

## Features

- 0.25W maximum no load power consumption
- Efficiency up to 83%
- Isolated output 3kVAC / 1 minute
- SCP, OVP, OCP(OLP) protection
- Wide operating temperature range  
-40°C to +70°C with derating
- Universal input 90-264VAC

## Regulated Converter

## RAC20-N

**20 Watt  
Single  
Output**



### Description

The RAC20-N series is a universal-input, board-mounting AC/DC module that delivers 20W in a compact 2" x 1" footprint. The converter is pin-compatible with the RAC05-SC, RAC10-SC and RAC20-SB models, offering a simple power upgrade or a cost-down option without requiring any PCB changes.

### Selection Guide

| Part Number | Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ. <sup>(1)</sup> [%] | Max. Capacitive Load [µF] | Output Power max. [W] |
|-------------|---------------------------|----------------------|---------------------|------------------------------------|---------------------------|-----------------------|
| RAC20-05SN  | 90-264                    | 5                    | 3600                | 78                                 | 5000                      | 18                    |
| RAC20-12SN  | 90-264                    | 12                   | 1660                | 82                                 | 1500                      | 20                    |
| RAC20-15SN  | 90-264                    | 15                   | 1330                | 83                                 | 1000                      | 20                    |
| RAC20-24SN  | 90-264                    | 24                   | 833                 | 83                                 | 470                       | 20                    |

#### 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 [µF] | Output Power max. [W] |
|-------------|---------------------------|----------------------|---------------------|------------------------------------|---------------------------|-----------------------|
| RAC20-3.3SN | 90-264                    | 3.3                  | 3600                | 73                                 | 5000                      | 12                    |

### Model Numbering



#### Ordering Examples:

|            |         |        |               |
|------------|---------|--------|---------------|
| RAC20-05SN | 20 Watt | 5Vout  | Single Output |
| RAC20-24SN | 20 Watt | 24Vout | Single Output |

**PREFERRED ALTERNATIVES**  
Please consider these alternatives:

**RAC20-K Series**

UL60950-1 certified  
CSA G22.2 No. 60950-1-07 certified  
IEC/EN60950-1 certified  
EN55032 compliant  
EN55024 compliant

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

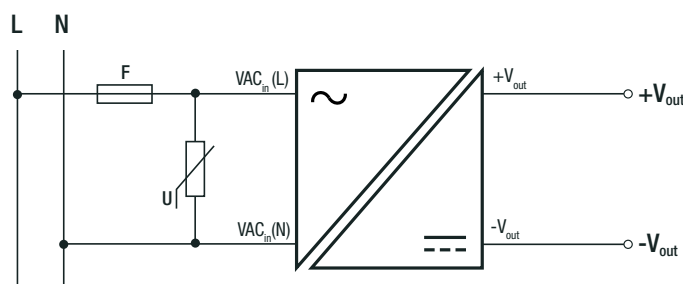
| BASIC CHARACTERISTICS   |                      |                  |                 |              |                  |
|---|----------------------|------------------|-----------------|--------------|------------------|
| Parameter   | Condition            |                  | Min.            | Typ.         | Max.             |
| Input Voltage Range <sup>(2)</sup>  |                      |                  | 90VAC<br>120VDC | 230VAC       | 264VAC<br>370VDC |
| Input Current   | 115VAC<br>230VAC     |                  |                 |              | 385mA<br>250mA   |
| Inrush Current  | 2ms max., cold start | 115VAC<br>230VAC |                 |              | 20A<br>40A       |
| No load Power Consumption   | 115VAC/230VAC        |                  |                 |              | 0.25W            |
| Input Frequency Range   | AC Input             |                  | 47Hz            |              | 440Hz            |
| Minimum Load  |                      |                  | 0%              |              |                  |
| Hold-up Time  | 115VAC<br>230VAC     |                  |                 | 10ms<br>50ms |                  |
| Output Ripple and Noise <sup>(3)</sup>  | 20MHz BW             |                  |                 |              | 120mVp-p         |
| <b>Notes:</b>   |                      |                  |                 |              |                  |
| Note2: The products were submitted for safety files at AC-Input operation                   |                      |                  |                 |              |                  |
| Note3: Measurements are made with a 0.1µF and 47µF MLCC in parallel across output (low ESR) |                      |                  |                 |              |                  |

