Features

Regulated Converters

- 4:1 Wide Input Voltage Range
- 1.6kVDC Isolation
- UL, IEC/EN60950 & EN50155 Pending
- Efficiency up to 88%
- OVP, OCP & OTP
- +105°C max Case Temperature

RECOM
DC/DC Converter

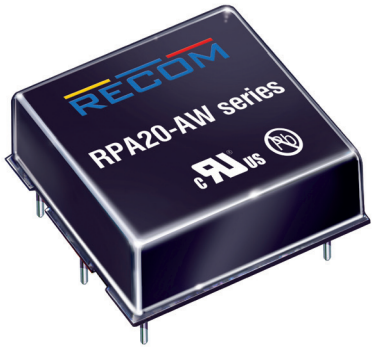
RPA20-AW

20 Watt 1“x1“ Single & Dual Output

3 YEAR Warranty

Description

The RPA20-AW series are high power density, wide input voltage range 20W DC/DC converters in an industry standard 1”x1” case size. Despite their small size, the RPA20-AW converters are fully specified devices with output currents up to 6Amps, up to 88% efficiency, no minimum load, 1600VDC isolation, tight regulation and low ripple/noise figures. The outputs are also fully protected against over-temperature, short circuits, overcurrent and overvoltage and the single output version offers a ±10% trim range. A heatsink option is available to extend the operating temperature range. The converters are UL and EN50155 pending and will find many uses in railway and industrial applications where board space is at a premium.



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]
RPA20-243.3SAW[2,3]	9-36	3.3	6000	960	87	10000
RPA20-2405SAW[2,3]	9-36	5	4000	960	88	10000
RPA20-2412SAW[2,3]	9-36	12	1670	960	88	1000
RPA20-2415SAW[2,3]	9-36	15	1330	960	88	1000
RPA20-2412DAW[2,3]	9-36	±12	±830	960	88	±1000
RPA20-2415DAW[2,3]	9-36	±15	±670	960	88	±680

Notes:

Note1: Efficiency is tested by nominal Vin, full load and at 25°C.

RoHS 2 compliant 10 from 10 – RECOM CONVERTERS COMPLIANT PRODUCTS
REACH compliant – EUROPEAN DC-DC CONVERTERS COMPLIANT PRODUCTS
c UL us E224736

UL60950-1 Pending
IEC/EN60950 Pending
EN50155 Pending

Model Numbering

RPA20- ___ ___ AW/ ___ ___

- Input Voltage
- Output Voltage
- Single or Dual
- Package[3]
- CTRL Logic[2]

Ordering Examples

RPA20-243.3SAW = 24V Input, 3.3V Output, Single, no CTRL pin
RPA20-2405DAW/P = 24V Input, 5V Output, Dual, Pos. CTRL function
RPA20-2415SAW-HC = 24V Input, 15V Output, Single, no CTRL pin, glued Heat-sink
RPA20-2415DAW/N-HC = 24V Input, 15V Output, Dual, Neg. CTRL function, glued Heat-sink

Notes:

Note2: part without suffixes is without CTRL pin, trim pin fitted
add suffix “P” for positive CTRL function (1=ON, 0=OFF), trim pin fitted
add suffix “N” for negative CTRL function (0=ON, 1=OFF), trim pin fitted
trim pin is only available for single outputs

Note3: add suffix “-HC” for glued Heat-Sink (compatible with all other suffixes)

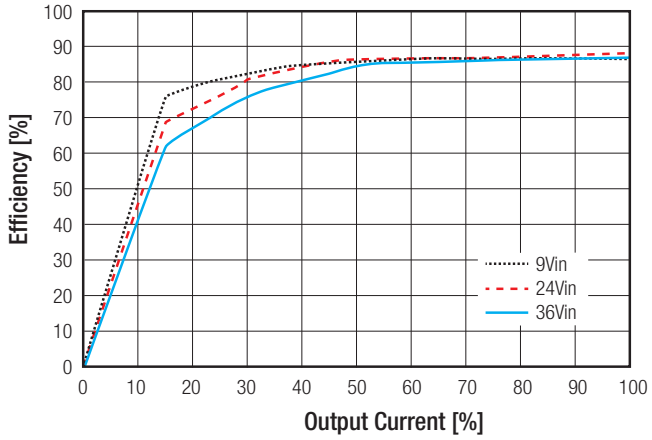
Specifications measured @ta = 25°C, resistive load, nominal Vin and rated Iout unless otherwise noted

