

Features

Regulated Converter

- Universal input 85-264VAC
- <150mW No load power consumption
- Class II installations (without FG)
- -25°C to +80°C Operating temperature
- Continuous SCP, OCP
- EN/IEC/UL60950, EN/IEC/UL62368 & EN60335-1 certified

RECOM
AC/DC Converter

RAC01-GA

**1 Watt
Single
Output
EMC Class A**



Description

The RAC01-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 -25°C to +80°C operating temperature range. The RAC01-GA have a built-in Class A / FCC Part 15 EMC filter, are certified 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]
RAC01-05SGA	85-264	5	200	63	500
RAC01-12SGA	85-264	12	83	68	200

On Request

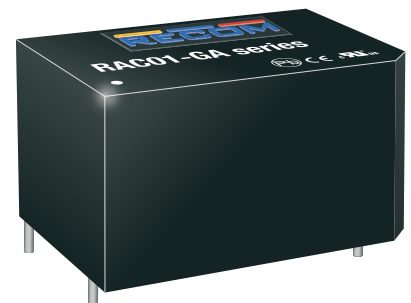
RAC01-3.3SGA	85-264	3.3	303	63	500
RAC01-15SGA	85-264	15	66	63	200
RAC01-24SGA ⁽³⁾	85-264	24	42	63	200

Notes:

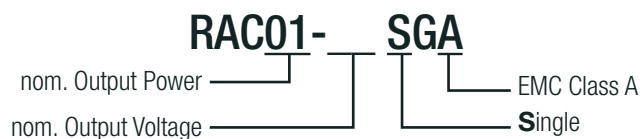
Note1: Measured with all input voltages at 25°C with constant resistant mode at full load

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

Note3: Minimum order quantity ≥2000pcs



Model Numbering



Ordering Examples:

RAC01-12SGA 12Vout Single Output EMC Class A

IEC/EN60950-1 certified
CAN/CSA-C22.2 No. 62368 certified
UL62368-1 certified
IEC/EN62368-1 certified
EN60335-1 certified
EN55032 compliant
EN55024 compliant
CB Report pending

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi-type		
Input Voltage Range ^(4,5,6)	nom. Vin= 230VAC		85VAC	230VAC	264VAC
Input Current	115VAC 230VAC			25mA 18mA	30mA 20mA
Inrush Current	cold start at 25°C	115VAC 230VAC			30A 40A
No load Power Consumption					150mW
Input Frequency Range			47Hz		63Hz
Minimum Load			0%		
Power Factor	115VAC, 230VAC		0.4		0.6
Start-up Time	115VAC 230VAC				1s 2s
Hold-up time	115VAC 230VAC				18ms 80ms
Internal Operating Frequency	100% load at nominal Vin			65kHz	
Output Ripple and Noise	20MHz BW	0°C to 80 °C	5Vout 12Vout		100mVp-p 200mVp-p
		-25 °C to 0 °C	5Vout 12Vout		200mVp-p 300mVp-p

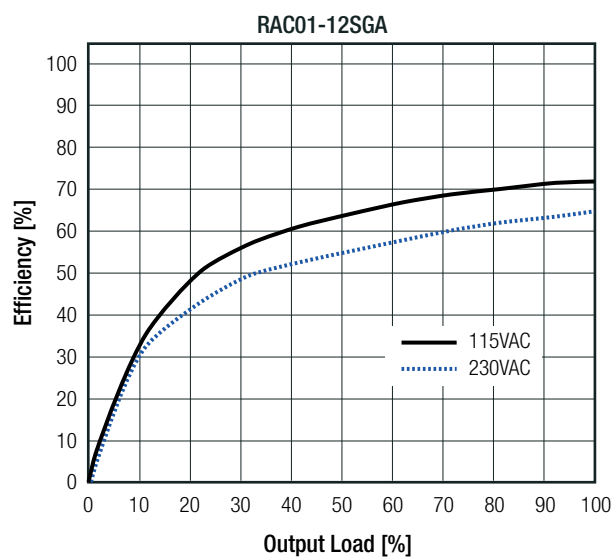
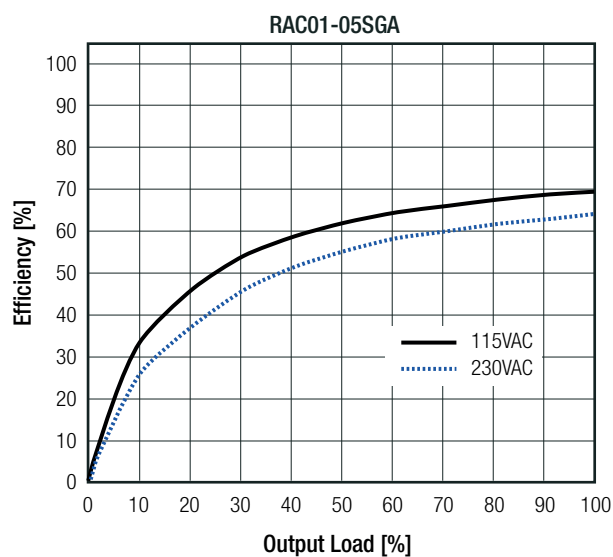
Notes:

