

# RAC03-K/SMT Series ◊ AC/DC Power Supply

3W ◊ Input: 100V-240VAC

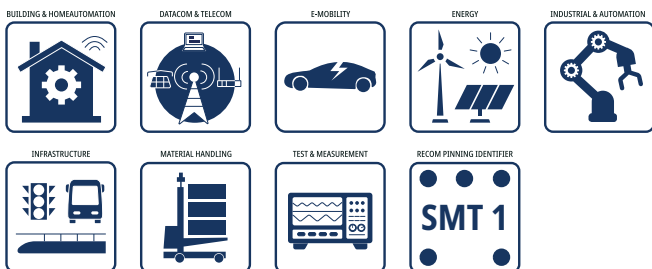
## FEATURES

- JEDEC-reflow solder-able construction
- Full load line-rating from 85 to 265Vac
- -40°C to +80°C rated operating temperature
- 6000m operating altitude
- Shock and vibration stabilized
- No external components for floating loads
- 3 year warranty



Dimensions (LxWxH): 27.7 x 23.7 x 19.0mm (1.1 x 0.9 x 0.8 inch)  
15.5g (0.034 lbs)

## APPLICATIONS



## SAFETY & EMC



## DESCRIPTION

The compact 3 Watt AC/DC power supplies series RAC03-K/SMT boast an optimized design tailored for JEDEC-reflow solder processes. With a mere 1in<sup>2</sup> footprint, these units facilitate automated production, ensuring a shock and vibration-resistant PCBA. The fully integrated modules eliminate the need for external components in floating load configurations, providing safety-rated performance at altitudes up to 6000m. Operating seamlessly in temperatures ranging from -40 to +80°C, and offering a continuous 3-Watt output power from -25 to +60°C, these power supplies are engineered for reliability. Compliant with international standards, including EN/IEC/UL62368, EN60335, and IEC61558, they are an ideal solution for a diverse range of applications from IoT to industrial automation, driving sensors, household and monitoring devices, as well as housekeeping auxiliary power supplies, these power units are well-suited for domestic use.

## SELECTION GUIDE

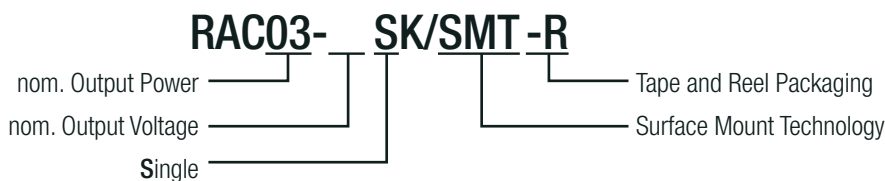
Part Number	Input Voltage Range [VAC]	Output Voltage nom. [VDC]	Output Current max. [mA]	Efficiency <sup>(1)</sup>
				typ. [%]
RAC03-3.3SK/SMT-R	85-265	3.3	900	69
RAC03-05SK/SMT-R	85-265	5	600	74
RAC03-12SK/SMT-R	85-265	12	250	78
RAC03-15SK/SMT-R	85-265	15	200	75
RAC03-18SK/SMT-R	85-265	18	170	78
RAC03-24SK/SMT-R	85-265	24	125	77

Note1: Efficiency is tested at nominal input (230VAC) and constant resistive load at +25°C ambient

# RAC03-K/SMT Series $\diamond$ AC/DC Power Supply

3W  $\diamond$  Input: 100V-240VAC

## MODEL NUMBERING



### BASIC CHARACTERISTICS (measured @ $T_{AMB}= 25^{\circ}\text{C}$ , nom. $V_{IN}$ , full load and after warm-up unless otherwise stated)

