

# Features

# Regulated Converter

- Universal Input 85-305VAC
- 3W 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



# RAC03-GA

**3 Watt  
Single  
Output  
EMC Class A**



## Description

The RAC03-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 RAC03-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

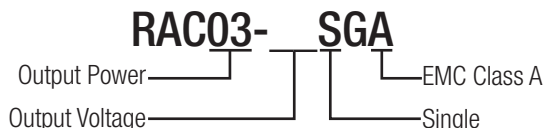
Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. <sup>(1)</sup> [%]	Max. Capacitive Load <sup>(2)</sup> [µF]
RAC03-3.3SGA	85-305	3.3	910	70	2000
RAC03-05SGA	85-305	5	600	72	1500
RAC03-12SGA	85-305	12	250	78	500
RAC03-15SGA	85-305	15	200	78	200
RAC03-24SGA	85-305	24	130	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

RAC03-12SGA = 3W 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			70mA 45mA	
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			0.53 0.41	
Start-up Time	115VAC, 230VAC			30ms	1s
Hold-up Time	115VAC 230VAC			5ms 40ms	
Internal Operating Frequency	100% load at nominal Vin			65kHz	

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

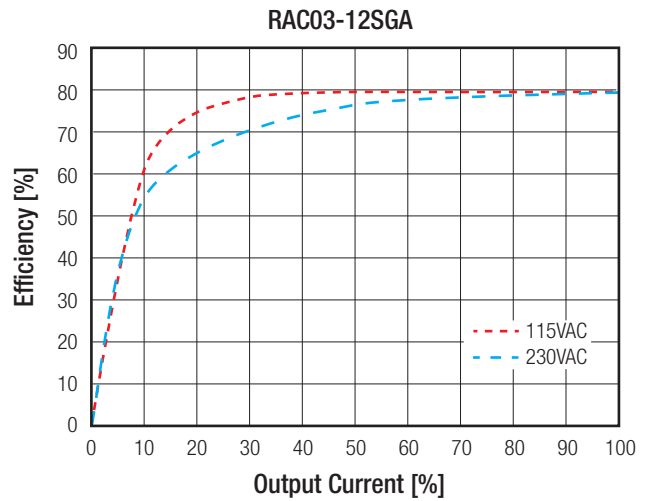
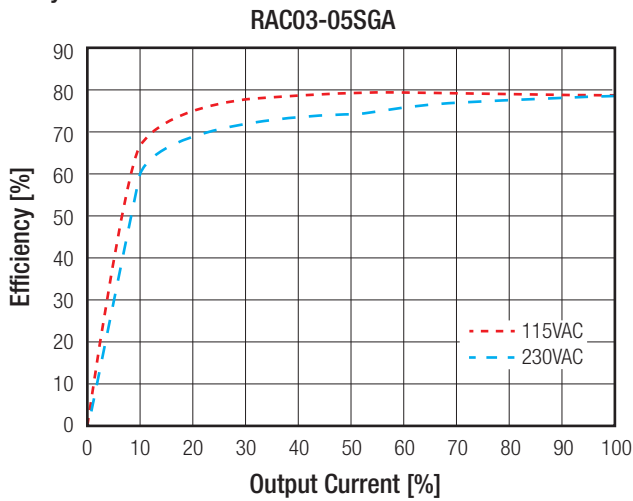
### Specifications (measured @ $t_a=25^\circ\text{C}$ , nom. $V_{in}$ , full load unless otherwise noted)

Output Ripple and Noise <sup>(3)</sup>	20MHz BW	0°C to 85°C	3.3, 5Vout 12Vout 15Vout 24Vout	100mVp-p 150mVp-p 200mVp-p 240mVp-p
		-30°C to 0°C	3.3, 5Vout 12Vout 15, 24Vout	200mVp-p 250mVp-p 300mVp-p

#### Notes:

Note3: Measurements are made with a 12" twisted pair-wire with a 0.1 $\mu\text{F}$  and 10 $\mu\text{F}$  parallel capacitor across output (low ESR).

