

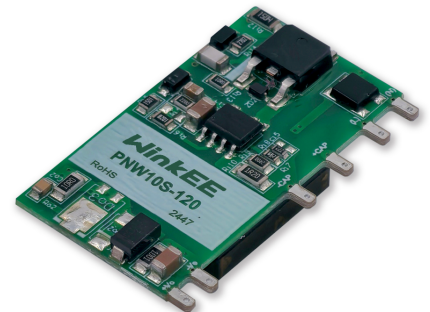
PNW10S Series



10W, Open Frame, AC/DC Converters

Features

- ▶ Rated power: 10W Max
- ▶ Universal input: 90~528VAC, 47~63Hz
- ▶ Regulated single output
- ▶ Isolation voltage 4000VAC
- ▶ Typical efficiency 70 ... 83%
- ▶ 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, EN 61558-1, EN 60335-1, CISPR32, EN55032 Class B
- ▶ Designed for both civil and industrial applications
- ▶ 5 year warranty



Overview

PNW10S series are compact size and open frame AC/DC power converters, designed for energy meters, and high reliability industrial applications. They feature ultra-wide input voltage range 90~528VAC, low stand by power consumption, high efficiency, and class II reinforced insulation. They are designed to meet IEC/EN/UL62368-1, EN60335-1, EN61558-1, UKCA and EMC performance meets CISPR32, EN55032 Class B with external components, 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.
PNW10S-033	90~528VAC 100~745VDC	3.3	2,000	70	1,500
PNW10S-050		5	2,000	77	1,500
PNW10S-090		9	1,100	80	1,000
PNW10S-120		12	830	82	680
PNW10S-150		15	670	82	470
PNW10S-240		24	420	83	330

* 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	Conditions	Min.	Typ.	Max.	Unit
Input voltage range	AC in	90	-	528	VAC
	DC in	100	-	745	VDC
Nominal input voltage		100	-	480	VAC
Input frequency		47	-	63	Hz
Input current	85VAC	-	0.23	0.30	A
	115VAC		0.18	0.25	
	230VAC		0.12	0.20	
	380VAC		0.09	0.15	
Inrush current Cold start	85VAC	-	11.6	-	A
	115VAC		13.5		
	230VAC		28.6		
	380VAC		42.6		
Leakage current	480VAC/50HZ	-	0.5	-	mA RMS
Output voltage accuracy $I_{OUT}=10\%\sim 100\%$ of $I_{OUT, rated}$	$V_{OUT}=3.3V$	-	± 3.0	± 6.0	%
	Others		± 2.5	± 5.0	
Line regulation Full load	$V_{OUT}=3.3V$	-	± 2.0	-	%
	Others		± 1.5		
Load regulation	$I_{OUT}=10\%\sim 100\%$ of $I_{OUT, rated}$	-	± 3.0	-	%
Ripple and noise [2]	20MHz bandwidth	-	100	180	mVp-p
Temperature coefficient		-	± 0.20	-	%/ $^{\circ}\text{C}$
Standby power consumption	$V_{IN}<115VAC$	-	0.20	0.30	W
	Others	-	0.10	0.15	
Minimum load		10	-	-	% I_{OUT}
Over current protection	Automatic recovery	110	-	-	% I_{OUT}
Short circuit protection		Hiccup mode, automatic recovery			
External fuse		2A, 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.

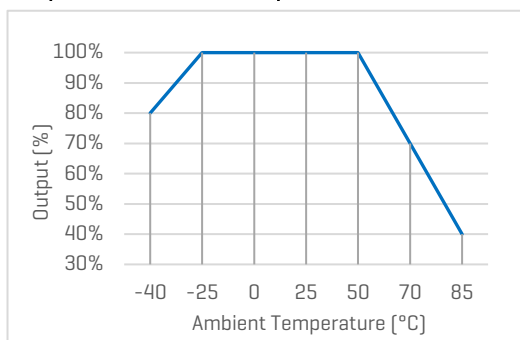
General Specifications

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		-	50	-	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	> 500,000 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		38x15.25x20mm, 11g			

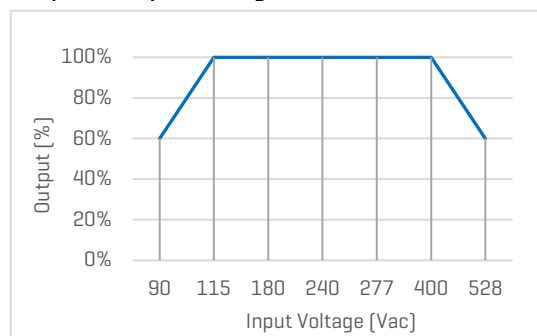
Characteristic Curves

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 2A slow blow. R1*, R11* ... R14* refer of that in Table 2.

