Features

Regulated Converter

- 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
- IEC/EN/UL60950 & EN60335-1 certified, EN55032 Class A

RECOM

AC/DC Converter

RAC04-GA

4 Watt Single Output EMC Class A

3 YEAR warranty

UL60950-1 certified
IEC/EN60950-1 certified
UL62368-1 certified
IEC/EN62368-1 certified
EN61558-1 certified
EN61558-2-16 certified
EN60335-1 certified
CB Report

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 certified to IEC/EN/UL60950-1 and EN60335 and are certified 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]
RAC04-05SGA	85-305	5	800	72	1500
RAC04-09SGA	85-305	9	440	77	1000
RAC04-12SGA	85-305	12	330	78	500
RAC04-24SGA	85-305	24	170	80	150
On Request					
RAC04-3.3SGA	85-305	3.3	1210	70	2000
RAC04-15SGA	85-305	15	270	78	200

Notes:

Note1: Efficiency is tested at 230VAC and full load at +25°C ambient

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

Model Numbering

RAC04-__ SGA

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

Ordering Examples:

RAC04-12SGA 12Vout Single Output EMC Class A

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 [3,4]	nom. Vin = 230VDC			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				5ms 40ms	
Internal Operating Frequency	100% load at nominal Vin				65kHz	
Output Ripple and Noise [5]	20MHz BW	0°C to 85 °C	5Vout 9Vout 12Vout 24Vout			100mVp-p 120mVp-p 150mVp-p 240mVp-p
		-30 °C to 0 °C	5Vout 9Vout 12Vout 24Vout			200mVp-p 250mVp-p 250mVp-p 300mVp-p

Notes:

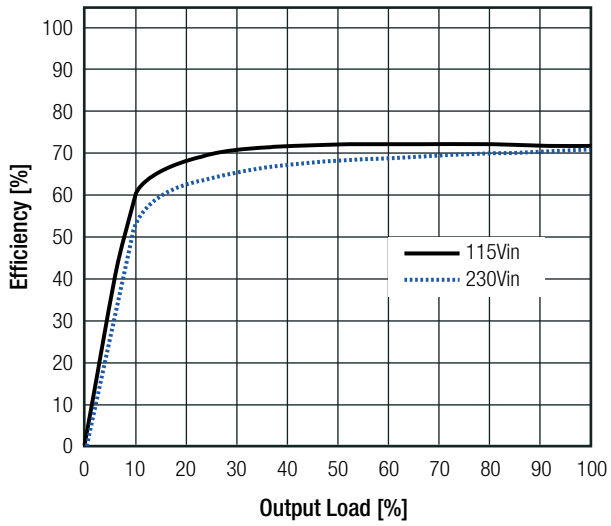
Note3: The products were submitted for safety files at AC-Input operation

Note4: Refer to “Line Derating”

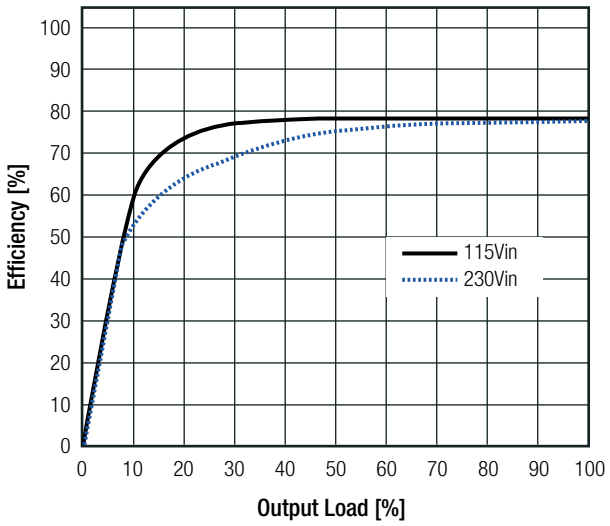
Note5: Measurements are made with a 12” twisted pair-wire with a 0.1µF and 10µF parallel capacitor across output (low ESR)