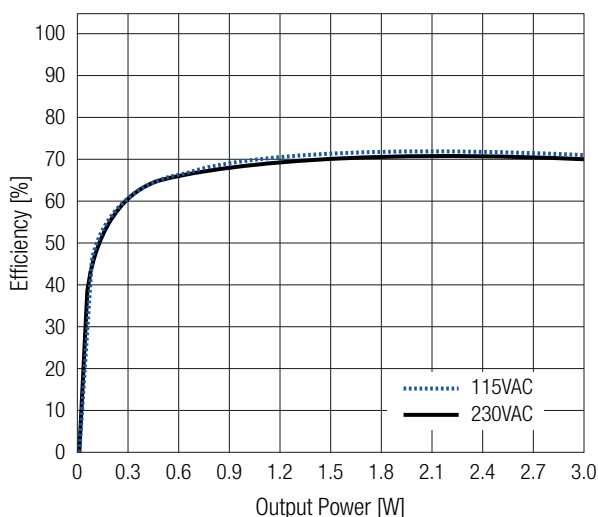
Parameter	Condition	Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz	100VAC		240VAC
Operating Range <sup>(2)</sup>	47-63Hz	85VAC		265VAC
	DC	120VDC		370VDC
Input Current	115VAC			80mA
	230VAC			40mA
Inrush Current	cold start at 25°C	115VAC		10A
		230VAC		20A
No Load Power Consumption	230VAC		100mW	
Ecodesign Standby Mode Use (Available output power for stated input power)	Input Power=	0.3W		0.17W
		0.5W		0.3W
		1W		0.7W
Input Frequency Range	AC Input	47Hz		63Hz
Minimum Load		0%		
Power Factor	115VAC	0.5		
	230VAC	0.4		
Start-up time			20ms	
Rise time			15ms	
Hold-up time	115VAC		15ms	
	230VAC		80ms	
Internal Operating Frequency	100% load at nominal Vin			130kHz
Output Ripple and Noise <sup>(3)</sup>	20MHz BW	RAC03-3.3SK/SMT; RAC03-05SK/SMT		80mVp-p
		all others		1% of nom $V_{OUT}$

Note2: The products were submitted for safety files at AC-Input operation.

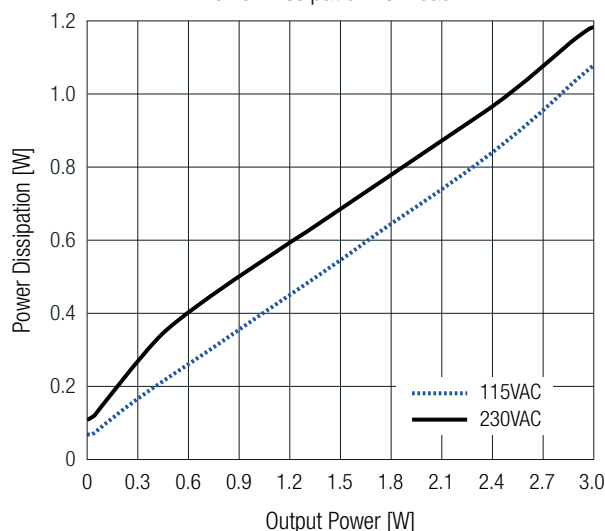
Note3: Measurements are made with a 0.1 $\mu$ F MLCC & 10 $\mu$ F E-cap in parallel across output. (low ESR)