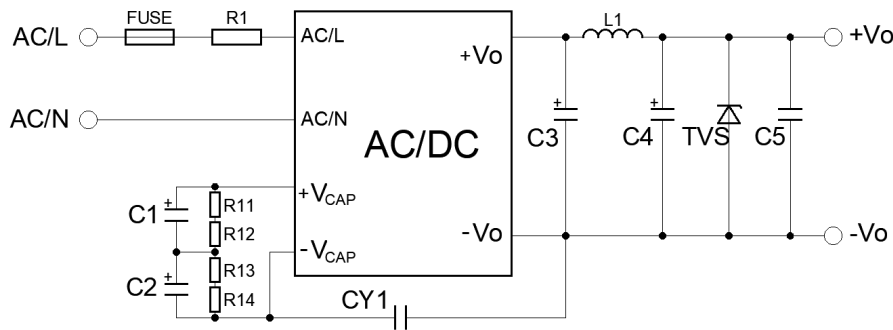


Figure 1. Typical external circuit

Recommended Component [Table 1]

V _{OUT} [V]	C1*, C2*	C3*	C4*	C5	CY1*	L1*	TVS
3.3	47uF, 400V	1500uF, 6.3V	680uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ7.0A
5	47uF, 400V	820uF, 16V	680uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ7.0A
9	47uF, 400V	470uF, 25V	330uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ12A
12	47uF, 400V	470uF, 25V	330uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ20A
15	33uF, 400V	470uF, 25V	330uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ20A
24	33uF, 400V	470uF, 35V	100uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ30A

EMC Enhancement for EN55032 Class B

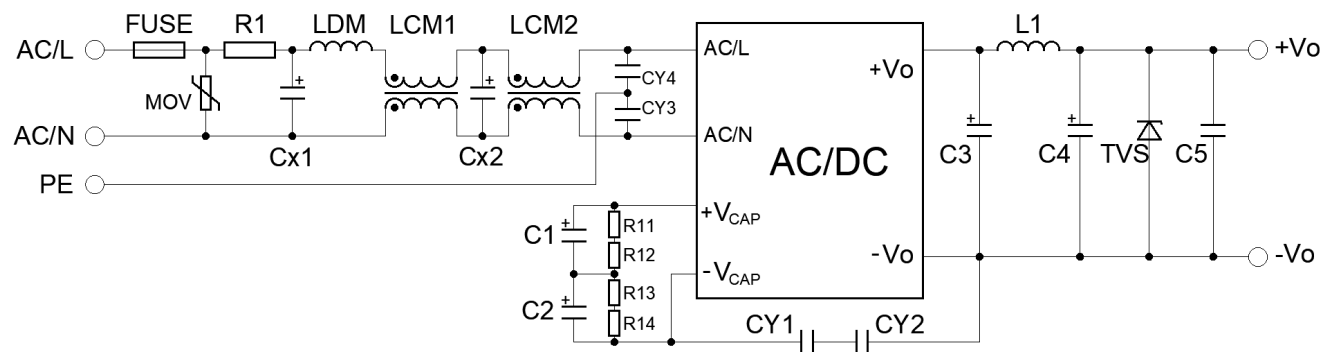


Figure 2. Circuit for EMC enhancement

Recommended Component [Table 2]

Item	FUSE*	R1*	MOV	LDM	LCM1	LCM2
Spec	2A, 500VAC	6.8 Ohm, 3W	14D911K	2.2mH, 0.35A	200uH, 0.8A	12.6mH 0.5A
Item	Cx1, Cx2	C1*, C2*	R11* ... R14*	CY1 ... CY4		
Spec	0.1uF, 480VAC	47uF, 400VAC	1M Ohm, 1206	1nF, 400VAC		

Components above with "" are required for the converter's operating. "R1" is wire-wound resistor.

*Refer to Table 1 for the output circuit configuration.

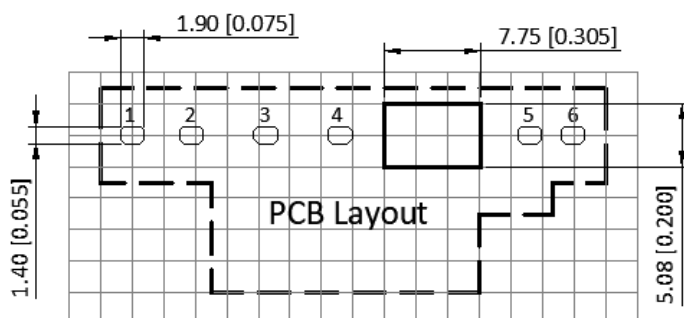
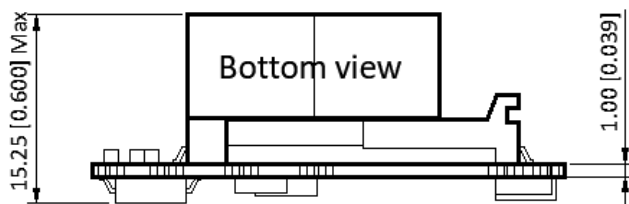
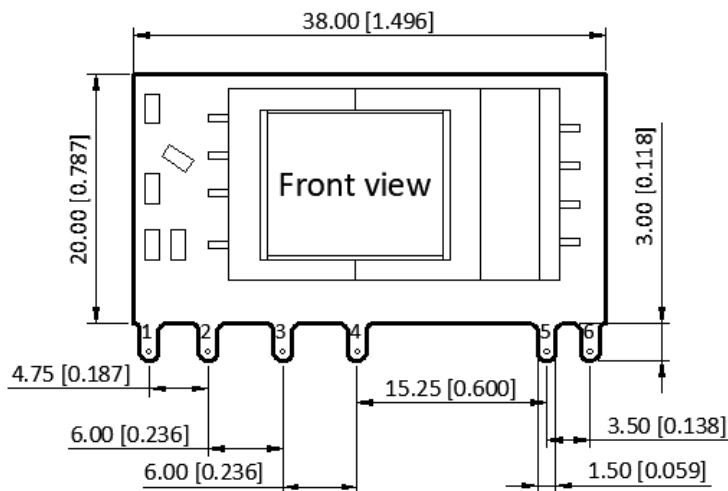
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Mechanical Specifications

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

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