

Features

- 5W Class II Power Supply in Compact 1" x 1" Package (High Power Density)
- Internal EMC Class B Filter
- UL/IEC/EN60950-1 certified
- UL/IEC/EN62368-1 (UL Pending)
- Electrical Protection
- Operating Temperature Range: -25°C to +50°C @ Full Load

Regulated Converters



RAC05-K

5 Watt
1" x 1"
Single Output



Description

The RAC05-K series are ultra-compact AC/DC power supply modules in lightweight fully-encapsulated plastic casing. Beside safety approvals for industrial and IT solutions UL60950-1 and UL62368-1, the units meet EN55032-"B" limits without any external components. Integrated fusing as well as electrical protections against short circuit and over voltage are on board. With their excellent efficiency over the entire load range including light load standby conditions, these power modules are especially suitable for IOT applications and control equipment.

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	Max. Capacitive Load [µF]
RAC05-3.3SK	85-264	3.3	1515	76	6000
RAC05-05SK	85-264	5	1000	80	6000
RAC05-12SK	85-264	12	416	81	1500
RAC05-15SK	85-264	15	333	82	1000
RAC05-24SK	85-264	24	210	84	330

Notes:

Note1: Efficiency is tested at 25°C with constant resistant mode at full load and 230VAC

Model Numbering

RAC05- SK
Output Voltage Single Output

Specifications (measured @ ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				Pi Type
Input Voltage Range (2)	(refer to line derating graph on PA-2)	85VAC 120VDC		264VAC 370VDC
Input Current	115VAC 230VAC			250mA 100mA
Inrush Current	cold start	115VAC 230VAC		15A 30A
No load Power Consumption	264VAC		75mW	
Input Frequency Range		47Hz		63Hz
Start-up Time				2s
Rise Time				25ms
Hold-up time	115VAC 230VAC			12ms 60ms
Minimum Load		0%		
Internal Operating Frequency				130kHz
Output Ripple and Noise	20MHz BW	3.3Vout, 5Vout others	60mVp-p	1% of Vout
Power Factor	115VAC 230VAC	0.6 0.45		

Notes:

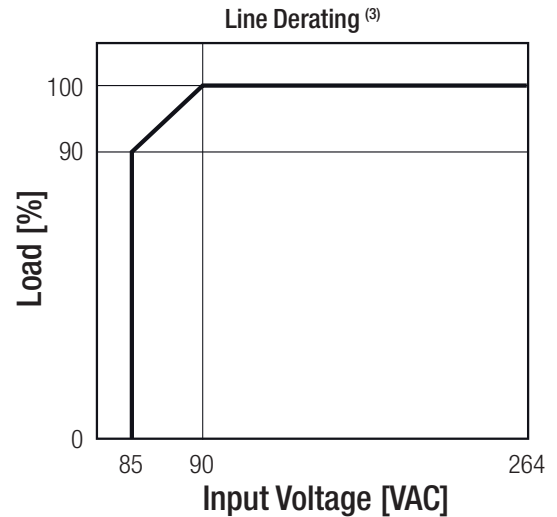
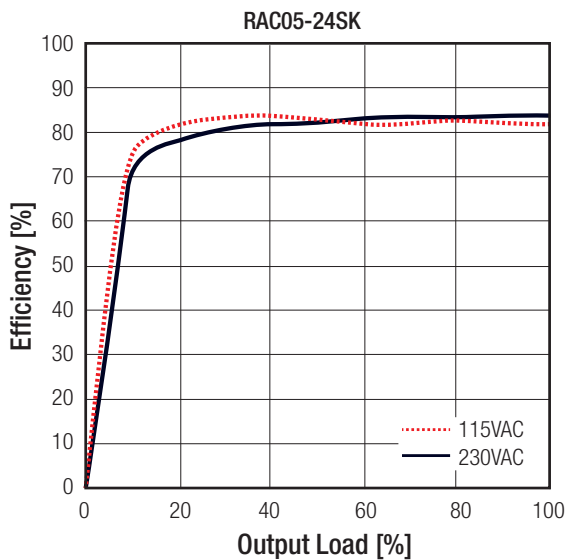
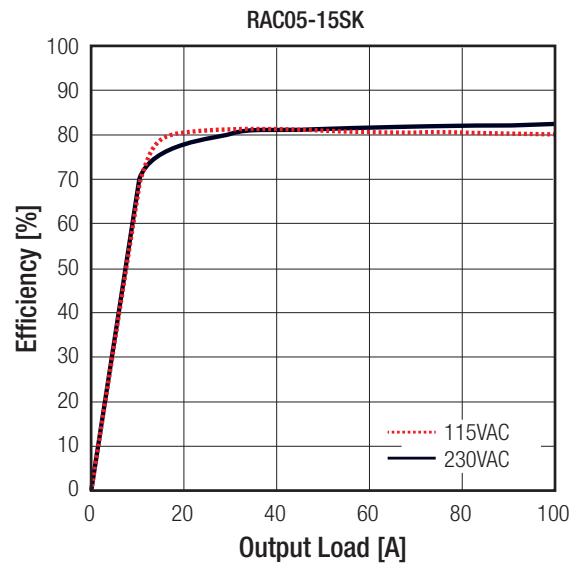
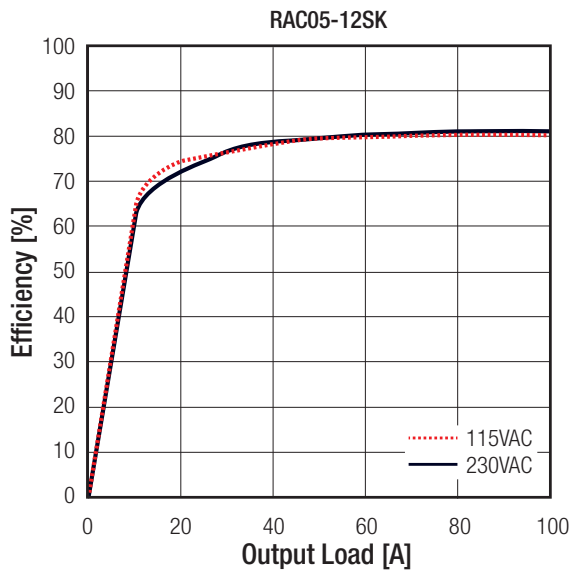
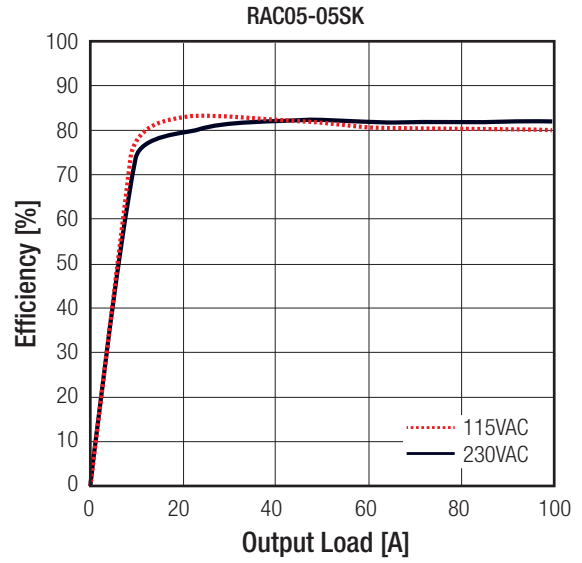
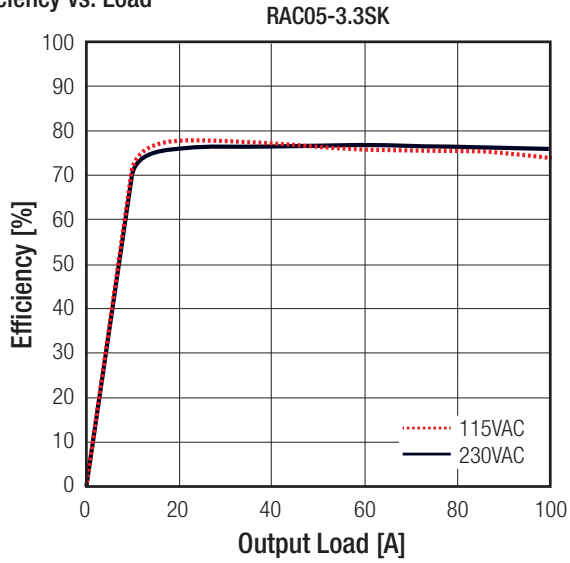
Note2: The products were submitted for safety files at AC-Input operation.