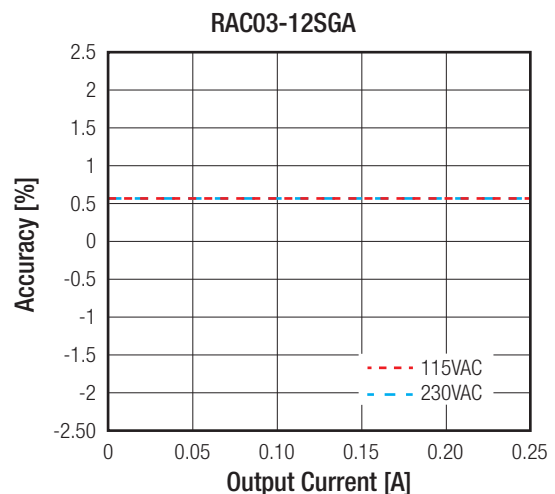
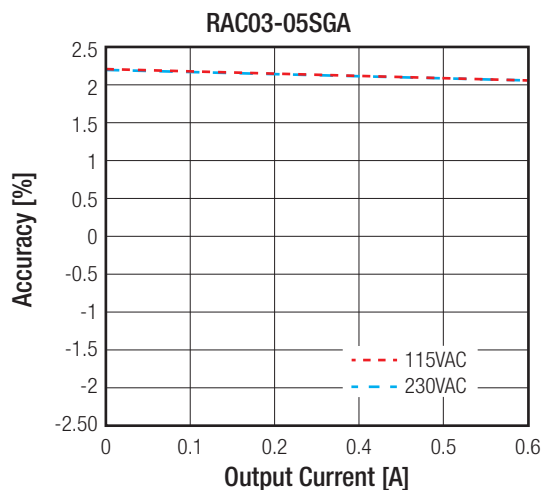
#### Efficiency vs. Load



#### 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



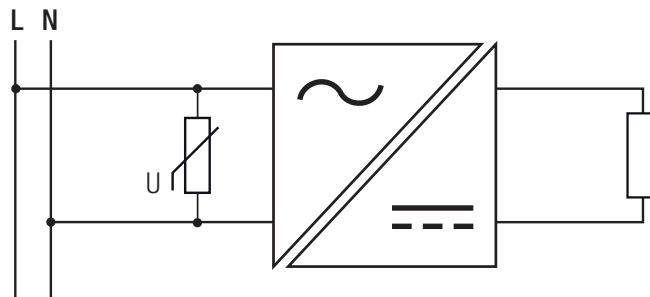
**Specifications** (measured @  $t_a=25^{\circ}\text{C}$ , nom.  $V_{in}$ , full load unless otherwise noted)

PROTECTIONS		
Parameter	Type	Value
Input Fuse	internal	T1A, 300V
Short Circuit Protection (SCP)	below 100mΩ	long-term mode, auto recovery
Over Voltage Protection (OVP)	3.3Vout	3.8V - 4.9V, hiccup mode auto recovery
	5Vout	5.3V - 6.8V, hiccup mode auto recovery
	12Vout	12.6V - 16.2V, hiccup mode auto recovery
	15Vout	15.75V - 20.3V, hiccup mode auto recovery
	24Vout	25.2V - 32.4V, hiccup mode auto recovery
Over Current Protection (OCP)	3.3Vout	1.41A - 3A, hiccup mode auto recovery
	5Vout	0.91A - 2.2A, hiccup mode auto recovery
	12Vout	0.37A - 0.95A, hiccup mode auto recovery
	15Vout	0.29A - 0.72A, hiccup mode auto recovery
	24Vout	0.19A - 0.45A, hiccup mode auto recovery
Over Voltage Category (OVC)		OVC II
Isolation Voltage <sup>(4)</sup>	I/P to O/P	rated for 1 minute 3kVAC/10mA
Isolation Resistance		10MΩ 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.

