

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

3W ◊ Input: 100V-240VAC

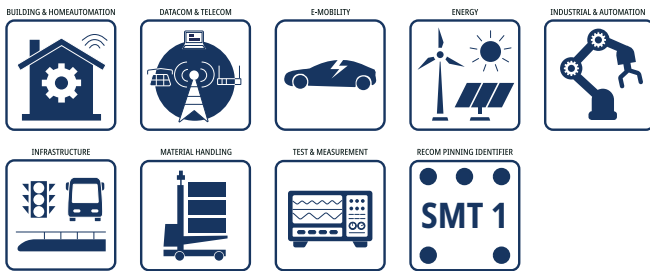
FEATURES

- 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 1in² 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

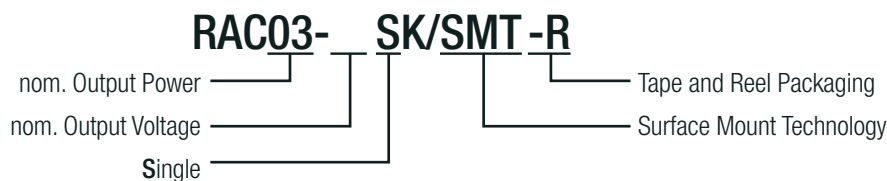
Part Number	Input Voltage Range [VAC]	Output Voltage nom. [VDC]	Output Current max. [mA]	Efficiency ⁽¹⁾
				typ. [%]
RAC03-3.3SK/SMT-R	85-265	3.3	900	69
RAC03-05SK/SMT-R	85-265	5	600	74
RAC03-12SK/SMT-R	85-265	12	250	78
RAC03-15SK/SMT-R	85-265	15	200	75
RAC03-18SK/SMT-R	85-265	18	170	78
RAC03-24SK/SMT-R	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 @ $T_{AMB}= 25^{\circ}C$, nom. V_{IN} , full load and after warm-up unless otherwise stated)

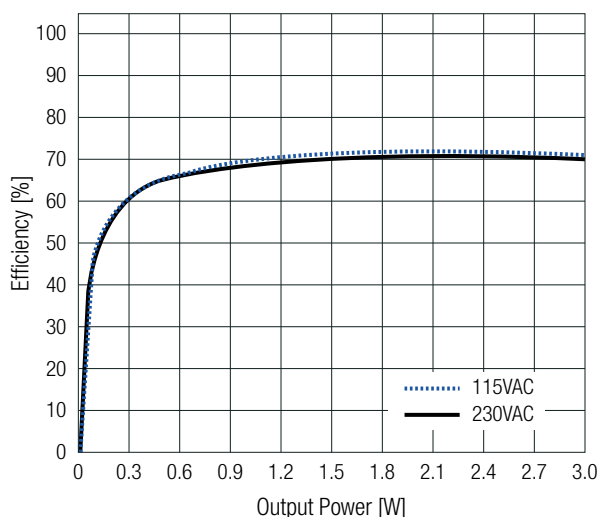
Parameter	Condition	Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz	100VAC		240VAC
Operating Range ⁽²⁾	47-63Hz	85VAC		265VAC
	DC	120VDC		370VDC
Input Current	115VAC			80mA
	230VAC			40mA
Inrush Current	cold start at 25°C	115VAC		10A
		230VAC		20A
No Load Power Consumption	230VAC		100mW	
Ecodesign Standby 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 ⁽³⁾	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.

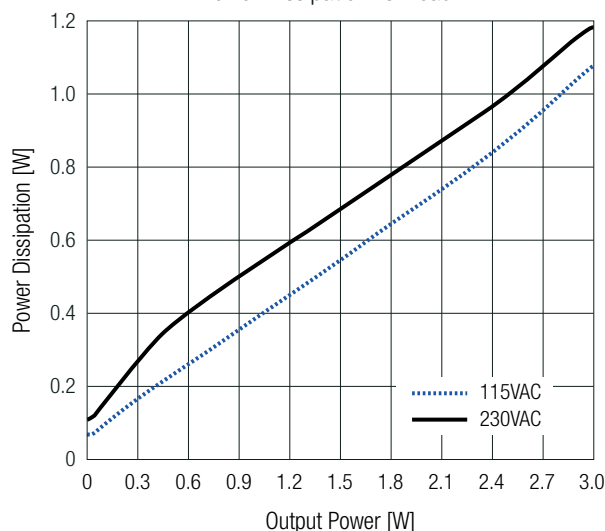
Note3: Measurements are made with a 0.1 μ F MLCC & 10 μ F E-cap in parallel across output. (low ESR)