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UL/IEC/EN62368-1 (UL pending)
UL/IEC/EN60950-1 certified
CSA C22.2 No. 60950-1-07 certified
CSA C22.2 No. 62368-1-14 (pending)
EN61204-3
CB Report

Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

Efficiency vs. Load



Notes:

Note3: No derating required for the specified DC-input range

Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

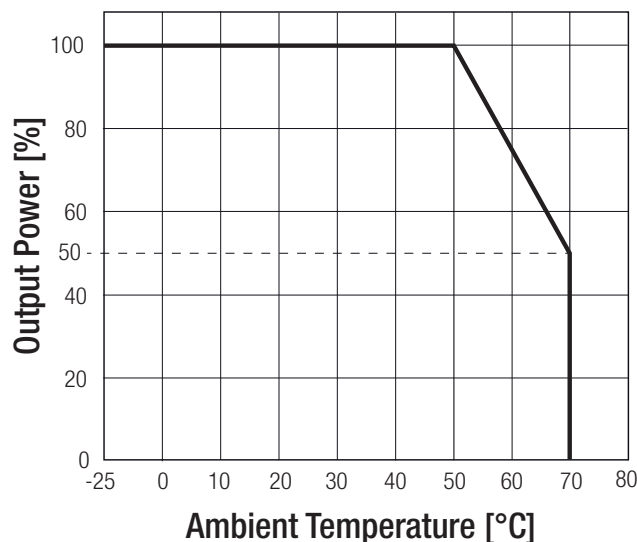
REGULATIONS		
Parameter	Condition	Value
Output Accuracy		$\pm 1.0\%$ typ.
Line Regulation		$\pm 0.5\%$ typ.
Load Regulation		$\pm 1.0\%$ typ.
Transient Response	25% load step change Recovery Time	4.0% max. 500 μs

PROTECTIONS		
Parameter	Type	Value
Internal Input Fuse		T1A, slow blow
Short Circuit Protection (SCP)		Hiccup, automatic restart
Over Voltage Protection (OVP)		125% - 195%, auto recovery
Over Current Protection (OCP)		125% - 195%, auto recovery
Over Voltage Category (OVC)		OVC II
Isolation Voltage	I/P to O/P, I/P to Case and O/P to Case	tested for 1 minute tested for 3 seconds 3kVAC 4kVAC
Isolation Resistance	I/P to O/P, Isolation Voltage 500VDC	1G Ω min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V	100pF max.
Insulation Grade		reinforced
Leakage Current		0.25mA max.

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	with derating (see graph)	-25°C to $+70^\circ\text{C}$
Maximum Case Temperature	230VAC	$+75^\circ\text{C}$
Temperature Coefficient		$\pm 0.05\%/^\circ\text{C}$
Operating Altitude		3000m
Operating Humidity	non-condensing	20% to 90% RH
Design Lifetime	115VAC/60Hz and full load at $+25^\circ\text{C}$	$>10 \times 10^3$ hours
MTBF	according to MIL-HDBK-217F, G.B.	$+25^\circ\text{C}$ $+50^\circ\text{C}$ $>450 \times 10^3$ hours $>250 \times 10^3$ hours
Pollution Degree		PD2
Vibration		10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes

Derating Graph

(@ Chamber and natural convection 0.1m/s)

