Features

Regulated Converters

- 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, IEC/EN/UL60950 & CE certified

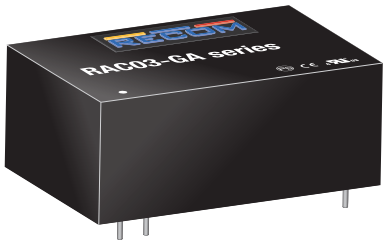
RECOM

AC/DC Converter

RAC03-GA

3 Watt Single Output EMC Class A

3 YEAR warranty



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 certified to IEC/EN/UL60950-1 and EN60335 and are pending to IEC/EN/UL62368 and EN61558 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]
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
On Request					
RAC03-09SGA	85-305	9	330	77	1000

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

RAC03-__SGA

- Output Power
- Output Voltage
- EMC Class A
- Single

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	refer to line derating graph on page PA-4		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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RoHS 2+ compliant 10 from 10 · REACH compliant · ERP compliant · HOUSEHOLD CERTIFIED EN-60335-1 appliances

FC c UL us E196683 CE

UL60950-1 certified
IEC/EN60950-1 certified
UL62368-1 pending
IEC/EN62368-1 pending
EN61558-1 pending
EN61558-2-16 pending

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

Output Ripple and Noise[4]	20MHz BW	0°C to 85°C	3.3, 5 Vout 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

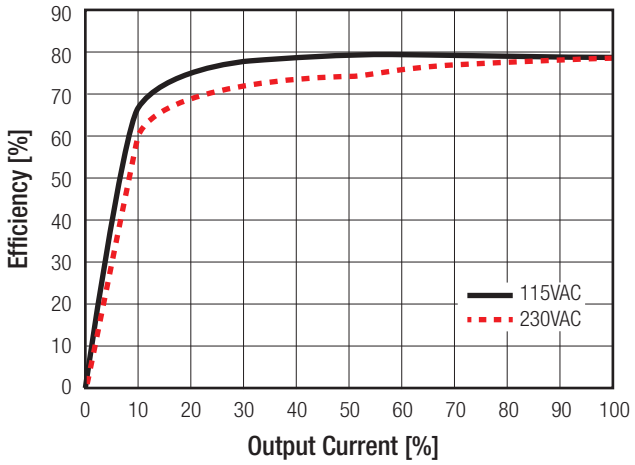
Notes:

Note3: The products were submitted for safety files at AC-Input Operation

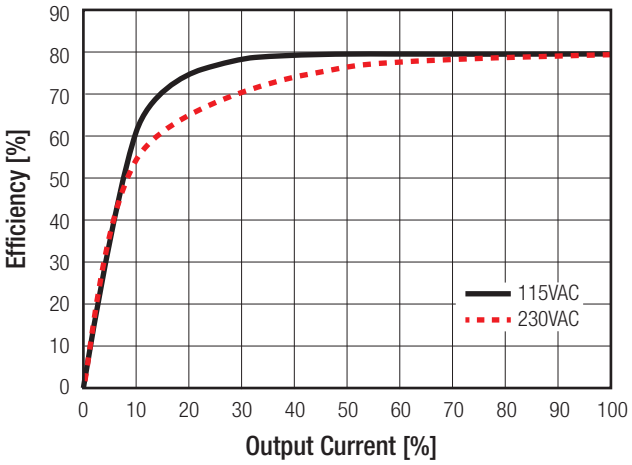
Note4: Measurements are made with a 12" twisted pair-wire with a 0.1µF and 10µF parallel capacitor across output (low ESR)

