

Features

Regulated Converters

- 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 certified
- Electrical protection
- Operating temperature range: -25°C to +50°C @ full load

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 [μ F]
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 resistive load and 115VAC

Model Numbering

RAC05- SK

Output Voltage _____ Single Output

Specifications (measured @ $t_a = 25^\circ\text{C}$, 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 page PA-3		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					
continued on next page					

RECOM
AC/DC Converter

RAC05-K

5 Watt
1" x 1"
Single Output

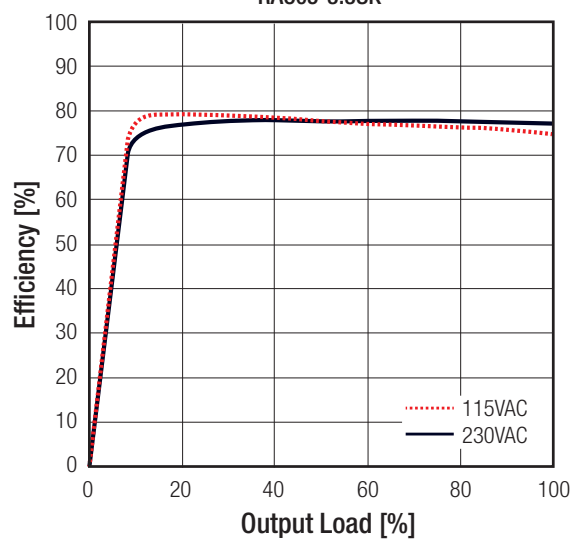


UL/IEC/EN62368-1 certified
UL/IEC/EN60950-1 certified
CSA C22.2 No. 60950-1-07 certified
CSA C22.2 No. 62368-1-14 certified
EN61204-3
CB Report

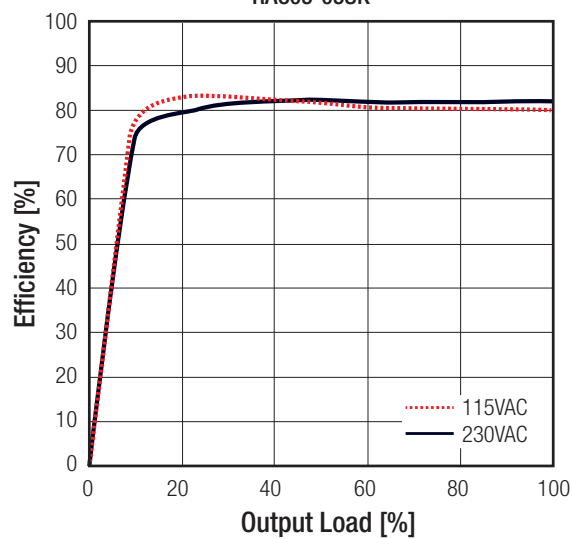
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

Efficiency vs. Load

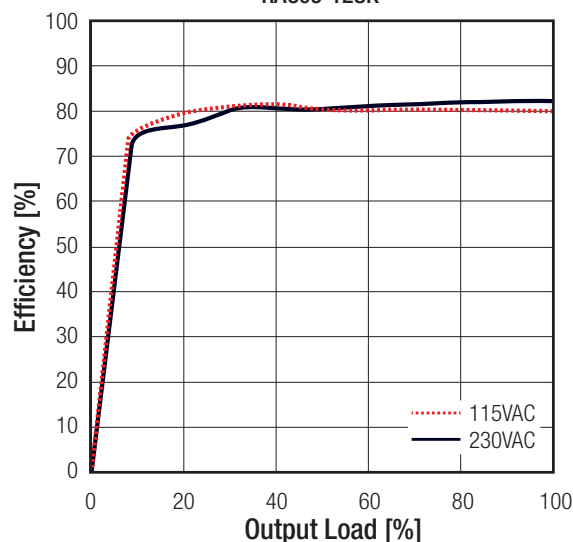
RAC05-3.3SK



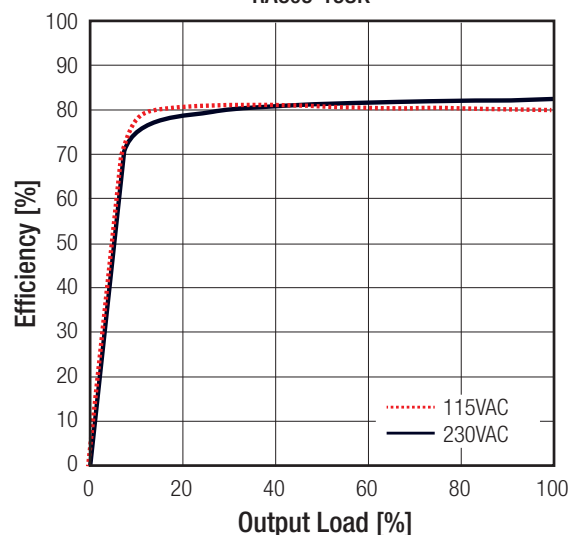
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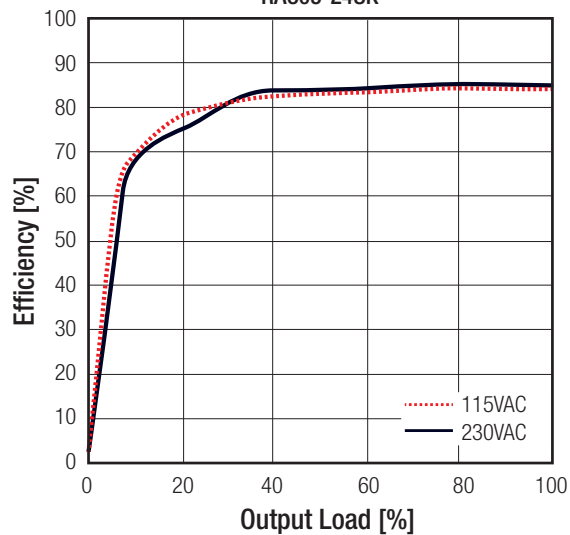
RAC05-12SK