Note4: No proper operation with DC input voltage

Note5: The products were submitted for safety files at AC-Input operation

Note6: Refer to **"Line Derating"**

Efficiency vs. Load

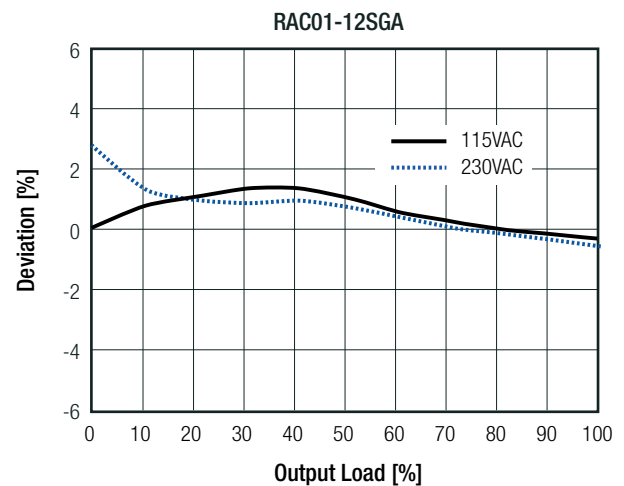
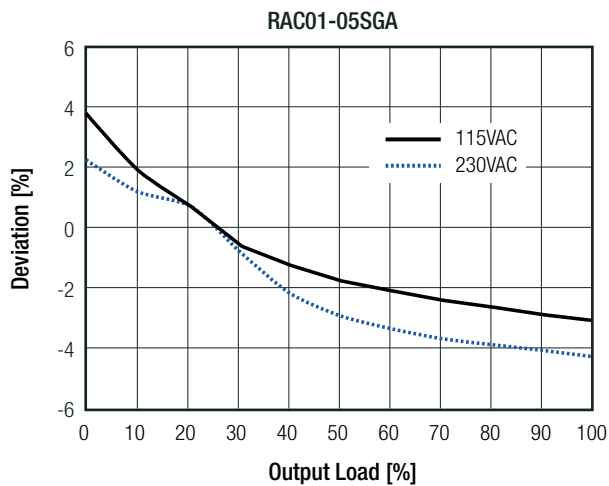


Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

REGULATIONS

Parameter	Condition	Value
Output Accuracy	-25°C to $+80^\circ\text{C}$	$\pm 6.0\%$ max.
Line Regulation	-25°C to $+80^\circ\text{C}$	$\pm 2.0\%$ max.
Load Regulation	-25°C to $+80^\circ\text{C}$	6.0% max.

Deviation vs. Load



PROTECTIONS

Parameter	Type		Value
Input Fuse ⁽⁷⁾	internal		fusible resistor, $1\Omega/1\text{W}$
Short Circuit Protection (SCP)	below $100\text{m}\Omega$		continuous, auto recovery
Over Voltage Category			OVCII
Over Current Protection (OCP)	5V _{out} 12V _{out}		0.22A - 0.5A, hiccup mode 0.25A - 0.91A, hiccup mode
Class of Equipment			Class II
Isolation Voltage ⁽⁸⁾	I/P to O/P	rated for 1 minute	3kVAC
Isolation Resistance			$100\text{M}\Omega$ min.
Insulation Grade			reinforced
Leakage Current	I/P to O/P		0.25mA max.

