

Features

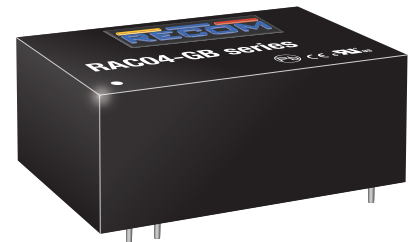
- Universal input 85-305VAC
- 4W PCB mount package
- <75mW No load power consumption
- Ultra low profile, compact size
- -40°C to +85°C Operating temperature
- Continuous SCP, OCP, OVP
- IEC/EN/UL60950 & CE certified, EN55032 Class B

Regulated Converter



RAC04-GB

**4 Watt
Single
Output
EMC Class B**



UL60950-1 certified
IEC/EN60950-1 certified
UL62368-1 pending
IEC/EN62368-1 certified
EN61558-1 certified
EN61558-2-16 certified
IEC60950-1 CB
IEC62368-1 CB

Description

The RAC04-GB 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-GB have a built-in Class B / FCC Part 15 EMC filter, are certified to IEC/EN/UL60950-1 and are pending to IEC/EN/UL62368 and EN61558 safety standards and come with a three year warranty.

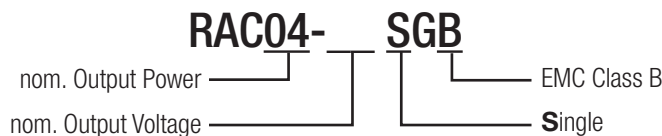
Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ ⁽¹⁾ [%]	Max. Capacitive Load ⁽²⁾ [µF]
RAC04-3.3SGB	85-305	3.3	1210	70	2000
RAC04-05SGB	85-305	5	800	72	1500
RAC04-09SGB ⁽³⁾	85-305	9	440	77	1000
RAC04-12SGB	85-305	12	330	78	500
RAC04-15SGB	85-305	15	270	78	200
RAC04-24SGB	85-305	24	170	80	150

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
 Note3: Minimum order quantity ≥2000pcs

Model Numbering



Ordering Examples:

RAC04-12SGB 12Vout Single Output EMC Class B

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

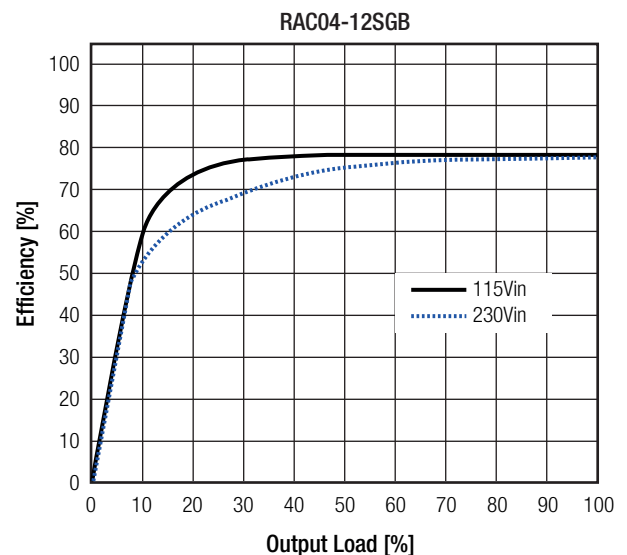
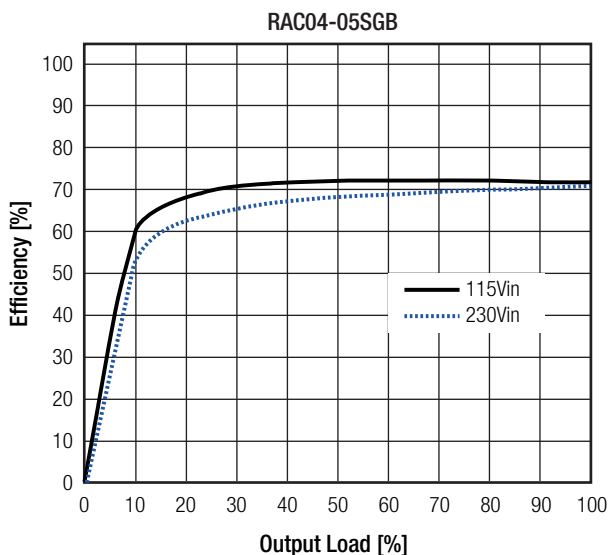
BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi-type		
Input Voltage Range ⁽⁴⁾	refer to line derating graph on PA-4		85VAC 120VDC		305VAC 430VDC
Input Current	115VAC 230VAC			85mA 55mA	
Inrush Current	cold start at 25°C	115VAC 230VAC			10A 20A
No load Power Consumption					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			10ms 40ms	
Internal Operating Frequency	100% load at nominal Vin			65kHz	
Output Ripple and Noise ⁽⁵⁾	20MHz BW	0°C to 85 °C	3.3Vout 5Vout 9Vout 12Vout 15Vout 24Vout		100mVp-p 100mVp-p 120mVp-p 150mVp-p 200mVp-p 240mVp-p
		-30 °C to 0 °C	3.3Vout 5Vout 9Vout 12Vout 15Vout 24Vout		200mVp-p 200mVp-p 250mVp-p 250mVp-p 300mVp-p 300mVp-p

