

# 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



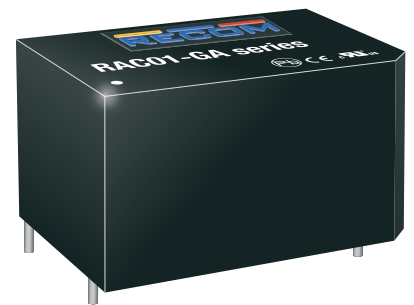
# RAC01-GA

**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 <sup>(1)</sup> [%] | Max. Capacitive Load <sup>(2)</sup> [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 <sup>(3)</sup> | 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 resistive load  
 Note3: Minimum order quantity ≥2000pcs



## Model Numbering



### 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 <sup>(4,5,6)</sup> | nom. Vin= 230VAC         |                  | 85VAC           | 230VAC       | 264VAC               |
| Input Current                          | 115VAC<br>230VAC         |                  |                 | 25mA<br>18mA | 30mA<br>20mA         |
| Inrush Current                         | cold start at 25°C       | 115VAC<br>230VAC |                 |              | 30A<br>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<br>230VAC         |                  |                 |              | 1s<br>2s             |
| Hold-up time                           | 115VAC<br>230VAC         |                  |                 |              | 18ms<br>80ms         |
| Internal Operating Frequency           | 100% load at nominal Vin |                  |                 | 65kHz        |                      |
| Output Ripple and Noise                | 20MHz BW                 | 0°C to 80 °C     | 5Vout<br>12Vout |              | 100mVp-p<br>200mVp-p |
|  |                          | -25 °C to 0 °C   | 5Vout<br>12Vout |              | 200mVp-p<br>300mVp-p |

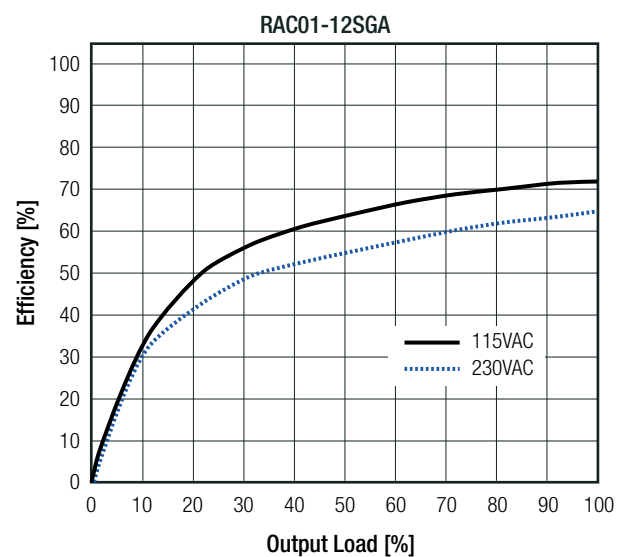
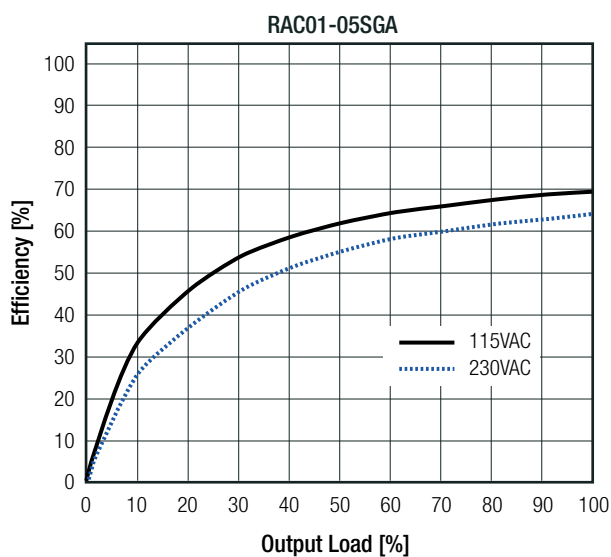
#### Notes:

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**"

