

Features

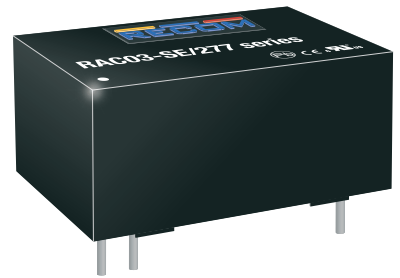
- 30mW max. no load power consumption
- High efficiency up to 80%
- Isolated output 3kVAC / 1 minute
- SCP, OVP protection
- Wide operating temperature range: -40°C to +85°C
- Universal input 85-305VAC

Regulated Converter



RAC03-SE/277

**3 Watt
Single
Output**



IEC/EN60950-1 certified
 CAN/CSA-22.2 No. 60950 certified
 UL60950-1 certified
 EN60335-1 certified
 EN55032 certified
 EN55024 certified
 EN55014 certified
 CB Report

Description

The ultra-compact RAC03-SE/277 modules are available with output voltages of 3.3, 5, 12 and 24V, and the input-to-output isolation is 3kVAC/1min. With a standby consumption of 30mW maximum, the mini power supplies are particularly suitable for energy-saving sleep mode and standby applications. Because of its compact design (height <18mm), it is a versatile solution for home automation and other similar applications. Complete with an integrated input filter, the series has enhanced EMI performance and complies with EN55032, class B. The mini power supplies are also protected against short circuit with fully automatic restart after the error has been solved. The converters are EN/UL60950-1 certified and come complete with a 3 year warranty.

Selection Guide

| Part Number | nom. Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ ⁽¹⁾ [%] | Max. Capacitive Load ⁽²⁾ [µF] |
|-----------------|--------------------------------|----------------------|---------------------|-----------------------------------|--|
| RAC03-3.3SE/277 | 100-277 | 3.3 | 900 | 71 | 22000 |
| RAC03-05SE/277 | 100-277 | 5 | 600 | 76 | 7500 |
| RAC03-12SE/277 | 100-277 | 12 | 250 | 78 | 1000 |
| RAC03-24SE/277 | 100-277 | 24 | 125 | 80 | 200 |

Notes:

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

Note2: Max Cap Load is tested at minimum input and constant resistive load

Model Numbering



Ordering Examples:

RAC03-05SE/277 3 Watt 5Vout Single Output
 RAC03-12SE/277 3 Watt 12Vout Single Output

Specifications (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

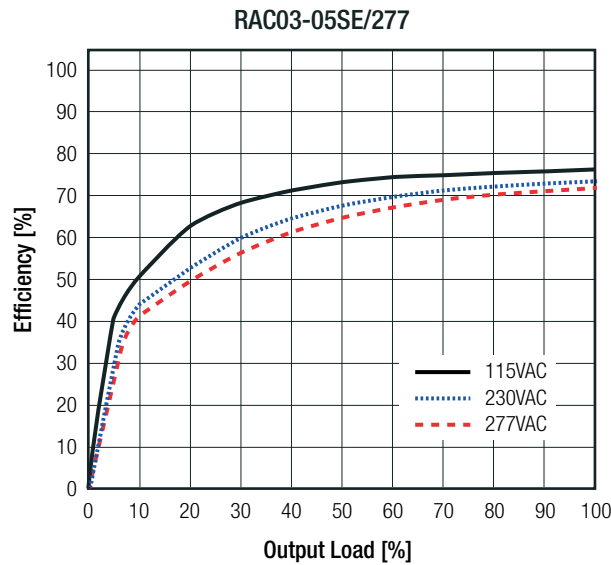
| Parameter | Condition | Min. | Typ. | Max. |
|--|--------------------------|------------------|--------------|------------------|
| Input Voltage Range ⁽³⁾ | nom. Vin = 230VAC | 85VAC 120VDC | 277VAC | 305VAC 430VDC |
| Input Current | 115VAC 230VAC | | 70mA 45mA | |
| Inrush Current | cold start at +25°C | 115VAC 230VAC | | 15A 30A |
| No load Power Consumption | 85-305VAC, 47-63Hz | | | 30mW |
| Input Frequency Range | AC Input | 47Hz | | 440Hz |
| Minimum Load | | | 2% | |
| Hold-up Time | 115VAC 230VAC | | 15ms 80ms | |
| Internal Operating Frequency | 100% load at nominal Vin | | 55kHz | |
| Output Ripple and Noise ⁽⁴⁾ | | | 200mVp-p | |

Notes:

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

Note4: Ripple and Noise is the maximum peak-to-peak voltage value measured at the output with a 20MHz bandwidth, at rated line voltage at full load. And with a 47µF low-ESR electrolytic capacitor in parallel with a 0.1µF ceramic capacitor across output