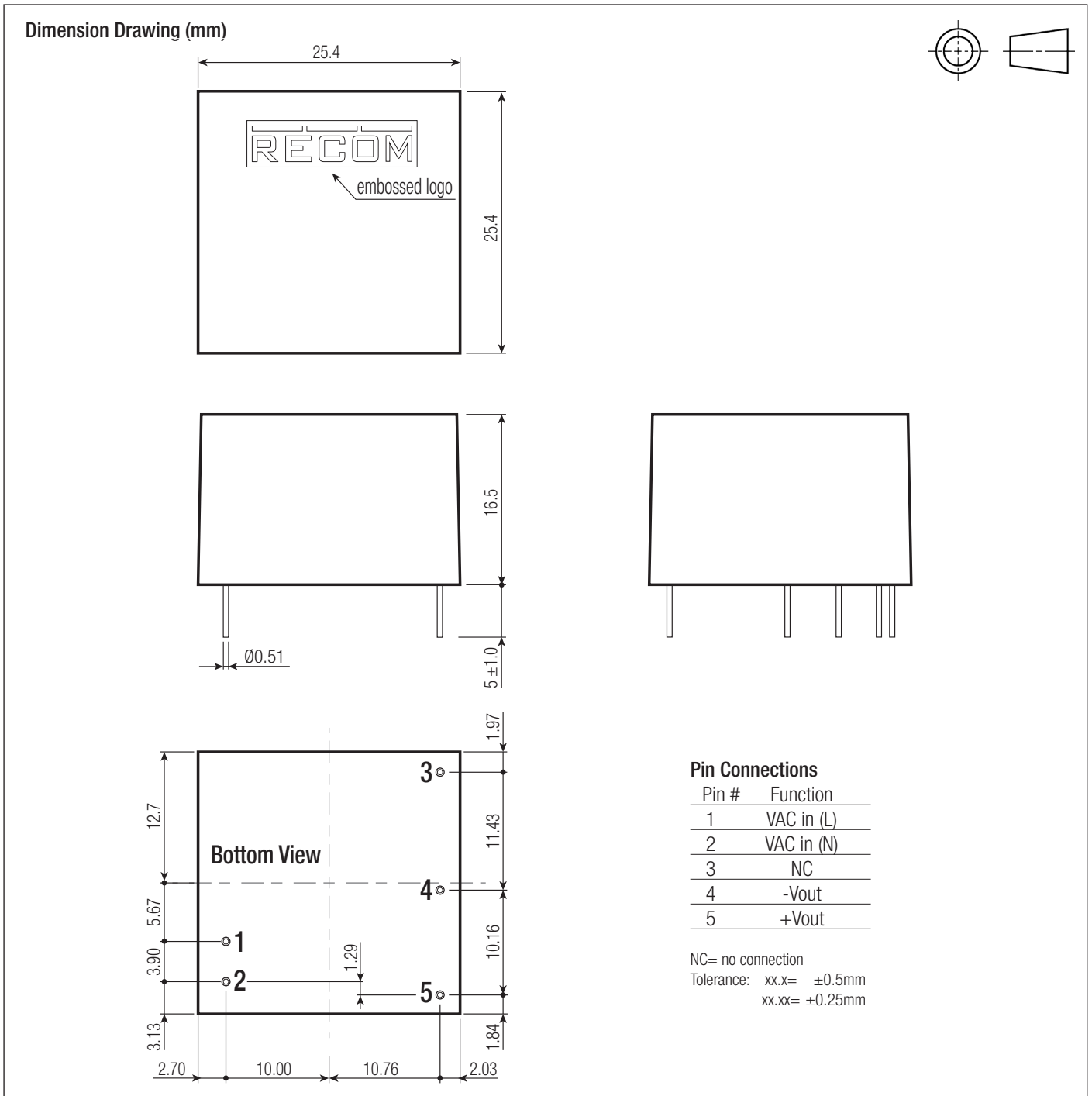


Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E224736	UL60950-1, 2nd Edition, 2014 CSA C22.2 No. 60950-1-07, 2nd Edition, 2014
Audio/Video, information and communication technology equipment - Safety requirements		UL62368-1, 2nd Edition, 2014 CSA C22.2 Nr. 62368-1-14, 2nd Edition, 2014
Information Technology Equipment, General Requirements for Safety (CB Scheme)	E491408-A2-CB-1	IEC60950-1, 2nd Edition + AM2, 2013 EN60950-1, 1st Edition, 2006 + AM2, 2013
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	OFF-4787889086-1	IEC62368-1, 2nd Edition, 2014 EN62368-1, 2014 + A11, 2017
RoHS2		RoHS 2011/65/EU + AM2015/863
EMC Compliance	Conditions	Standard / Criterion
Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility		EN61204-3:2000; Class B
ESD Electrostatic discharge immunity test	$\pm 8\text{kV}$ Air; $\pm 4\text{kV}$ Contact	EN61000-4-2:2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	10V/m, 80MHz-1GHz 3V/m, 1.5GHz-2GHz 1V/m, 2GHz-2.7GHz	EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC In Port: $\pm 2\text{kV}$	EN61000-4-4:2012, Criteria B
Surge Immunity	AC In Port (L-N): $\pm 1\text{kV}$ DC Output Port: $\pm 0.5\text{kV}$	EN61000-4-5:2014, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC and DC Power Port: 10V	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 1A/m	EN61000-4-8: 2010, Criteria A
Voltage Dips and Interruptions	Voltages Dips: >95% Voltage Dips: 30% Interruptions: >95%	EN61000-4-11:2004, Criteria B EN61000-4-11:2004, Criteria C EN61000-4-11:2004, Criteria C
Voltage Fluctuations and Flicker in Public Low-Voltage Systems $\leq 16\text{A}$ per phase		EN61000-3-3:2013

DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	Case	black plastic (UL94V-0)
	Potting	silicone (UL94V-0)
	PCB	FR4 (UL94V-0)
	Baseplate	plastic (UL94V-0)
Package Dimension (LxWxH)		25.4 x 25.4 x 16.5mm
Package Weight		20g typ.
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Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)



PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	530.0 x 27.5 x 25.6mm
Packaging Quantity		18pcs
Storage Temperature Range	non-condensing	-40°C to +85°C
Storage Humidity		20% to 90% RH

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