BASIC CHARACTERISTICS

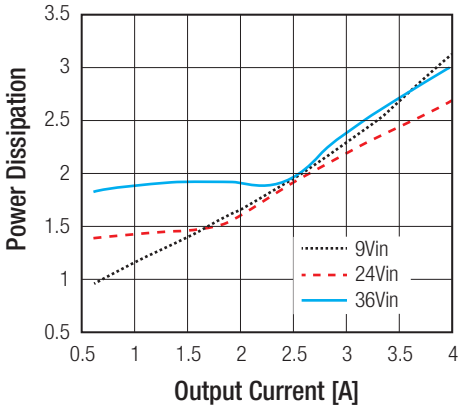
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter					Pi-Type
Input Voltage Range			9VDC	24VDC	36VDC
Input Surge Voltage	100ms				50VDC
Quiescent Current			20mA		55mA
Start-up time	Power up CTRL ON/OFF			8ms	16ms
Internal Operating Frequency				550kHz	
Minimum Load			0%		
Ripple and Noise	20MHz BW, 10µF tantalum capacitor and 1µF ceramic capacitor			50mVp-p	
Under Voltage Lockout (UVLO)	DC-DC ON DC-DC OFF		8VDC 7VDC	8.5VDC 7.5VDC	9VDC 8VDC
ON/OFF Control	Positive Logic	DC-DC ON DC-DC OFF	Open or 2.4 < Vr < 10VDC Short or 0 < Vr < 0.8VDC		
	Negative Logic	DC-DC ON DC-DC OFF	Short or 0 < Vr < 0.8VDC Open or 2.4 < Vr < 10VDC		
Input current of CTRL pin				6mA	
Output Trim	Single Outputs		-10%		+10%

RPA20-2405SAW

Efficiency vs. Output Current

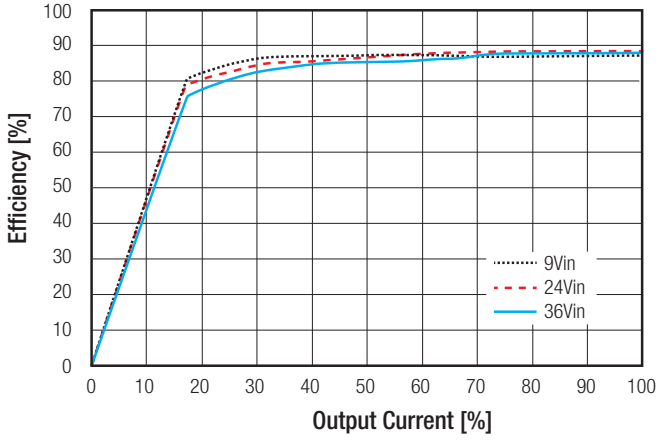


Power Dissipation vs Output Current

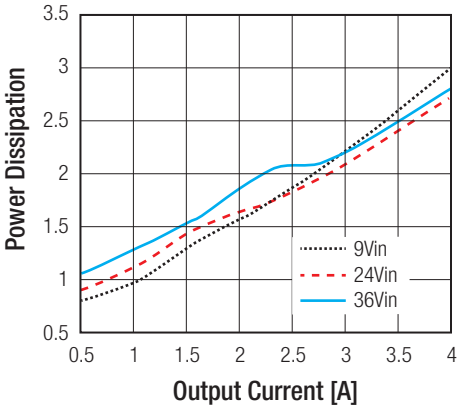


RPA20-2412SAW

Efficiency vs. Output Current



Power Dissipation vs Output Current



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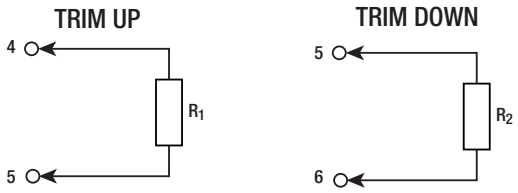
Specifications measured @ta = 25°C, resistive load, nominal Vin and rated Iout unless otherwise noted

OUTPUT TRIM

Output Voltage Trimming

RPA20-AW converters offer the feature of trimming the output voltage over a certain range around the nominal value by using external trim resistors. The values for trim resistors shown in trim tables below are according to standard E96 values; therefore, the specified voltage may slightly vary.