### RAC03-3.3SK/SMT RAC03-05SK/SMT

Efficiency vs. Load



Power Dissipation vs. Load

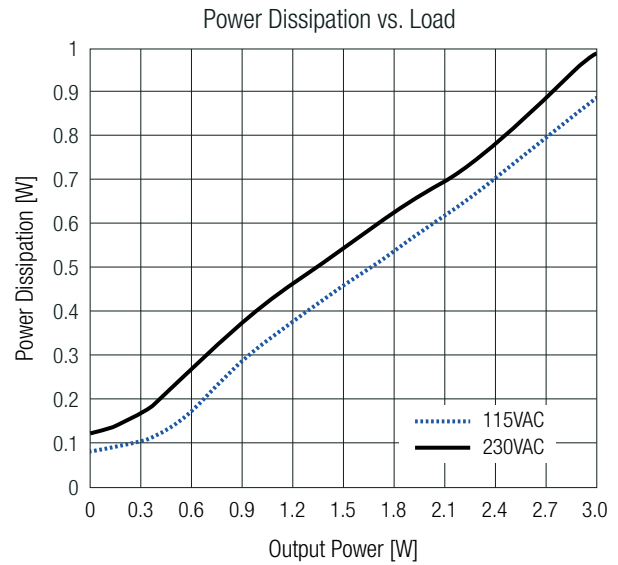
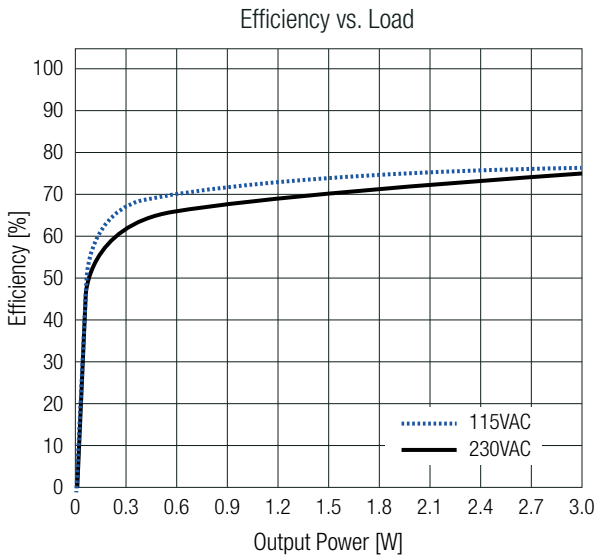


# RAC03-K/SMT Series $\diamond$ AC/DC Power Supply

3W  $\diamond$  Input: 100V-240VAC

**BASIC CHARACTERISTICS** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

all others

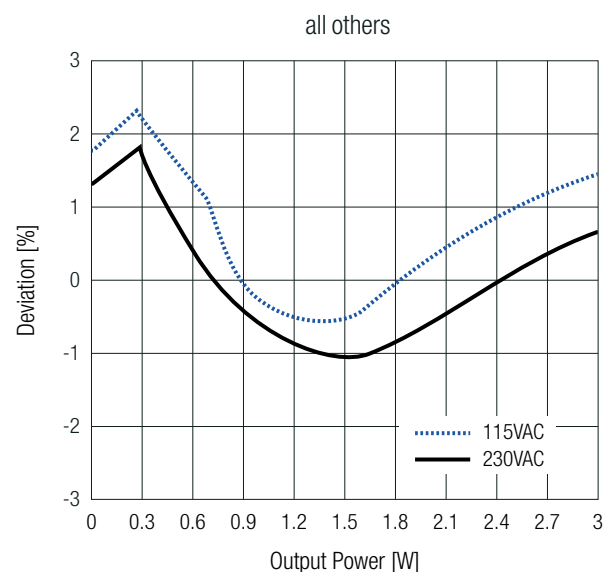
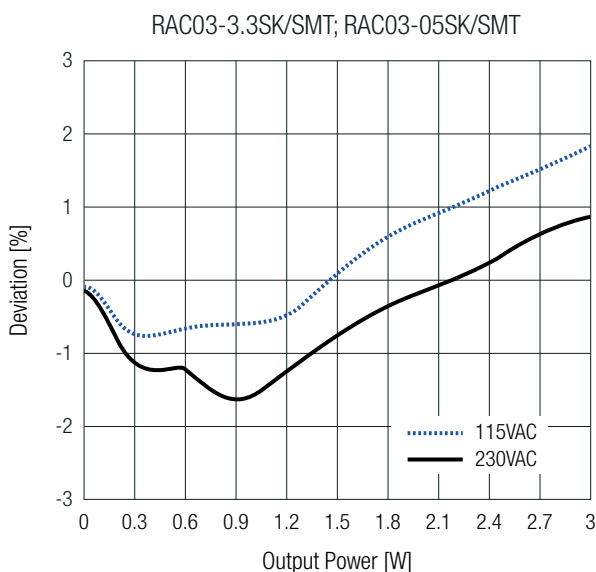


**REGULATIONS** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

Parameter	Condition	Value
Output Accuracy		$\pm 3.0\%$ typ.
Line Regulation	low line to high line, full load	$\pm 2.5\%$ typ.
Load Regulation <sup>(4)</sup>	10% to 100% load	2.5% typ.
Transient Response	25% load step change	4.0% max.
	recovery time	500 $\mu\text{s}$ max.

