

RACM06E-K/277 Series / AC/DC Power Supply

6W / Universal Input 100V - 277VAC

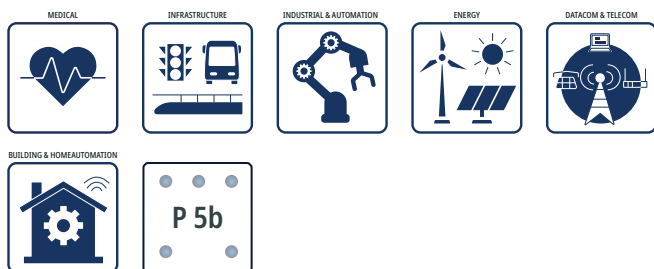
FEATURES

- 6 Watt output up to 60°C
- 1"x1" footprint; 17mm low profile
- 100-277VAC nominal operating range
- -40°C to +90°C operating temperature ratings
- OVC III rated up to 5000m Altitude
- 2MOPP rating; BF ready
- EN55032 class "B" compliant @ floating load
- 3 years warranty



Dimensions (HxWxD): 25.4 x 25.4 x 16.7mm (1.0 x 1.0 x 0.6 inch)
20g (0.04 lbs)

APPLICATIONS



SAFETY & EMC



DESCRIPTION

The industry's most compact integrated 6-watt AC/DC power supply series RACM06E is based on a 1"x1" footprint and fits into a low profile of just 17 mm. Multiple international safety certifications to industrial, medical, and household standards ease implementation into a wide range of applications for direct connections to worldwide mains input voltage conditions to OVC III and without limitation to operating altitudes of up to 5000m. Even though it is a cost-efficient construction the thermally optimized design has safety rating for full load output power from -40°C up to 60°C with some derating continuing up 90°C. Internal EMI Filter supports compliance to EN55032 class "B" in floating output configurations without any need for additional filter components.

SELECTION GUIDE

Part Number	Input Voltage Range [VAC]	Output Voltage nom. [VDC]	Output Current		Efficiency ⁽¹⁾ typ. [%]
			max. [mA]		
RACM06E-3.3SK/277	80-305	3.3	1818		73
RACM06E-05SK/277	80-305	5	1200		77
RACM06E-12SK/277	80-305	12	500		82
RACM06E-15SK/277	80-305	15	400		83
RACM06E-24SK/277	80-305	24	250		83

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

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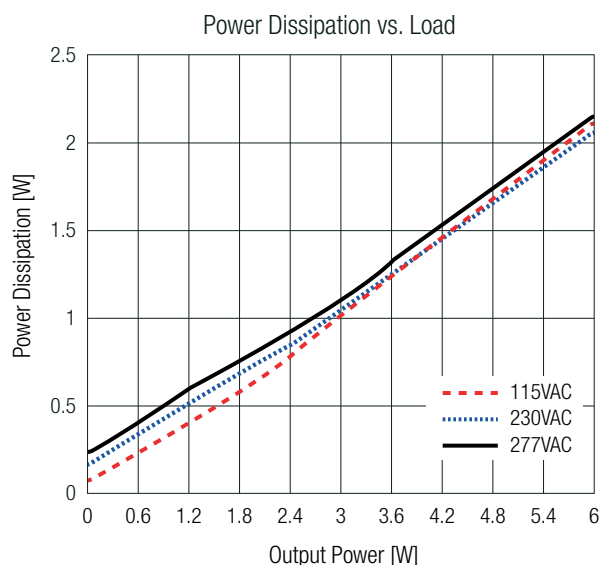
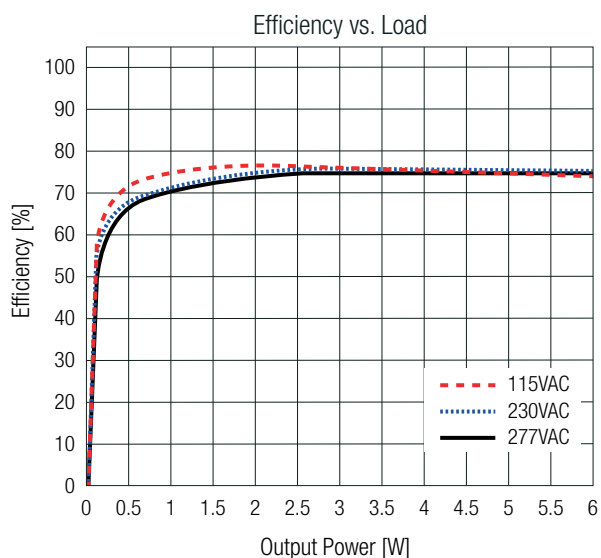
BASIC CHARACTERISTICS (measured @ $T_{AMB}= 25^{\circ}C$, nom. V_{IN} , full load and after warm-up unless otherwise stated)

