

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

## 6W / Universal Input 100V - 277VAC

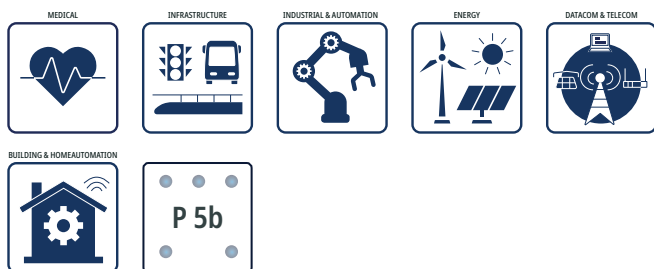
### FEATURES

- 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 17mm. 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	Output Voltage	Output Current	Efficiency <sup>(1)</sup>
	Range [VAC]	nom. [VDC]	max. [mA]	typ. [%]
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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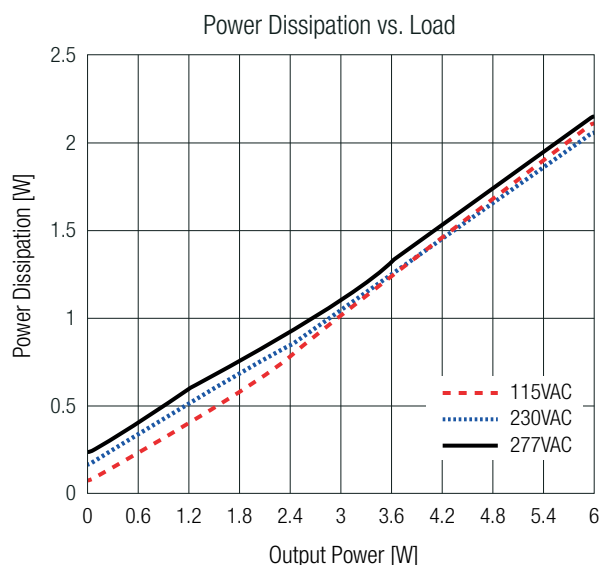
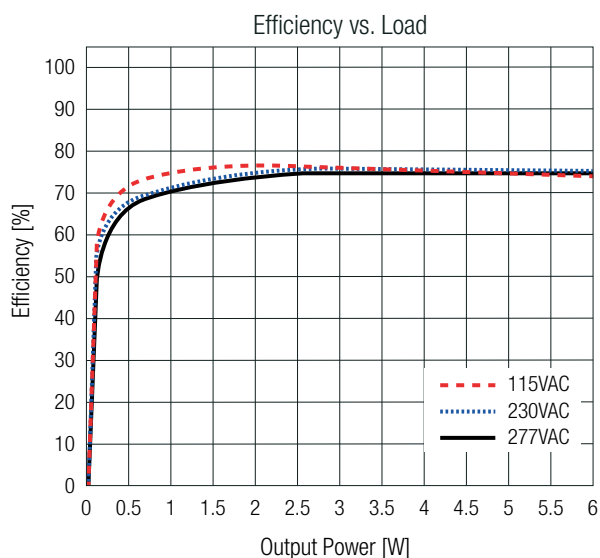
**BASIC CHARACTERISTICS** (measured @  $T_{AMB}= 25^{\circ}C$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

Parameter	Condition	Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz	100VAC		277VAC
Operating Range <sup>(2)</sup>	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 <sup>(3)</sup>	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.

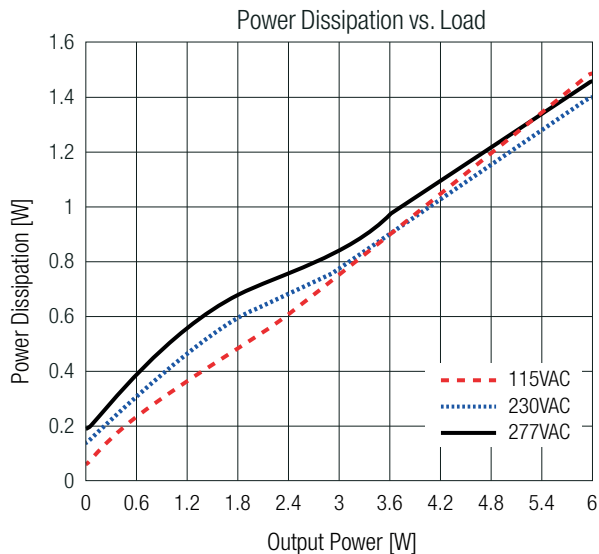
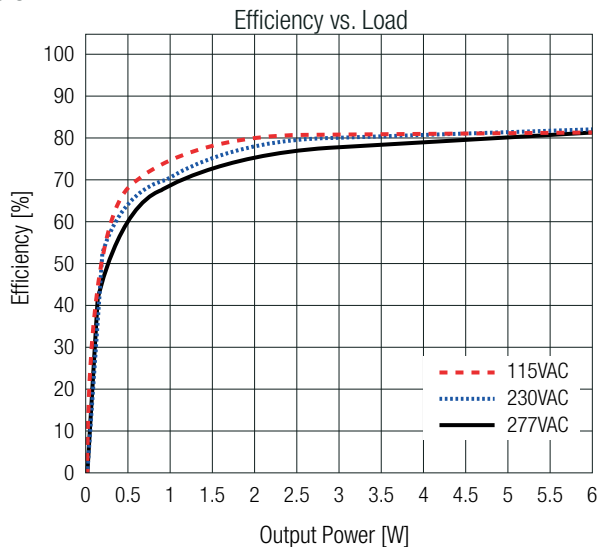
Note3: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

