

# PNR10S Series

10W, Open Frame, SIP Package AC/DC Power Converters

## Features

- ▶ Rated power: 10W Max.
- ▶ Universal input: 85~305VAC, 47~63Hz
- ▶ Regulated single output
- ▶ Isolation voltage 4000VAC
- ▶ Typical efficiency 75 ... 85%
- ▶ Energy saving, standby power only 0.1W
- ▶ Operating temperature range: -40~+85°C
- ▶ RoHS compliance
- ▶ Compact SIP package
- ▶ Over voltage, over current, and short circuit protection
- ▶ Meet IEC/EN/UL 62368-1, IEC/EN 61558, IEC/EN 60335 CISPR32, EN55032 Class B
- ▶ 3 year warranty



## Model Numbers

| Model Number | Input Voltage [VAC]     | Output Voltage [VDC] | Output Current [mA] Max. | Ripple & Noise [mVp-p] Max. | Efficiency [%] Typ. | Capacitive Load [uF] Max. |
|--------------|-------------------------|----------------------|--------------------------|-----------------------------|---------------------|---------------------------|
| PNR10S-033   | 85~305VAC<br>100~430VDC | 3.3                  | 2000                     | 100                         | 74                  | 15000                     |
| PNR10S-050   |                         | 5                    | 2000                     | 100                         | 78                  | 12000                     |
| PNR10S-090   |                         | 9                    | 1100                     | 100                         | 79                  | 6000                      |
| PNR10S-120   |                         | 12                   | 840                      | 100                         | 83                  | 2000                      |
| PNR10S-150   |                         | 15                   | 670                      | 100                         | 83                  | 1500                      |
| PNR10S-240   |                         | 24                   | 420                      | 100                         | 84                  | 680                       |

\* Only typical models are listed, other models may be available, upon request.

### Electrical Specifications

Unless otherwise indicated, specifications are measured at  $T_A=25^{\circ}\text{C}$ , humidity<75%, nominal input voltage and rated output load.

| Parameters  | Condition   | Min.                    | Typ.                   | Max.                      | Unit                  | Note |
|---|---|-------------------------|------------------------|---------------------------|-----------------------|------|
| Input voltage range   | AC in   | 85                      | -                      | 305                       | VAC                   |      |
|   | DC in   | 100                     | -                      | 430                       | VDC                   |      |
| Input frequency   |   | 47                      | -                      | 63                        | Hz                    |      |
| Nominal input voltage   |   | 100                     | -                      | 277                       | VAC                   |      |
| Input current   | 115VAC<br>230VAC  | -                       | -                      | 0.40<br>0.25              | A                     |      |
| Inrush current<br>Cold start  | 115VAC<br>230VAC  | -                       | 18<br>35               | -                         | A                     |      |
| Leakage current   | 277VAC/50HZ   |                         |                        | 0.25                      | mA RMS                |      |
| Output voltage accuracy<br>$I_{OUT}=10\%\sim 100\%$ of $I_{OUT, rated}$ |   | -                       | $\pm 1$                | $\pm 3$                   | %                     |      |
| Line regulation<br>Full load  | $V_{OUT}=3.3\text{V}$<br>Others   | -                       | $\pm 2.5$<br>$\pm 1.5$ | -                         | %                     |      |
| Load regulation<br>$I_{OUT}=0\%\sim 100\%$ of $I_{OUT, rated}$          |   | -                       | $\pm 3$                | -                         | %                     |      |
| Ripple and noise<br>20MHz bandwidth, peak to peak                       |   | -                       | 80                     | 100                       | mV                    |      |
| Standby power consumption   | 230VAC  | -                       | 0.1                    | 0.25                      | W                     |      |
| Temperature coefficient   |   | -                       | $\pm 0.15$             | -                         | %/ $^{\circ}\text{C}$ |      |
| Hold-up time  | 115VAC<br>230VDC  | -                       | 8<br>40                | -                         | mS                    |      |
| Minimum load  |   | 0                       | -                      | -                         | %                     |      |
| Over current protection   | Automatic recovery  | 110                     | -                      | -                         | % $I_{OUT}$           |      |
| Over voltage protection<br>Hiccup or clamping by Zener diode            | $V_{OUT}=3.3, 5\text{V}$<br>$V_{OUT}=9\text{V}$<br>$V_{OUT}=12\text{V}$<br>$V_{OUT}=15\text{V}$<br>$V_{OUT}=24\text{V}$ | -                       | -                      | 9<br>12<br>16<br>20<br>30 | VDC                   |      |
| Short circuit protection  | Automatic recovery  | Continuous, hiccup mode |                        |                           |                       |      |
| Recommended external fuse   |   | 1A, slow blow, required |                        |                           |                       |      |