Parameter	Condition	Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz	100VAC		277VAC
Operating Range ⁽²⁾	47-63Hz	80VAC		305VAC
	DC	120VDC		430VDC
Input Current	115/230/277VAC			150mA
Inrush Current	cold start at 25°C	115VAC		15A
		230VAC		30A
		277VAC		36A
No Load Power Consumption	RACM06E-3.3SK/277; RACM06E-24SK/277			110mW
	others			120mW
Input Frequency Range		47Hz		63Hz
Minimum Load		0%		
Power Factor	115VAC		0.6	
	230VAC		0.5	
	277VAC		0.48	
Start-up time	RACM06E-24SK/277			25ms
	others			20ms
Rise time	RACM06E-15SK/277			15ms
	RACM06E-24SK/277			22ms
	others			10ms
Hold-up time	230VAC	RACM06E-3.3SK/277; RACM06E-05SK/277	50ms	
		others	60ms	
Internal Operating Frequency				130kHz
Output Ripple and Noise ⁽³⁾	20MHz BW	RACM06E-3.3SK/277		120mVp-p
		RACM06E-05SK/277		100mVp-p
		others		1% Vout

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

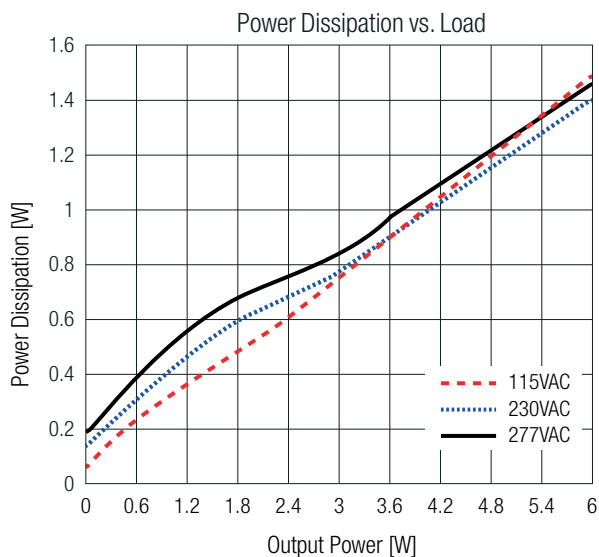
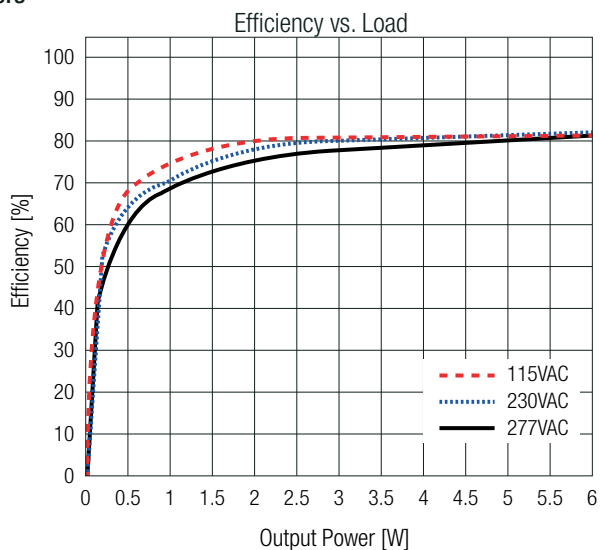
Note3: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

