°C
Maximum Case Temperature		+105°C
Temperature Coefficient		±0.02%/°C max.
Thermal Impedance	Natural convection (20LFM) without Heat-sink Natural convection (20LFM) with Heat-sink	18.2°C/W 15.8°C/W
Operating Humidity		5% - 95% RH
Thermal Shock		MIL-STD-810F
Vibration		MIL-STD-810F
MTBF	MIL-HDBK-217F	3376 x 10^3 hours

Derating Graph(5)

RP10-2405SAW



RP10-2405SAW-HC



Notes:

Note5: 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
UL General Safety	E196683	UL60950-1 1st Ed.: 2003 C22.2 No. 60950 1st. Ed.: 2003

EMC Compliance	Condition	Standard / Criterion
EMI Standard(6)	with external filter	EN55022, Class A or B
ESD	Air ±8kV and Contact ± 6kV	EN61000-4-2, Criteria A
Radiated Immunity	10 V/m	EN61000-4-3, Criteria A
Fast Transient(7)	±2kV	EN61000-4-4, Criteria A
Surge(7)	±1kV	EN61000-4-5, Criteria A
Conducted Immunity	3 Vr.m.s	EN61000-4-6, Criteria A
Power frequency magnetic field	100A/m continuous, 1000A/m 1 second	EN61000-4-8, Criteria A

Notes:

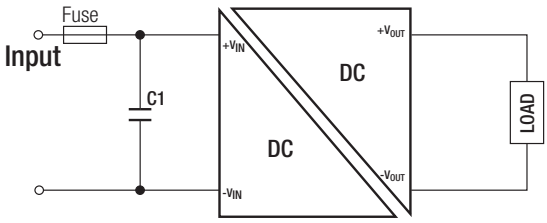
Note6: The standard modules meet EMI Class A without external components and Class B with external components; see filter suggestions below. RP10-2405SAW meets EMI Class B without external components.

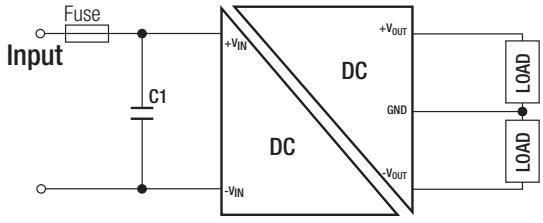
Note7: An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Recom suggests: Nippon chemi-con KY series, 220µF/100V.

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

EMI Filtering Class B



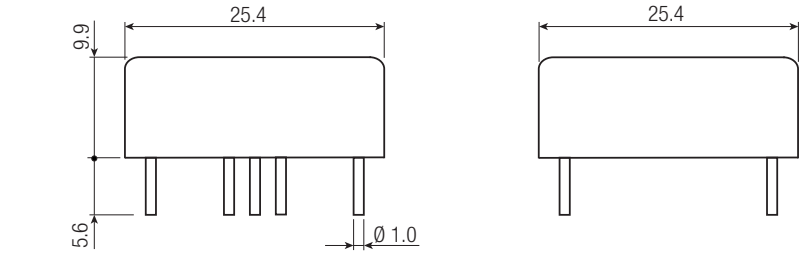


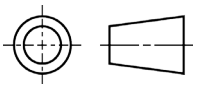
MODEL	C1
RP10-24xxS_DA	6.8µF/50V 1812 MLCC
RP10-48xxS_DA	4.7µF/100V 1812 MLCC

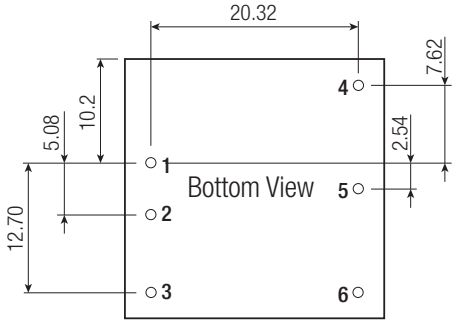
DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case Base Potting	Copper Alloy C2680 FR4 PCB Epoxy (UL94-V0)
Package Dimensions (LxWxH)	without Heat-sink with Heat-sink	25.4 x 25.4 x 9.9mm 31.4 x 25.4 x 16.5mm
Package Weight	without Heat-sink with Heat-sink	16.5g 22.94g

Dimension Drawing (mm)







Pin Connections

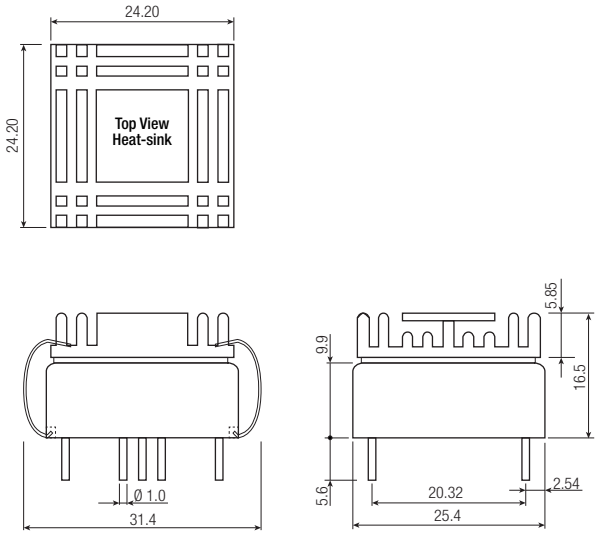
Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	CTRL[2]	CTRL[2]
4	+Vout	+Vout
5	Trim	Com
6	-Vout	-Vout

Pin Pitch Tolerance ±0.25mm
Pin dimension tolerance ±0.1mm
XX.X ± 0.5mm
XX.XX ± 0.25mm

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

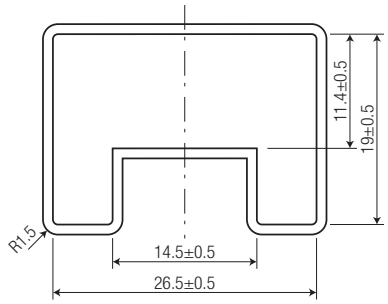
Dimension Drawing (mm) with Heat-sink



PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimensions (LxWxH)	Tube Tray	257 x 28.5 x 21mm 230 x 180 x 28mm
Packaging Quantity	without Heat-sink | Tube with Heat-sink | Tray	8pcs. 20pcs.
Storage Temperature Range		-55°C to +125°C
Storage Humidity		5% - 95% RH

Tube Dimension Drawing (mm)



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