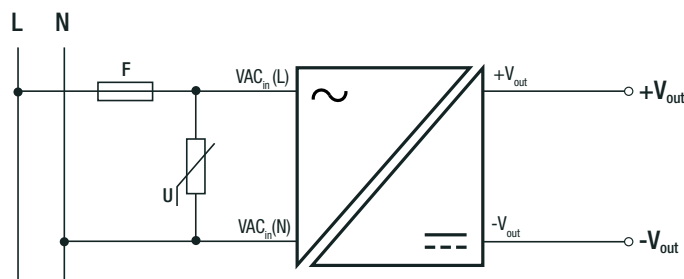
Notes:

Note7: Refer to local wiring regulations if input over-current protection is also required

Note8: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note9: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC-61051-2. e.g. EPCOS S14 series

Protection Circuit



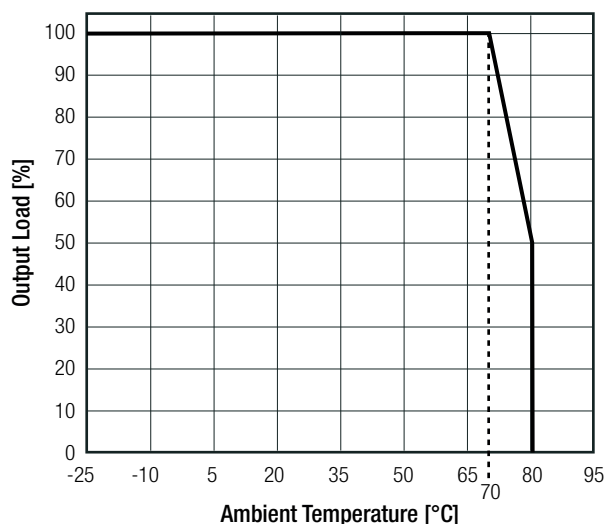
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ENVIRONMENTAL

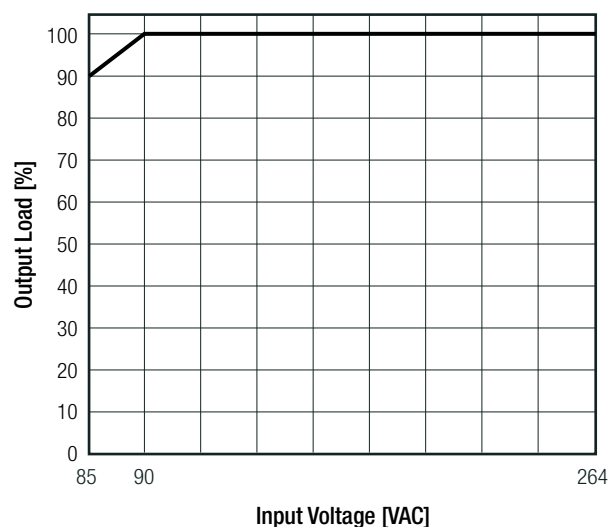
Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	-25°C to +70°C
		refer to "Derating Graph"	-25°C to +80°C
Maximum Case Temperature			+120°C
Temperature Coefficient			0.03%/K
Operating Altitude ⁽¹⁰⁾			4000m
Operating Humidity	non-condensing		5% - 90% RH max.
Pollution Degree			PD2
Shock			10-150Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes
Vibration	according to MIL-STD-202G		20G/11ms pulse, 3 times at each x, y, z axes
MTBF ⁽¹¹⁾	according to MIL-HDBK-217F, method 2	+25°C	1691 x 10 ³ hours
		+70°C	424 x 10 ³ hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)



Line Derating



Notes:

- Note10: Recognized by UL for safe operation up to 4000m. High altitude operation may impact the performance and lifetime.
Contact TechsupportAT@recom-power.com for advice
- Note11: Based on calculation for 5Vout