RACM06E-3.3SK/277; RACM06E-05SK/277



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

others

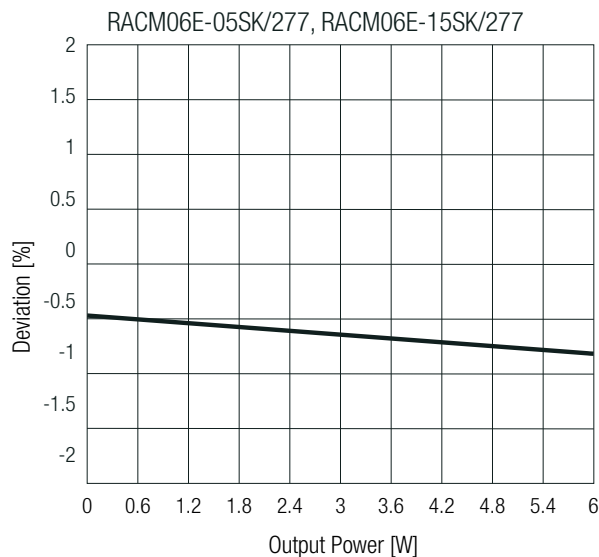
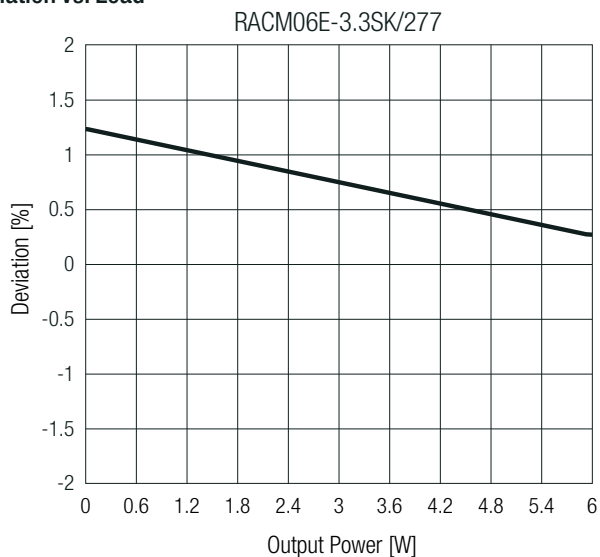


REGULATIONS (measured @ $T_{AMB} = 25^{\circ}\text{C}$, nom. V_{IN} , full load and after warm-up unless otherwise stated)

Parameter	Condition	Value
Output Accuracy		$\pm 2.0\%$ max.
Line Regulation	low line to high line, full load	$\pm 0.3\%$ max.
Load Regulation ⁽⁴⁾	10% to 100% load	1.0% max.
Transient Response	25% load step change	4.0% max.
	recovery time	500 μs typ.

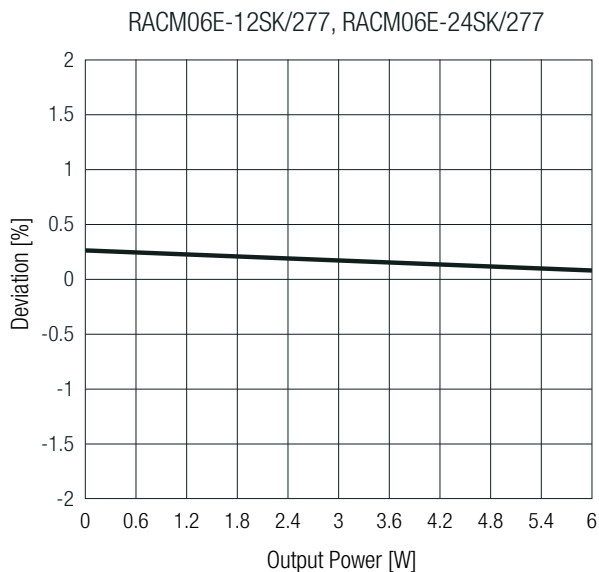
Note4: Operation below 10% load will not harm the converter, but specifications may not be met

