

**!NOT RECOMMENDED FOR NEW DESIGNS!**

LAST TIME BUY: 30<sup>TH</sup> OCT 2020, 3,3SA, 09SA, 15SA, 05DA, 12DA, 15DA, 0512TA, 0515TA

LAST TIME BUY: 30<sup>TH</sup> OCT 2020, SCREW TERMINAL VERSION

**RECOM**  
AC/DC Converter

## Features

- 20 Watt PCB mount package
- Universal input voltage range
- 3000VAC / 1 minute isolation
- Low output ripple and noise
- Short circuit protected
- UL certified, CE marked

## Regulated Converter

## RAC20-A

20 Watt  
Single,  
Dual, Double,  
Triple Output



### Description

Universal input voltage switching power module for PCB or DIN-rail mounting available with single, dual or triple output voltages.



### Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ <sup>(1)</sup> [%]	Max. Capacitive Load [ $\mu$ F]
RAC20-05SA	90-264	5	4000	79	13000
RAC20-12SA	90-264	12	1670	83	920
RAC20-24SA	90-264	24	840	84	600

#### Notes:

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

### NRND (Last time buy: 30<sup>th</sup> Oct 2020)

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ <sup>(1)</sup> [%]	Max. Capacitive Load [ $\mu$ F]
RAC20-3.3SA <sup>(2)</sup>	90-264	3.3	4500	75	25000
RAC20-09SA <sup>(2)</sup>	90-264	9	2230	82	1100
RAC20-15SA <sup>(2)</sup>	90-264	15	1340	83	820
RAC20-05DA <sup>(2)</sup>	90-264	$\pm$ 5	$\pm$ 2000	79	$\pm$ 4300
RAC20-12DA <sup>(2)</sup>	90-264	$\pm$ 12	$\pm$ 833	82	$\pm$ 560
RAC20-15DA <sup>(2)</sup>	90-264	$\pm$ 15	$\pm$ 677	82	$\pm$ 220
RAC20-0512TA <sup>(2)</sup>	90-264	5/ $\pm$ 12	2800/ $\pm$ 250	81	3500/ $\pm$ 200
RAC20-0515TA <sup>(2)</sup>	90-264	5/ $\pm$ 15	2800/ $\pm$ 200	81	3500/ $\pm$ 150



C **UL** US  
E196683



### Model Numbering



#### Notes:

Note2: no suffix for standard package (THT)  
add suffix "ST" for screw terminal module

#### Ordering Examples:

RAC20-05SA	20 Watt	5Vout	Single Output	THT
RAC20-05DA	20 Watt	$\pm$ 5Vout	Dual Output	THT
RAC20-0512TA-ST	20 Watt	5/ $\pm$ 12Vout	Triple Output	Screw Terminal
RAC20-15SA-ST	20 Watt	15Vout	Single Output	Screw Terminal

**PREFERRED ALTERNATIVES**  
Please consider these alternatives:

**RAC20-K Series**

UL60950-1 certified  
CSA C22.2 No. 60950-1-07 certified  
EN60950-1 certified  
EN55032 compliant  
EN55024 compliant

**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

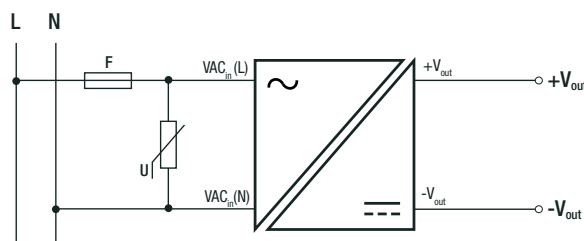
BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range <sup>(3)</sup>	nom. Vin = 230VAC		90VAC 100VDC	230VAC	264VAC 375VDC
Input Current	115VAC 230VAC				400mA 270mA
Inrush Current	2ms max.	115VAC 230VAC			30A 50A
No load Power Consumption	115VAC/230VAC				470mW
Input Frequency Range	AC Input		47Hz		440Hz
Minimum Load	Single, Dual Triple		0%	10%	
Hold-up Time	115VAC/230VAC		13ms		
Internal Operating Frequency				100kHz	
Output Ripple and Noise <sup>(4)</sup>	20MHz BW	Noise Ripple			<0.5% Vout + 50mVp-p max. <0.2% Vout + 40mVp-p max.
<b>Notes:</b>					
Note3: The products were submitted for safety files at AC-Input operation					
Note4: Measurements are made with a 0.1µF and 47µF MLCC across output (low ESR)					