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

Efficiency vs. Load

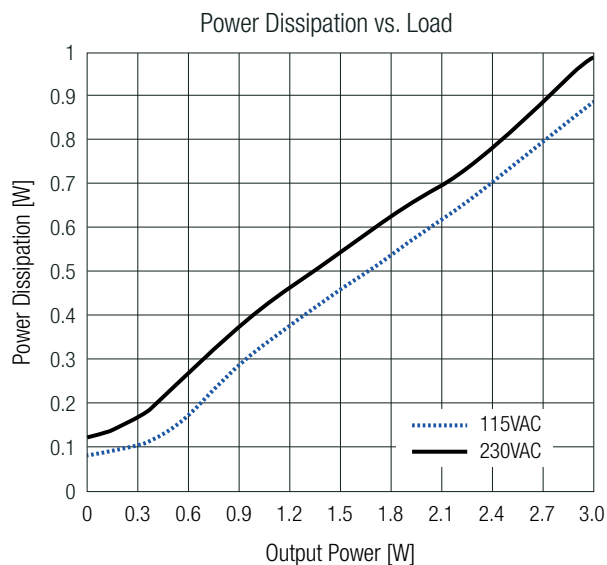
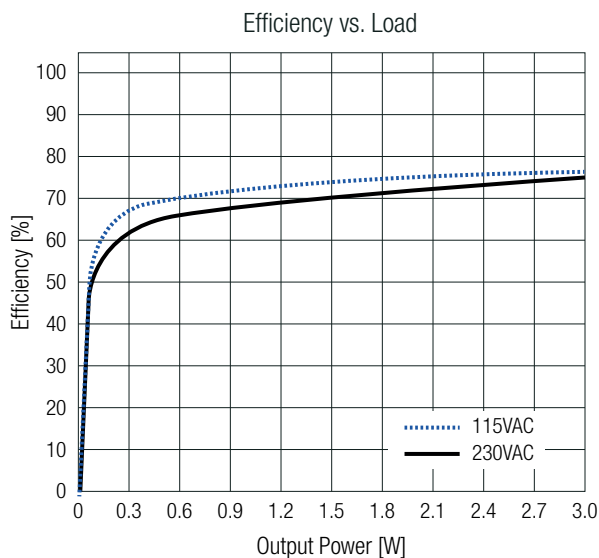


Power Dissipation vs. Load



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

all others

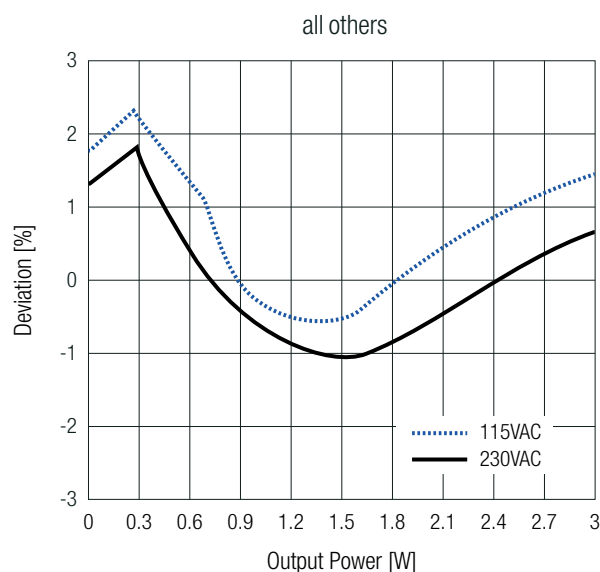
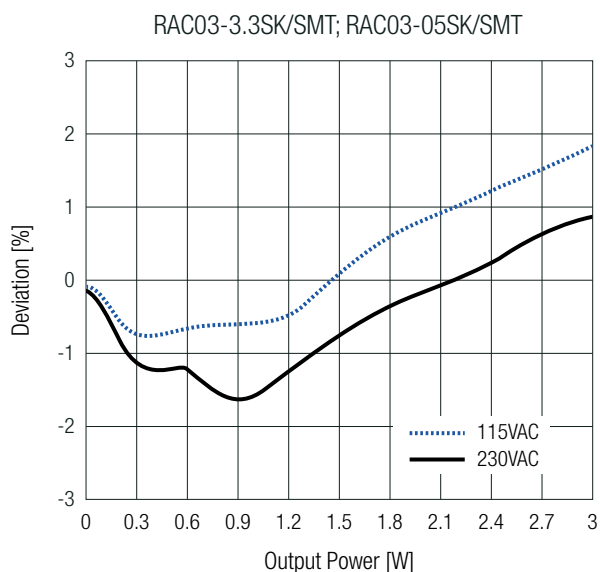