### 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

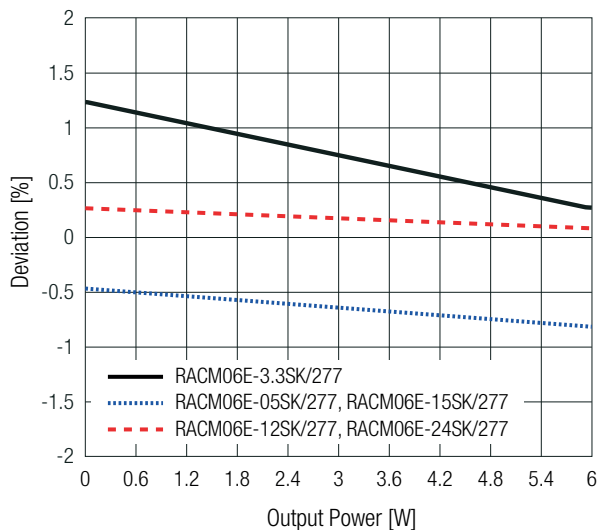


**REGULATIONS** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

Parameter	Condition	Value
Output Accuracy		$\pm 2.0\%$ max.
Line Regulation	low line to high line, full load	$\pm 0.3\%$ max.
Load Regulation <sup>(4)</sup>	10% to 100% load	1.0% max.
Transient Response	25% load step change	4.0% max.
	recovery time	500 $\mu\text{s}$ typ.

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

**Deviation vs. Load**



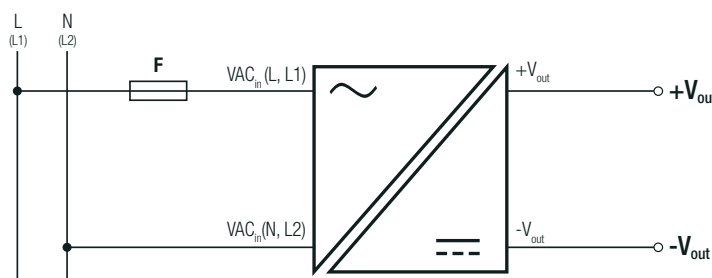
**PROTECTIONS (measured @  $T_{AMB}= 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)**

Parameter	Type	Value
Input Fuse <sup>(6)</sup>		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 <sup>(5)</sup>	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 <sup>(6)</sup>**



