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

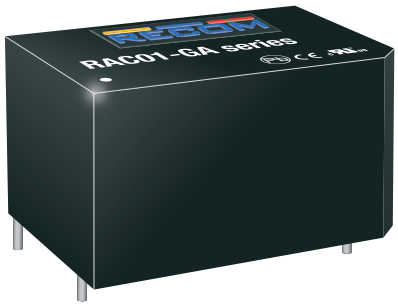
AC/DC Converter

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 resisitive load

Note3: Minimum order quantity ≥2000pcs

Model Numbering

RAC01-__ SGA

- nom. Output Power
- nom. Output Voltage
- EMC Class A
- **S**ingle

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

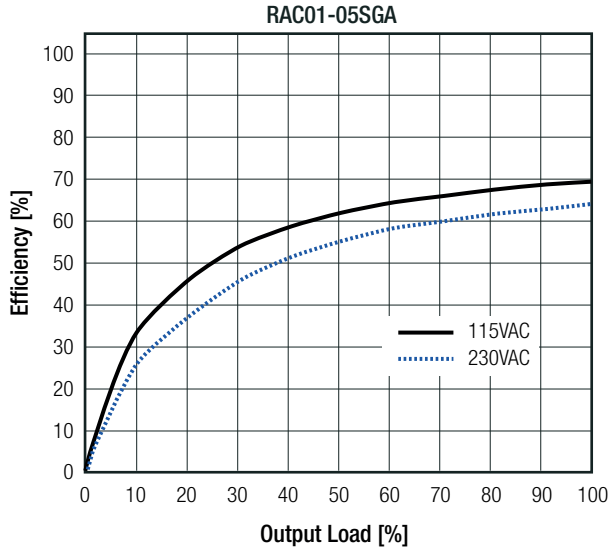
Notes:

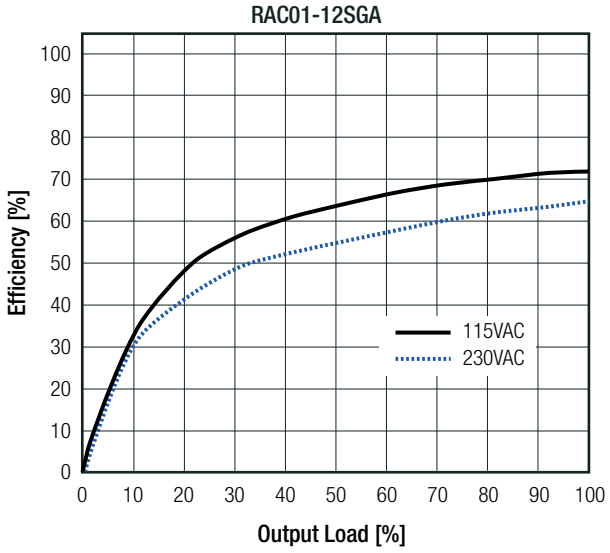
Note4: No proper operation with DC input voltage

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

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

Efficiency vs. Load





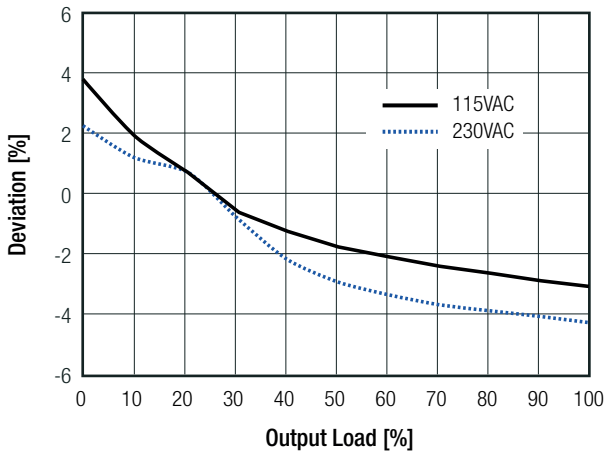
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

REGULATIONS

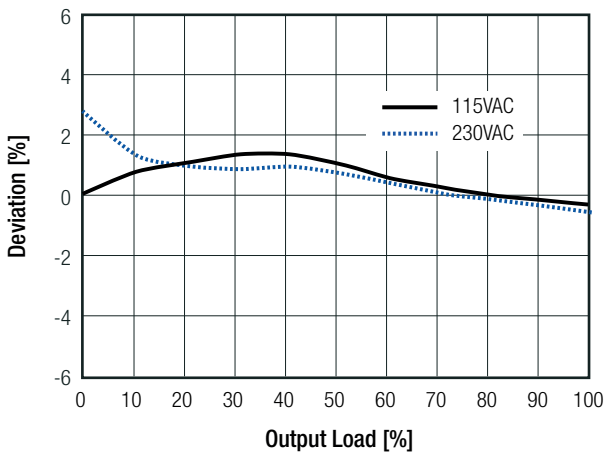
Parameter	Condition	Value
Output Accuracy	-25°C to +80°C	±6.0% max.
Line Regulation	-25°C to +80°C	±2.0% max.
Load Regulation	-25°C to +80°C	6.0% max.

Deviation vs. Load

RAC01-05SGA



RAC01-12SGA



PROTECTIONS

Parameter	Type		Value
Input Fuse [7]	internal		fusible resistor, 1Ω/1W
Short Circuit Protection (SCP)	below 100mΩ		continuous, auto recovery
Over Voltage Category			OVCII
Over Current Protection (OCP)	5Vout 12Vout		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			100MΩ min.
Insulation Grade			reinforced
Leakage Current	I/P to O/P		0.25mA max.