Note4: Operation below 10% load will not harm the converter, but specifications may not be met

Deviation vs. Load



# RAC03-K/SMT Series $\diamond$ AC/DC Power Supply

## 3W $\diamond$ Input: 100V-240VAC

### PROTECTIONS (measured @ $T_{AMB}= 25^{\circ}\text{C}$ , nom. $V_{IN}$ , full load and after warm-up unless otherwise stated)

Parameter	Type		Value
Input Fuse <sup>(5)</sup>	internal		fusable resistor
Limited Powr Source (LPS)			yes
Short Circuit Protection (SCP)	below 100m $\Omega$		hiccup mode, auto recovery
Over Current Protection (OCP)			hiccup mode, auto recovery
Over Voltage Category (OVC)			OVC II
Class of Equipment			Class II
Isolation Voltage <sup>(6)</sup>	I/P to O/P	1 minute	according to 60335-1
			according to 62368-1
			according to 61558
Isolation Resistance	$V_{ISO}= 500\text{VDC}$		1G $\Omega$ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V		100pF max.
Insulation Grade			reinforced

Note5: For system integration with DC operation, consider a suitable DC fuse in front of the input

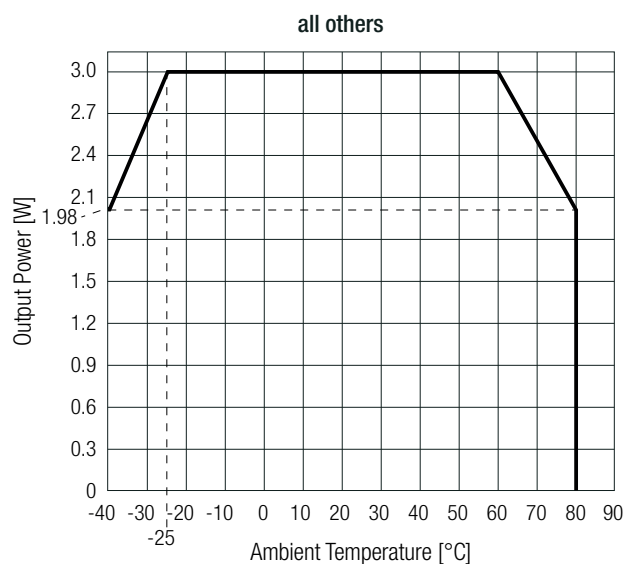
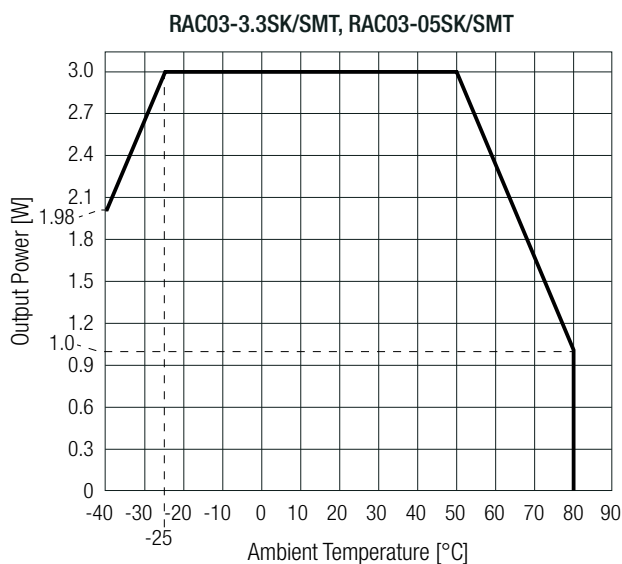
Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

### ENVIRONMENTAL (measured @ $T_{AMB}= 25^{\circ}\text{C}$ , nom. $V_{IN}$ , full load and after warm-up unless otherwise stated)