Notes:

Note4: The products were submitted for safety files at AC-Input operation

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

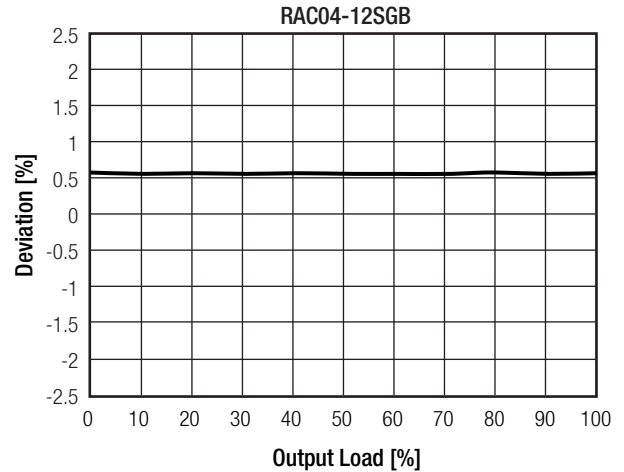
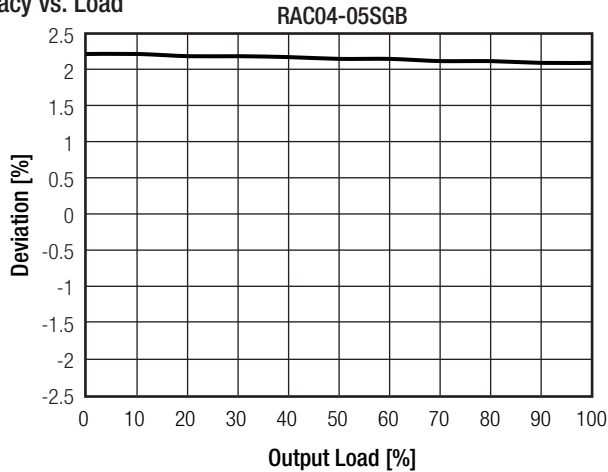


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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.

Accuracy vs. Load



PROTECTIONS

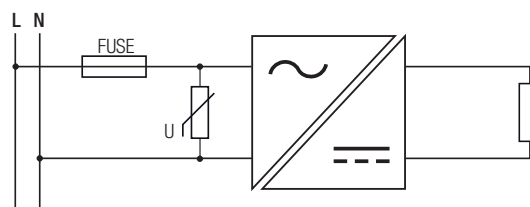
Parameter	Type	Value
Input Fuse	internal	T1A slow blow type, 300V
Short Circuit Protection (SCP)	below 100mΩ	long-term mode, auto recovery
Over Voltage Protection (OVP)	3.3Vout	3.8V - 4.9V
	5Vout	5.3V - 6.8V
	9Vout	10.3V - 12.2V
	12Vout	12.6V - 16.2V
	15Vout	15.75V - 20.3V
	24Vout	25.2V - 32.4V
Over Voltage Category		OVCII
Over Current Protection (OCP)	3.3Vout	1.41A - 3A
	5Vout	0.91A - 2.2A
	9Vout	0.49A - 1.25A
	12Vout	0.37A - 0.95A
	15Vout	0.29A - 0.72A
	24Vout	0.19A - 0.45A
Class of Equipment		Class II
Isolation Voltage ⁽⁶⁾	I/P to O/P	rated for 1 minute
Isolation Resistance		10MΩ min.
Isolation Capacitance		800pF min. 1200pF max.
Insulation Grade		reinforced
Leakage Current	277VAC, 50Hz	0.1mA max.

Notes:

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: For operation ≥230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series

Protection Circuit



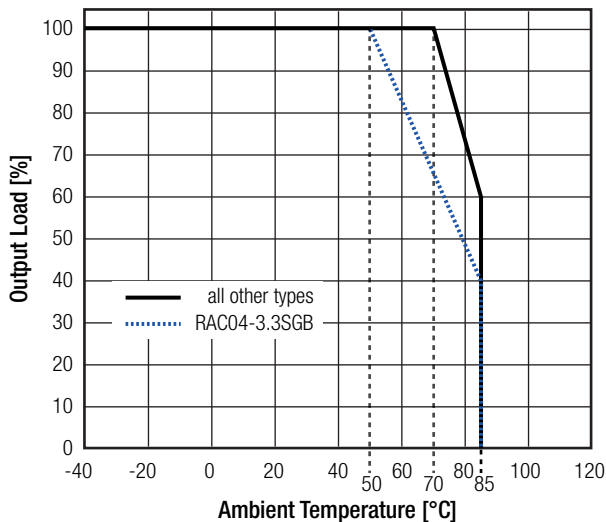
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ENVIRONMENTAL