Efficiency vs. Load

RAC04-05SGA



RAC04-12SGA



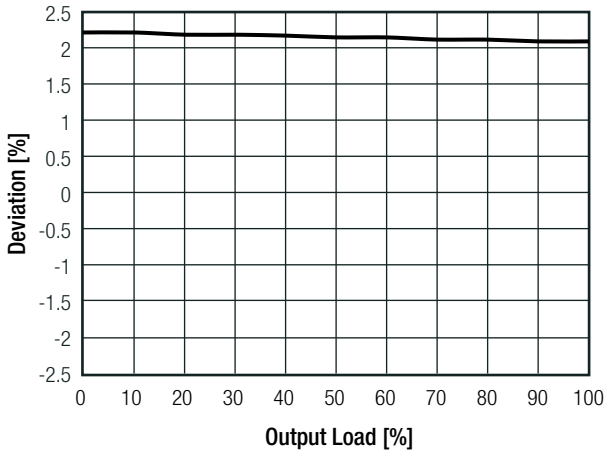
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

REGULATIONS

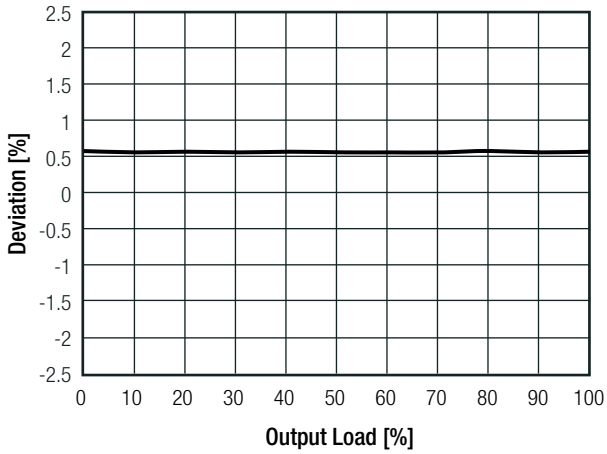
Parameter	Condition	Value
Output Accuracy		±2.5% max.
Line Regulation	low line to high line	±0.5% max.
Load Regulation	10% to 100% load	0.5% max.

Deviation vs. Load
(at 115VAC, 230VAC)

RAC04-05SGA



RAC04-12SGA



PROTECTIONS

Parameter	Type		Value	
Input Fuse [6]	internal		T1A slow blow type, 300V	
Short Circuit Protection (SCP)	below 100mΩ		long-term mode, auto recovery	
Over Voltage Protection (OVP)	5Vout 9Vout 12Vout 24Vout		5.3V - 6.8V 10.3V - 12.2V 12.6V - 16.2V 25.2V - 32.4V	hiccup mode, auto recovery
Over Voltage Category			OVCII	
Over Current Protection (OCP)	5Vout 9Vout 12Vout 24Vout		0.91A - 2.2A 0.49A - 1.25A 0.37A - 0.95A 0.19A -0.45A	hiccup mode, auto recovery
Class of Equipment			Class II	
Isolation Voltage [7]	I/P to O/P	rated for 1 minute	3kVAC/10mA	
Isolation Resistance			10MΩ min.	
Isolation Capacitance			800pF min. / 1200pF max.	
Insulation Grade			reinforced	
Leakage Current	277VAC, 50Hz		0.1mA max.	