\* Ripple and noise measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 1uF ceramic capacitor and a 10uF electrolytic capacitor in parallel.

# PNR10S Series



10W, Open Frame, SIP Package AC/DC Power Converters

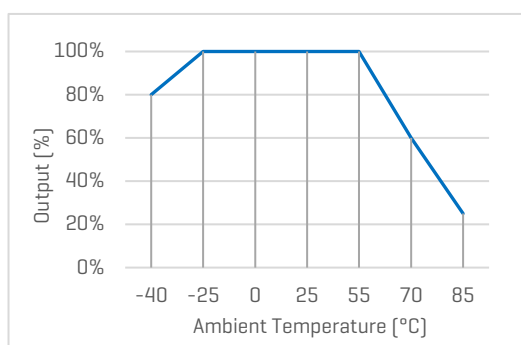
## General Specifications

| Parameters  | Condition            | Min.   | Typ.       | Max. | Unit  | Note |
|---|----------------------|--|------------|------|-------|------|
| <b>Isolation voltage</b><br>1 minute, leakage current 5mA max | Input to Output      | 4000   | -          | -    | VAC   |      |
| <b>Insulation resistance</b><br>500VDC                        | Input to Output      | 100  |            |      | M Ohm |      |
| <b>Operating temperature range</b>                            | See "Derating Curve" | -40  | -          | 85   | °C    |      |
| <b>Storage temperature</b>                                    |                      | -40  | -          | 105  | °C    |      |
| <b>Storage humidity</b>                                       |                      | -  | -          | 95   | %RH   |      |
| <b>Switching frequency</b>                                    |                      | -  | 65         | -    | KHz   |      |
| <b>Soldering temperature</b>                                  | Wave<br>Manual       | -  | 260<br>360 | -    | °C    |      |
| <b>Cooling method</b>   |                      | Free air convection                            |            |      |       |      |
| <b>Safety class</b>   |                      | Class II, no FG                                |            |      |       |      |
| <b>MTBF</b>   | MIL-HDBK-217F        | >1,000,000 Hours, 25°C                         |            |      |       |      |
| <b>Design based on standards</b>                              |                      | IEC/EN/UL 62368, EN 60335, EN 61558, UKCA      |            |      |       |      |
| <b>Safety certifications</b>                                  |                      | IEC/EN 62368-1                                 |            |      |       |      |
| <b>EMC</b>  |                      | CISPR32, EN55032 Class B with external circuit |            |      |       |      |
| <b>Size, and Weight</b>                                       | Default package      | 32.0x14.5x20mm, 10g Typ.                       |            |      |       |      |

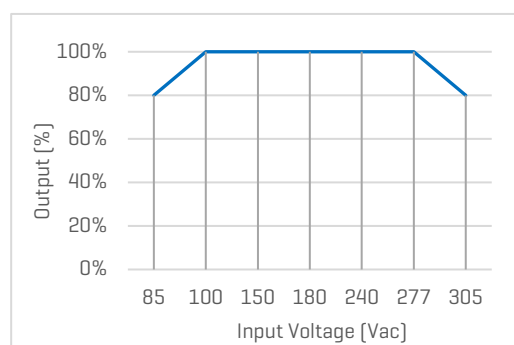
## Characteristic Curves

### Derating Curves

#### Output vs Ambient Temperature



#### Output vs Input Voltage



### Recommended External Circuits

#### Typical External Circuit

\*This circuit is the basic design reference, components with “\*” are required for the converter’s operating.

