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

Description

The RACO3-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 RACO3-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	

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



Ordering Example

BASIC CHARACTERISTICS

RACO3-12SGA = 3W Output Power, 12V Output Voltage, Single Output, EMC Class A

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

Parameter	Condition		Min.	Тур.	Max.
Internal Input Filter					Pi-Type
Input Voltage Range			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%		
ower 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 nom	ninal Vin		65kHz	

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RAC03-GA

3 Watt
Single
Output
EMC Class A













UL60950-1 Certified IEC/EN60950-1 Certified UL62368-1 Pending IEC/EN62368-1 Pending EN61558-1 Pending EN61558-2-16 Pending



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Zertifiziert nach ISO 9001:2015



Series

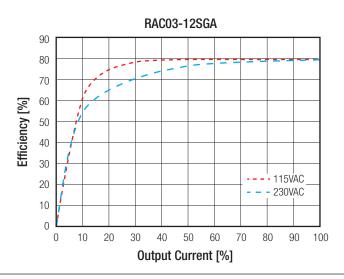
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

Output Ripple and Noise ⁽³⁾	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:

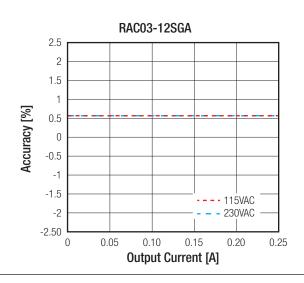
Note3: Measurements are made with a 12" twisted pair-wire with a 0.1µF and 10µF parallel capacitor across output (low ESR).

Efficiency vs. Load RAC03-05SGA 90 80 70 60 Efficiency [%] 50 40 30 115VAC 20 230VAC 10 0 90 100 **Output Current [%]**



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 RAC03-05SGA 2.5 2 1.5 1 Accuracy [%] 0.5 0 -0.5 -1 -1.5 115VAC 230VAC -2 -2.50 0.1 0.4 0.5 0.6 0 0.2 **Output Current [A]**





Series

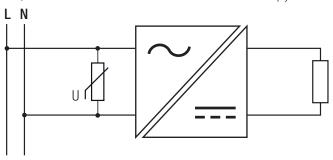
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

PROTECTIONS				
Parameter		Туре	Value	
Input Fuse		internal	T1A, 300V	
Short Circuit Protection (SCP)	bel	ow 100mΩ	long-term mode, auto recovery	
		3.3Vout	3.8V - 4.9V, hiccup mode auto recovery	
		5Vout	5.3V - 6.8V, hiccup mode auto recovery	
Over Voltage Protection (OVP)		12Vout	12.6V - 16.2V, hiccup mode auto recovery	
		15Vout	15.75V - 20.3V, hiccup mode auto recovery	
		24Vout	25.2V - 32.4V, hiccup mode auto recovery	
		3.3Vout	1.41A - 3A, hiccup mode auto recovery	
		5Vout	0.91A - 2.2A, hiccup mode auto recovery	
Over Current Protection (OCP)		12Vout	0.37A - 0.95A, hiccup mode auto recovery	
		15Vout	0.29A - 0.72A, hiccup mode auto recovery	
		24Vout	0.19A - 0.45A, hiccup mode auto recovery	
Class of Equipment			Class II	
Over Voltage Category (OVC)			OVC II	
Isolation Voltage ⁽⁴⁾	I/P to O/P	rated for 1 minute	3kVAC/10mA	
Isolation Resistance			10MΩ min.	
Insulation Grade			Reinforced	
Leakage Current	27	7VAC, 50Hz	0.1mA max.	

Notes:

Note4: For repeat Hi-Pot testing, reduce the time and/or the test voltage.

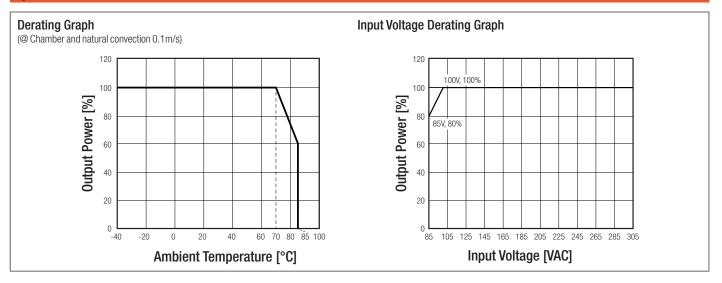
Note5: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series.



