

## Features

- 35mW max. no load power consumption
- Efficiency up to 76%
- Isolated output 3kVAC / 1 minute
- SCP, OVP protection
- Wide operating temperature range: -40°C to +85°C
- Universal input 85-305VAC

## Regulated Converter

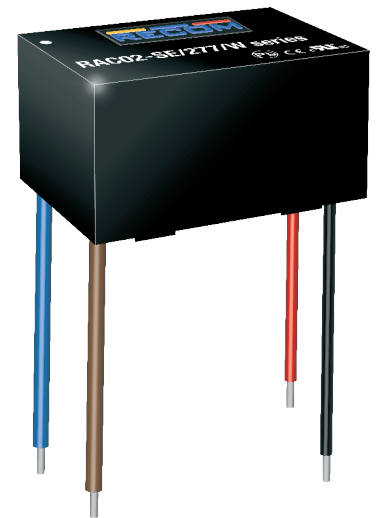
## RAC02-SE/277/W

## 2 Watt Single Output



### Description

The ultra-compact wired RAC02-SE/277/W 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 35mW maximum, the mini power supplies are particularly suitable for energy-saving sleep mode and stand-by 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 <sup>(1)</sup> [%]	Max. Capacitive Load <sup>(2)</sup> [μF]
RAC02-3.3SE/277/W	100-277	3.3	600	67	12000
RAC02-05SE/277/W	100-277	5.0	400	70	5500
RAC02-12SE/277/W	100-277	12	167	73	500
RAC02-24SE/277/W	100-277	24	83	76	160

#### 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



### Model Numbering



#### Ordering Examples:

RAC02-05SE/277/W    2 Watt    5Vout    Single Output    Wired Version  
 RAC02-12SE/277/W    2 Watt    12Vout    Single Output    Wired Version

**PREFERRED ALTERNATIVES**  
 Please consider these alternatives:

**RAC05-K/277/W Series**

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

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

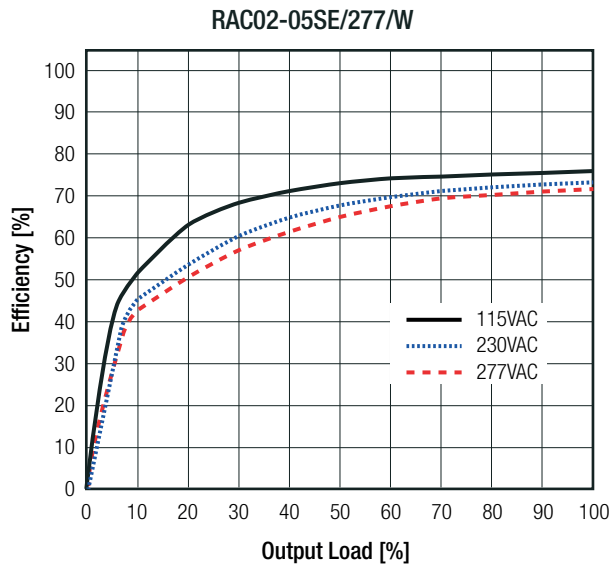
### BASIC CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range <sup>(3)</sup>	nom. Vin= 230VAC	85VAC 120VDC	277VAC	305VAC 430VDC
Input Current	115VAC 230VAC		47mA 30mA	
Inrush Current	cold start at +25°C	115VAC 230VAC		15A 30A
No load Power Consumption	85-305VAC, 47-63Hz			35mW
Input Frequency Range	AC Input	47Hz		440Hz
Minimum Load			2%	
Hold-up Time	115VAC	18ms		
Internal Operating Frequency	100% load at nominal Vin		55kHz	
Output Ripple and Noise <sup>(4)</sup>	3.3Vout 5, 12, 24Vout			300mVp-p 250mVp-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 <sup>(5)</sup>		±6.0% max.
Line Regulation	low line to high line, full load	±1.5% max.
Load Regulation	2% 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 @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

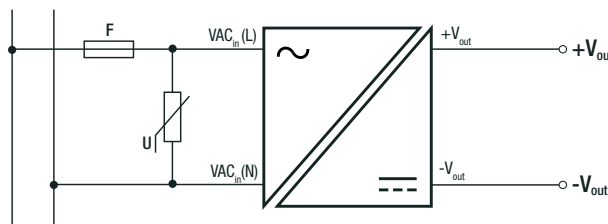
**PROTECTIONS**

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ		continuous, automatic recovery
Over Voltage Protection (OVP)	zener diode clamp		110% - 140%
Over Current Limit			110% - 190%
Over Voltage Category			OVCII
Isolation Voltage	I/P to O/P	tested for 1 minute	3kVAC
Isolation Resistance			1GΩ min.
Leakage Current	85-305VAC, 47-63Hz		10μA max.