\*FUSE\* to be 1A, 300V, slow blow and is also required for safety, R1\* is 6.8 Ohm, 3W, wire-wound resistor

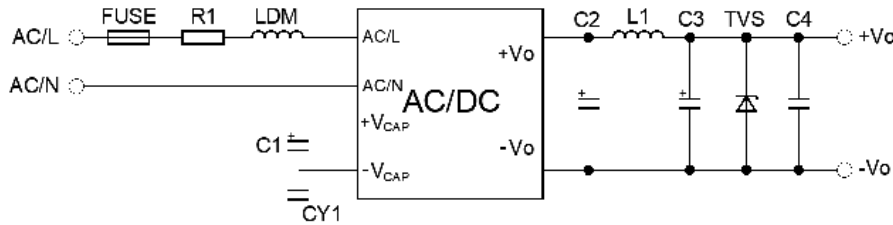


Figure 1. Typical external circuit

#### Recommended Component Spec [Table 1]

| V <sub>OUT</sub> [V] | C1*        | C2*        | C3*        | C4         | CY1*        | LDM*        | TVS      |
|----------------------|------------|------------|------------|------------|-------------|-------------|----------|
| 3.3, 5               | 22uF, 450V | 820uF, 16V | 150uF, 25V | 0.1uF, 50V | 1nF, 400VAC | 2.2uH, 6.5A | SMBJ7.0A |
| 9, 12                | 22uF, 450V | 470uF, 25V | 150uF, 25V | 0.1uF, 50V | 1nF, 400VAC | 2.2uH, 6.5A | SMBJ12A  |
| 15, 24               | 22uF, 450V | 470uF, 35V | 100uF, 35V | 0.1uF, 50V | 1nF, 400VAC | 3.3uH, 5A   | SMBJ20A  |

#### Circuit for EMC Enhancement

\*This application circuit is recommended for EMC enhancement. It is not mandatory if this is not critical in the application.

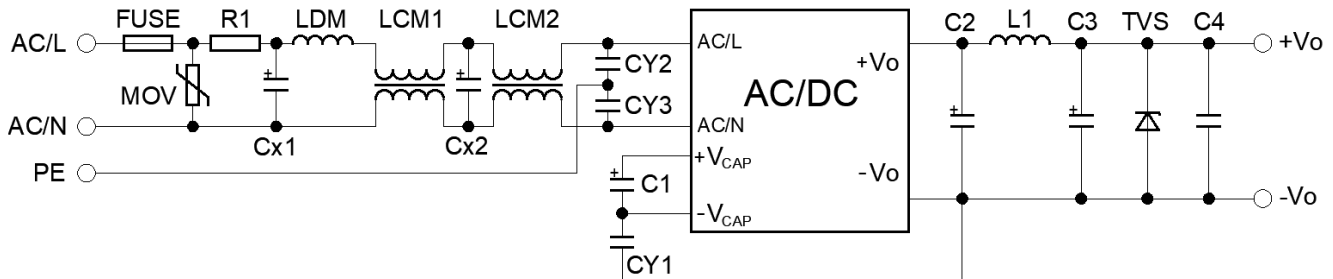


Figure 2. External circuit design for EMC enhancement

#### Recommended Component Spec [Table 2]

| Item | FUSE*    | MOV     | Cx1, Cx2      | LDM         | LCM1        | LCM2              | CY1, CY2, CY3 |
|------|----------|---------|---------------|-------------|-------------|-------------------|---------------|
| Spec | 2A, 300V | S14K350 | 0.1uF, 310VAC | 2.2mH, 0.4A | 200uH, 0.8A | 12.6mH, 0.5A min. | 1nF, 400VAC   |