ENVIRONMENTAL						
Parameter	Condition		Value			
Operating Temperature Range	without derating (@ natural convection 0.7	-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.			
VIDIAUOII			along x,y,z axes for 6 cycles			
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	100 x 10 ³ hours			
וטוווווו	according to MIL-HDDR-2171, G.B.	+70°C	100 x 10 ³ hours			
continued on next page						



Series



SAFETY AND CERTIFICATION		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for	SA17031845 001	IEC60950-1, 2nd Edition, 2005 + A1, 2009 + A2, 2013
Safety (LVD)	SA17031043 001	EN60950-1, 2006 + A11, 2009 + A1, 2010 + A12, 2011 +A2, 2013
Information Technology Equipment, General Requirements	E196683-A3-UL	UL60950-1, 2nd Edition, 2014
for Safety	L130003-A3-0L	CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014
Audio/video, information and communication technology	pending	UL62368-1
equipment. Safety requirements	politility	CAN/CSA C22.2 No 62368-1
Audio/video, information and communication technology	pending	IEC62368-1
equipment. Safety requirements	portaing	EN62368-1
Household and similar electrical appliances - Safety. General	SA1703184L 01001	EN60335, 2012 + A11, 2014
requirements	0/11/001012 01001	21000000, 2012 1 7(11, 2011
Measurement methods for electromagnetic fields of		
household appliances and similar apparatus with regard to	SA1703184L 01001	EN62233, 2008
human exposure		
Safety of power transformers, power supplies, reactors and	P.	EN61558-1, 2005 + A1, 2009
similar products for supply voltages up to 1100 V Part 2:	pending	EN61558-2-16, 2009 + A1, 2013
Particular requirements		D-110 0044 /05 /511 . AM004 5 /000
RoHs 2+		RoHS 2011/65/EU + AM2015/863
EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance	EA1703184E 01001	EN55032, 2015, Class A
characteristics - Limits and methods of measurement	with external components	LN33032, 2013, 0lass A
Limitations on the amount of electromagnetic intererence	EA1703184E 01001	47 CFR FCC Part 15 Subpart B: 2016
allowed from digital and electronic devices	LA1703104L 01001	47 GITT OOT alt 10 Subpart B. 2010
ESD Electrostatic discharge immunity test	Air ±8kV, Contact ±4kV	EN61000-4-2, 2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity	3V/m	EN61000-4-3, 2006 + A1, 2008 + A2, 2010, Criteria A
test	37/111	EN01000-4-3, 2000 + A1, 2000 + A2, 2010, Gitteria A
Fast Transient and Burst Immunity	AC Power Port ±1kV	EN61000-4-4, 2012, Criteria A
Tast Hansion and Baret minianty		END4000 4 F 0044 0 11 1 D
Surge Immunity	AC Power Port L-N ±1kV	EN61000-4-5, 2014, Criteria B
-		
Surge Immunity	AC Power Port L-N ±1kV AC Power Port 3V	EN61000-4-5, 2014, Criteria B EN61000-4-6, 2014, Criteria A
Surge Immunity Immunity to conducted disturbances, induced by radio-		
Surge Immunity Immunity to conducted disturbances, induced by radio-	AC Power Port 3V	EN61000-4-6, 2014, Criteria A
Surge Immunity Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port 3V Voltage Dips >95%	EN61000-4-6, 2014, Criteria A EN61000-4-11, 2004, Criteria A



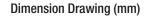
Series

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

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

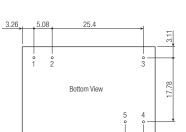
TBD

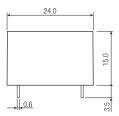
DIMENSION and PHYSICAL CHARACTERISTICS					
Parameter	Туре	Value			
Material	Case	black plastic, (UL94 V-0)			
IVIALEITAI	PCB	FR4, (UL94 V-0)			
Package Dimension (LxWxH)		37.0 x 24.0 x 15.0mm			
Package Weight		20g typ.			

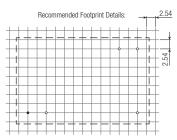












Ψ



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

Tolerance: XX.X ± 0.5 mm Pin Width: XX.X ± 0.05 mm

PACKAGING INFORMATION					
Parameter	Туре	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 are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer 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.