REGULATIONS (measured @ $T_{AMB} = 25^{\circ}\text{C}$, nom. V_{IN} , full load and after warm-up unless otherwise stated)

Parameter	Condition	Value
Output Accuracy		$\pm 3.0\%$ typ.
Line Regulation	low line to high line, full load	$\pm 2.5\%$ typ.
Load Regulation ⁽⁴⁾	10% to 100% load	2.5% typ.
Transient Response	25% load step change	4.0% max.
	recovery time	500 μs 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 ⁽⁵⁾	internal		fusible resistor
Limited Powr Source (LPS)			yes
Short Circuit Protection (SCP)	below 100m Ω		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 ⁽⁶⁾	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 Ω 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

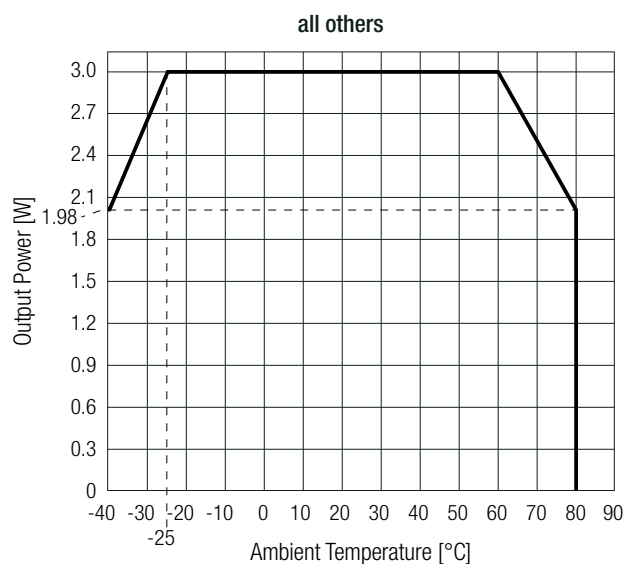
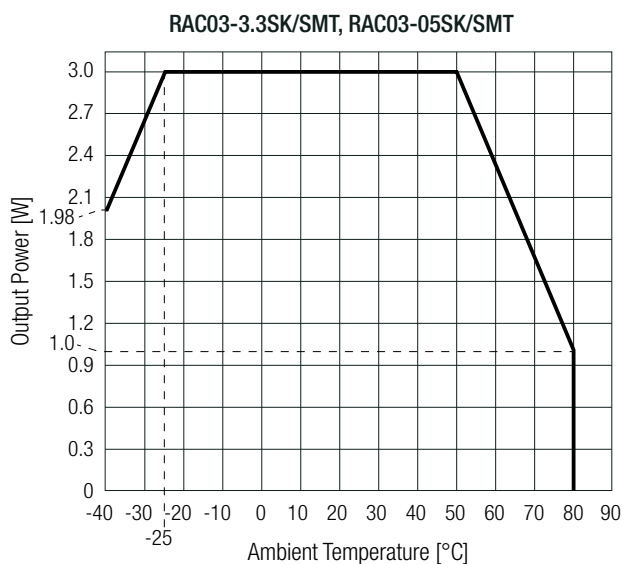
Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