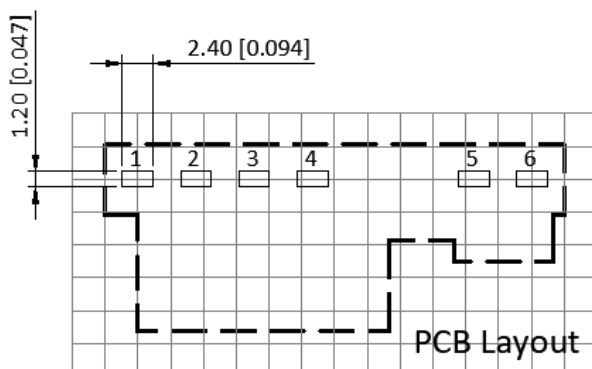
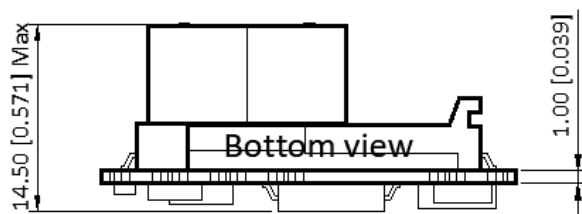
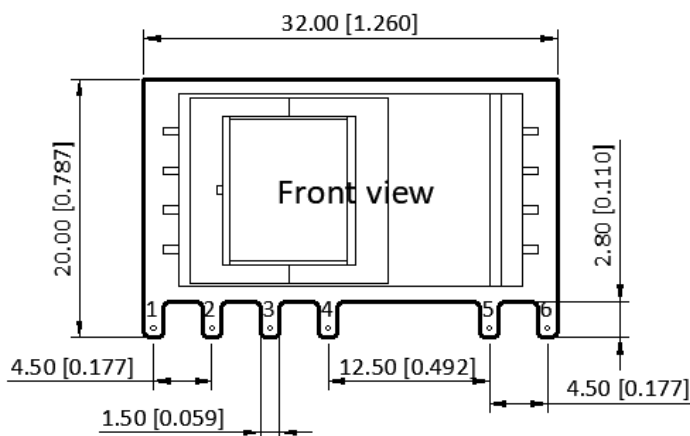
\*Components above with “\*” are required for the converter’s operating.

\*Refer to Table 1 for other components that not shown in Table 2

# PNR10S Series

10W, Open Frame, SIP Package AC/DC Power Converters

## Mechanical Specifications



### Pin Definition

| Pin # | Single Out        |
|-------|-------------------|
| 1     | AC [L]            |
| 2     | AC [N]            |
| 3     | +V [CAP]          |
| 4     | -V [CAP]          |
| 5     | -V <sub>OUT</sub> |
| 6     | +V <sub>OUT</sub> |

\* Unless otherwise specified unit: mm [inch]

\* General tolerance:  $\pm 1.00$  [ $\pm 0.040$ ]

\* Pin thickness:  $\pm 0.10$  [ $\pm 0.004$ ]

\* Footprint grid 2.54 x 2.54 mm

### FAVOTEK LIMITED

#17 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong  
Tel: +852 8191 6662 Eml: info@favotek.com  
www.favotek.com

Favotek reserves the right to make changes to the product at any time without notice. Information provided by Favotek is believed to be accurate and reliable. However, no responsibility is assumed by Favotek for its use, nor for any infringements of patents or other rights of third parties which may result from its use.

## Want to know more?

For sales, technical support or additional information  
please get in touch with our team of experts.

### ADDITIONAL SERVICES

## We provide an end-to-end service

From the initial consultation and sourcing  
unique components to supplying bespoke solutions  
including a full design and build process.

### Bespoke services

Customised and curated technology solutions  
across the full range of Conexa Tech products

### Sourcing

A full suite of electronics, cable, and mechanical sourcing capabilities

### Design & Build

Development and manufacturing services

hello@conextech.com | +44 118 402 3430

CONEXATECH.COM