

Features

- Universal Input 85-305VAC
- 4W PCB Mount Package
- <75mW No Load Power Consumption
- Ultra Low Profile, Compact Size
- -40°C to +85°C Operating Temperature
- Continuous SCP, OCP, OVP
- EN60335, EN60950, UL60950 & CE Pending

Regulated Converter

Description

The RAC04-GA series are low cost AC/DC power supplies, ideal for PCB mounted, compact, board level industrial applications. They feature universal AC input voltage range, regulated and short-circuit -proof isolated DC outputs, low standby power consumption and -40°C to +85°C operating temperature range. The RAC04-GA have a built-in Class A / FCC Part 15 EMC filter, are pending to EN60335, EN60950 and EN62368 safety standards and come with a three year warranty.

Selection Guide

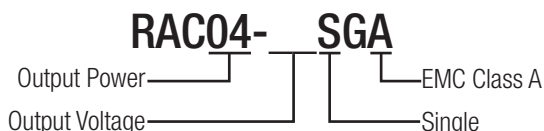
Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	Max. Capacitive Load ⁽²⁾ [µF]
RAC04-05SGA	85-305	5	800	72	1500
RAC04-12SGA	85-305	12	330	78	500
RAC04-24SGA	85-305	24	170	80	150

Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max. Cap. Load is tested at nominal input and full resistive load

Model Numbering



Ordering Example

RAC04-12SGA = 4W Output Power, 12V Output Voltage, Single Output, EMC Class A

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

BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				Pi-Type
Input Voltage Range		85VAC 120VDC		305VAC 430VDC
Input Current	115VAC 230VAC		85mA 55mA	
Inrush Current	cold start at 25°C	115VAC 230VAC		10A 20A
No Load Power Consumption				75mW
Input Frequency Range	AC Input	45Hz		65Hz
Minimum Load		0%		
Power Factor	115VAC 230VAC		0.55 0.42	
Start-up Time	115VAC, 230VAC		30ms	1s
Hold-up Time	115VAC 230VAC		6ms 60ms	
Internal Operating Frequency	100% load at nominal Vin		65kHz	

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RAC04-GA

4 Watt Single Output EMC Class A



UL60950-1 Pending
IEC/EN60950-1 Pending
UL62368-1 Pending
IEC/EN62368-1 Pending
EN60335 Pending

Specifications (measured @ $t_a=25^\circ\text{C}$, nom. V_{in} , full load unless otherwise noted)

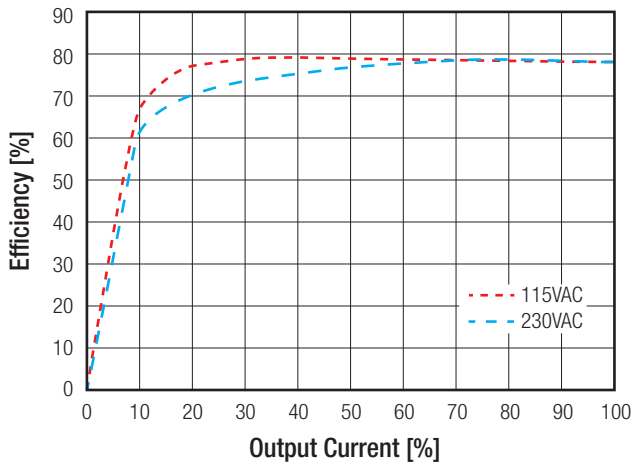
Output Ripple and Noise ^③	20MHz BW	0°C to 85°C	5 Vout 12Vout 24Vout		100mVp-p 150mVp-p 240mVp-p
		-30°C to 0°C	5Vout 12Vout 24Vout		200mVp-p 250mVp-p 300mVp-p

Notes:

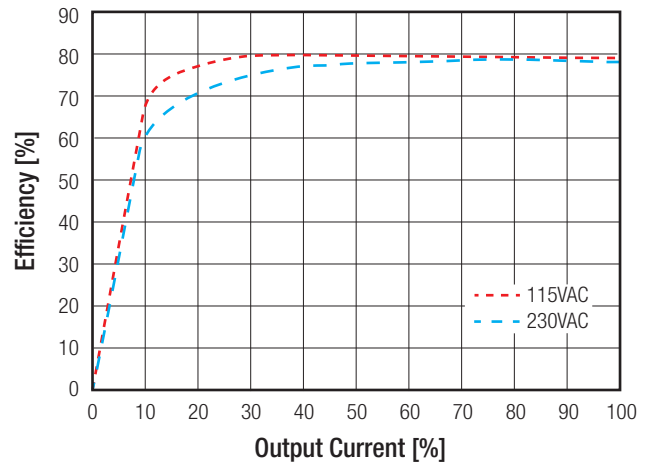
Note3: Measurements are made with a 12" twisted pair-wire with a 0.1 μF and 10 μF parallel capacitor across output (low ESR).

Efficiency vs. Load

RAC04-05SGA



RAC04-12SGA

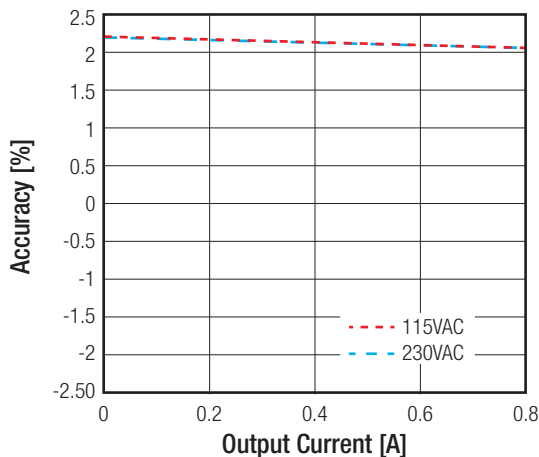


REGULATIONS

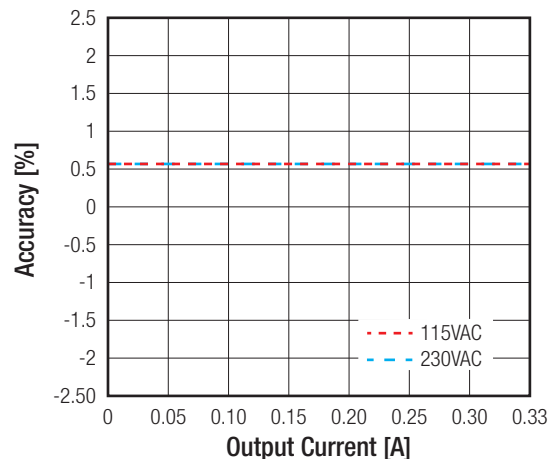
Parameter	Condition	Value
Output Accuracy		$\pm 2.5\%$ max.
Line Regulation	low line to high line	$\pm 0.5\%$ max.
Load Regulation	10% to 100% load	$\pm 0.5\%$ max.

Accuracy vs. Load

RAC04-05SGA



RAC04-12SGA



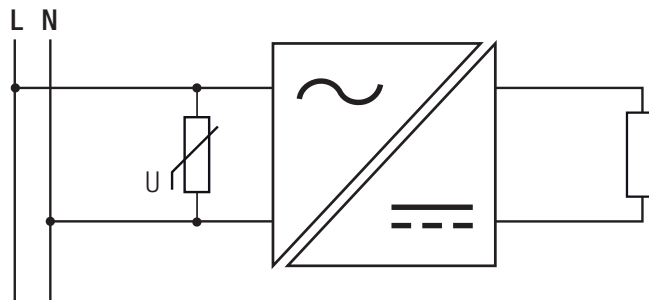
Specifications (measured @ $t_a=25^{\circ}\text{C}$, nom. V_{in} , full load unless otherwise noted)

PROTECTIONS		
Parameter	Type	Value
Input Fuse	internal	T1A, 300V
Short Circuit Protection (SCP)	below 100m Ω	long-term mode, auto recovery
Over Voltage Protection (OVP)	5Vout	5.3V - 6.8V, hiccup mode auto recovery
	12Vout	12.6V - 16.2V, hiccup mode auto recovery
	24Vout	25.2V - 32.4V, hiccup mode auto recovery
Over Current Protection (OCP)	5Vout	0.91A - 2.2A, hiccup mode auto recovery
	12Vout	0.37A - 0.95A, hiccup mode auto recovery
	24Vout	0.19A - 0.45A, hiccup mode auto recovery
Over Voltage Category (OVC)		OVC II
Isolation Voltage ⁽⁴⁾	I/P to O/P	rated for 1 minute
Isolation Resistance		10M Ω min.
Insulation Grade		Double
Leakage Current	277VAC, 50Hz	0.1mA max.