RAC05-15SK



RAC05-24SK



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

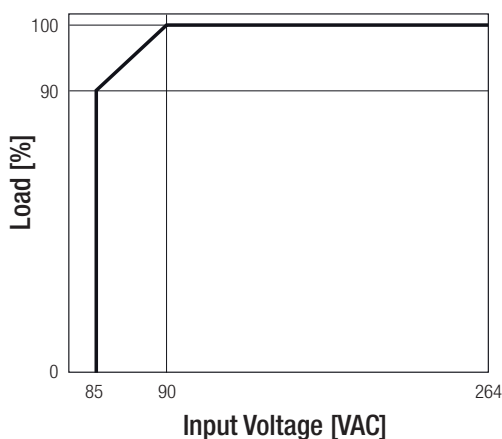
PROTECTIONS

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

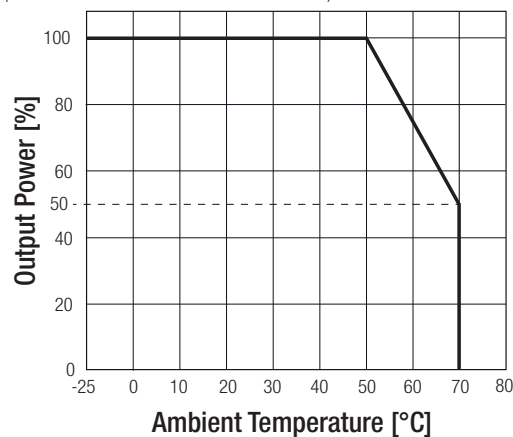
Parameter	Condition	Value
Operating Temperature Range	with derating (see graph)	-25°C to $+70^\circ\text{C}$
Maximum Case Temperature	230VAC	$+75^\circ\text{C}$
Temperature Coefficient		$\pm 0.05\%/^\circ\text{C}$
Operating Altitude		3000m
Operating Humidity	non-condensing	20% to 90% RH
Design Lifetime	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

Line Derating ⁽³⁾



Derating Graph

(@ Chamber and natural convection 0.1m/s)



Notes:

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

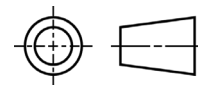
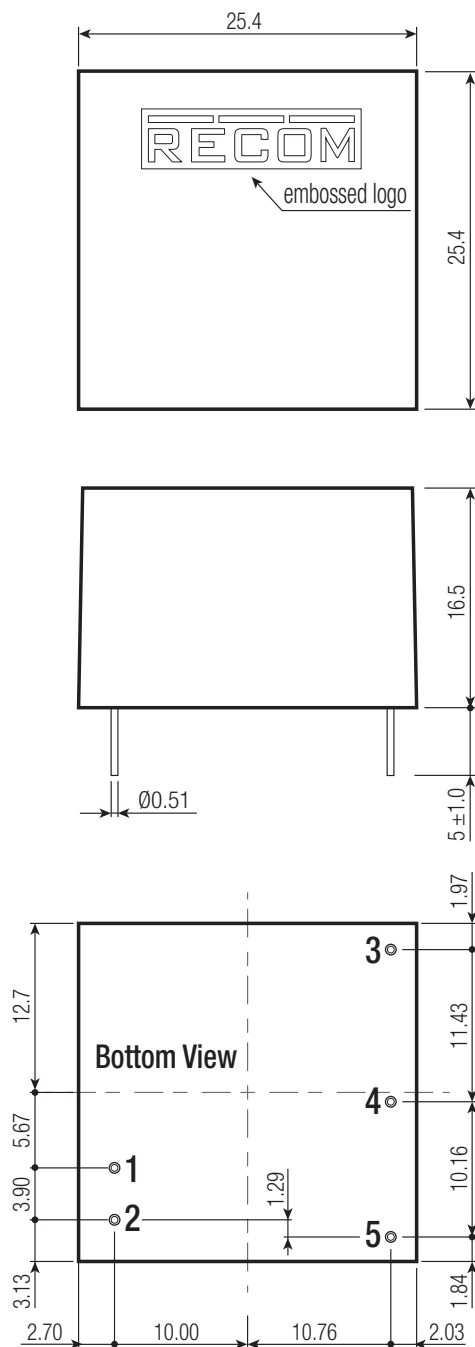
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

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 Potting PCB Baseplate	black plastic (UL94V-0) silicone (UL94V-0) FR4 (UL94V-0) plastic (UL94V-0)
Package Dimension (LxWxH)		25.4 x 25.4 x 16.5mm
Package Weight		20g typ.
continued on next page		

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

Dimension Drawing (mm)



Pin Connections

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

NC= no connection

Tolerance: xx.x= $\pm 0.5\text{mm}$

xx.xx= $\pm 0.25\text{mm}$

Notes:

Note4: In terms of creepance and clearance unconnected pin #3 should be considered secondary side

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

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.