Efficiency vs. Load



REGULATIONS

| Parameter | Condition | Value |
|---|----------------------------------|-------------------------|
| Output Voltage Tolerance ⁽⁵⁾ | | ±2% typ. / ±6.0% max. |
| Line Regulation | low line to high line, full load | ±1.0% typ. / ±1.5% max. |
| Load Regulation | 10% to 100% load | 6.0% typ. |

Notes:

Note5: Includes initial voltage accuracy, thermal drift, line regulation and load regulation at rated input voltage and load conditions

Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} (115/230VAC), full load and after warm-up unless otherwise stated)

PROTECTIONS

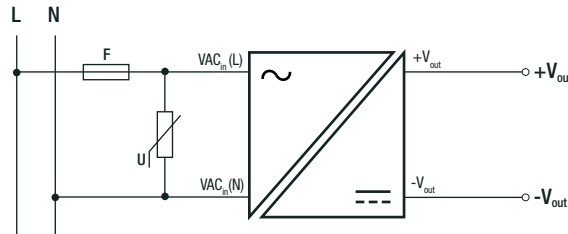
| Parameter | Type | | Value |
|--------------------------------|---------------------------|---------------------|--------------------------------|
| Short Circuit Protection (SCP) | below $100\text{m}\Omega$ | | continuous, automatic recovery |
| Over Voltage Protection (OVP) | zener diode clamp | | 112% - 140% |
| Over Current Limit | | | 120% - 190% |
| Over Voltage Category | | | OVCII |
| Isolation Voltage | I/P to O/P | tested for 1 minute | 3kVAC |
| Isolation Resistance | | | $1\text{G}\Omega$ min. |
| Leakage Current | 85-305VAC, 47-63Hz | | $10\mu\text{A}$ max. |

Notes:

Note6: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

Note7: An external MOV is recommended. The Varistor should comply with IEC-61051-2. e.g. EPCOS S 14 series

Protection Circuit



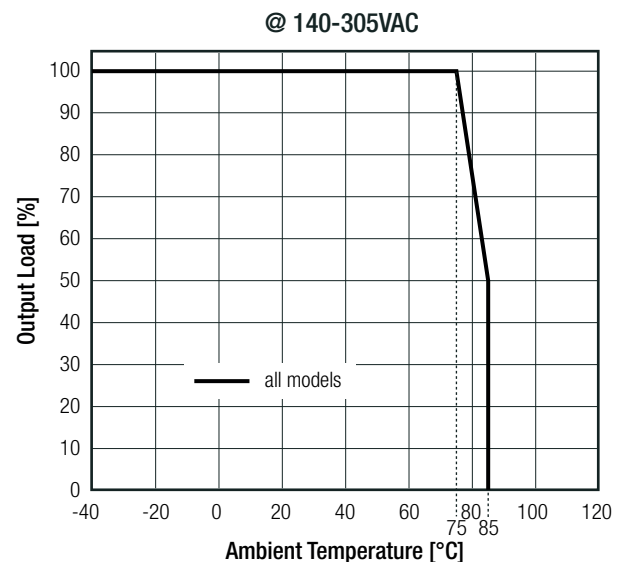
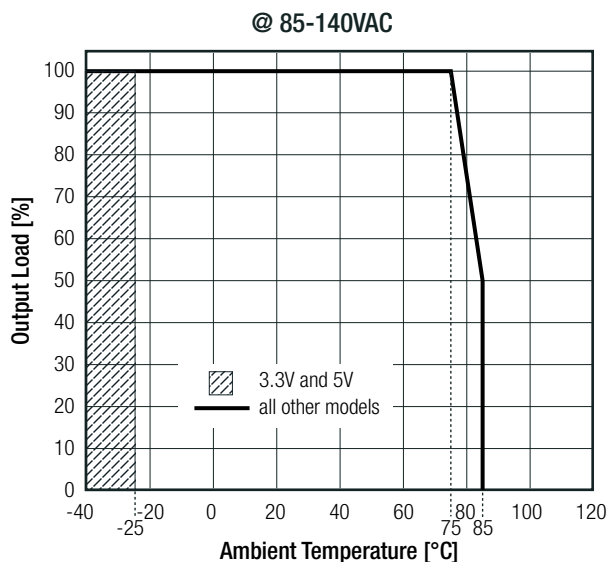
ENVIRONMENTAL

| Parameter | Condition | | | Value |
|--|----------------------------------|---------------------|--------|--|
| Operating Temperature Range ⁽⁸⁾ | full load, 230VAC | | | -40°C to $+75^\circ\text{C}$ |
| | refer to derating graph | | | -40°C to $+85^\circ\text{C}$ |
| Maximum Case Temperature | | | | $+105^\circ\text{C}$ |
| Thermal Impedance | | | | 10K/W typ. |
| Operating Humidity | non-condensing | | | 5% - 95% RH max. |
| Vibration | | | | MIL-STD-202G |
| MTBF | according to MIL-HDBK-217F, G.B. | $+25^\circ\text{C}$ | 115VAC | 3503×10^3 hours |
| | | | 230VAC | 1816×10^3 hours |

