

Features

- Compact low profile AC-DC power supply
- 80mW no load power consumption
- Class II power supply with 3kVAC isolation
- Extra wide input voltage range (80~264VAC)
- Low output ripple/noise
- EN, UL and CE certified

Regulated Converters

RAC03-C

**3 Watt
Single
Output**



Description

The RAC03-C series is an ultra-compact universal input AC/DC power module for PCB mounting. It features high efficiency, low standby power, high operating temperature, soft start, low output ripple/noise, overload and short-circuit protection as well as a built-in EMC Class B filter. Output voltages range from 3.3VDC to 24VDC, including a 3.8VDC version designed for battery chargers and GSM modems.



Selection Guide

| Part Number | Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ ⁽¹⁾ [%] | Max. Capacitive Load ^(2,3) [µF] |
|-------------|---------------------------|----------------------|---------------------|-----------------------------------|--|
| RAC03-3.3SC | 80-264 | 3.3 | 900 | 67 | 6800 |
| RAC03-3.8SC | 80-264 | 3.8 | 789 | 67 | 6800 |
| RAC03-05SC | 80-264 | 5 | 600 | 72 | 4000 |
| RAC03-09SC | 80-264 | 9 | 333 | 76 | 3000 |
| RAC03-12SC | 80-264 | 12 | 250 | 76 | 680 |
| RAC03-15SC | 80-264 | 15 | 200 | 76 | 470 |
| RAC03-24SC | 80-264 | 24 | 125 | 78 | 200 |

Notes:

- Note1: Efficiency is tested at nominal input and full load at +25°C ambient
 Note2: Measured @ 230VAC / 50Hz / Ta=25°C with constant resistant mode at full load
 Note3: If used @ 115VAC / 60Hz with full load, max. capacitive load is less, please contact RECOM Techsupport for detailed information

Model Numbering



Ordering Examples:

| | | | |
|------------|--------|---------|---------------|
| RAC3-3.3SC | 3 Watt | 3.3Vout | Single Output |
| RAC3-24SC | 3 Watt | 24Vout | Single Output |

PREFERRED ALTERNATIVES
Please consider these alternatives:

RAC03E-K/277

IEC/EN60950-1 certified
 UL60950-1 certified
 CAN/CSA-C22.2 No. 60950-1 certified
 IEC/EN60335-1 certified
 EN55032/14 compliant
 EN55024 compliant
 CB-Report

Specifications (measured at Ta= 25°C, full load otherwise noted)

BASIC CHARACTERISTICS

| Parameter | Condition | Min. | Typ. | Max. |
|--|---|-----------------|--------------|----------------------|
| Input Voltage Range ^(4,5) | nom. Vin = 230VAC | 80VAC 115VDC | | 264VAC 370VDC |
| Input Current | 115VAC 230VAC | | | 85mA 40mA |
| Inrush Current | <0.5ms 115VAC 230VAC | | | 30A 60A |
| No load Power Consumption | 115VAC 230VAC | | | 60mW 100mW |
| Input Frequency Range | AC Input | 47Hz | | 63Hz |
| Minimum Load | | 0% | | |
| Start-up Time | 115VAC 230VAC | | | 0.5s 0.2s |
| Rise Time | 115VAC 230VAC | | 20ms 20ms | |
| Hold-up time | 115VAC 230VAC | 15ms 80ms | | |
| Internal Operating Frequency | 100% load at nominal Vin | | 35kHz | |
| Output Ripple and Noise ⁽⁶⁾ | 20MHz BW 3.3, 3.8, 5Vout all others | | | 120mVp-p 150mVp-p |

