

# 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<br>100VDC  | 230VAC | 264VAC<br>375VDC |
| Input Current                          | 115VAC<br>230VAC       |                  |  |        | 400mA<br>270mA   |
| Inrush Current                         | 2ms max.               | 115VAC<br>230VAC |  |        | 30A<br>50A       |
| No load Power Consumption              | 115VAC/230VAC          |                  |  |        | 470mW            |
| Input Frequency Range                  | AC Input               |                  | 47Hz   |        | 440Hz            |
| Minimum Load                           | Single, Dual<br>Triple |                  | 0%   | 10%    |                  |
| Hold-up Time                           | 115VAC/230VAC          |                  | 13ms   |        |                  |
| Internal Operating Frequency           |                        |                  |  | 100kHz |                  |
| Output Ripple and Noise <sup>(4)</sup> | 20MHz BW               | Noise<br>Ripple  | <0.5% Vout + 50mVp-p max.<br><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<br>Triple   | ±0.5% typ.<br>±1.0% typ. (+5Vout) / ±5.0 typ. (±Vout)           |
| Load Regulation <sup>(5)</sup> | 10% to 100% load      | Single<br>Dual<br>Triple | 1.0% typ.<br>3.0% typ.<br>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

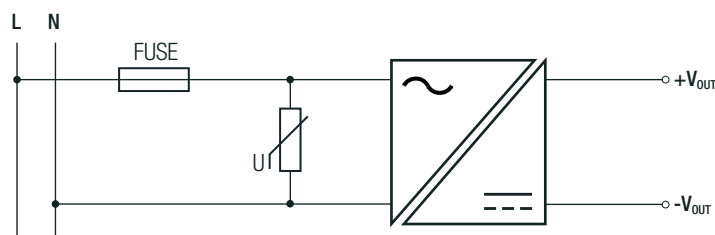
**PROTECTIONS**

| 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<br>refer to derating graph | -25°C to +50°C<br>-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<br>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)

### 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                |

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.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А