Efficiency vs. Load

RAC03-05SGA



RAC03-12SGA



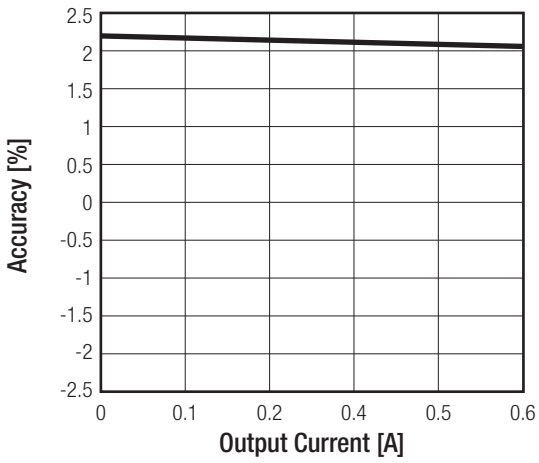
REGULATIONS

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

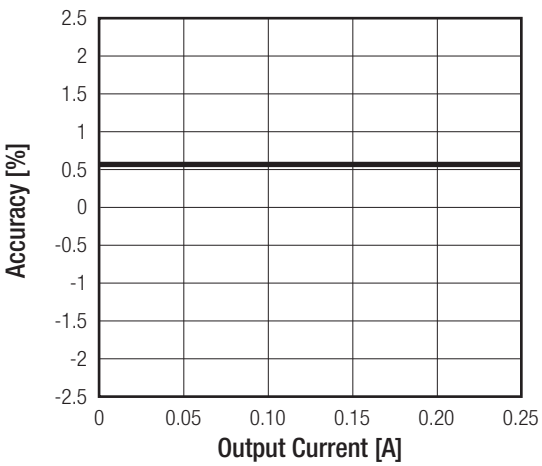
Accuracy vs. Load

(@nom. Vin: 115/230VAC)

RAC03-05SGA



RAC03-12SGA



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

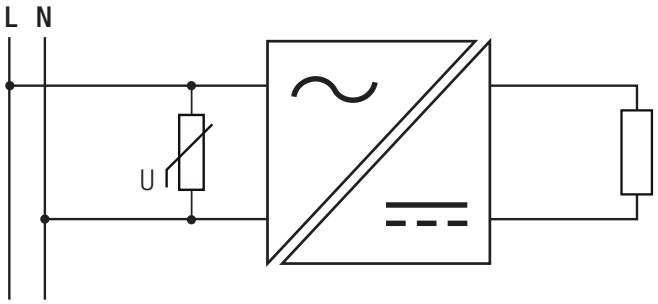
PROTECTIONS

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 5Vout 12Vout 15Vout 24Vout		3.8V - 4.9V, hiccup mode auto recovery 5.3V - 6.8V, hiccup mode auto recovery 12.6V - 16.2V, hiccup mode auto recovery 15.75V - 20.3V, hiccup mode auto recovery 25.2V - 32.4V, hiccup mode auto recovery
Over Current Protection (OCP)	3.3Vout 5Vout 12Vout 15Vout 24Vout		1.41A - 3A, hiccup mode auto recovery 0.91A - 2.2A, hiccup mode auto recovery 0.37A - 0.95A, hiccup mode auto recovery 0.29A - 0.72A, hiccup mode auto recovery 0.19A - 0.45A, hiccup mode auto recovery
Class of Equipment			Class II
Over Voltage Category (OVC)			OVC II
Isolation Voltage(5)	I/P to O/P	rated for 1 minute	3kVAC/10mA
Isolation Resistance			10MΩ min.
Insulation Grade			Reinforced
Leakage Current	277VAC, 50Hz		0.1mA max.

Notes:

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note6: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series



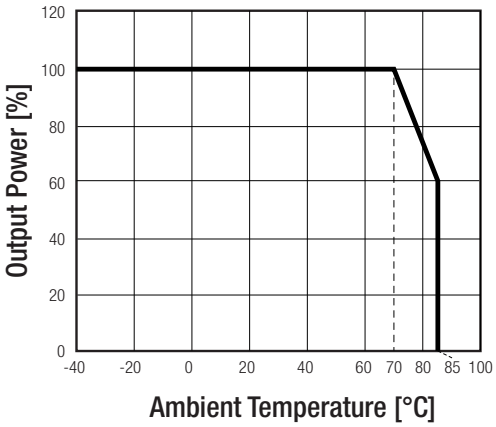
ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 1m/s see graph	without derating	-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 +70°C	100 x 10^3 hours 17 x 10^3 hours

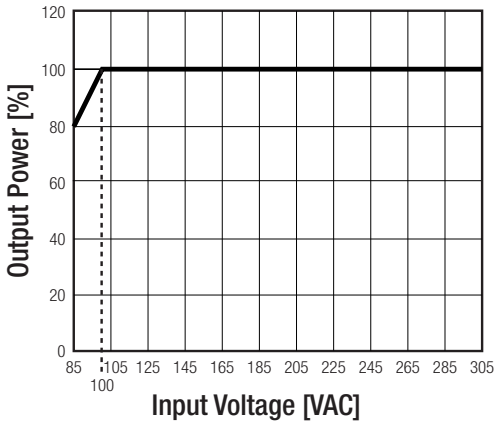
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Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

Derating Graph
(@ Chamber and natural convection 0.1m/s)