Parameter	Condition		Value
Operating Ambient Temperature Range	@ natural convection (0.1m/s)	with derating, refer to „Derating Graph“	-40 $^{\circ}\text{C}$ to +80 $^{\circ}\text{C}$
Maximum Case Temperature			+95 $^{\circ}\text{C}$
Temperature Coefficient			$\pm 0.05\%/K$
Operating Altitude	according to 62368-1		5000m
	according to 60335-1		6000m
Operating Humidity	non-condensing		20-90% RH max.
Pollution Degree			PD2
Vibration	according to MIL-STD-202G		10-500Hz, 2G, 10min.: 1cycle, period / 60min. each along x,y,z axes
MTBF	according to MIL-HDBK-217, G.B.	$T_{AMB}= +25^{\circ}\text{C}$	$>1977 \times 10^3$ hours
		$T_{AMB}= +30^{\circ}\text{C}$	$>1895 \times 10^3$ hours
		$T_{AMB}= +40^{\circ}\text{C}$	$>1794 \times 10^3$ hours
Design Lifetime	230VAC/60Hz and full load	$T_{AMB}= +25^{\circ}\text{C}$	$>40 \times 10^3$ hours

### Derating Graph

(@ Chamber and natural convection 0.1 m/s)



# RAC03-K/SMT Series $\diamond$ AC/DC Power Supply

## 3W $\diamond$ Input: 100V-240VAC

### SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements	E491408-A6012-UL	UL62368-1:2014, 2nd Edition
		CAN/CSA C22.2 No. 62368-1-14, 2nd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB Scheme)	231023001	IEC62368-1:2014, 2nd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements (LVD)		EN62368-1:2014 + A11:2017
Household and similar electrical appliances – Safety – Part 1: General requirements (CB Scheme)	LCS190408025CS	IEC60335-1:2010 + C1:2016, 5th Edition
Household and similar electrical appliances – Safety – Part 1: General requirements (LVD)		EN60335-1:2012 + A13:2017
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure		EN62233:2008
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V (CB Scheme)	50237373-001	IEC61558-1:2005 2nd Edition + A1:2009
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V	50237374-001	EN61558-1:2005 + A1:2009
Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1100 V Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units (CB Scheme)	50237373-001	IEC61558-2-16:2009 1st Edition + A1:2013
Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1100 V Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units	50237374-001	EN61558-2-16:2009 + A1:2013
RoHS2		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Low voltage power supplies, d.c. output - Part 3: Electromagnetic compatibility	LCS190408054BE	IEC/EN61204-3:2008, Class B
Electromagnetic compatibility of multimedia equipment - Emission requirements <sup>(7)</sup>		EN55032:2015, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission <sup>(7)</sup>		EN55014-1:2006 + A2:2011, Class B
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity		EN55014-2:2015
ESD Electrostatic discharge immunity test	Air: $\pm 2, 4, 8kV$ Contact: $\pm 2, 4kV$	IEC61000-4-2:2008 , Criteria B EN61000-4-2:2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity	10V/m (80-1000MHz) 3V/M (1.4-2GHz) 1V/m (2-2.7GHz)	IEC61000-4-3:2006 + A1:2007 , Criteria A EN61000-4-3:2006 + A1:2009, Criteria A
Fast Transient and Burst Immunity	AC & DC Port: $\pm 2kV$	IEC/EN61000-4-4:2012, Criteria B
Surge Immunity	AC Port: $\pm 1kV$ DC Port: $\pm 0.5kV$	IEC/EN61000-4-5:2014 + A1:2017, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC & DC Port: 10V	IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 30A/m	IEC61000-4-8:2009, Criteria A EN61000-4-8:2010, Criteria A
Voltage Dips	100%	IEC/EN61000-4-11:2004 + A1:2017, Criteria B
	60%, 30% and 20%	IEC/EN61000-4-11:2004 + A1:2017, Criteria C
Voltage Interruptions	>95%	IEC/EN61000-4-11:2004 + A1:2017, Criteria C
Limits of Harmonic Current Emissions		EN61000-3-2:2014
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		FCC 47 Part 15 Subpart B

Note7: If output is connected to GND, please contact RECOM tech support for further information