Regulated

Converters

3W PCB Mount Package

Universal Input 85-305VAC

- <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

RECON AC/DC Converter

RAC03-GB

3 Watt **Single Output EMC Class B**











UL60950-1 Certified IEC/EN60950-1 Certified UL62368-1 Pending IEC/EN62368-1 Pending EN61558-1 Pending EN61558-2-16 Pending

Description

The RAC03-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 RAC03-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 Gui	de				
Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽¹⁾ [%]	Max. Capacitive Load ⁽²⁾ [μF]
RAC03-05SGB	85-305	5	600	72	1500
RAC03-12SGB	85-305	12	250	78	500
RAC03-24SGB	85-305	24	130	80	150

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



Ordering Example

RAC03-12SGB = 3W Output Power, 12V Output Voltage, Single Output, EMC Class B

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

Parameter	Condition		Min.	Тур.	Max.
Internal Input Filter					Pi-Type
Input Voltage Range			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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Series

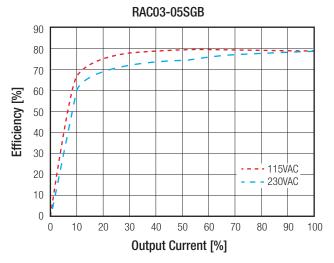
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

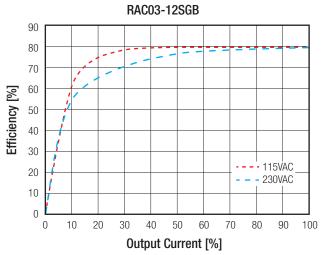
	0°C to 85°C	5 Vout 12Vout		100mVp-p 150mVp-p	
Output Ripple and Noise ⁽³⁾	20MHz BW	-30°C to 0°C	24Vout 5Vout 12Vout		240mVp-p 200mVp-p 250mVp-p
			24Vout		300mVp-p

Notes:

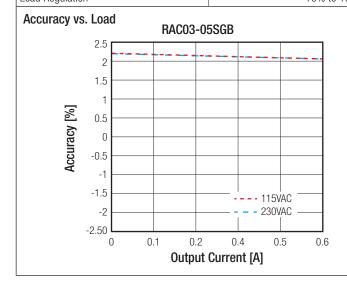
Note3: Measurements are made with a 12" twisted pair-wire with a 0.1µF and 10µF parallel capacitor across output (low ESR).

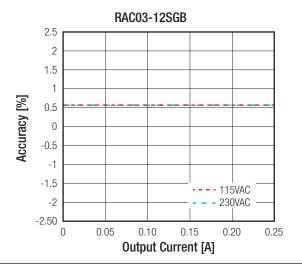
Efficiency vs. Load





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.







Series

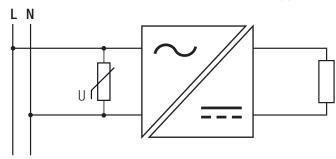
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

PROTECTIONS			
Parameter		Туре	V alue
Input Fuse		internal	T1A, 300V
Short Circuit Protection (SCP)	bel	ow 100mΩ	long-term mode, auto recovery
Over Voltage Protection (OVP)		5Vout 12Vout 24Vout	5.3V - 6.8V, hiccup mode auto recovery 12.6V - 16.2V, hiccup mode auto recovery 25.2V - 32.4V, hiccup mode auto recovery
Over Current Protection (OCP)		5Vout 12Vout 24Vout	0.91A - 2.2A, hiccup mode auto recovery 0.37A - 0.95A, 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 ⁽⁴⁾	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	27	7VAC, 50Hz	0.1mA max.

Notes:

Note4: For repeat Hi-Pot testing, reduce the time and/or the test voltage.

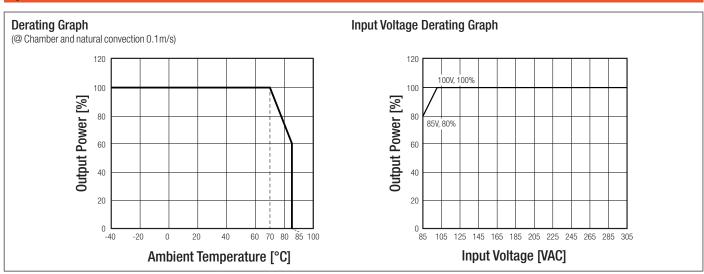
Note5: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series.



