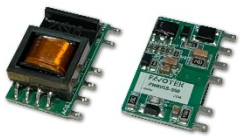
PNR05S Series

5W, Open Frame, SIP Package AC/DC Power Converters

Features

- Rated power: 5W
- Universal input: 85~305VAC 47~63Hz
- Regulated single output
- Isolation voltage 4000VAC
- Typical efficiency 69 ... 81%
- Energy saving, standby power only 0.1W
- Operating temperature range: -40~+85°C
- RoHS compliance
- Compact SIP package
- Designed for high reliability and long lifetime
- Certified to IEC/EN 62368-1, CISPR32, EN55032
- Suitable for both civil and industrial applications
- 3 year warranty



Overview

PNR05S series are compact size AC/DC power converters, featuring universal input voltage range 85~305VAC, low standby power consumption, high efficiency. They are certified to IEC/EN 62368-1, and EMC performance meets CISPR32, EN55032, ideally suitable for industrial, and critical commercial applications.

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.
PNR05S-033	85~305VAC 70~430VDC	3.3	1,000	150	69	1500
PNR05S-050		5	1,000	150	76	1500
PNR05S-090		9	560	150	77	680
PNR05S-120		12	420	150	78	470
PNR05S-150		15	340	150	79	330
PNR05S-240		24	210	150	81	100

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

Electrical Specifications

Unless otherwise indicated, specifications are measured at T_A=25°C, humidity<75%, nominal input voltage and rated output load.

Parameters	Condition	Min.	Typ.	Max.	Unit	Note
Input voltage range	AC in DC in	85 70	-	305 430	VAC VDC	
Input frequency		47	-	63	Hz	
Nominal input voltage		100	-	277	VAC	
Input current	115VAC 230VAC	-	0.10 0.07	-	A	
Inrush current Cold start	115VAC 230VAC	-	20 40	-	A	

Electrical Specifications (continued)

Unless otherwise indicated, specifications are measured at T_A=25°C, humidity<75%, nominal input voltage and rated output load.

Parameters	Condition	Min.	Typ.	Max.	Unit	Note
Output voltage accuracy I_{OUT}=10%~100% of $I_{OUT, rated}$		-	±5	-	%	
Line regulation Full load	V_{OUT}=3.3V Others	-	±2.5 ±1.5	-	%	
Load regulation I_{OUT}=10%~100% of $I_{OUT, rated}$		-	±3	-	%	
Ripple and noise 20MHz bandwidth, peak to peak		-	80	180	mV	
Standby power consumption	230VAC	-	0.10	0.15	W	
Temperature coefficiency		-	±0.15	-	%/°C	
Minimum load		10	-	-	%	
Over current protection	Automatic recovery	110	-	-	% I_{OUT}	
Short circuit protection	Automatic recovery	Continuous, hiccup mode				
Recommended external fuse		1A, slow blow				

* 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.

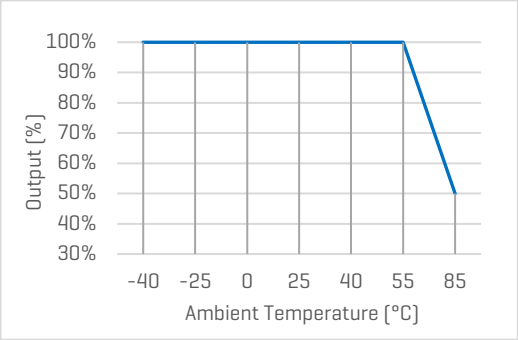
General Specifications

Parameters	Condition	Min.	Typ.	Max.	Unit	Note
Isolation voltage 1 minute, leakage current 5mA max	Input to Output	4000	-	-	VAC	
Operating temperature range	See "Derating Curve"	-40	-	85	°C	
Storage temperature		-40	-	105	°C	
Storage humidity		-	-	95	%RH	
Soldering temperature	Wave Manual	-	260 360	-	°C	
Cooling method7		Free air convection				
Safety class		Class II, no FG				
MTBF	MIL-HDBK-217F	>1,000,000 Hours, 25°C				
Design based on standards		UL/EN/IEC 62368-1, EN/IEC 60335-1, EN/IEC 61558-1				
Safety certifications		EN/IEC 62368-1				
EMC		CISPR32, EN55032 Class B with external circuit				
Size, and Weight		26.4x11.0x14.8mm, 5.9g				