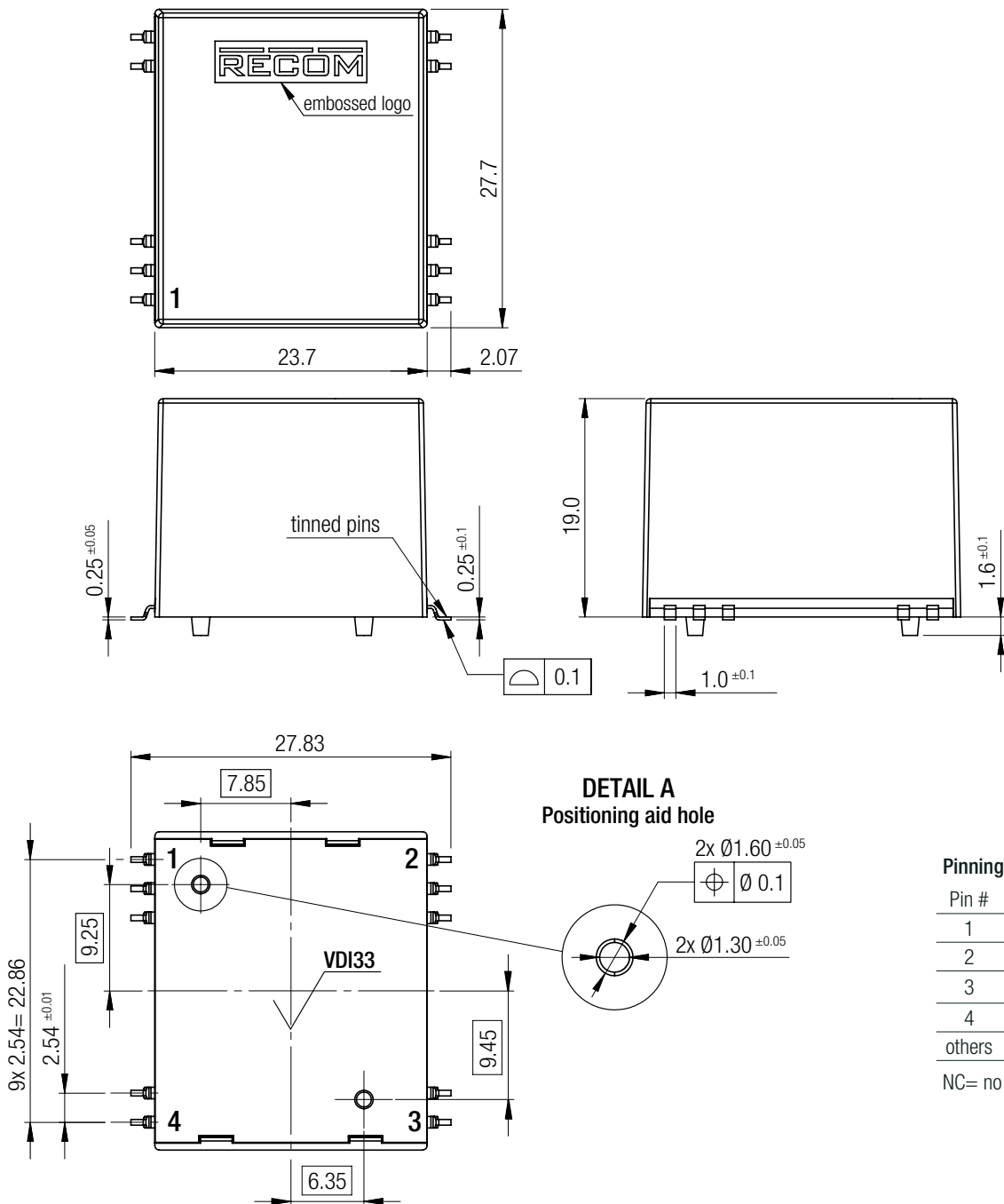
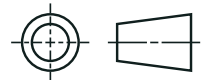
# RAC03-K/SMT Series $\diamond$ AC/DC Power Supply

3W  $\diamond$  Input: 100V-240VAC

## DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Materials	case/baseplate	black plastic, (UL94 V-0)
	potting	silicone, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		27.7 x 23.7 x 19.0mm 1.1 x 0.9 x 0.8 inch
Weight		15.5g typ. 0.034 lbs

Dimension Drawing (mm)