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 ⁽⁷⁾		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 ⁽⁷⁾		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

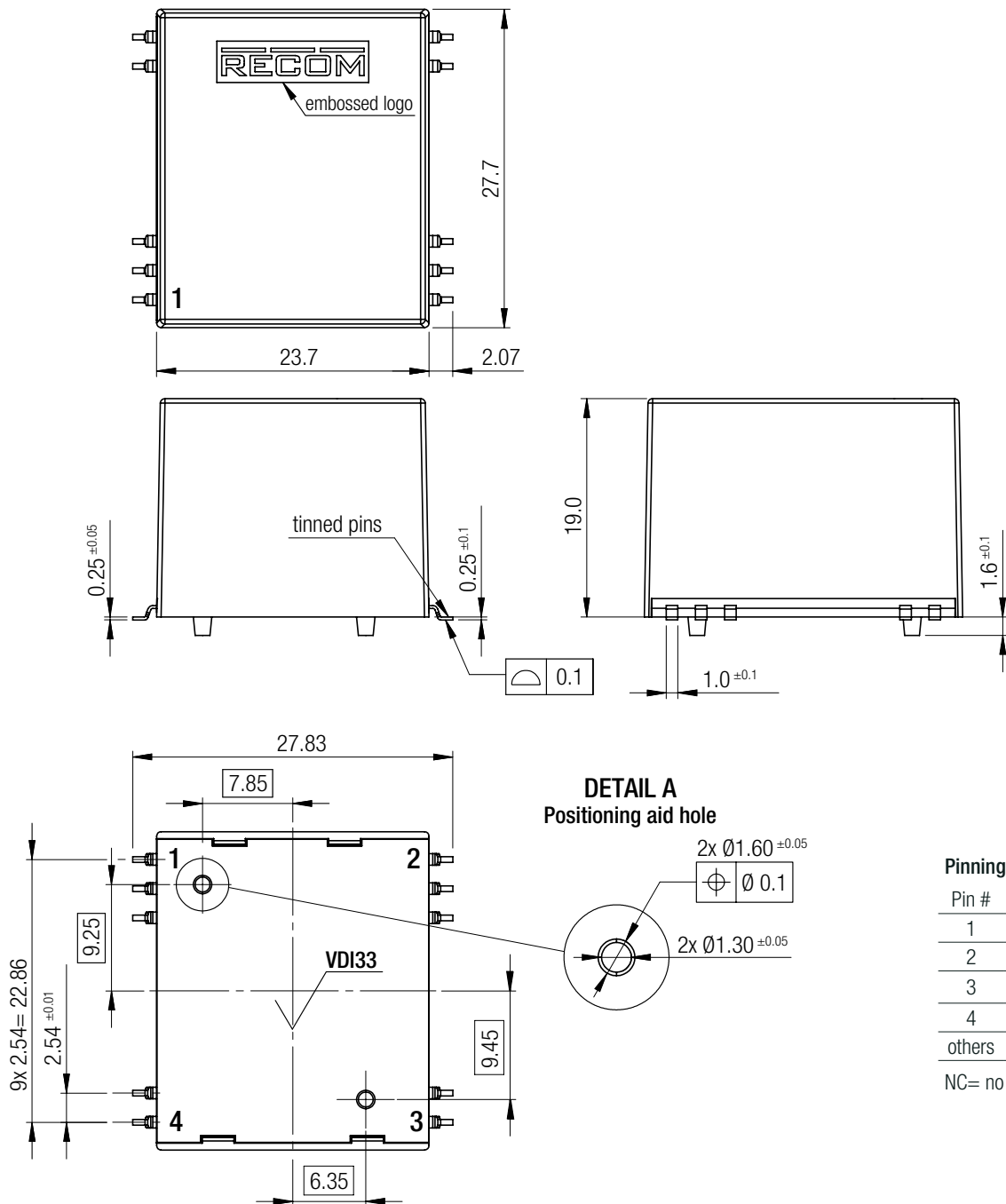
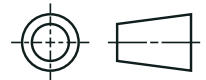
RAC03-K/SMT Series \diamond AC/DC Power Supply