RPA20-243.3SAW

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	3.33	3.36	3.39	3.43	3.46	3.49	3.53	3.56	3.59	3.63	Volts
R_U =	402	169	100	75	47.5	34.8	26.1	17.8	12.1	8.06	KOhms
Trim down	1	2	3	4	5	6	7	8	9	10	%
Vout =	3.27	3.23	3.20	3.17	3.14	3.10	3.07	3.04	3.0	2.97	Volts
R_D =	402	191	113	75	52.3	39.2	26.7	20	12.1	8.06	KOhms

RPA20-2405SAW

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	5.40	5.45	5.50	Volts
R_U =	604	243	147	95.3	68.1	39.2	34.8	22.1	15	8.06	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 =	604	287	169	124	105	78.7	54.9	39.2	15	0.5	KOhms

RPA20-2412SAW

Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout =	12.12	12.24	12.36	12.48	12.6	12.72	12.84	12.96	13.08	13.20	Volts
R_U =	604	267	162	105	75	499	40.2	24.9	18.2	10	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	10.80	Volts
R_D =	750	309	200	124	90.9	64.9	45.3	32.4	20	12.1	KOhms

RPA20-2415SAW

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 =	1000	243	200	130	90.9	61.9	40.2	30.1	24.9	10	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 =	1000	348	210	140	95.3	68.1	45.3	30.1	18.2	8.06	KOhms

Specifications measured @ta = 25°C, resistive load, nominal Vin and rated Iout unless otherwise noted

REGULATION

Parameter	Condition		Value
Output Accuracy	Single & Dual		±0.1% typ., ±2.0% max.
Line Regulation	low line to high line	Single	±0.1% typ., ±0.2% max.
		Dual	±0.1% typ., ±0.5% max.
Load Regulation	3.3Vout		±0.3%
	5Vout		±0.2%
	12Vout, 15Vout		±0.1%
	±12Vout, ±15Vout		±1.0%
Cross Regulation	asymmetrical 25%<>100% load		±2.0% typ., ±3.0% max.
Transient Response	50-75%, full load, 0.1A/µs		±3.0% typ.
	25% load step change		250µs typ.

PROTECTION

Parameter	Condition	Value
Short Circuit Protection (SCP)	below 100mΩ	continuous, auto recovery
Over Voltage Protection (OVP)		115%-150% Output Voltage, Hiccup, auto recovery
Over Current Protection (OCP)	Output Voltage 10% low	110%-160% Output Current, Hiccup
Over Temperature Protection (OTP)		115°C ±5°C
Isolation Voltage	I/P to O/P	1.6kVDC/1 minute
Isolation Resistance		10MΩ min.
Isolation Capacitance		1100pF typ.

Notes:

Note4: An input fuse is required if the mains supply is not over-current protected. Recommended fuse: 3A slow blow type.

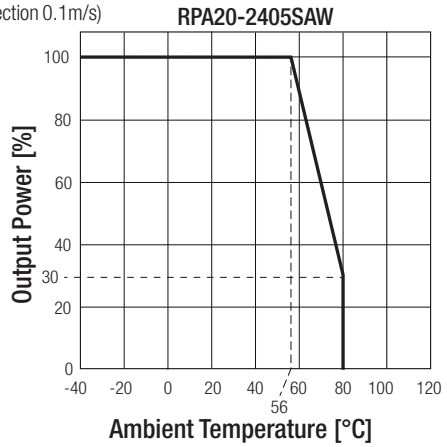
ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range (5)		refer to derating graph
Maximum Case Temperature		+105°C
Temperature Coefficient		0.02%/°C
Thermal Impedance	vertical direction by natural convection without Heat-sink	18°C/W
	vertical direction by natural convection with Heat-sink	16°C/W
Operating Altitude		2134m
Operating Humidity		95% RH