Notes:

Note8: At low input voltage (85-140VAC) and temperature below -25°C the RAC03-3.3SER/277 and RAC03-05SER/277, will not start

Derating Graph



Specifications (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report / File Number | Standard |
|---|----------------------|--|
| Information Technology Equipment - General Requirments for Safety (CB Scheme) | L0339L26-CB-1-B4 | IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013 |
| Information Technology Equipment, General Requirements for Safety | E224736-A24-UL | UL60950-1, 2nd Edition, 2014 CAN/CSA-C22.2 60950-1, 2nd Edition, 2014 |
| Household and similar electrical appliances - Safety - Part 1: General requirements | L0339L26-B2-L | EN60335-1:2012 + A11:2014 |
| 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)

| EMC Compliance (Industrial) | Condition | Standard / Criterion |
|---|---|---|
| Electromagnetic compatibility of multimedia equipment – Emission Requirements | 1502CE17 | EN55032:2015, Class B |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55024:2010 |
| ESD Electrostatic discharge immunity test | ±8.0kV air, ±4.0kV contact | EN61000-4-2:2009, Criteria B |
| 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 |
| Power Magnetic Field Immunity | 50Hz, 1A/m | EN61000-4-8:2010, Criteria A |
| Voltage Dips and Interruptions | 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 B |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |

EMC Compliance (Household)

| EMC Compliance (Household) | Condition | Standard / Criterion |
|--|---|--|
| Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission | E16113001 | EN55014-1:2006+A2:2011 |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55014-2:2015 |
| ESD Electrostatic discharge immunity test | ±8.0kV air, ±4.0kV contact | 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 to N ±2.0kV DC Output: L to N ±1.0kV | IEC61000-4-5:2014, Criteria B |
| Immunity to conducted disturbances, induced by radio-frequency fields | 3 Vr.m.s. | IEC61000-4-6:2013, Criteria A |
| Voltage Dips and Interruptions | Voltage Dips >95% Voltage Dips 30% Voltage Interruptions >95% | IEC61000-4-11:2004, Criteria B IEC61000-4-11:2004, Criteria C IEC61000-4-11:2004, Criteria C |
| Limits of Harmonic Current Emissions | | EN61000-3-2:2014 |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |

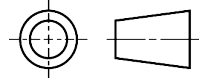
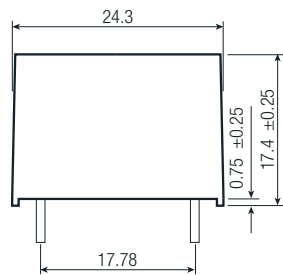
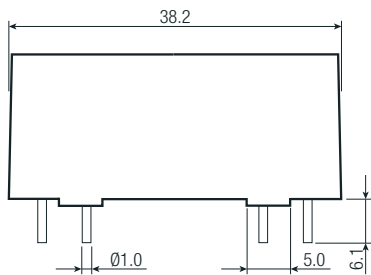
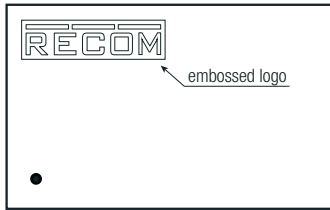
DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|-------------------|-----------------|---|
| Material | case potting | black plastic, (UL94V-0) silicone, (UL94V-0) |
| Dimension (LxWxH) | | 38.25 x 24.35 x 17.4mm |
| Weight | | 28g typ. |

continued on next page

Specifications (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)



Pin Connections

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

NCno connection

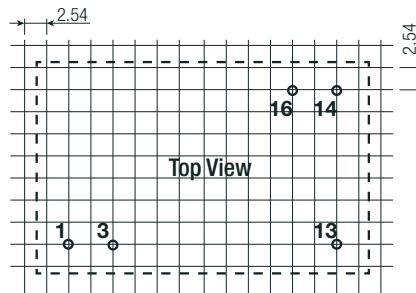
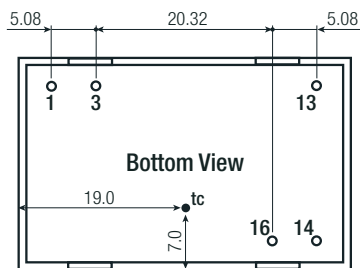
tc= case temperature measuring point

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.35mm Pin width:

±0.05mm

Recommended Footprint Details



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 +85°C |

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