Notes:

Note4: For repeat Hi-Pot testing, reduce the time and/or the test voltage.

Note5: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series.



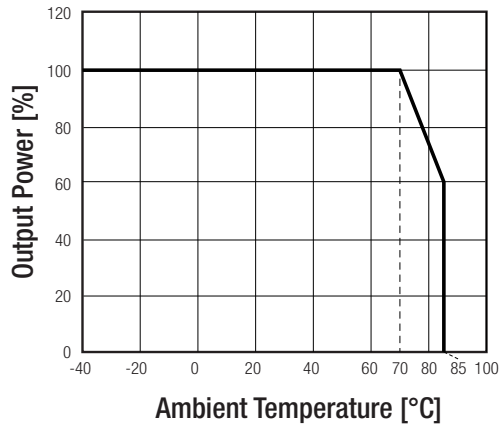
ENVIRONMENTAL			
Parameter	Condition	Value	
Operating Temperature Range	without derating (@ natural convection 0.1m/s, see graph)	-40°C to +70°C	
Maximum Case Temperature		+100°C	
Temperature Coefficient		±0.03%/°C	
Operating Altitude		3000m	
Operating Humidity	non-condensing	5% - 95% RH	
Pollution Degree		PD2	
Shock		20G/11ms pulse, 3 times at each x, y, z axes	
Vibration		10-150Hz, 2G 10min./1cycle, period 60min. along x,y,z axes for 6 cycles	
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	100 x 10 ³ hours
		+70°C	100 x 10 ³ hours

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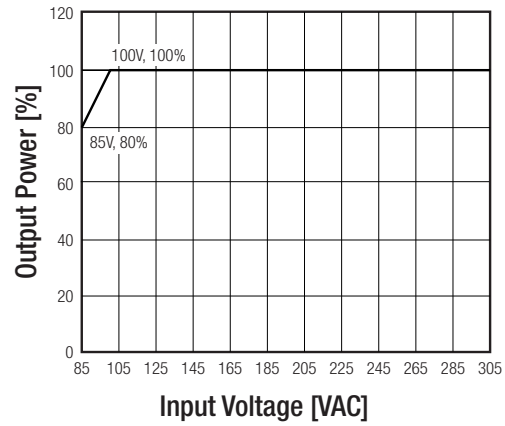
Specifications (measured @ $t_a=25^\circ\text{C}$, nom. V_{in} , full load unless otherwise noted)

Derating Graph

(@ Chamber and natural convection 0.1 m/s)



Input Voltage Derating Graph



SAFETY AND CERTIFICATIONS PENDING

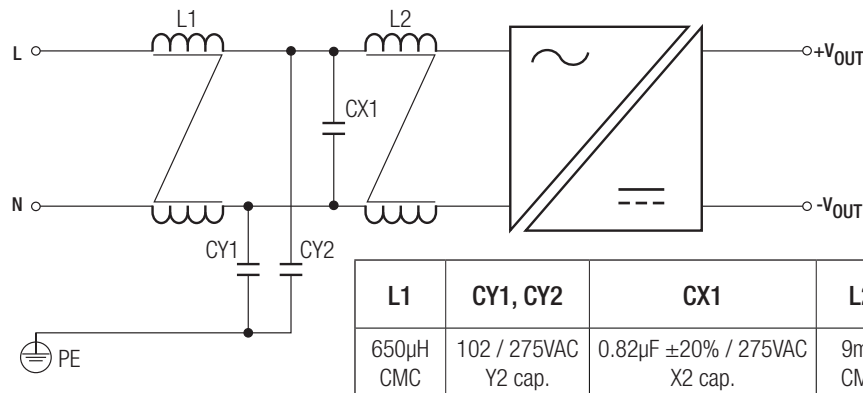
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)		IEC60950-1 EN60950-1
Information Technology Equipment, General Requirements for Safety		UL60950-1 CAN/CSA C22.2 No. 60950-1-07
Audio/video, information and communication technology equipment. Safety requirements		UL62368-1 CAN/CSA C22.2 No 62368-1
Audio/video, information and communication technology equipment. Safety requirements		IEC62368-1 EN62368-1
Household and similar electrical appliances - Safety. General requirements		IEC60335
RoHs 2+		RoHs 10/10, 2015

EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement		EN55032, Class A
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		FCC Part 15
Limits of Harmonic Current Emissions		EN61000-3-2
ESD Electrostatic discharge immunity test		EN61000-4-2
Radiated, radio-frequency, electromagnetic field immunity test		EN61000-4-3
Fast Transient and Burst Immunity		EN61000-4-4
Surge Immunity		EN61000-4-5
Immunity to conducted disturbances, induced by radio-frequency fields		EN61000-4-6
Power Magnetic Field Immunity		EN61000-4-8
Voltage Dips and Interruption		EN61000-4-11

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Specifications (measured @ $t_a=25^\circ\text{C}$, nom. V_{in} , full load unless otherwise noted)

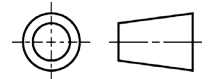
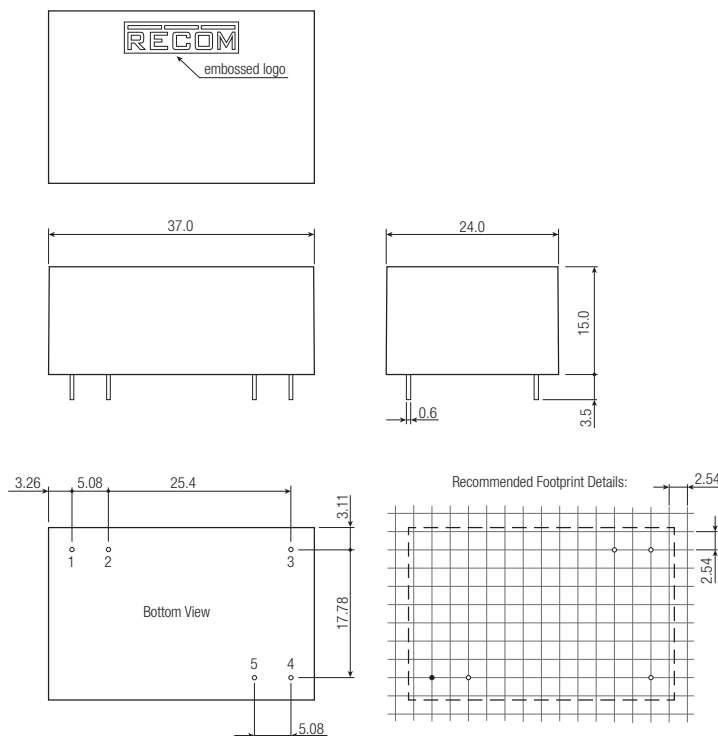
EMI Filtering according to EN60335-1 / EN55032 Class B Compliance



DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case PCB	black plastic, (UL94 V-0) FR4, (UL94 V-0)
Package Dimension (LxWxH)		37.0 x 24.0 x 15.0mm
Package Weight		20g typ.

Dimension Drawing (mm)



Pin Connections

Pin #	Single
1	VAC in (L)
2	VAC in (N)
3	NC
4	-Vout
5	+Vout

Tolerance: XX.X $\pm 0.5\text{mm}$
Pin Width: XX.X $\pm 0.05\text{mm}$

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	505.0 x 39.7 x 23.2mm
Packaging Quantity		20pcs
Storage Temperature Range		-40 $^\circ\text{C}$ to +100 $^\circ\text{C}$
Storage Humidity	non-condensing	5% - 95% RH max.

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