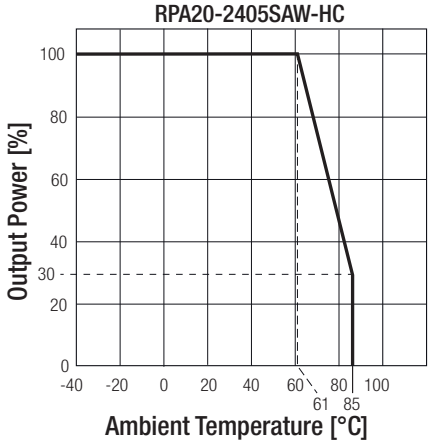
Derating Graph (5)

(@ Chamber and natural convection 0.1m/s)

RPA20-2405SAW



RPA20-2405SAW-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 team at techsupportAT@recom-power.com

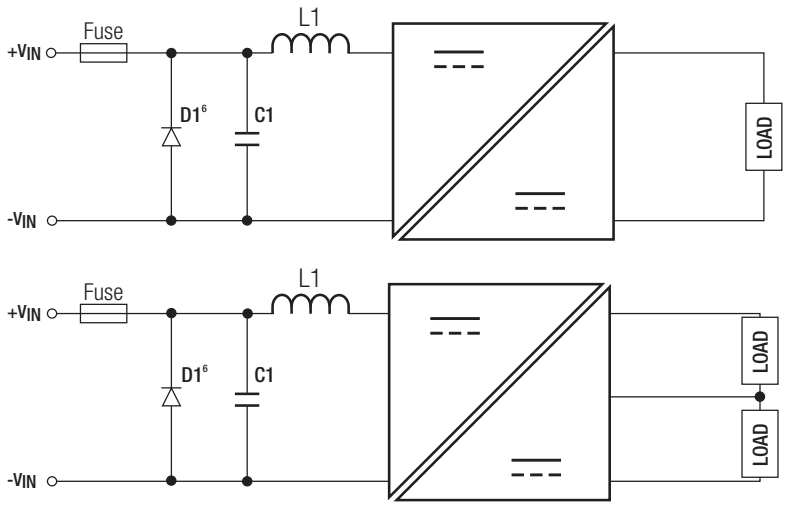
Specifications measured @ta = 25°C, resistive load, nominal Vin and rated Iout unless otherwise noted

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E224736 pending	UL60950-1, 2nd Edition, 2014 CSA C22.2 No. 60950, 2nd Edition, 2014
IEC/EN Information Technology Equipment - General Requirments for Safety (CB Scheme)	E224736-A42+A43 pending	IEC60950-1, 2nd Edition, 2005 EN60950-1, 1st Edition, 2005
EN Information Technology Equipment - General Requirments for Safety (LVD Directive)	pending	EN60950-1, 1st Edition, 2006
Railway Applications - Electrical Equipment used on rolling stock	pending	EN50155, 1st Edition, 2007

EMC Compliance (designed to meet)	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics Limits and methods of measurement	with external filter	EN55022, Class A, 2010

EMI Filtering according to EN50121-3-2 and EN55022 Class A



MODEL	C1	L1
RPA20-xxyyS_DAW	47µF/50V electrolyt capacitor	1µH

Notes:

Note6: Diode is only needed for EN50155.

DIMENSIONS and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case Baseplate Potting	Al Alloy, anodize black non-conductive FR4 Silicone (UL94-V0)
Package Dimensions (LxWxH)	without Heat-sink with Heat-sink	25.4 x 25.4 x 10.2mm 25.4 x 25.4 x 16.8mm
Package Weight	without Heat-sink with Heat-sink	17g 21g