**Notes:**

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

**Protection Circuit**



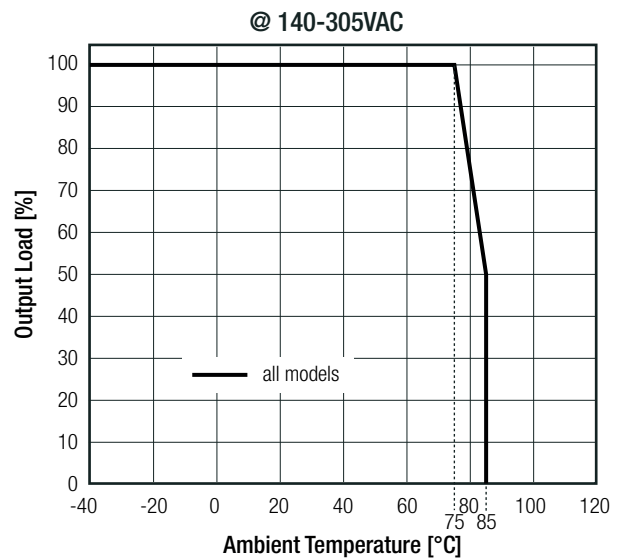
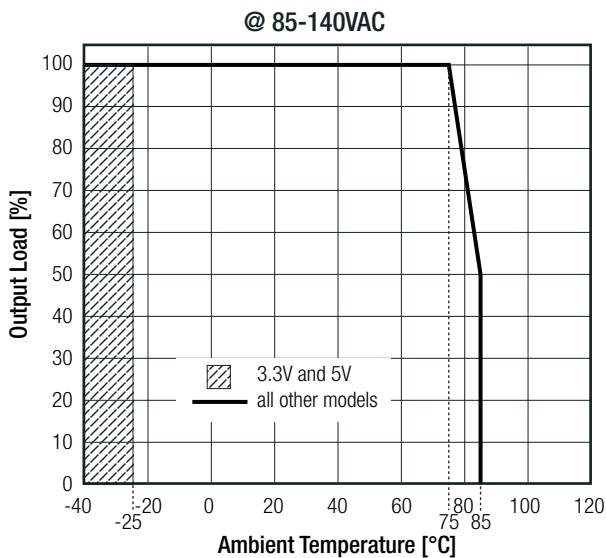
**ENVIRONMENTAL**

Parameter	Condition			Value
Operating Temperature Range <sup>(7)</sup>	full load, 230VAC			-40°C to +75°C
	refer to derating graph			-40°C to +85°C
Maximum Case Temperature				+105°C
Thermal Impedance				8.5K/W typ.
Operating Humidity	non-condensing			5% - 95% RH max.
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	115VAC	2238 x 10 <sup>3</sup> hours
			230VAC	1670 x 10 <sup>3</sup> hours

**Notes:**

Note7: At low input voltage (85-140VAC) and temperature below -25°C the RAC02-3.3SE/277/W and RAC02-05SE/277/W, 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 Requirements for Safety	L0339L26-CB-1-B4	IEC60950-1:2005 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Information Technology Equipment, General Requirements for Safety	E224736-X1-A24-UL	UL No. 60950-1, 2nd Edition, 2014 CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2014
Household and similar electrical appliances, General requirements	L0339L26-B2-L	EN60335-1:2012+A11:2014
EAC Safety of Low Voltage Equipment	RU-AT.37.02367	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
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, 1 A/m EN61000-4-8:2010, Criteria A
Voltage Dips and Interruption	Voltage Dips: >95% reduction >30% reduction Interruption: >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)**

Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	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-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 Interruption	Voltage Dips: >95% reduction >30% reduction Interruption: >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

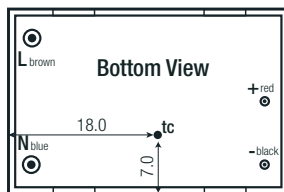
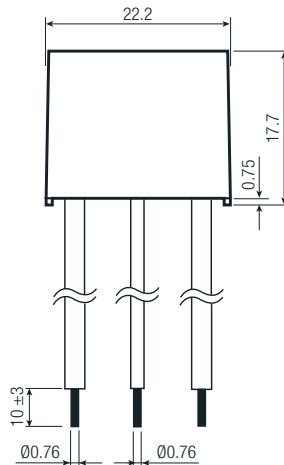
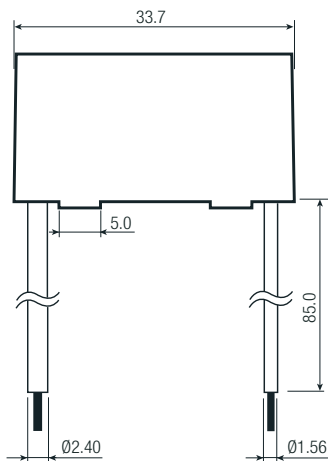
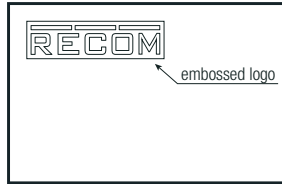
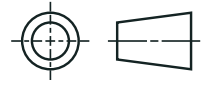
**DIMENSION AND PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	case potting	black plastic, (UL94V-0) epoxy, (UL94V-0)
Dimension (LxWxH)		33.7 x 22.2 x 17.75mm
Weight		25g 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)**



**Wired Connections**

Wired Color	Type	Function
1, blue	UL-1015, AWG22	VAC in (N)
2, brown	UL-1015, AWG22	VAC in (L)
3, black	UL-1430, AWG22	-Vout
4, red	UL-1430, AWG22	+Vout

Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.35mm

<b>PACKAGING INFORMATION</b>		
Parameter	Type	Value
Packaging Dimension (LxWxH)	cardboard box	520.0 x 195.0 x 68.0mm
Packaging Quantity		30pcs
Storage Temperature Range		-40°C to +85°C

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