SAFETY AND CERTIFICATIONS

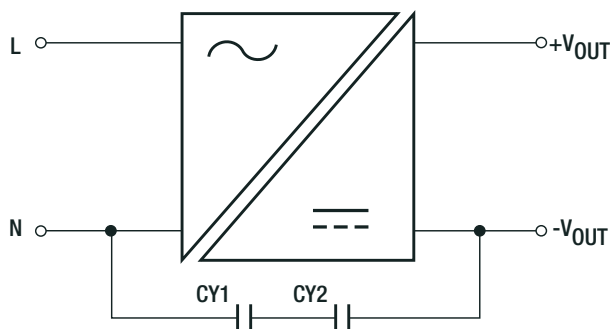
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	SA1804152L01001	IEC60950-1:2005 2nd Edition + Am2:2013 EN60950-1:2006 + A12:2011 + A2:2013
Audio/Video, information and communication technology equipment - Part1: Safety requirements	E196683-A5 and E19668-A6001	UL62368-1, 2nd Edition CAN/CSA-C22.2 No. 62368-1-14
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB Scheme)	SA1804152S 001	IEC62368-1:2014 2nd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements		EN62368-1:2014+A11:2017
Household and similar electrical appliances – Safety – Part 1: General requirements	SES180313004001E	EN60335-1:2012+A11:2014
RoHS2		RoHS 2011/65/EU + AM2015/863

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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	EA1804152E 01001	EN55032, Class A
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
ESD Electrostatic discharge immunity test	Air $\pm 2, 4, 8\text{kV}$ Contact $\pm 2, 4\text{kV}$	EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC Power Port: $\pm 1.0\text{kV}$	EN61000-4-4:2012, Criteria A
Surge Immunity	AC Power Port: L-N $\pm 1.0\text{kV}$	EN61000-4-5:2014, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port 3V	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 1A/m	EN61000-4-8:2009, Criteria A
Voltage Dips and Interruption	Voltage Dips >95%	EN61000-4-11:2004, Criteria A
	Voltage Dips 30%	EN61000-4-11:2004, Criteria B
	Voltage Interruptions >95%	EN61000-4-11:2004, Criteria B
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013

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



CY1,CY2

Vishay 564R30TSD22, SLCC
X7R radial, 2.2nF, 3kVDC $\pm 10\%$

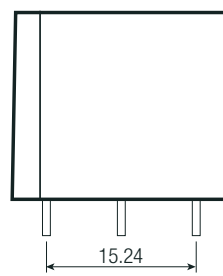
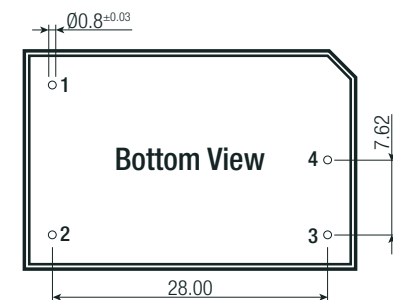
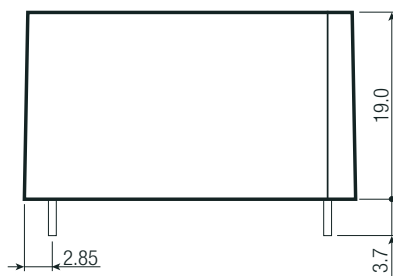
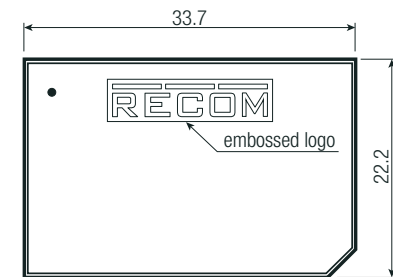
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case PCB	black plastic (UL94V-2) FR4 (UL94V-0)
Dimension (LxWxH)		33.7 x 22.2 x 19.0mm
Weight		12g typ.

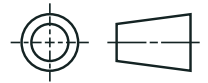
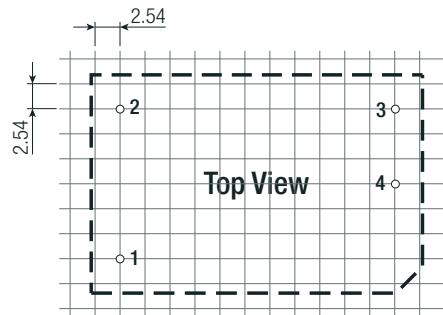
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)



Recommended Footprint Details



Pin Connections

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

Tolerance:

Pin length: -0.5/+0.9

xx.x= ±0.5mm

x.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	470.0 x 36.4 x 26.4mm
Packaging Quantity		20pcs
Storage Temperature Range		-25°C to +85°C
Storage Humidity	non-condensing	5% - 95% RH max.

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.

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