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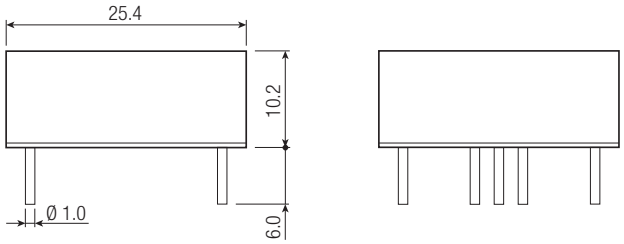
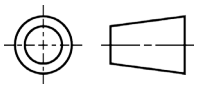
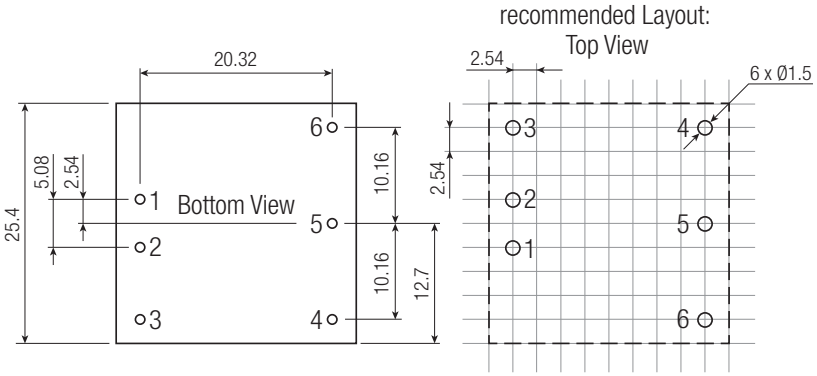
Specifications measured @ta = 25°C, resistive load, nominal Vin and rated Iout unless otherwise noted

Dimension Drawing (mm)





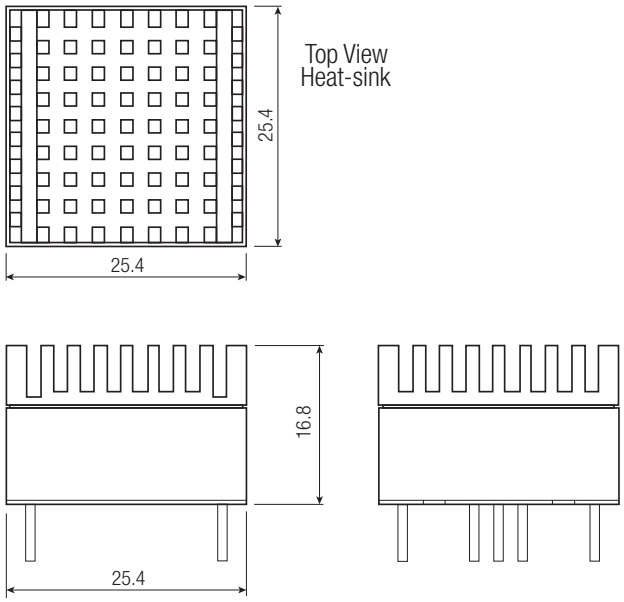


Pin Connections

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

Heat-sink Dimension Drawing (mm)



PACKAGING INFORMATION			
Parameter	**Type**		**Value**
Packaging Dimensions (LxWxH)	without Heat-sink with Heat-sink	Tube	285.0 x 27.6 x 19.0mm 285.0 x 27.6 x 25.8mm
Packaging Quantity			10pcs
Storage Temperature Range			-55°C to +125°C
Storage Humidity			5% - 95% RH

Mouser Electronics

Authorized Distributor

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RECOM:

RPA20-2405SAW RPA20-2405SAW/N RPA20-2405SAW/N-HC RPA20-2405SAW/P RPA20-2405SAW/P-HC RPA20-2405SAW-HC RPA20-243.3SAW RPA20-243.3SAW/N RPA20-243.3SAW/N-HC RPA20-243.3SAW/P RPA20-243.3SAW/P-HC RPA20-243.3SAW-HC RPA20-2415SAW RPA20-2415SAW/N RPA20-2415SAW/N-HC RPA20-2415SAW/P RPA20-2415SAW/P-HC RPA20-2415SAW-HC RPA20-2415DAW RPA20-2415DAW/N RPA20-2415DAW/N-HC RPA20-2415DAW/P RPA20-2415DAW/P-HC RPA20-2415DAW-HC RPA20-2412SAW RPA20-2412SAW/N RPA20-2412SAW/N-HC RPA20-2412SAW/P RPA20-2412SAW/P-HC RPA20-2412SAW-HC RPA20-2412DAW RPA20-2412DAW/N RPA20-2412DAW/N-HC RPA20-2412DAW/P RPA20-2412DAW/P-HC RPA20-2412DAW-HC