Parameter	Condition		Value
Operating Temperature Range	without derating (@ natural convection 0.	1m/s, see graph)	-40°C to +70°C
Maximum Case Temperature			+100°C
Temperature Coefficient			±0.03%/°C
Operating Altitude			3000m
Operating Humidity	non-condensing	non-condensing	
Pollution Degree			
Shock			20G/11ms pulse, 3 times at each x, y, z axes
Vibration			10-150Hz, 2G 10min./1cycle, period 60min.
VIDIATION			along x,y,z axes for 6 cycles
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	100 x 10 ³ hours
IVITOF	according to Mile-HDBK-217F, G.B.	+70°C	100 x 10 ³ hours



Series



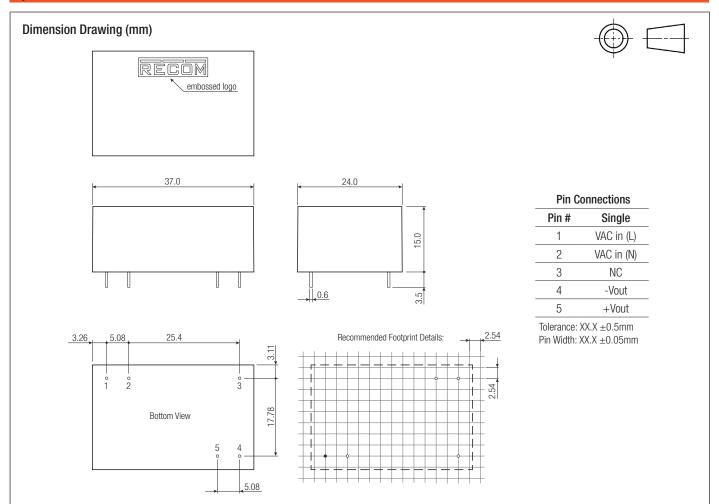
SAFETY AND CERTIFICATION		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)	SA17031845 001	IEC60950-1, 2nd Edition, 2005 + A1, 2009 + A2, 2013 EN60950-1, 2006 + A11, 2009 + A1, 2010 + A12, 2011 +A2, 2013
Information Technology 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 CAN/CSA C22.2 No 62368-1
Audio/video, information and communication technology equipment. Safety requirements	pending	IEC62368-1 EN62368-1
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	EN55032, 2015, Class B
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 + A1, 2008 + 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

DIMENSION and PHYSICAL CHARACTERISTICS					
Parameter	Туре	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.			
continued on next page					



Series

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



PACKAGING INFORMATION					
Parameter	Туре	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.			

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Regulated Converters

- 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
- EN60335, EN60950, UL60950 & CE Pending

Description

The RACO4-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 RACO4-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 Gu	ide				
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
RAC04-12SGA	85-305	12	330	78	500
RAC04-24SGA	85-305	24	170	80	150

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

DACIC CHADACTEDICTICS



Ordering Example

RACO4-12SGA = 4W Output Power, 12V Output Voltage, Single Output, EMC Class A

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

Parameter	Condition		Min.	Тур.	Max.
Internal Input Filter					Pi-Type
Input Voltage Range			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	

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RAC04-GA

4 Watt
Single
Output
EMC Class A













UL60950-1 Certified IEC/EN60950-1 Certified UL62368-1 Pending IEC/EN62368-1 Pending EN61558-1 Pending EN61558-2-16 Pending



Series

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

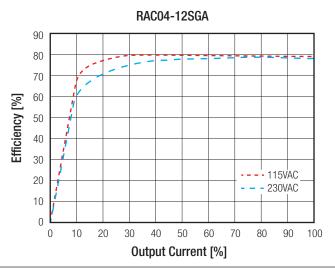
		0°C to 85°C	5 Vout 12Vout	100mVp-p 150mVp-p
Output Ripple and Noise(3)	20MHz BW		24Vout 5Vout	240mVp-p 200mVp-p
		-30°C to 0°C	12Vout	250mVp-p
			24Vout	300mVp-p

Notes:

Note3: Measurements are made with a 12" twisted pair-wire with a 0.1µF and 10µF parallel capacitor across output (low ESR).