| REGULATIONS   |                                  |            |
|---|----------------------------------|------------|
| Parameter   | Condition                        | Value      |
| Output Accuracy   |                                  | ±2.0% typ. |
| Line Regulation   | low line to high line, full load | ±0.5% typ. |
| Load Regulation <sup>(4)</sup>  | 5% to 100% load                  | 1.0% typ.  |
| <b>Notes:</b>   |                                  |            |
| Note4: Operation below 5% 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)  |            | 110% - 140%, zener diode clamp |
| Over Current Protection (OLP)  |            | Hiccup mode, auto recovery     |
| Isolation Voltage              | I/P to O/P | tested for 1 minute<br>3kVAC   |

- Notes:**
- Note5: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type
  - Note6: An external MOV is recommended. The varistor should comply with IEC-61051-2. e.g. 14S471K series

**Protection Circuit**

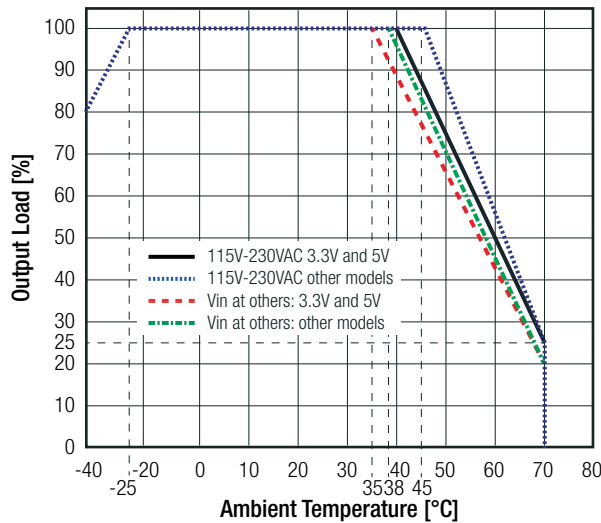


**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| ENVIRONMENTAL               |                                  |                         |                             |
|-----------------------------|----------------------------------|-------------------------|-----------------------------|
| Parameter                   | Condition                        |                         | Value                       |
| Operating Temperature Range | @ natural convection 0.1m/s      | full load               | -25°C to +35°C              |
|                             |                                  | refer to derating graph | -40°C to +70°C              |
| Maximum Case Temperature    |                                  |                         | +80°C                       |
| Temperature Coefficient     |                                  |                         | ±0.05%/K                    |
| 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**