Deviation vs. Load



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

Deviation vs. Load



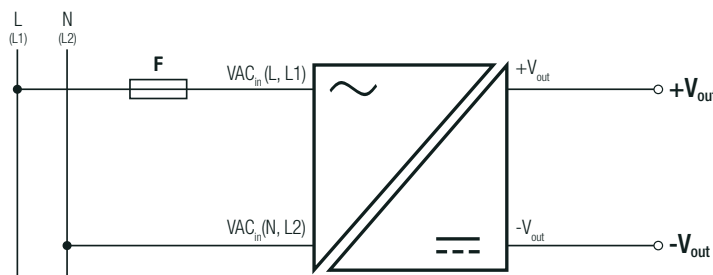
PROTECTIONS (measured @ $T_{AMB} = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

Parameter	Type	Value
Input Fuse ⁽⁶⁾		external fuse required
Short Circuit Protection (SCP)	below 100mΩ	hiccup mode
Over Voltage Protection (OVP)		125% - 195%, hiccup mode
Over Voltage Category (OVC)	according to 60601-1, 60335-1	OVCII
	according to 62368-1, 61558	OVCIII
Over Temperature Protection (OTP)		not protective against overload, hiccup mode
Class of Equipment		Class II
Isolation Voltage ⁽⁶⁾	1 minute; I/P to O/P	4kVAC
Insulation Grade		reinforced
Leakage Current		0.1mA max.
Means of Protection		2MOPP
Medical Device Classification		BF ready

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note6: Safety agency tested fuses: T1A, 420VAC or T1A, 600VAC

Protection Circuit ⁽⁶⁾



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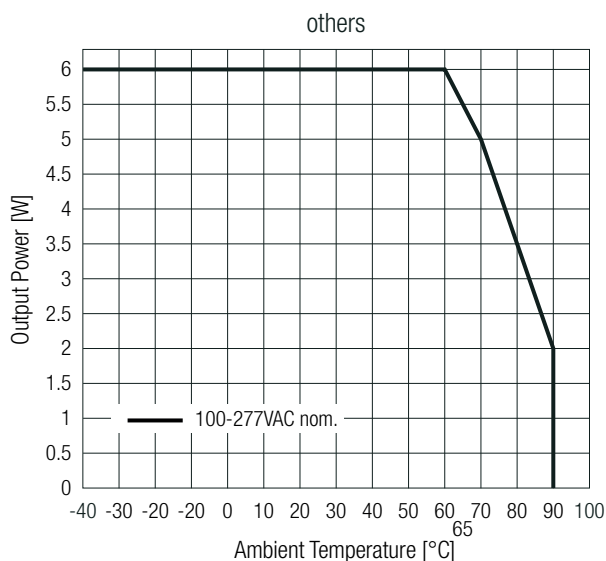
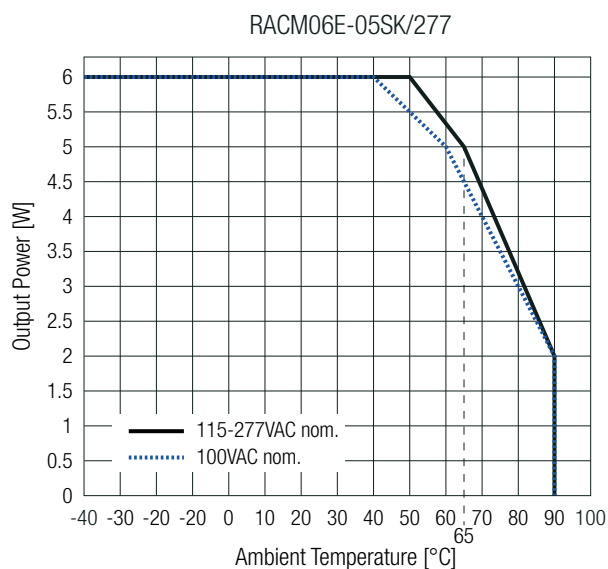
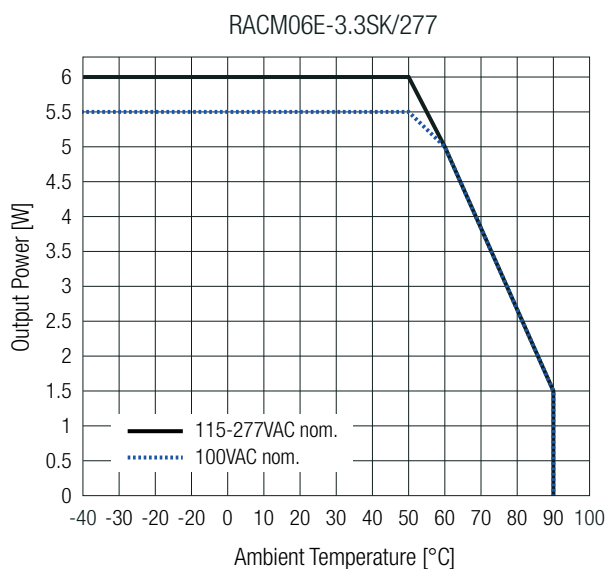
ENVIRONMENTAL (measured @ $T_{AMB} = 25^{\circ}\text{C}$, nom. V_{IN} , full load and after warm-up unless otherwise stated)