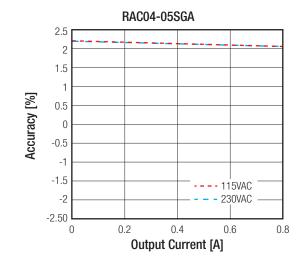
Efficiency vs. Load RAC04-05SGA 80 70 60 Efficiency [%] 50 40 30 - 115VAC 20 230VAC 10 0 50 20 100

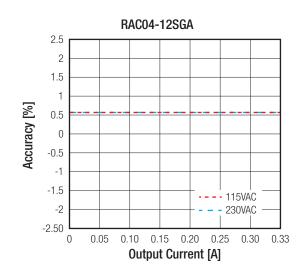
Output Current [%]



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







Series

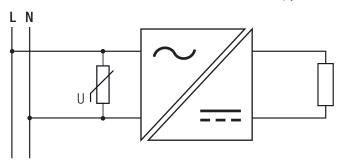
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

PROTECTIONS				
Parameter		Туре	V alue	
Input Fuse		internal	T1A, 300V	
Short Circuit Protection (SCP)	bel	ow 100mΩ	long-term mode, auto recovery	
		5Vout	5.3V - 6.8V, hiccup mode auto recovery	
Over Voltage Protection (OVP)		12Vout	12.6V - 16.2V, hiccup mode auto recovery	
		24Vout	25.2V - 32.4V, hiccup mode auto recovery	
		5Vout	0.91A - 2.2A, hiccup mode auto recovery	
Over Current Protection (OCP)		12Vout	0.37A - 0.95A, hiccup mode auto recovery	
		24Vout	0.19A - 0.45A, hiccup mode auto recovery	
Class of Equipment			Class II	
Over Voltage Category (OVC)			OVC II	
Isolation Voltage ⁽⁴⁾	I/P to O/P	rated for 1 minute	3kVAC/10mA	
Isolation Resistance			10M Ω min.	
Insulation Grade			Reinforced	
Leakage Current	27	7VAC, 50Hz	0.1mA max.	

Notes:

Note4: For repeat Hi-Pot testing, reduce the time and/or the test voltage.

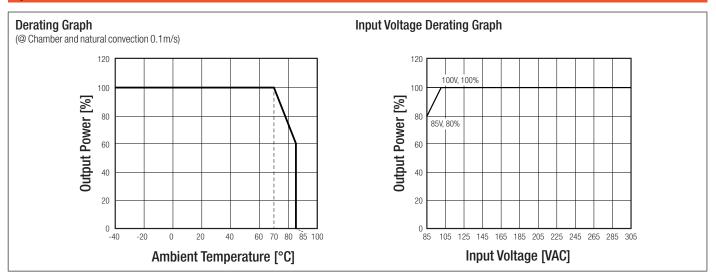
Note5: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series.



ENVIRONMENTAL						
Parameter	Condition		Value			
Operating Temperature Range	without derating (@ natural convection 0	.1m/s, see graph)	-40°C to +70°C			
Maximum Case Temperature			+100°C			
Temperature Coefficient			±0.03%/°C			
Operating Altitude						
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 100 x 10 ³ hours			
	continued on next page					



Series



Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)	SA17031845 001	IEC60950-1, 2nd Edition, 2005 + A1, 2009 + A2, 2013 EN60950-1, 2006 + A11, 2009 + A1, 2010 + A12, 2011 +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 CAN/CSA C22.2 No 62368-1
Audio/video, information and communication technology equipment. Safety requirements	pending	IEC62368-1 EN62368-1
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 + A1, 2008 + 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



Series

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

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

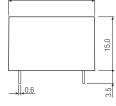
TBD

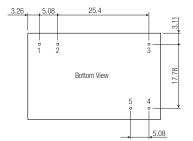
DIMENSION and PHYSICAL CHARACTERISTICS			
Parameter	Туре	Value	
Material	Case	black plastic, (UL94 V-0)	
Material	PCB	FR4, (UL94 V-0)	
Package Dimension (LxWxH)		37.0 x 24.0 x 15.0mm	
Package Weight		20g typ.	

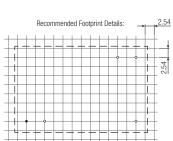
Dimension Drawing (mm)











Pin Connections

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

Tolerance: XX.X ± 0.5 mm Pin Width: XX.X ± 0.05 mm

PACKAGING INFORMATION		
Parameter	Туре	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 are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer 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.

