PNR05S Series

5W, Open Frame, AC/DC Converters

Features

- Rated power: 5W Max
- Universal input: 85~305VAC, 47~63Hz
- Regulated single output
- Isolation voltage 4000VAC
- Typical efficiency 73 ... 81%
- Energy saving, standby power only less than 0.1W
- Operating temperature range: -40~+85°C
- RoHS compliance
- Compact SIP package
- Over voltage, over current and short circuit protection
- Certified to UL/EN/IEC 62368-1, CISPR32, EN55032 Class B Meet EN 60335-1, EN 61558-1
- Designed for both civil and industrial applications
- 5 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 UL/EN/IEC 62368-1, and EMC performance meets CISPR32, EN55032 Class B, ideally suitable for industrial, and critical commercial applications.

Model Numbers

Model Number	Input Voltage [VAC]	Output Voltage [VDC]	Output Current [mA] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
PNR05S-033 [1]	85~305VAC 100~430VDC	3.3	1,000	73	1500
PNR05S-050 [1]		5	1,000	76	1500
PNR05S-075 [1]		7.5	667	76	680
PNR05S-090 [1]		9	560	77	680
PNR05S-120 [1]		12	420	78	470
PNR05S-150 [1]		15	340	79	330
PNR05S-180		18	277	80	330
PNR05S-240 [1]		24	210	81	100

Note [1]: Models that are certified to UL62368-1.

Electrical Specifications

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

Parameters	Conditions	Min.	Typ.	Max.	Unit
Input voltage range	AC in DC in	85 100	-	305 430	VAC VDC
Input frequency		47	-	63	Hz
Nominal input voltage		100	-	277	VAC
Input current	115VAC 230VAC	-	-	0.15 0.10	A
Inrush current Cold start	115VAC 230VAC	-	20 40	-	A
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 [2]	20MHz bandwidth	-	80	180	mVp-p
Temperature coefficiency		-	±0.15	-	%/°C
Standby power consumption		-	0.10	-	W
Hold up time Full load	115VAC 230VAC	-	8 40	-	mS
Minimum load		10	-	-	% I_{OUT}
Over current protection	Automatic recovery	110	-	-	% I_{OUT}
Short circuit protection		Hiccup mode, automatic recovery			
External fuse		1A, slow blow *required*			

Note [2]: Ripple and noise measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor.

PNR05S Series

5W, Open Frame, AC/DC Converters

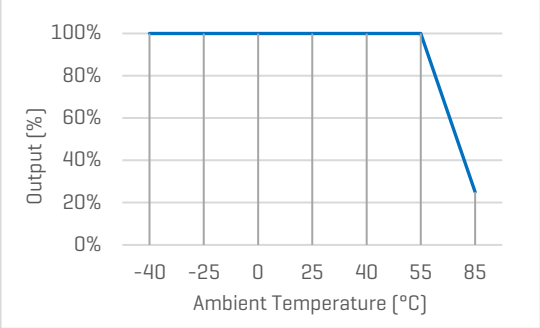
General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage Tested for 1 minute	I/P to O/P	4000	-	-	VAC
Isolation resistance 500VDC, 25°C, 70%RH	I/P to O/P	100	-	-	M Ohm
Switching frequency		-	65	-	KHz
Operating temperature range	See "Derating Curve"	-40	-	85	°C
Storage temperature		-40	-	105	°C
Storage humidity		10	-	95	%RH
Soldering temperature		-	260	-	°C
Cooling method		Free air convection			
Safety class		Class II			
MTBF	MIL-HDBK-217F	> 1,000,000 Hours, 25°C			
Safety standards		UL/EN/IEC 62368-1, UKCA, EN 60335-1, EN 61558-1			
EMC standards	CISPR32, EN55032	Class A with External Circuit "Figure 1" [A] Class B with External Circuit "Figure 2" [B]			
ESD	IEC/EN61000-4-2	Contact ±6kV, Air ±8kV, perf. Criteria B			
Radiated	IEC/EN61000-4-3	10V/m, perf. Criteria A			
EFT, Burst	IEC/EN61000-4-4	±2kV, perf. Criteria B [A] ±4kV, perf. Criteria B [B]			
Surge	IEC/EN61000-4-5	Line to Line ±1kV, perf. Criteria B [A] Line to Line ±2kV, perf. Criteria B [B]			
Conducted	IEC/EN61000-4-6	10Vrms, perf. Criteria A			
Size, and Weight		26.4x11.0x14.8mm, 5g			

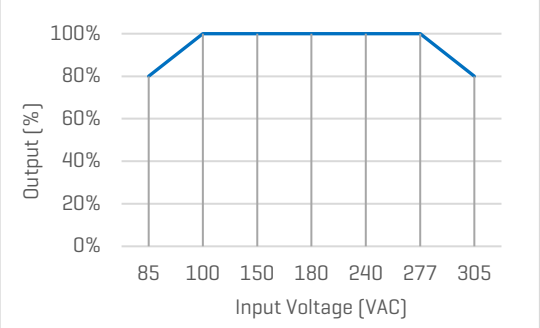
Characteristic Curves

Derating Curves

Output vs Ambient Temperature



Output vs Input Voltage



Recommended External Circuits

Typical External Circuit for EN55032 Class A

This circuit is the basic design reference, components with "" are required for the converter's operating.
FUSE to be 1A, slow blow and R1* to be 12 Ohm 3W, both are required for safety.