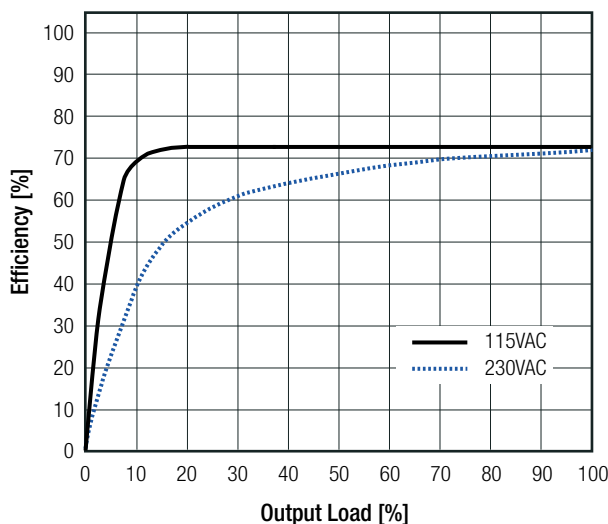
Notes:

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

Note5: Refer to line derating graph on page PA-3

Note6: Measurements are made with a 0.1µF MLCC across output (low ESR)

Efficiency vs. Load



REGULATIONS

| Parameter | Condition | Value |
|--------------------------------|-----------------------|------------|
| Output Accuracy | | ±5.0% max. |
| Line Regulation | low line to high line | ±3.0% max. |
| Load Regulation ⁽⁷⁾ | 10% to 100% load | 6.0% max. |

Notes:

Note7: Operation below 10% load will not harm the converter, but specifications may not be met

Specifications (measured at Ta= 25°C, full load otherwise noted)

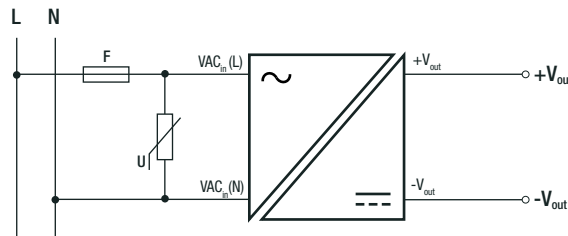
| PROTECTIONS | | | |
|--------------------------------|-------------|---------------------|---------------------------------|
| Parameter | Type | | Value |
| Short Circuit Protection (SCP) | below 100mΩ | | Hiccup mode, automatic recovery |
| Over Voltage Category | | | OVCII |
| Isolation Voltage | I/P to O/P | tested for 1 minute | 3kVAC |
| Isolation Resistance | I/P to O/P | | 1GΩ min. |
| Isolation Capacitance | | | 1000pF typ. |
| Insulation Grade | | | double insulated |
| Leakage Current | | | 0.85mA max. |

Notes:

Note8: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

Note9: MOV required for 230VAC operation. The Varistor should comply with IEC-61051-2. e.g. EPCOS S14 Series