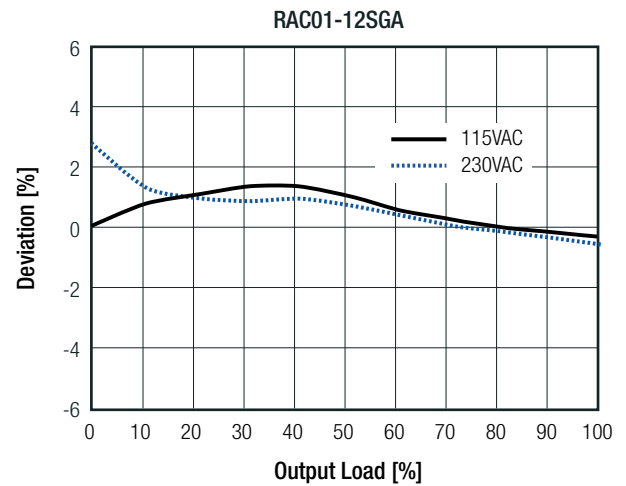
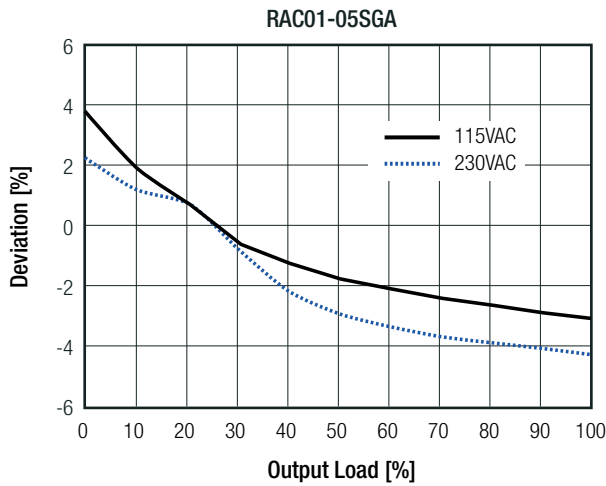
#### Efficiency vs. Load



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

| 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**



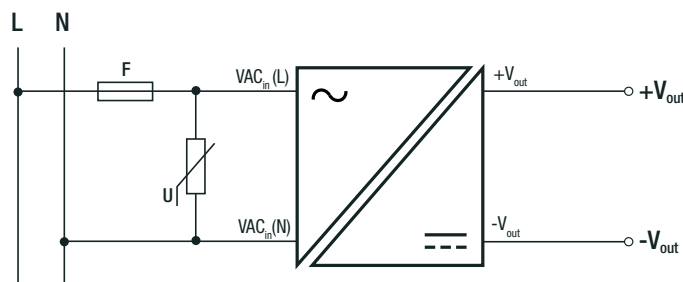
**PROTECTIONS**

| Parameter                        | Type            | Value   |
|----------------------------------|-----------------|---|
| Input Fuse <sup>(7)</sup>        | internal        | fusible resistor, 1Ω/1W                                 |
| Short Circuit Protection (SCP)   | below 100mΩ     | continuous, auto recovery                               |
| Over Voltage Category            |                 | OVCII   |
| Over Current Protection (OCP)    | 5Vout<br>12Vout | 0.22A - 0.5A, hiccup mode<br>0.25A - 0.91A, hiccup mode |
| Class of Equipment               |                 | Class II  |
| Isolation Voltage <sup>(8)</sup> | I/P to O/P      | rated for 1 minute<br>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**