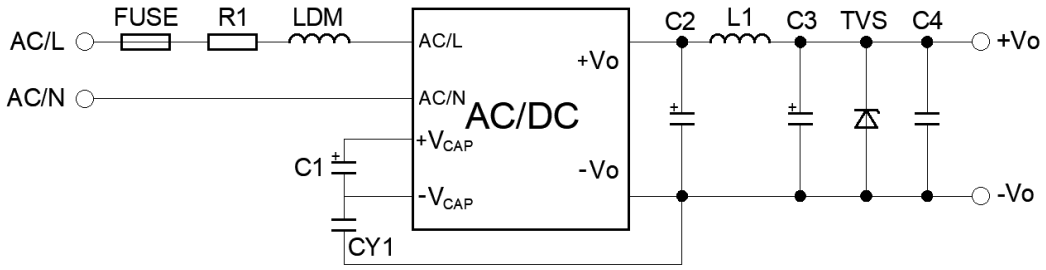


Figure 1. Typical external circuit

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

EMC Enhancement for EN55032 Class B

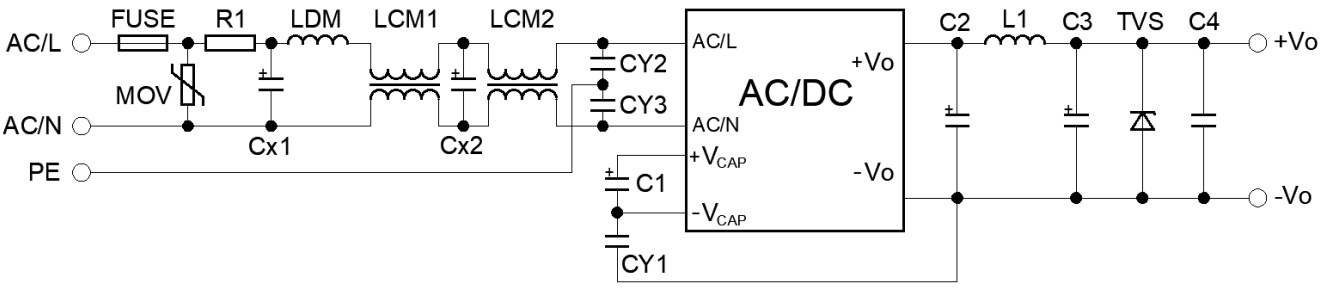


Figure 2. Circuit for EMC Enhancement

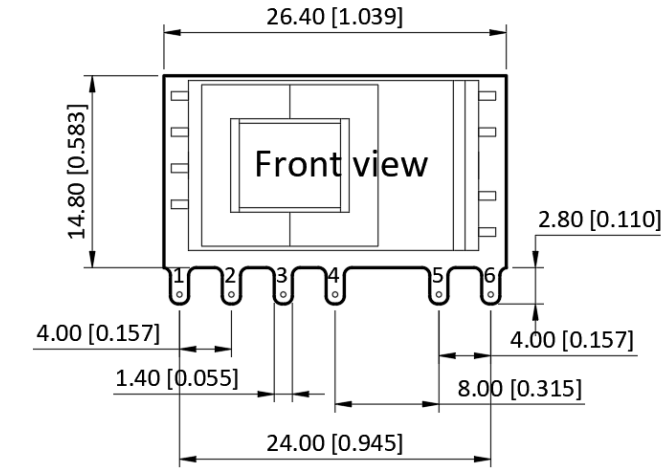
Recommended Component Spec [Table 2]

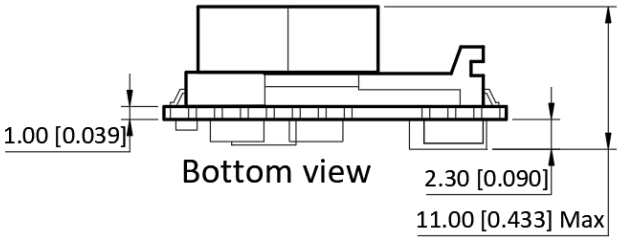
Item	FUSE*	MOV	Cx1, Cx2	LDM	LCM1	LCM2	CY1, CY2, CY3
Spec	2A, 300V	14D561	0.1uF, 310VAC	2.2mH	200uH	12.6mH	1nF, 400VAC

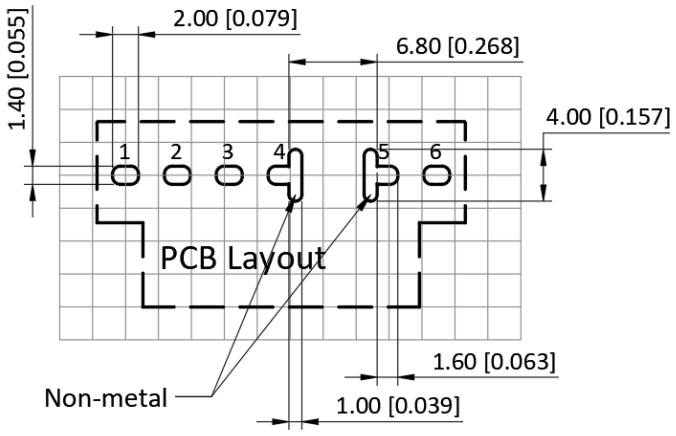
Components above with "" are required for the converter's operating.
*Refer to Table 1 for other components that not shown in Table 2

Mechanical Specifications

Default Package







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: ±0.15 [±0.006]
* Pin distance: ±0.50 [±0.020]
* Footprint grid 2.54 x 2.54 mm