REGULATIONS			
Parameter	Condition		Value
Output Accuracy			±2.0% max.
Line Regulation	low line to high line	Single, Dual Triple	±0.5% typ. ±1.0% typ. (+5Vout) / ±5.0 typ. (±Vout)
Load Regulation <sup>(6)</sup>	10% to 100% load	Single Dual Triple	1.0% typ. 3.0% typ. 2.0% typ. (+5Vout) / 5.0 typ. (±Vout)
<b>Notes:</b>			
Note5: Operation below 10% load will not harm the converter, but specifications may not be met			

PROTECTIONS			
Parameter	Type		Value
Short Circuit Protection (SCP)			Hiccup mode, auto recovery
Over Voltage Protection (OVP)			zener diode clamp
Over Current Protection (OCP)			105% typ.
Isolation Voltage	I/P to O/P	tested for 1 minute	3kVAC
Leakage Current			0.25mA max.

**Notes:**

- Note6: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type  
 Note7: An external MOV is recommended. The varistor should comply with IEC-61051-2. e.g. 14S471K series



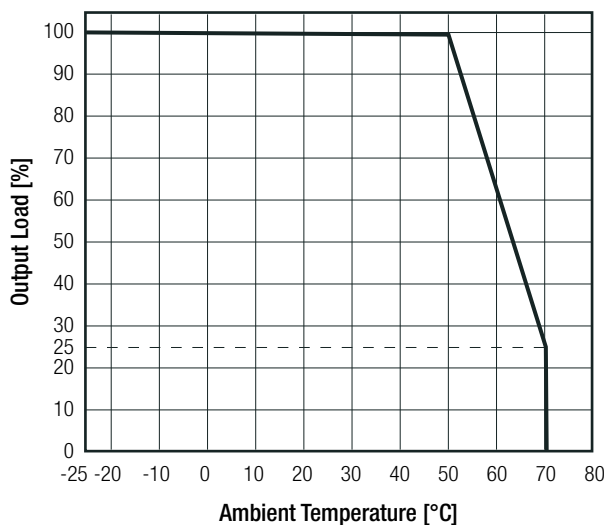
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**ENVIRONMENTAL**

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load refer to derating graph	-25°C to +50°C -25°C to +70°C
Temperature Coefficient			±0.02%/K typ.
Operating Humidity	non-condensing		95% RH max.
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	>400 x 10 <sup>3</sup> hours

**Derating Graph**

(@ Chamber and natural convection 0.1m/s)



**SAFETY AND CERTIFICATIONS**

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E196683	UL60950-1, 2nd Edition, 2007 CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2007
Information Technology Equipment, General Requirements for Safety		EN60950-1:2006 + A2:2013
EAC Safety of Low Voltage Equipment	RU-AT.49.09571	TP TC 004/2011
RoHS2+		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements		EN55032:2015, Class B
Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement		EN55024:2010 + A1:2015
Limits for Harmonic Current Emissions		EN61000-3-2: 2014
Limitation of Voltage Fluctuations/Flicker in Low-Voltage Systems		EN61000-3-3: 2013

**DIMENSION AND PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	case	epoxy with fibreglass (UL94V-0)
Dimension (LxWxH)	standard	70.0 x 48.0 x 22.0mm
	with suffix "-ST"	111.9 x 64.6 x 27.5mm
Weight	standard	122g typ.
	with suffix "-ST"	197g typ.

continued on next page



**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION			
Parameter	Type		Value
Packaging Dimension (LxWxH)	cardboard box	standard	260.0 x 70.0 x 42.0mm
		with suffix "-ST"	119.0 x 64.0 x 54.0mm
Packaging Quantity	standard		3pcs
	with suffix "-ST"		1pcs
Storage Temperature Range			-40°C to +85°C
Storage Humidity	non-condensing		95% RH

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