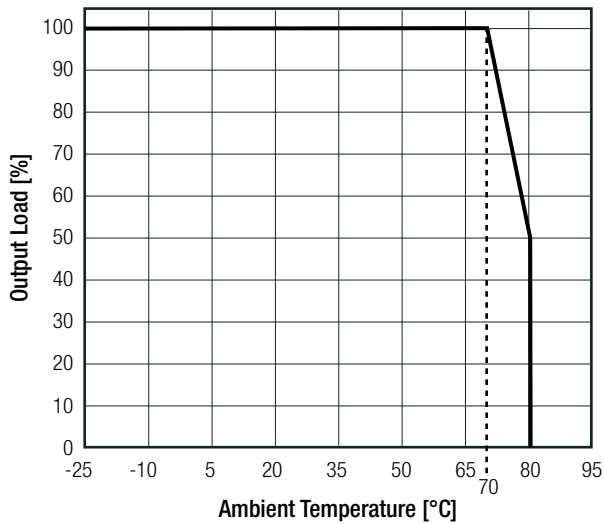
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**ENVIRONMENTAL**

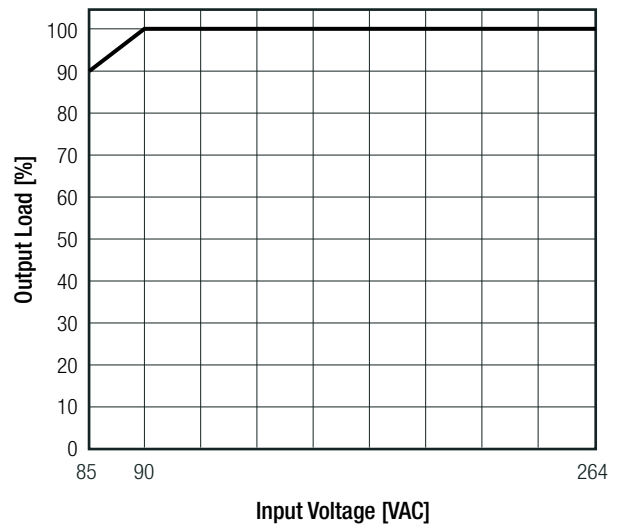
| Parameter                          | Condition                            |                           | Value   |
|------------------------------------|--------------------------------------|---------------------------|---|
| Operating Temperature Range        | @ natural convection 0.1m/s          | 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 <sup>(10)</sup> |                                      |                           | 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 <sup>(11)</sup>               | according to MIL-HDBK-217F, method 2 | +25°C                     | 1691 x 10 <sup>3</sup> hours                                    |
|                                    |                                      | +70°C                     | 424 x 10 <sup>3</sup> hours                                     |

**Derating Graph**

(@ Chamber and natural convection 0.1 m/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**

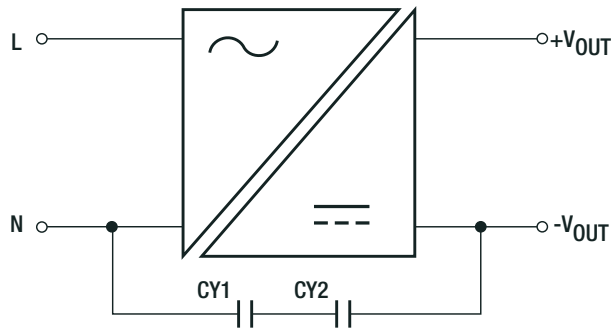
| Certificate Type (Safety)  | Report / File Number           | Standard  |
|--|--------------------------------|---|
| Information Technology Equipment, General Requirements for Safety  | SA1804152L01001                | IEC60950-1:2005 2nd Edition + Am2:2013<br>EN60950-1:2006 + A12:2011 + A2:2013 |
| Audio/Video, information and communication technology equipment - Part1: Safety requirements             | E196683-A5 and<br>E19668-A6001 | UL62368-1, 2nd Edition<br>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<br>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**