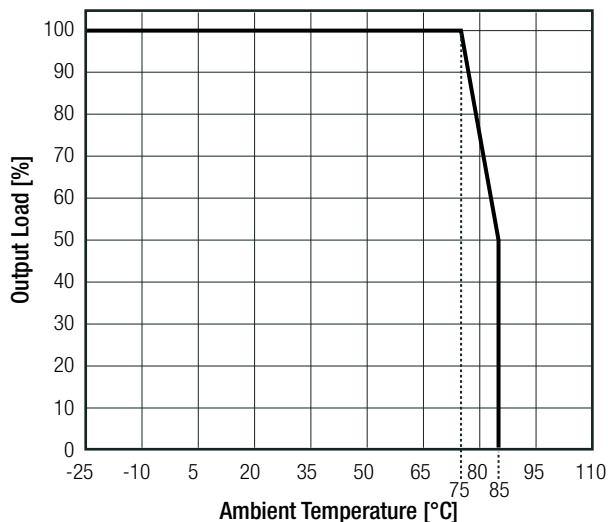
Protection Circuit



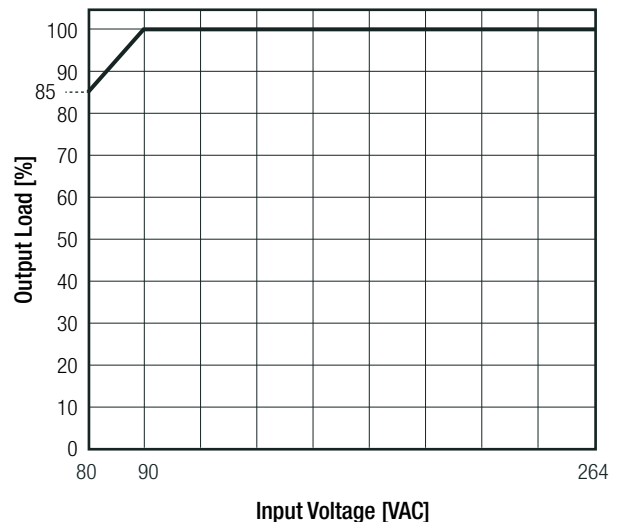
| ENVIRONMENTAL | | | |
|--|----------------------------------|-------------------------|-----------------------------|
| Parameter | Condition | | Value |
| Operating Temperature Range ⁽⁸⁾ | @ natural convection 0.1m/s | full load | -25°C to +75°C |
| | | refer to derating graph | -25°C to +85°C |
| Maximum Case Temperature | | | +100°C |
| Temperature Coefficient | +25°C to +75°C | | 0.07%/K |
| Operating Altitude | | | 2000m |
| Operating Humidity | non-condensing | | 95% RH max. |
| Pollution Degree | | | PD2 |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C | 550 x 10 ³ hours |
| | | +80°C | 76 x 10 ³ hours |

Derating Graph

(@ Chamber and natural convection 0.1m/s)



Line Derating



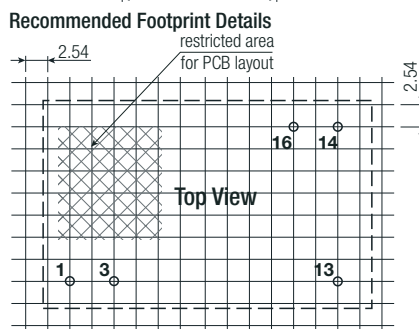
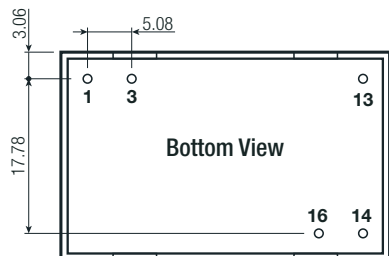
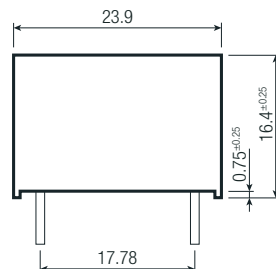
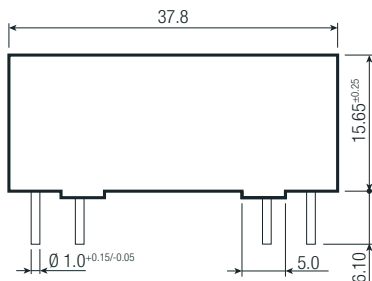
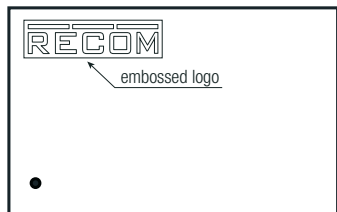
Specifications (measured at Ta= 25°C, full load otherwise noted)