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

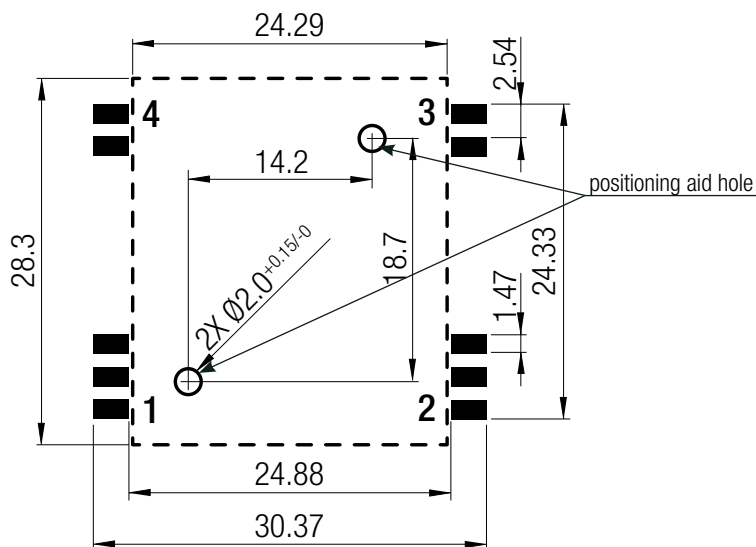
Pin #	Single
1	-Vout
2	+Vout
3	VAC in (N)
4	VAC in (L)
others	NC

NC= no connection

Tolerance: xx.x= ± 0.5 mm
xx.xx= ± 0.25 mm

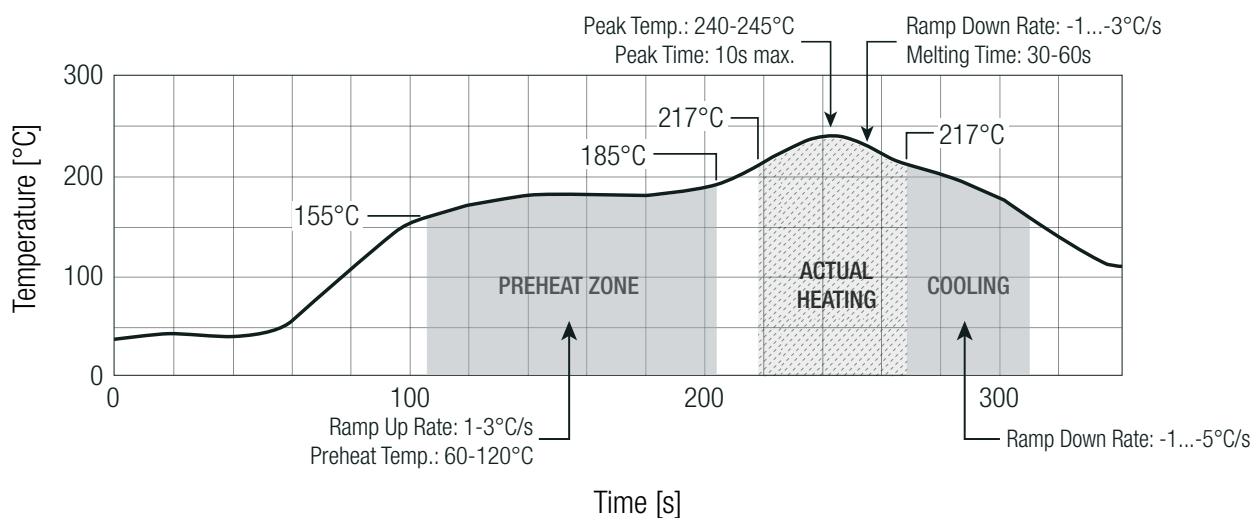
DIMENSION & PHYSICAL CHARACTERISTICS

Recommended Footprint Details (Top view)



Tolerance: xx.x= ± 0.5 mm
xx.xx= ± 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

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.