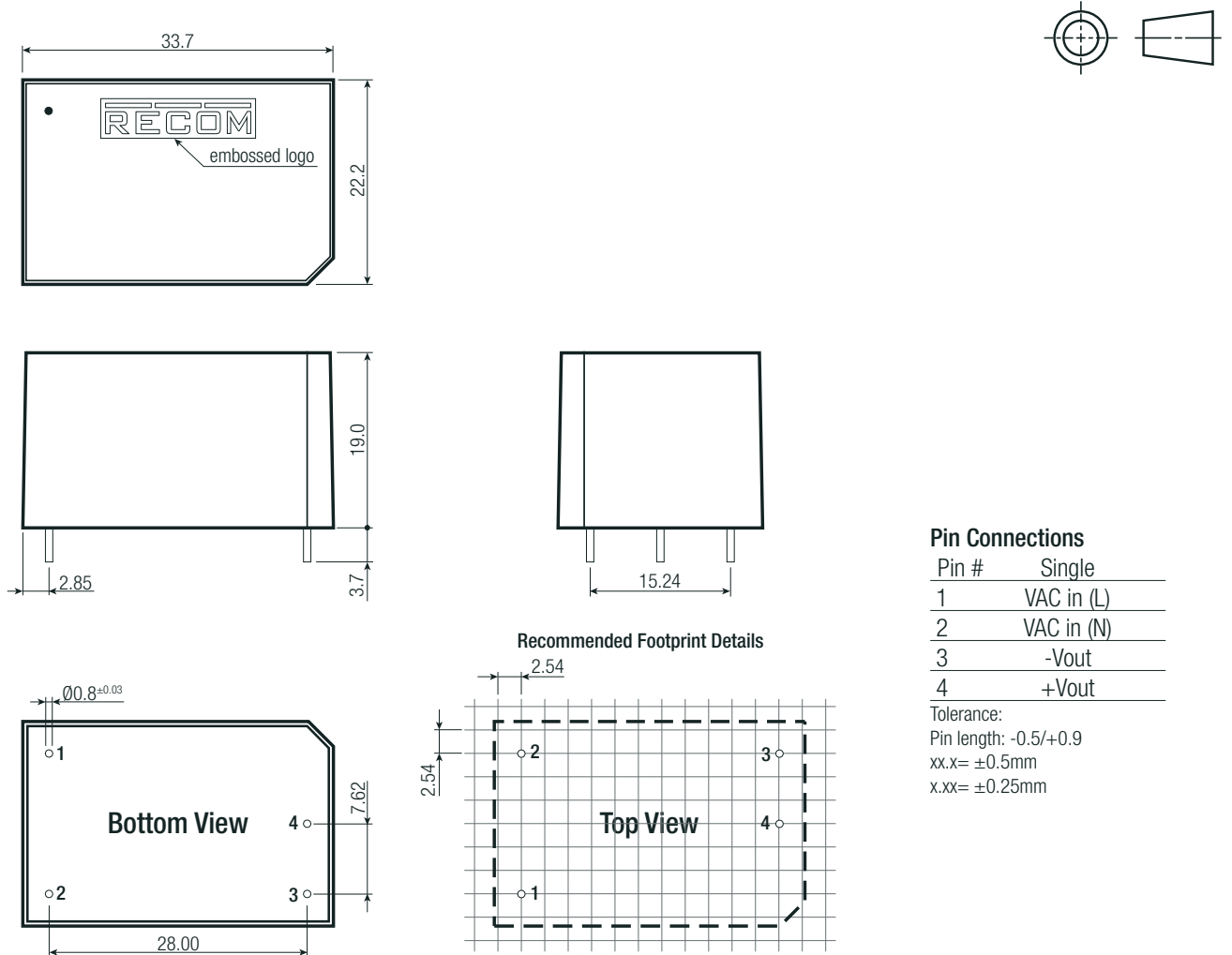
| CY1,CY2   |
|---|
| Vishay 564R30TSD22, SLCC<br>X7R radial, 2.2nF, 3kVDC ±10% |

| DIMENSION AND PHYSICAL CHARACTERISTICS |             |  |
|--|-------------|--|
| Parameter                              | Type        | Value                                    |
| Material                               | case<br>PCB | black plastic (UL94V-2)<br>FR4 (UL94V-0) |
| Dimension (LxWxH)                      |             | 33.7 x 22.2 x 19.0mm                     |
| Weight                                 |             | 12g typ.                                 |

continued on next page

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

### Dimension Drawing (mm)



### 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.      |

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