Line Derating Graph



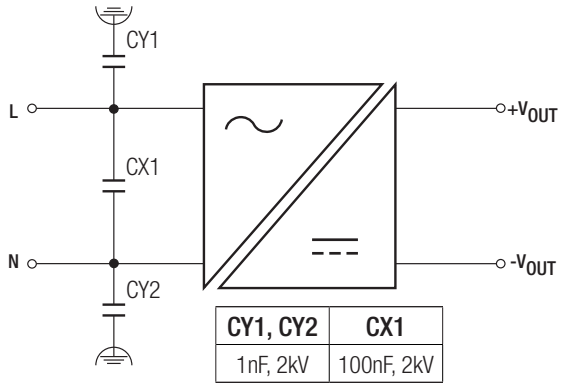
SAFETY AND CERTIFICATION		
Certificate Type (Safety)	**Report / File Number**	**Standard**
Information Technology Equipment, General Requirements for Safety (LVD)	SA17031845 001	IEC60950-1, 2nd Edition: 2005 + A2, 2013 EN60950-1: 2006 +A2, 2013
Information Technology Equipment, General Requirements for Safety	E196683-A3-UL	UL60950-1, 2nd Edition: 2014 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition: 2014
Audio/video, information and communication technology equipment. Safety requirements	pending	UL62368-1, 2nd Edition CAN/CSA C22.2 No 62368-1
Audio/video, information and communication technology equipment. Safety requirements	pending	IEC62368-1, 2nd Edition: 2014 EN62368-1: 2014
Household and similar electrical appliances - Safety. General requirements	SA1703184L 01001	EN60335: 2012 + A11, 2014
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	SA1703184L 01001	EN62233: 2008
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements	pending	EN61558-1: 2005 + A1, 2009 EN61558-2-16: 2009 + A1, 2013
RoHs 2+		RoHS 2011/65/EU + AM2015/863

EMC Compliance	**Condition**	**Standard / Criterion**
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EA1703184E 01001 with external components	EN55032: 2015, Class A
Limitations on the amount of electromagnetic intererence allowed from digital and electronic devices	EA1703184E 01001	47 CFR FCC Part 15 Subpart B: 2016
ESD Electrostatic discharge immunity test	Air ±8kV, Contact ±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 ±1kV	EN61000-4-4: 2012, Criteria A
Surge Immunity	AC Power Port L-N ±1kV	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
Voltage Dips and Interruption	Voltage Dips >95% Voltage Dips 30% Voltage Interruptions >95%	EN61000-4-11: 2004, Criteria A EN61000-4-11, 2004, Criteria A EN61000-4-11, 2004, Criteria C

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

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

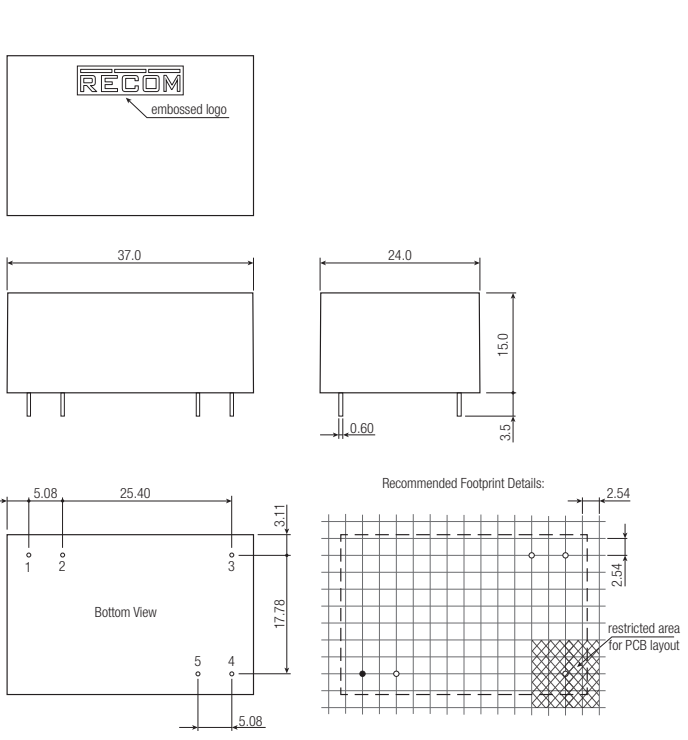


CY1, CY2	CX1
1nF, 2kV	100nF, 2kV

DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case	black plastic, (UL94 V-0)
	PCB	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

NC: not connected
Tolerance: XX.X ±0.5mm
Pin Width: XX.X ±0.05mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	505.0 x 39.7 x 23.2mm
Packaging Quantity		20pcs
Storage Temperature Range		-40°C to +100°C
Storage Humidtiy	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.