

# 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.

Consider RAC20-K series for new designs

### Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ <sup>(1)</sup> [%]	Max. Capacitive Load [µF]
RAC20-3.3SA <sup>(2)</sup>	90-264	3.3	4500	75	25000
RAC20-05SA <sup>(2)</sup>	90-264	5	4000	79	13000
RAC20-09SA <sup>(2)</sup>	90-264	9	2230	82	1100
RAC20-12SA <sup>(2)</sup>	90-264	12	1670	83	920
RAC20-15SA <sup>(2)</sup>	90-264	15	1340	83	820
RAC20-24SA <sup>(2)</sup>	90-264	24	840	84	600
RAC20-05DA <sup>(2)</sup>	90-264	±5	±2000	79	±4300
RAC20-12DA <sup>(2)</sup>	90-264	±12	±833	82	±560
RAC20-15DA <sup>(2)</sup>	90-264	±15	±677	82	±220
RAC20-0512TA <sup>(2)</sup>	90-264	5/±12	2800/±250	81	3500/±200
RAC20-0515TA <sup>(2)</sup>	90-264	5/±15	2800/±200	81	3500/±150

#### Notes:

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



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

### 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	±5Vout	Dual Output	THT
RAC20-0512TA-ST	20 Watt	5/±12Vout	Triple Output	Screw Terminal
RAC20-15SA-ST	20 Watt	15Vout	Single Output	Screw Terminal

**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.		

**Notes:**

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)

**Notes:**

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 0.1 m/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 0.1 m/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.

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

### Dimension Drawing (mm)



### Pin Connections

Pin #	Single	Dual	Triple
1	FG	FG	FG
2	VAC in (N)	VAC in (N)	VAC in (N)
3	VAC in (L)	VAC in (L)	VAC in (L)
4	no Pin	no Pin	-Vout
5	-Vout	-Vout	Com
6	no Pin	Com	+Vout
7	+Vout	+Vout	+5V Rtn
8	no Pin	no Pin	+5Vout

Tolerance: xx.x=  $\pm 0.5$ mm  
xx.xx=  $\pm 0.25$ mm

### Screw Terminal Module "ST" version



### Screw terminal information

#	Single	Dual	Triple
1	FG	FG	FG
2	VAC in (N)	VAC in (N)	VAC in (N)
3	VAC in (L)	VAC in (L)	VAC in (L)
4	NC	NC	-Vout
5	-Vout	-Vout	Com
6	NC	Com	+Vout
7	+Vout	+Vout	+5V Rtn
8	NC	NC	+5Vout

7.5mm Pitch  
suitable wire: 24-12AWG (0.5-2.5mm<sup>2</sup>)  
wire stripping length: 7mm typ.  
recommended tightening torque: 0.5Nm  
NC = No Connection  
FC = Fixing Centers  
Tolerance: xx.x=  $\pm 0.5$ mm  
xx.xx=  $\pm 0.25$ mm

**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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