Parameter	Condition		Value
Operating Ambient Temperature Range	@ natural convection (0.1m/s); with derating		-40°C to +90°C
Maximum Case Temperature			+110°C
Temperature Coefficient			$\pm 0.05\%/K$
Operating Altitude ⁽⁷⁾	according to 62368-1, 60601-1, 61558		5000m
Operating Humidity	non-condensing		90% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217, G.B.	$T_{AMB} = +25^{\circ}\text{C}$	1936×10^3 hours
		$T_{AMB} = +40^{\circ}\text{C}$	1653×10^3 hours
Design Lifetime	$T_{AMB} = +50^{\circ}\text{C}$		43×10^3 hours

Note7: Recognized by safety agency for safe operation up to 5000m. High altitude operation may impact the performance and lifetime. Please contact RECOM tech support for advice

Derating Graph

(@ Chamber and natural convection 0.1m/s)



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SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements 2nd Edition	64.210.22.05225.01	EN62368-1:2014+A11:2017
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	085-220522401-000	IEC62368-1:2018 3rd Edition EN IEC 62368-1:2020+A11:2020
Medical electrical equipment Part 1: General requirements for basic safety and essential performance	E314885	ANSI/AAMI ES60601-1:2005 + A2:2010 CAN/CSA-C22.2 No. 60601-1:14 3rd Edition
Medical electrical equipment Part 1: General requirements for basic safety and essential performance	22SBDS12050-00721	IEC60601-1:2005 + AM1:2012 3rd Edition EN60601-1:2006 + A12:2014
Household and similar electrical appliances – Safety – Part 1: General requirements	pending	IEC60335-1:2010 + C1:2016 5th Edition EN60335-1:2012 + A15:2021
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	pending	EN62233:2008
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V 3rd Edition	085-220522601-000	IEC61558-1:2017 3rd Edition
	64.250.22.05226.01	EN IEC 61558-1:2019
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements	085-220522601-000	IEC61558-2-16:2009 + A1:2013 1st Edition
	64.250.22.05226.01	EN61558-2-16:2009+A1:2013
RoHS2		RoHS 2011/65/EU + AM2015/863
EMC Compliance (EN60601-1-2)	Condition	Standard / Criterion
Medical electrical equipment Part 1-2: General requirements for basic safety and essential performance		EN60601-1-2:2015 + A1:2021
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8, 15kV Contact: ±8kV	EN61000-4-2:2009
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-2700MHZ) 27V/m (385MHZ) 28V/m (450MHZ) 9V/m /710, 745, 780MHZ) 28V/m (810, 870, 930MHZ) 28V/m (1720, 1845, 1970MHZ) 28V/m (2450MHZ) 9V/m (5240, 5500, 5785MHZ)	EN61000-4-3:2006 + A2:2010
Fast Transient and Burst Immunity	AC Port: L-N 2kV	EN61000-4-4:2012
Surge Immunity	AC Port: L-N 0.5, 1, 2kV	EN61000-4-5:2014 + A1:2017
Immunity to conducted disturbances, induced by radio-frequency fields	3.6Vrms (0.15-80MHz)	EN61000-4-6:2014
Power Magnetic Field Immunity	30A/m	EN61000-4-8:2010
Voltage Dips and Interruptions	Dips: 100% (0.5P, 1.0P), 30% Interruption: 100%	EN61000-4-11:2004 + A1:2017
Limits of Voltage Fluctuations & Flicker	JYTA-R01-2200312	EN61000-3-3:2013 + A1:2019
EMC Compliance (EN55032)	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements		EN55032:2015 + A11:2020
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		FCC 47 CFR Part 15 Subpart B
EMC Compliance (EN61204-3)	Condition	Standard / Criterion
Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility		EN IEC 61204-3:2018
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV Contact: ±4kV	EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-1000MHz) 3V/m (1400-2000MHz) 1V/m (2000-2700MHz)	EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC Port: L-N 2kV	EN61000-4-4:2012, Criteria A
Surge Immunity	AC Port: L-N 1kV	EN61000-4-5:2014 + A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms (0.15-80MHz)	EN61000-4-6:2014, Criteria A