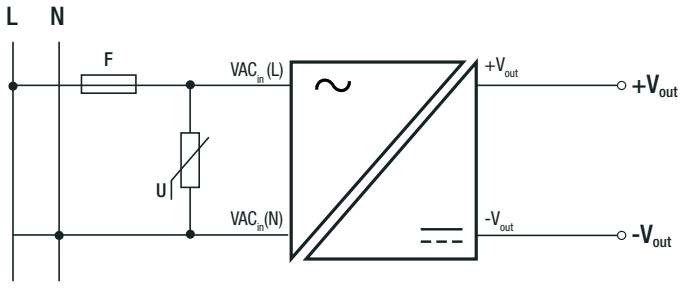
Notes:

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

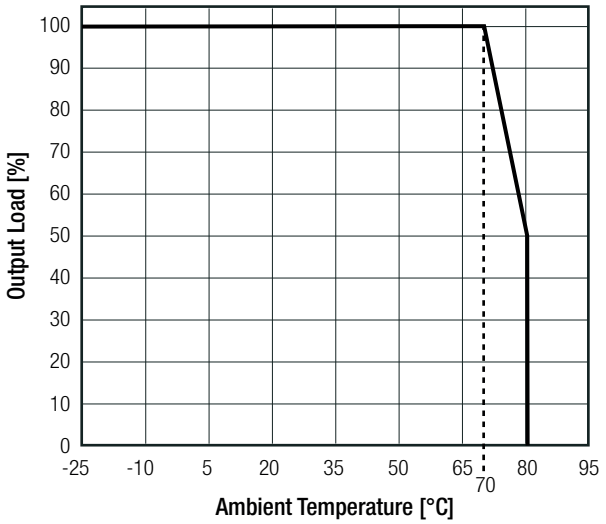


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

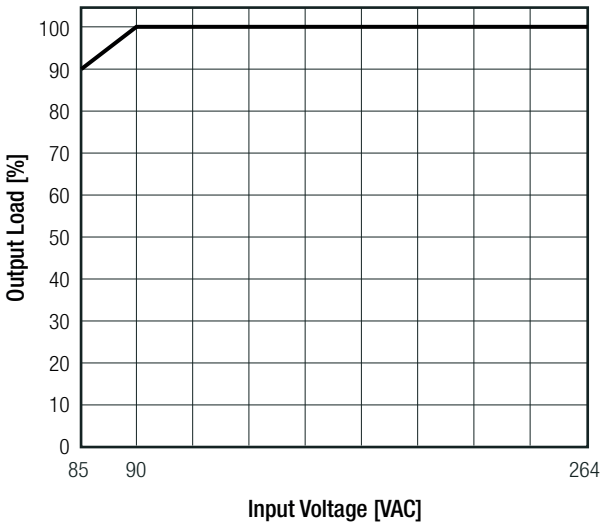
ENVIRONMENTAL

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 +70°C	1691 x 10^3 hours 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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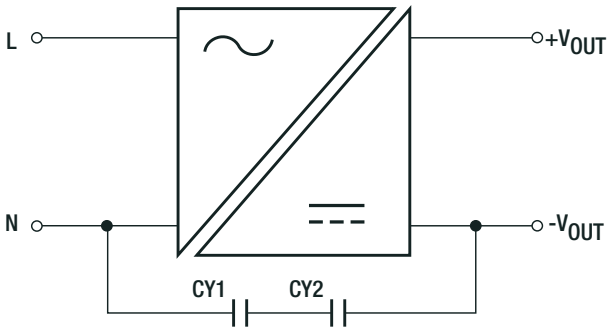
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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 ±2, 4, 8kV Contact ±2, 4kV	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: ±1.0kV	EN61000-4-4:2012, Criteria A
Surge Immunity	AC Power Port: L-N ±1.0kV	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 ±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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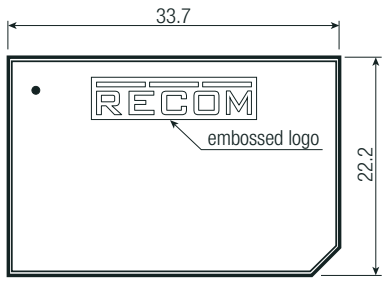
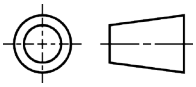
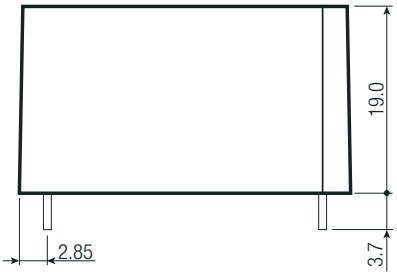
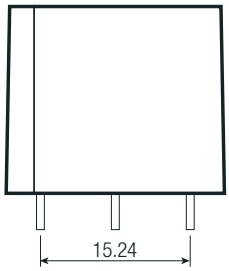
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

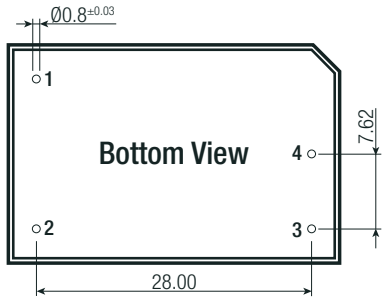
Dimension Drawing (mm)



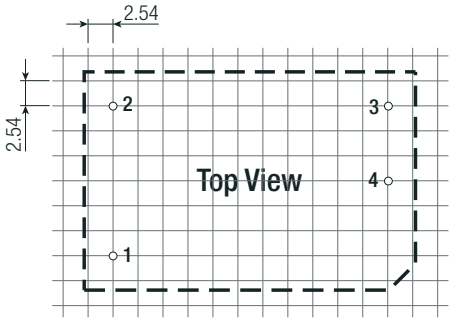








Recommended Footprint Details



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.