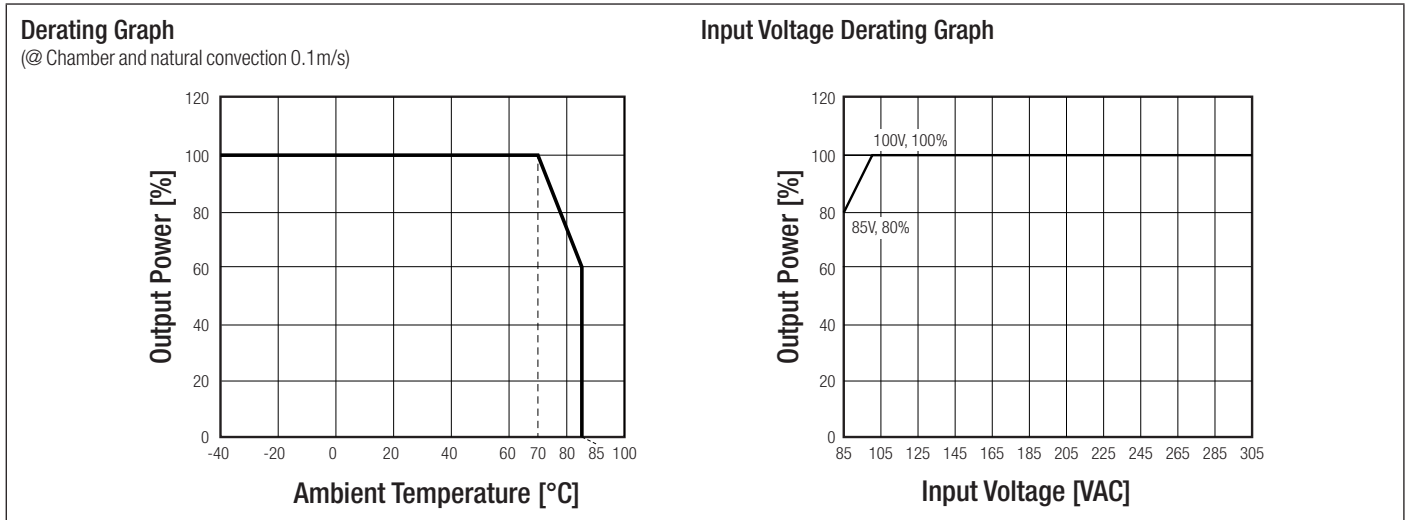
Note5: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series.



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 <sup>3</sup> hours
		+70°C	100 x 10 <sup>3</sup> hours

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

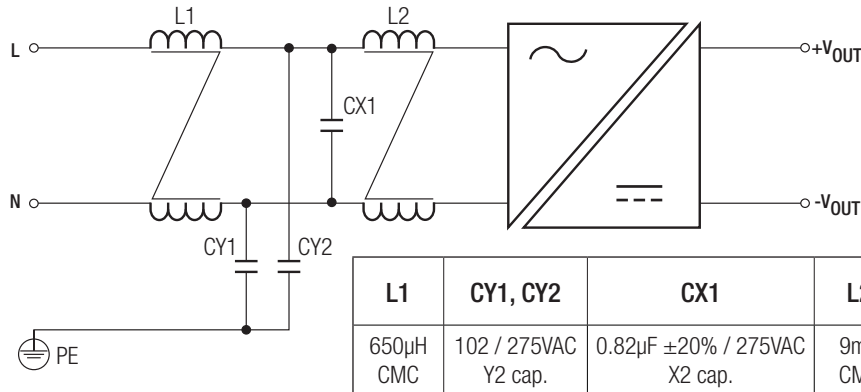


SAFETY AND CERTIFICATIONS PENDING		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)		IEC60950-1 EN60950-1
Information Technology Equipment, General Requirements for Safety		UL60950-1 CAN/CSA C22.2 No. 60950-1-07
Audio/video, 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)

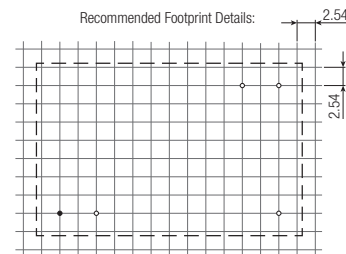
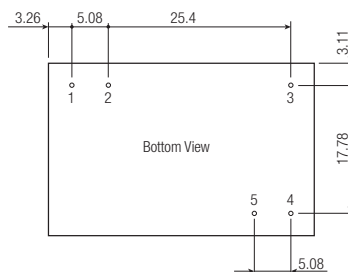
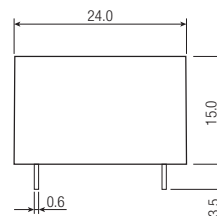
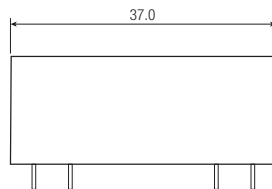
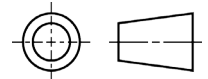
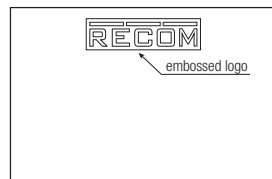
**EMI Filtering according to EN60335-1 / EN55032 Class B Compliance**



**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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