Regulated Converters

- 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

Description

The RACO4-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 RACO4-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 Gui	ide				
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
RAC04-12SGB	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 nominal input and full load at +25°C ambient Note2: Max. Cap. Load is tested at nominal input and full resistive load

Model Numbering



Ordering Example

BASIC CHARACTERISTICS

RACO4-12SGB = 4W Output Power, 12V Output Voltage, Single Output, EMC Class B

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

Parameter	Condition		Min.	Тур.	Max.
Internal Input Filter					Pi-Type
Input Voltage Range			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 nom	ninal Vin		65kHz	

continued on next page



RAC04-GB

4 Watt
Single
Output
EMC Class B











UL60950-1 Certified IEC/EN60950-1 Certified UL62368-1 Pending IEC/EN62368-1 Pending EN61558-1 Pending EN61558-2-16 Pending



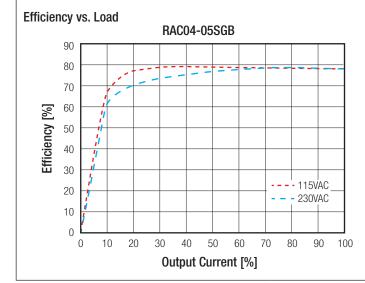
Series

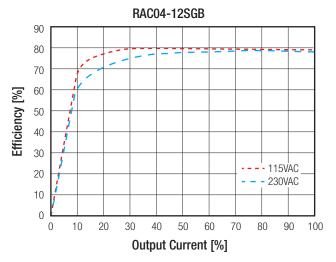
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

Output Ripple and Noise ⁽³⁾	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
Maton.			·	

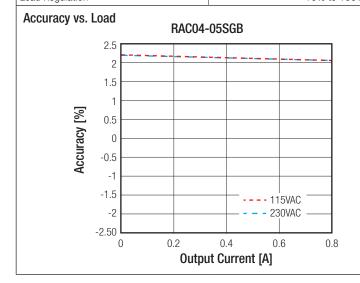
Notes:

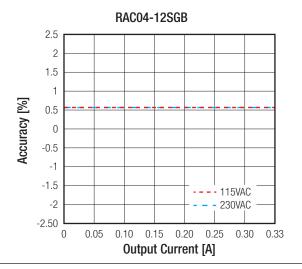
Note3: Measurements are made with a 12" twisted pair-wire with a 0.1µF and 10µF parallel capacitor across output (low ESR).





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.







Series

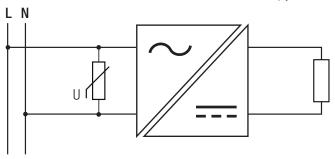
Specifications (measured @ ta=25°C, nom. Vin, full load unless otherwise noted)

PROTECTIONS			
Parameter		Туре	Value
Input Fuse		internal	T1A, 300V
Short Circuit Protection (SCP)	bel	ow 100mΩ	long-term mode, auto recovery
		3.3Vout	3.8V - 4.9V, hiccup mode auto recovery
		5Vout	5.3V - 6.8V, hiccup mode auto recovery
Over Voltage Protection (OVP)		12Vout	12.6V - 16.2V, hiccup mode auto recovery
		15Vout	15.75V - 20.3V, hiccup mode auto recovery
		24Vout	25.2V - 32.4V, hiccup mode auto recovery
		3.3Vout	1.41A - 3A, hiccup mode auto recovery
		5Vout	0.91A - 2.2A, hiccup mode auto recovery
Over Current Protection (OCP)		12Vout	0.37A - 0.95A, hiccup mode auto recovery
		15Vout	0.29A - 0.72A, hiccup mode auto recovery
		24Vout	0.19A - 0.45A, hiccup mode auto recovery
Class of Equipment			Class II
Over Voltage Category (OVC)			OVC II
Isolation Voltage ⁽⁴⁾	I/P to O/P	rated for 1 minute	3kVAC/10mA
Isolation Resistance			10M Ω min.
Isolation Capacitance			800pF min., 1200pF max.
Insulation Grade			Reinforced
Leakage Current	27	7VAC, 50Hz	0.1mA max.