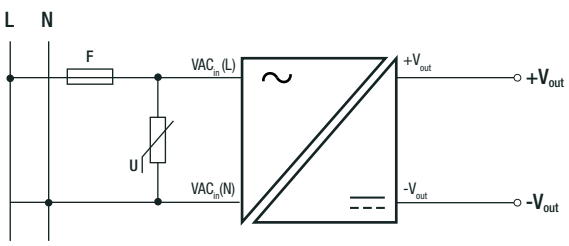
Notes:

Note6: Refer to local wiring regulations if input over-current protection is also required

Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note8: For operation ≥230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series

Protection Circuit

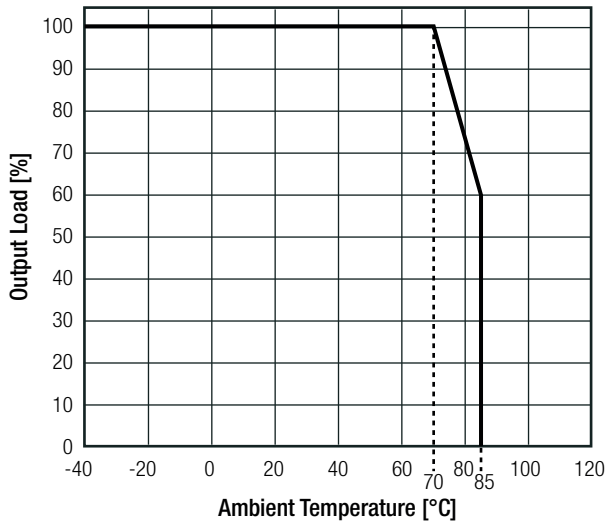


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

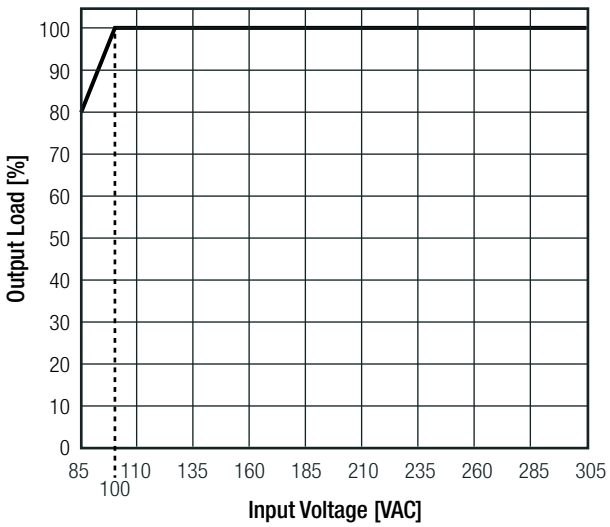
ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	-40°C to +70°C
		refer to derating graph	-40°C to +85°C
Maximum Case Temperature			+100°C
Temperature Coefficient			0.03%/K
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	17 x 10^3 hours

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



Line Derating



SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E196683-A4-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		UL62368-1, 2nd Edition CAN/CSA C22.2 No 62368-1-14
Information Technology Equipment, General Requirements for Safety	SA1703184S 001	EN60950-1: 2006 + A2:2013
Information Technology Equipment, General Requirements for Safety (CB)		IEC60950-1:2005, 2nd Edition + A2:2013
Audio/video, information and communication technology equipment. Safety requirements	4787985921-20171025-CB	EN62368-1: 2014
Audio/video, information and communication technology equipment. Safety requirements (CB)		IEC62368-1:2014, 2nd Edition
Household and similar electrical appliances – Safety – Part 1: General requirements	211-600771-000	EN60335-1:2012+A12:2017
Household and similar electrical appliances – Safety – Part 1: General requirements (CB)		IEC60335-1:2010, 5th Edition + A1:2013
Household and similar electrical appliances – Safety – Part 1: General requirements	SA1703184L 01001	EN60335-1:2012+A11:2014
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure		EN62233:2008