**Pinning information**

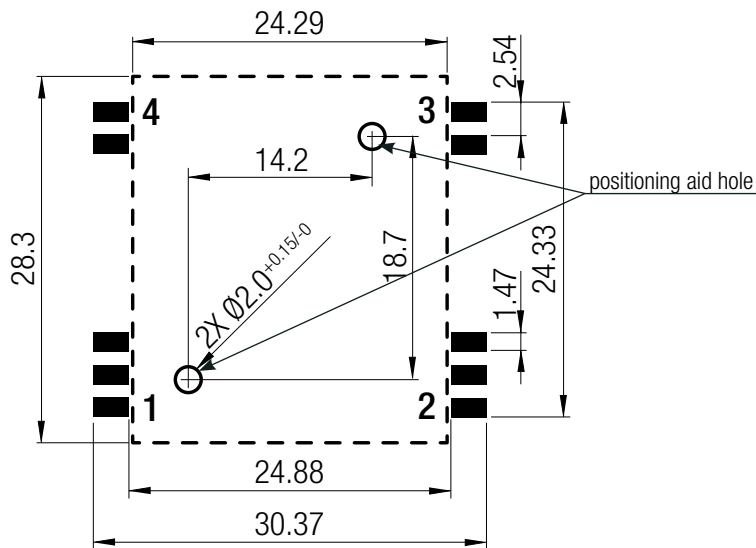
Pin #	Single
1	-Vout
2	+Vout
3	VAC in (N)
4	VAC in (L)
others	NC

NC= no connection

Tolerance: xx.x=  $\pm 0.5$ mm  
xx.xx=  $\pm 0.25$ mm

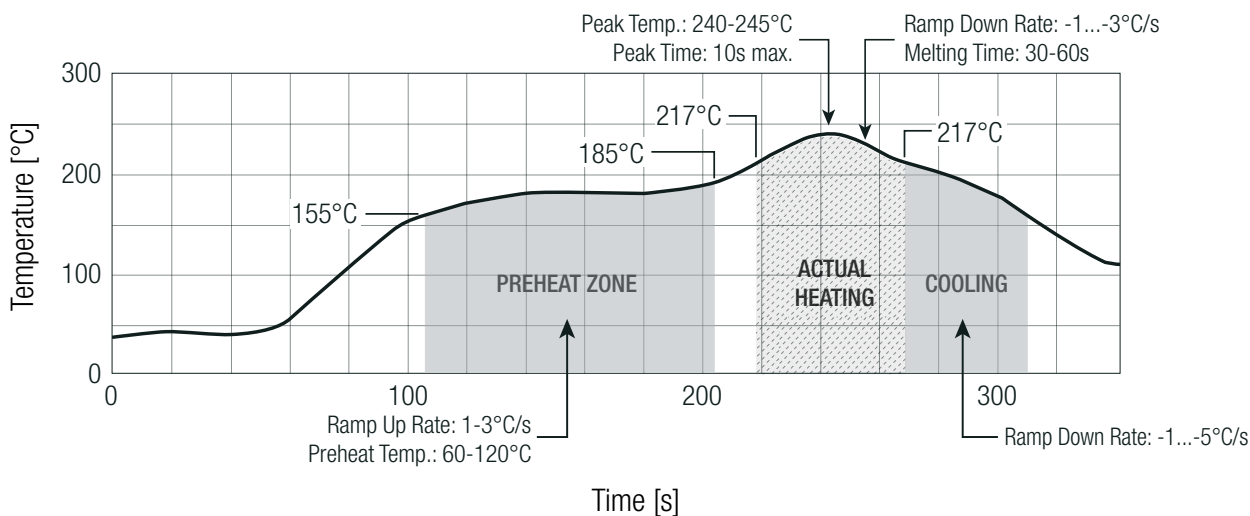
### DIMENSION & PHYSICAL CHARACTERISTICS

#### Recommended Footprint Details (Top view)



Tolerance: xx.x=  $\pm 0.5$ mm  
xx.xx=  $\pm 0.25$ mm

### SOLDER PROFILE



### PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimensions (LxWxH)	reel (diameter + width)	$\varnothing 380.0 + 60.0$ mm
	tape and reel (carton)	435.0 x 435.0 x 73.0mm
Tape Width		56mm
Packaging Quantity	reel	50pcs
Storage Temperature Range		-40°C to +85°C
Storage Humidity	non-condensing	20-95% RH max.
Moisture Sensitive Level		2

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