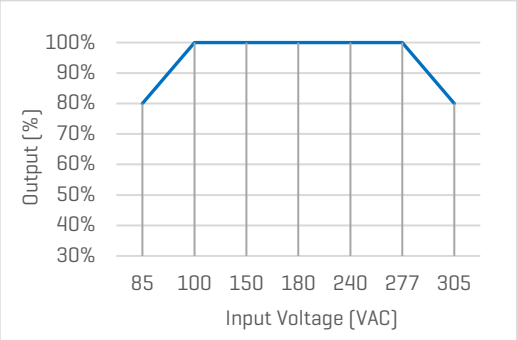
Characteristic Curves

Derating Curves

Output vs Ambient Temperature



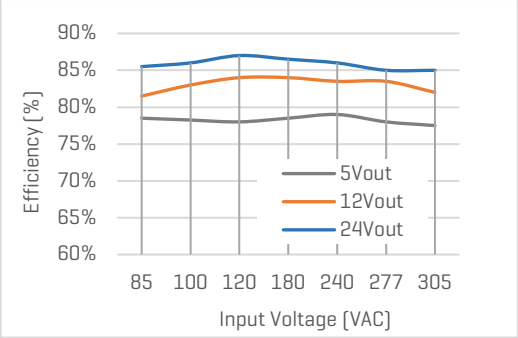
Output vs Input Voltage



Efficiency Curves

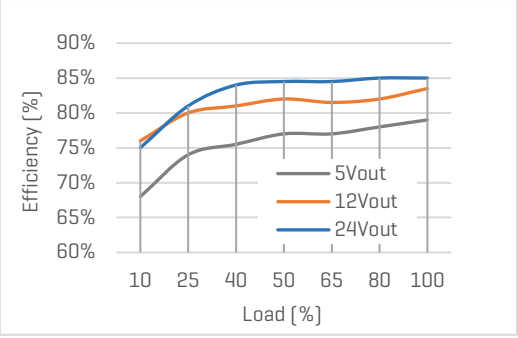
Efficiency vs Input Voltage

Full load



Efficiency vs Load

V_{IN}=230VAC



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, slow blow and is also required for safety.

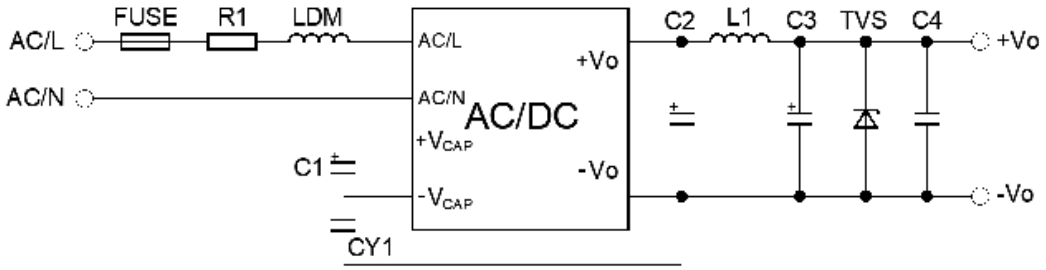


Figure 1. Typical external circuit

Recommended Component Spec [Table 1]

V_{OUT} [V]	C1*	C2*	C3*	C4	CY1*	L1*	TVS
3.3, 5	10uF, 450V	560uF, 16V	100uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 3A	SMBJ7.0A
9, 12	10uF, 450V	330uF, 25V	100uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 3A	SMBJ12A
15, 24	10uF, 450V	330uF, 35V	47uF, 35V	0.1uF, 50V	1nF, 400VAC	3.3uH, 2A	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.