Notes:

Note4: For repeat Hi-Pot testing, reduce the time and/or the test voltage.

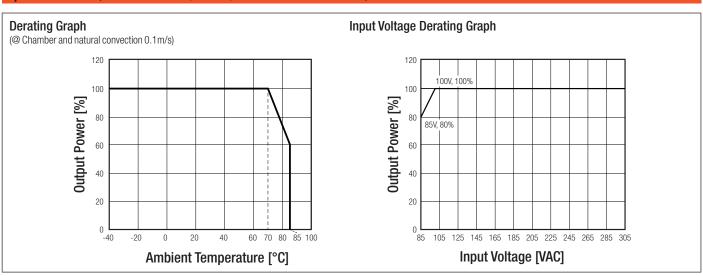
Note5: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC61051-2. eg. EPCOS S14 series.



ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	without derating (@ natural convection 0.7	1 m/s, see graph)	-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.
VIDIATION			along x,y,z axes for 6 cycles
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	100 x 10 ³ hours
IVITOI	according to MIL-HDBR-2171, G.B.	+70°C	100 x 10 ³ hours
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Series



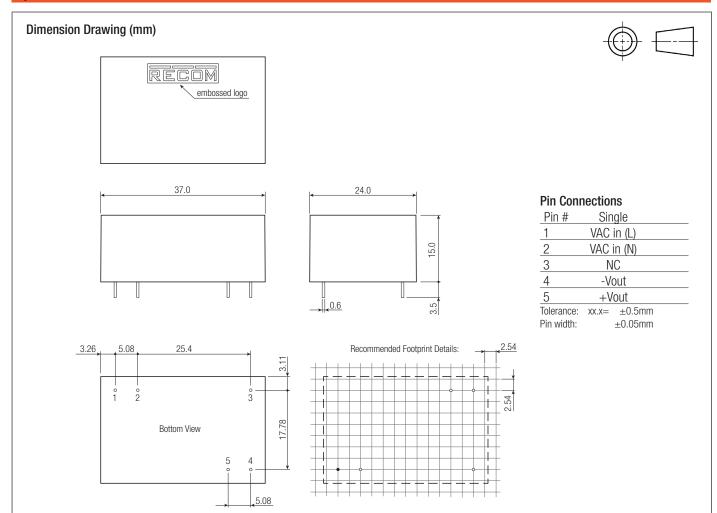
Report / File Number	Standard
SA17031845 001	IEC60950-1, 2nd Edition, 2005 + A1, 2009 + A2, 2013 EN60950-1, 2006 + A11, 2009 + A1, 2010 + A12, 2011 +A2, 2013
E196683-A3-UL	UL60950-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014
pending	UL62368-1 CAN/CSA C22.2 No 62368-1
pending	IEC62368-1 EN62368-1
pending	EN61558-1, 2005 + A1, 2009 EN61558-2-16, 2009 + A1, 2013
	RoHS 2011/65/EU + AM2015/863
Condition	Standard / Criterior
EA1703184E 01001	EN55032, 2015, Class E
EA1703184E 01001	47 CFR FCC Part 15 Subpart B: 2016
Air ±8kV, Contact ±4kV	EN61000-4-2, 2009, Criteria A
3V/m	EN61000-4-3, 2006 + A1, 2008 + A2, 2010, Criteria A
AC Power Port ±1kV	EN61000-4-4, 2012, Criteria A
AC Power Port L-N ±1kV	EN61000-4-5, 2014, Criteria E
AC Power Port 3V	EN61000-4-6, 2014, Criteria A
Voltage Dips >95% Voltage Dips 30%	EN61000-4-11, 2004, Criteria A EN61000-4-11, 2004, Criteria A
	SA17031845 001 E196683-A3-UL pending pending Pending Condition EA1703184E 01001 EA1703184E 01001 Air ±8kV, Contact ±4kV 3V/m AC Power Port ±1kV AC Power Port L-N ±1kV AC Power Port 3V

DIMENSION and PHYSICAL CHARACTERI	STICS	
Parameter	Туре	Value
Material	Case	black plastic, (UL94 V-0)
Material	PCB	FR4, (UL94 V-0)
Package Dimension (LxWxH)		37.0 x 24.0 x 15.0mm
Package Weight		20g typ.
	continued on next page	



Series

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



PACKAGING INFORMATION		
Parameter	Туре	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.

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