continued on next page

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

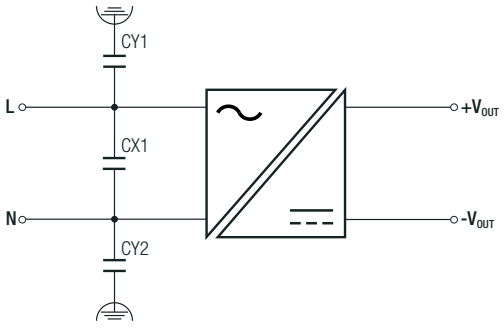
Certificate Type (Safety)	Report / File Number	Standard
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V	SA 1703184L 02001	EN61558-1: 2005 + A1:2009
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements		EN61558-2-16: 2009 + A1:2013
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V	211-600770-000	EN61558-1: 2005 + A1:2009
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements		EN61558-2-16: 2009 + A1:2013
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V (CB)	211-600770-000	IEC61558-1:2005, 2nd Edition + A1:2009
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements (CB)		IEC61558-2-16:2009, 1st Edition + A1:2013
EAC	RU-AT.03.67361	TP TC 004/020, 2011
RoHS 2+		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements (9)	EA1703184E 01001	EN55032: 2015, Class A
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices	EA1703184F 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 Port ±1kV	EN61000-4-4: 2012, Criteria A
Surge Immunity	AC 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% Interruptions >95%	EN61000-4-11: 2004, Criteria A EN61000-4-11: 2004, Criteria A EN61000-4-11: 2004, Criteria C

Notes:

Note9: If output is connected to GND, please contact RECOM tech support for advice

EMC Filtering according to EN55014-1 / EN55032 Class B Compliance



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

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case PCB	black plastic, (UL94V-0) FR4, (UL94V-0)
Dimension (LxWxH)		37.0 x 24.0 x 15.0mm
Weight		20g typ.

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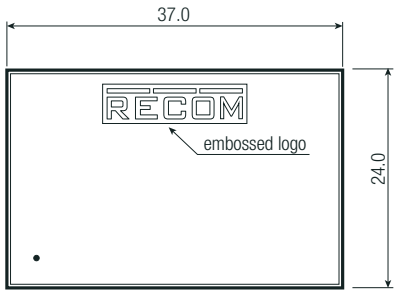
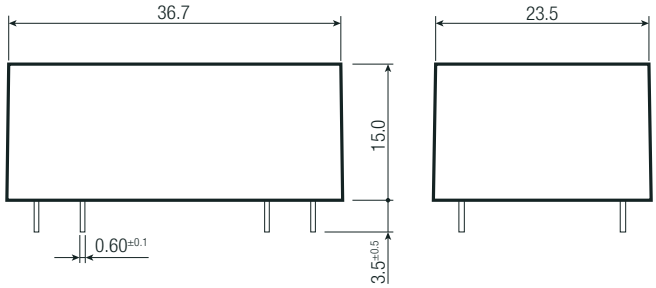
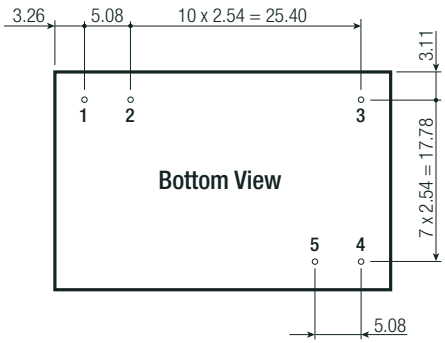
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

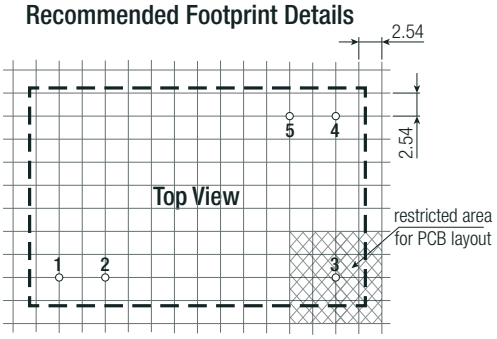
Dimension Drawing (mm)







Recommended Footprint Details



Pin Connections

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

NC: Not Connected
Tolerance: xx.x ±0.5mm
Pin Width: xx.xx ±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 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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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
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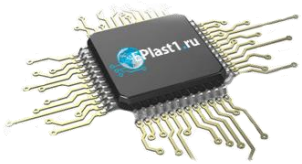
- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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