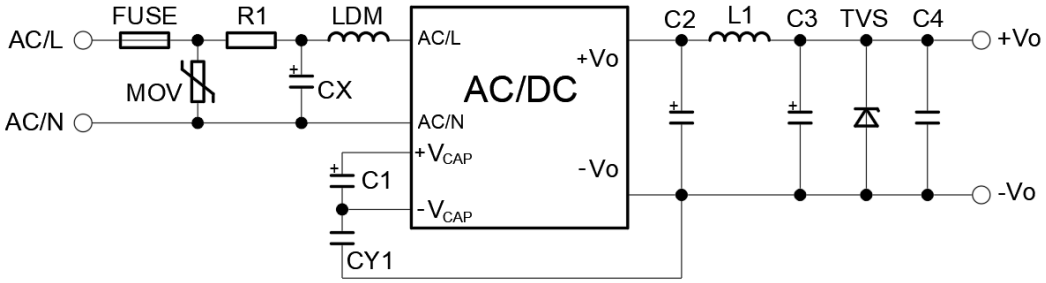


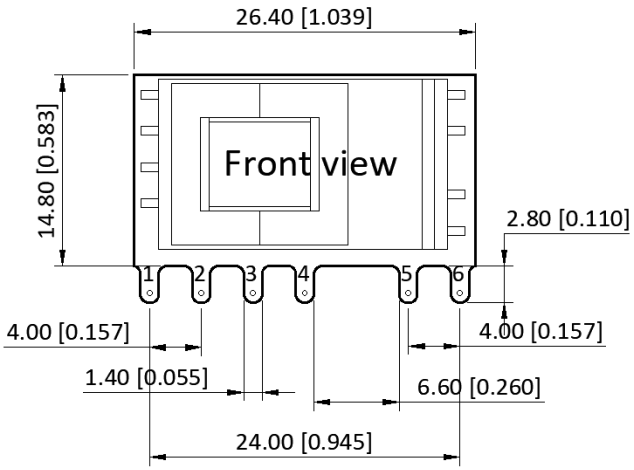
Figure 2. External circuit design for EMC enhancement

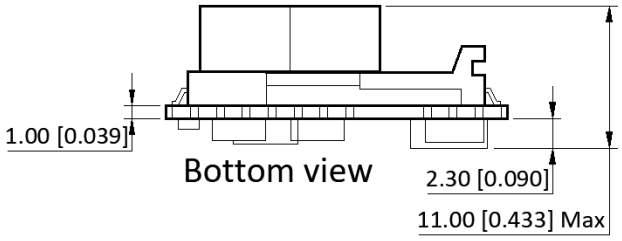
Recommended Component Spec [Table 2]

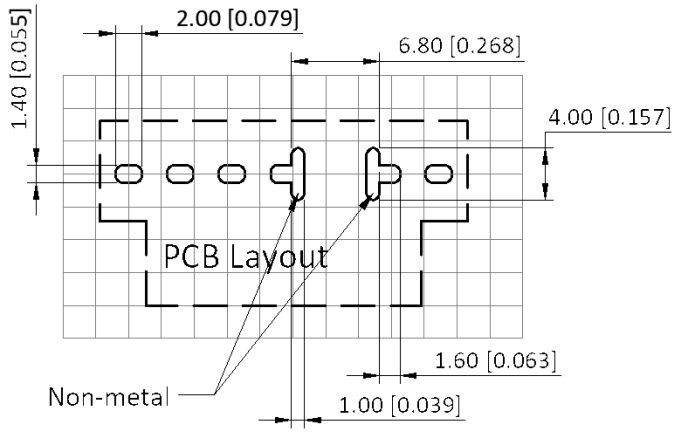
Item	FUSE*	MOV	CX	R1*	LDM
Spec	2A, 300V	S14K350	0.1uF, 310VAC	12 Ohm, 3W	2.2mH, 0.2A

Components above with "" are required for the converter's operating. "R1" is wire-wound resistor.
*Refer to Table 1 for components at the output.

Mechanical Specifications







Pin Definition

Pin #	Single Out
1	AC [L]
2	AC [N]
3	+V [CAP]
4	-V [CAP]
5	$-V_{OUT}$
6	$+V_{OUT}$

* Unless otherwise specified unit: mm [inch]
* General tolerance: ±1.00 [±0.040]
* Pin thickness: ±0.10 [±0.004]
* Footprint grid 2.54 x 2.54 mm

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