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

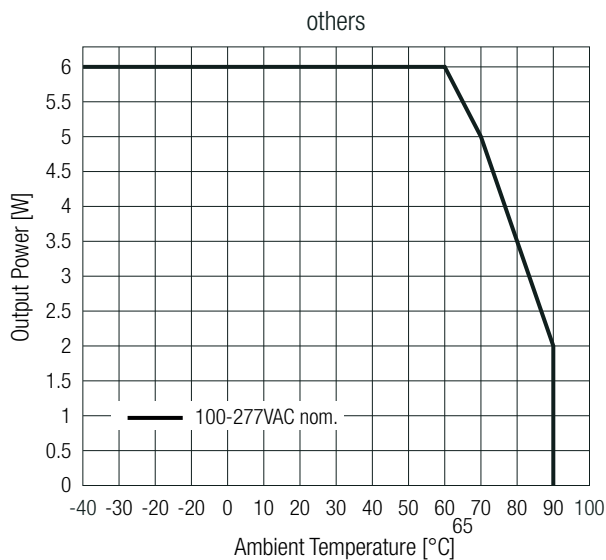
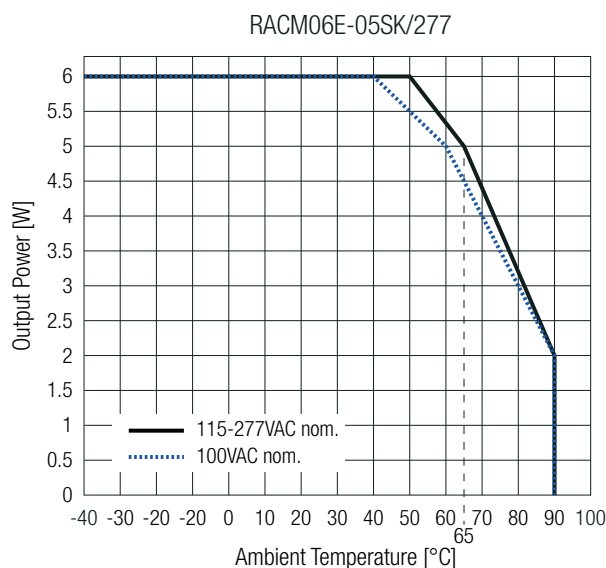
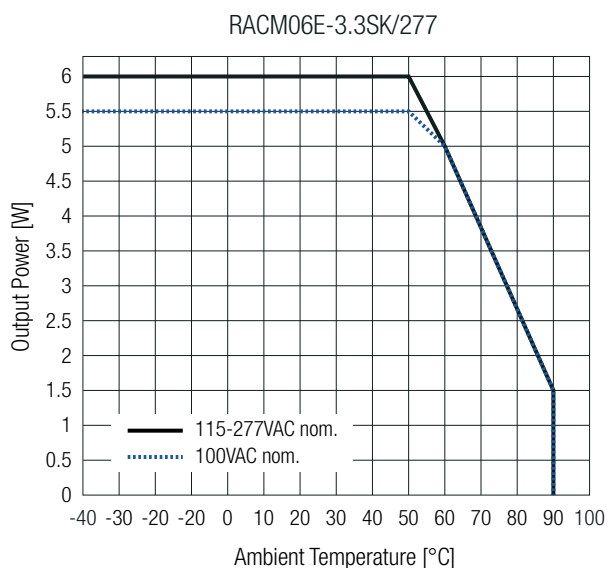
Parameter	Condition		Value
Operating Ambient Temperature Range	@ natural convection (0.1m/s); with derating		-40°C to +90°C
Maximum Case Temperature			+110°C
Temperature Coefficient			±0.05%/K
Operating Altitude <sup>(7)</sup>	according to 62368-1, 60601-1, 61558		5000m
Operating Humidity	non-condensing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

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

### Derating Graph

(@ Chamber and natural convection 0.1m/s)



### 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

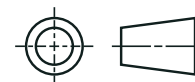
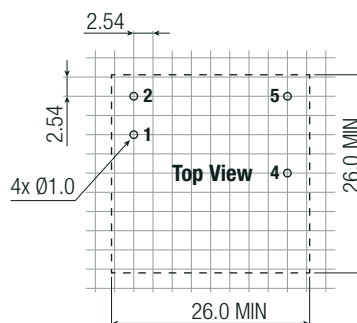
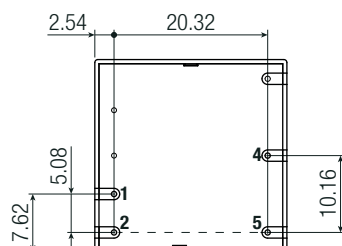
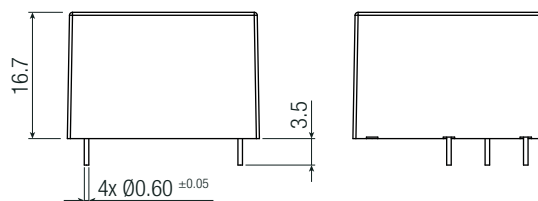
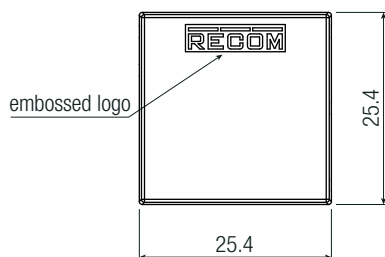
### SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Household and similar electrical appliances – Safety – Part 1: General requirements	64.260.22.05227.01	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		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
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

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

### 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.

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