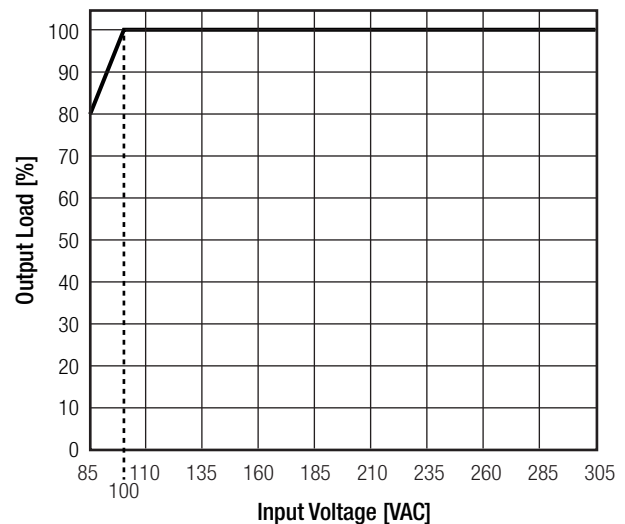
Parameter	Condition		Value
	(@ natural convection 0.1m/s) (see graph)	with derating	
Operating Temperature Range			-40°C to + 85°C
Maximum Case Temperature			+100°C
Temperature Coefficient			± 0.03%/°C
Operating Altitude			3000m
Operating Humidity	non-condensing		5% - 95% RH
Pollution Degree			PD2
Shock			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 ³ hours
		+70°C	17 x 10 ³ hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)



Line Derating Graph



SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)	SA1703184S 001	EN60950-1: 2006 + A2, 2013
Information Technology Equipment, General Requirements for Safety (CB)		IEC60950-1, 2nd Edition: 2005 + AM2, 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 (CB)	4787985921-20171025-CB	IEC62368-1, 2nd Edition: 2014 EN62368-1: 2014
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements	SA 1709184L 02001	EN61558-1: 2005 + A1, 2009 EN61558-2-16: 2009 + A1, 2013
RoHs 2+		RoHS 2011/65/EU + AM2015/863

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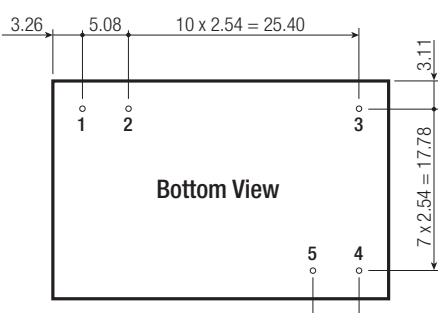
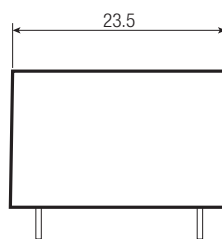
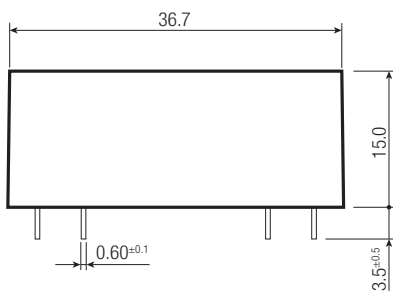
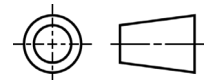
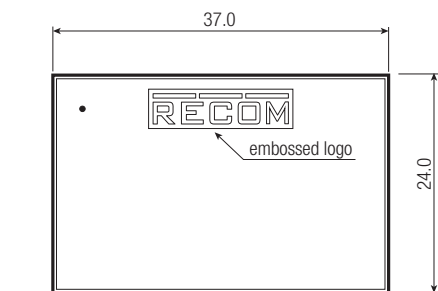
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EA1703184E 01001	EN55032: 2015, Class B
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 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%	EN61000-4-11: 2004, Criteria A
	Voltage Dips 30%	EN61000-4-11: 2004, Criteria A
	Voltage Interruptions >95%	EN61000-4-11: 2004, Criteria C

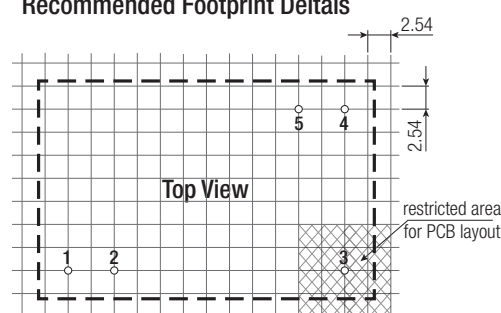
DIMENSION AND PHYSICAL CHARACTERISTICS

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

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.X ±0.05mm

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

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.

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