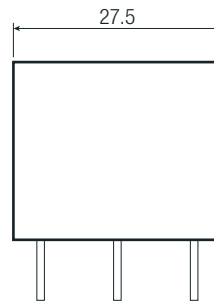
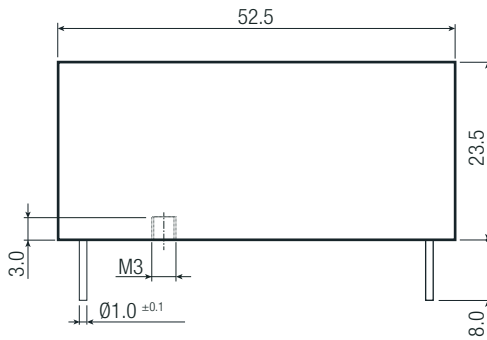
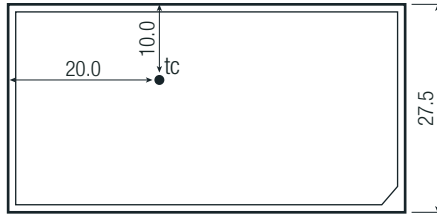
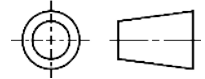
| Certificate Type (Safety)   | Report / File Number | Standard  |
|---|----------------------|---|
| Information Technology Equipment, General Requirements for Safety       | E196683              | UL60950-1, 2nd Edition, 2007<br>CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2007 |
| Information Technology Equipment, General Requirements for Safety (LVD) | SPCLVD1605075        | EN60950-1:2006 + A2:2013<br>IEC60950-1:2005 2nd Edition + 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              |
| ESD Electrostatic discharge immunity test   | ±8.0kV Air, ±4.0kV Contact                             | IEC61000-4-2, Criteria A       |
| Radiated, radio-frequency, electromagnetic field immunity test                                  | 3V/m   | IEC61000-4-3, Criteria A       |
| Fast Transient and Burst Immunity   | AC Power Port: ±1.0kV                                  | IEC61000-4-4, Criteria A       |
| Surge Immunity  | AC Power Port: ±1.0kV<br>DC Output: L-PE + N-PE ±2.0kV | IEC61000-4-5, Criteria A       |
| Immunity to conducted disturbances, induced by radio-frequency fields                           | AC Power Port: 3V                                      | IEC61000-4-6, Criteria A       |
| Power Magnetic Field Immunity   | 50Hz, 1A/m   | IEC61000-4-8, Criteria A       |
| Voltage Dips and Interruptions  | Voltage Dips >95%                                      | IEC61000-4-11:2004, Criteria A |
|   | Voltage Dips 30%                                       | IEC61000-4-11:2004, Criteria A |
|   | Voltage Interruptions >95%                             | IEC61000-4-11:2004, Criteria C |

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

| DIMENSION AND PHYSICAL CHARACTERISTICS |              |   |
|--|--------------|---|
| Parameter                              | Type         | Value   |
| Material                               | case potting | plastic resin (UL94V-0)<br>silicone (UL94V-0) |
| Dimension (LxWxH)                      |              | 52.5 x 27.5 x 23.5mm                          |
| Weight                                 |              | 62g typ.                                      |

**Dimension Drawing (mm)**



**Pinning information**

| Pin # | Single     |
|-------|------------|
| 1     | VAC in (L) |
| 2     | VAC in (N) |
| 3     | +VDC out   |
| 4     | -VDC out   |

recommended tightening torque= 1.21Nm max.

tc= case temperature measuring point

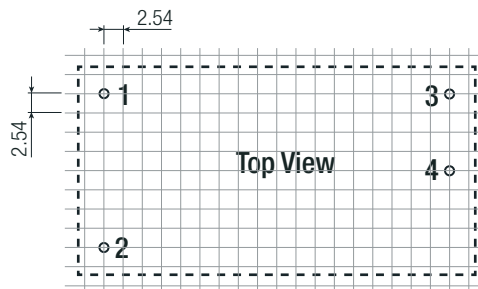
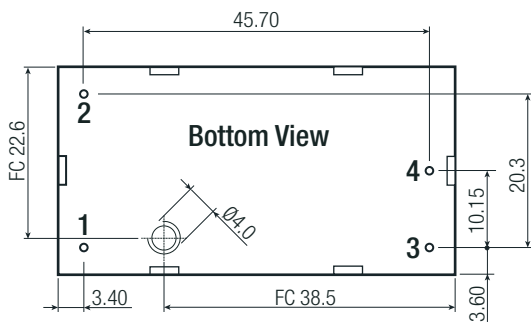
FC= fixing centers

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.35mm

Pin width: ±0.05mm

**Recommended Footprint Details**



| PACKAGING INFORMATION       |                |                       |
|-----------------------------|----------------|-----------------------|
| Parameter                   | Type           | Value                 |
| Packaging Dimension (LxWxH) | cardboard box  | 260.0 x 70.0 x 42.0mm |
| Packaging Quantity          |                | 8pcs                  |
| Storage Temperature Range   |                | -40°C to +85°C        |
| Storage Humidity            | non-condensing | 95% RH max.           |

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