| SAFETY AND CERTIFICATIONS | | |
|--|--|--|
| Certificate Type (Safety) | Report / File Number | Standard |
| Information Technology Equipment - General Requirments for Safety | SPCLVD1606038 | IEC60950-1:2006 + A2:2013 EN60950-1, 2nd Edition , 2013 |
| Household and similar electrical appliances – Safety – Part 1: General requirements | L0339L26-B2-L | IEC60335-1:2010+AMD1:2013 EN60335-1:2012+A11:2014 |
| Information Technology Equipment - General Requirments for Safety (CB Scheme) | L0339m10-CB-1-B1 | IEC60950-1:2005 2nd Edition + A2:2013 |
| Information Technology Equipment - General Requirments for Safety | | EN60950-1:2006 + A2:2013 |
| Information Technology Equipment - General Requirments for Safety | E224736-A5-UL ⁽¹⁰⁾ | UL60950-1, 2nd Edition, 2007 CSA C22.2 60950-1, 2nd Edition, 2007 |
| EAC Safety of Low Voltage Equipment | RU-AT.49.09571 | TP TC 004/2011 |
| RoHS2+ | | RoHS-2011/65/EU + AM-2015/863 |
| EMC Compliance Industrial | Condition | Standard / Criterion |
| Electromagnetic compatibility of multimedia equipment – Emission Requirements | | EN55032:2015, Class B |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55024:2010 + A1:2015 |
| ESD Electrostatic discharge immunity test | Air ±8.0kV; Contact ±4.0kV | IEC61000-4-2:2008, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 3V/m | IEC61000-4-3:2006 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity | AC Power Port: ±1.0kV | IEC61000-4-4:2012, Criteria A |
| Surge Immunity | AC Power Port: L-N ±1.0kV | IEC61000-4-5:2005, Criteria A |
| Immunity to conducted disturbances, induced by radio-frequency fields | AC Power Port: 3Vr.m.s | IEC61000-4-6:2008, Criteria A |
| Voltage Dips and Interruptions | Voltage Dips >95% | IEC61000-4-11:2004, Criteria A |
| | Voltage Dips 30% | IEC61000-4-11:2004, Criteria A |
| | Voltage Interruptions > 95% | IEC61000-4-11:2004, Criteria C |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |
| EMC Compliance Household | Condition | Standard / Criterion |
| Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission | | EN55014-1:2006+A2:2011 |
| Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity | | EN55014-2:2015 |
| ESD Electrostatic discharge immunity test | Air ±8.0kV; Contact ±4.0kV | IEC61000-4-2:2008, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 3V/m | IEC61000-4-3:2006 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity | AC Power Port: ±1.0kV DC Output: ±0.5kV | IEC61000-4-4:2012, Criteria A |
| Surge Immunity | AC Power Port: L-N ±2.0kV DC Output: L-N ±1.0kV | IEC61000-4-5:2014, Criteria B |
| Immunity to conducted disturbances, induced by radio-frequency fields | AC Power Port: 3V DC Output: 3V | IEC61000-4-6:2013, Criteria A |
| Voltage Dips and Interruptions | Voltage Dips >95% | IEC61000-4-11:2004, Criteria B |
| | Voltage Dips 30% | IEC61000-4-11:2004, Criteria C |
| | Voltage Interruptions > 95% | IEC61000-4-11:2004, Criteria C |
| Limits of Harmonic Current Emissions | | EN61000-3-2:2014 |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |
| Notes: Note10: UL is pending for RAC03-3.8SC | | |

Specifications (measured at Ta= 25°C, full load otherwise noted)

| DIMENSION AND PHYSICAL CHARACTERISTICS | | |
|--|-----------------|---|
| Parameter | Type | Value |
| Material | case potting | black plastic (UL94V-0) silicone (UL94V-0) |
| Dimension (LxWxH) | | 37.8 x 23.9 x 16.4mm |
| Weight | | 30g typ. |

Dimension Drawing (mm)



Pin Connections

| Pin # | Single |
|-------|------------|
| 1 | VAC in (L) |
| 3 | VAC in (N) |
| 13 | NC |
| 14 | -Vout |
| 16 | +Vout |

NC= no connection
Tolerance: xx.x= ±0.5mm

PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|----------------|-----------------------|
| Packaging Dimension (LxWxH) | tube | 520.0 x 32.0 x 27.0mm |
| Packaging Quantity | | 12pcs |
| Storage Temperature Range | | -40°C to +100°C |
| Storage Humidity | non-condensing | 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.