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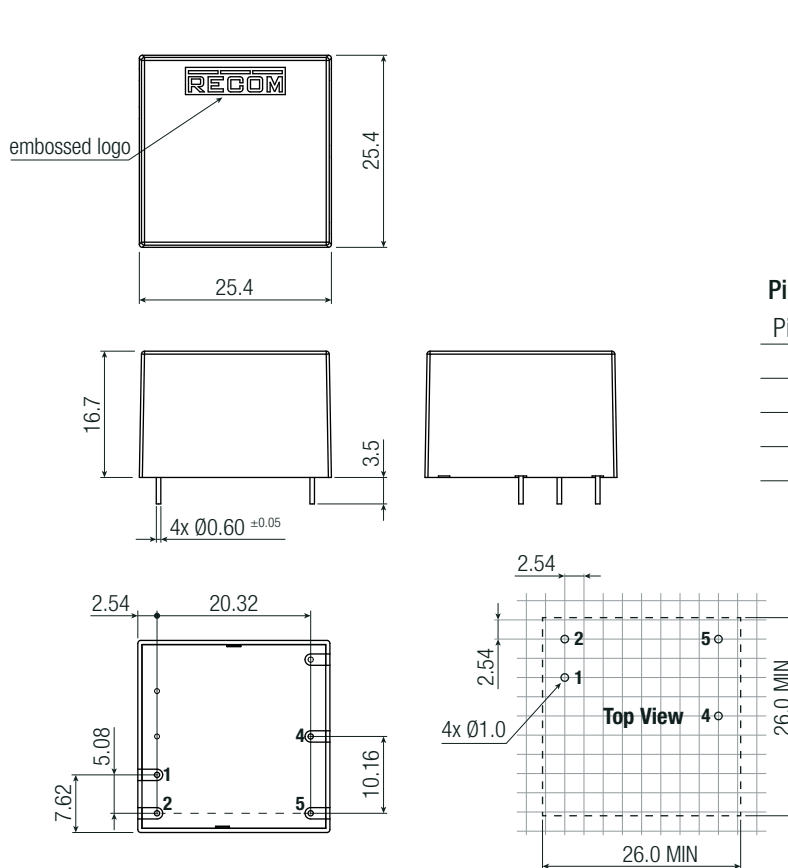
SAFETY & CERTIFICATIONS

EMC Compliance (EN61204-3)	Condition	Standard / Criterion
Power Magnetic Field Immunity	30A/m	EN61000-4-8:2010, Criteria A
Voltage Dips and Interruptions	Dips: 100% (0.5P, 1.0P) 20%, 30%, 60% Interruption: 100%	EN61000-4-11:2004 + A1:2017, Criteria A
Limits of Harmonic Current Emissions		EN IEC 61000-3-2:2019
Limits of Voltage Fluctuations & Flicker	AC Port: L-N 2kV	EN61000-3-3:2013 + A1:2019

DIMENSION & PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Materials	case/baseplate	plastic, (UL94-V0)
	potting	PU, (UL94-V0)
	PCB	FR4, (UL94-V0)
Dimension (HxWxD)		25.4 x 25.4 x 16.7mm 1.0 x 1.0 x 0.6 inch
Weight		20g typ. 0.04 lbs

Dimension Drawing (mm)



Pinning Information [P5b]

Pin #	Single
1	VAC in (L)
2	VAC in (N)
4	-Vout
5	+Vout

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	530.0 x 27.5 x 25.6mm
Packaging Quantity		18pcs
Storage Temperature Range		-40°C to +90°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.