

# DC/DC Converter

## PV40-27Bxx Series

# MORNSUN®

40W, 200-1200VDC ultra wide input voltage  
DC/DC converter for Renewable Energy



## FEATURES

- 6:1 ultra-wide input voltage range:200~1200VDC
- 4000VDC high isolation voltage
- conversion efficiency up to 84%
- Under input voltage protection, against reverse protection, output over-voltage protection, short circuit protection
- Can be equipped with wiring package or rail package uses

PV40-27Bxx series are regulated output DC/DC converters with features of 200-1200VDC ultra-high voltage input, high efficiency and high reliability. They can be widely used in photovoltaic power generation, high-voltage inverter and so on, which provide stable operating voltage to the equipment and improve the power and the load's safety performance with multiple protection when working under abnormal conditions.

## Selection Guide

Model	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency (200VDC, %/Typ.)	Max. Capacitive Load(uF)
PV40-27B12	40W	12V/3.33A	83	1200
PV40-27B15		15V/2.67A	84	1000
PV40-27B24		24V/1.67A	84	680

Note: \*product model with a suffix of "A5" means chassis mounting and that with a suffix of "A6" indicates DIN-Rail mounting (e.g. PV40-27B12A5 means chassis mounting; PV40-27B12A6 means DIN-Rail mounting).

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range		200	--	1200	VDC
Input current	200VDC	--	--	320	mA
	600VDC	--	--	100	
	1200VDC	--	--	55	
Inrush current	600VDC	--	60	--	A
Input under-voltage protection		Under voltage protection range: 175~185V Under voltage release range:185~195V			
External input fuse		3.15A Slow blow			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±2	%
Linear Regulation		--	±0.5	±1	
Load Regulation		--	±0.5	±1	
Output Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	100	200	mV
Temperature Drift Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥110%Io self-recovery			
Over-voltage Protection		(Feedback-clamp) Voltage limited			
Min. Load		0	--	--	%
Power-off Holding Time	600VDC input	--	5	--	ms

Note: \*Parallel line test method is adopted to test the ripple and noise, please see AC-DC Converter Application Notes for specific operation methods.

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General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output	4000	-	-	VDC
Operating Temperature		-25	-	+70	°C
Storage Temperature		-25	-	+85	
Storage Humidity		-	-	95	%RH
Welding Temperature	Wave-soldering	260±5°C; time:5~10s			
	Manual-welding	360±10°C; time:3~5s			
Switching Frequency		-	65	-	kHz
Power Derating	+50°C to +70°C	3	-	-	%/°C
MTBF		MIL-HDBK-217F@25°C > 300,000h			

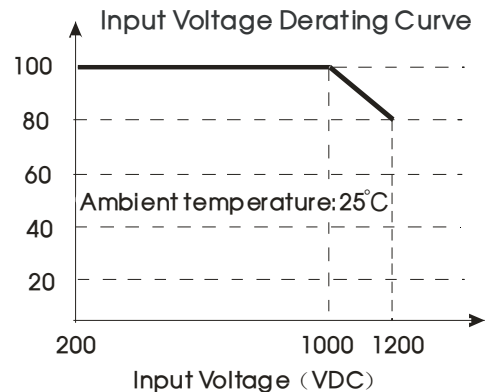
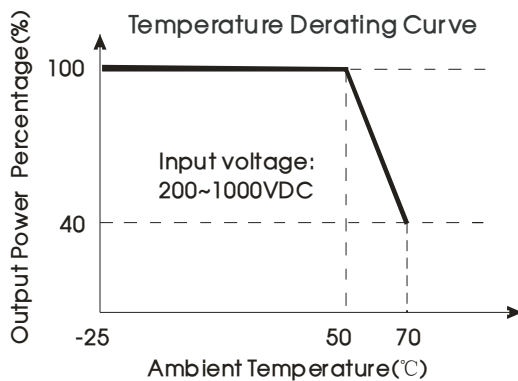
Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94-V0)	
Package Dimensions	Horizontal package	89.00*63.50*25.00 mm
	A5 wiring package	135.00*70.00*33.50 mm
	A6 rail package	137.00*70.00*39.00 mm
Weight	Horizontal package/A5 wiring package/A6 rail package 210.00g/295.00g/365.00g(Typ.)	
Cooling method	Free air convection	

EMC Specifications

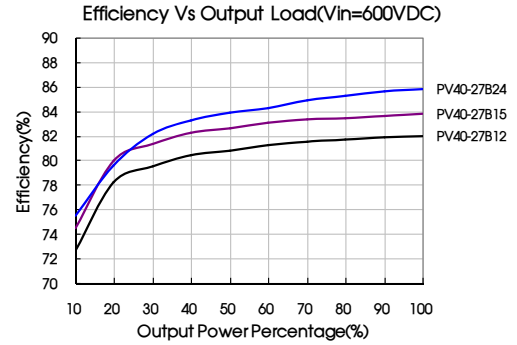
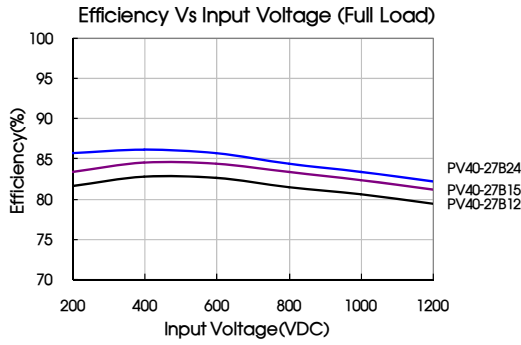
EMI	CE	CISPR22/EN55022, CLASS A(Recommended Circuit Refer to Figure2)	
	RE	CISPR22/EN55022, CLASS A (Recommended Circuit Refer to Figure2)	
EMS	ESD	IEC/EN61000-4-2	±6KV/±8KV Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV(Recommended Circuit Refer to Figure2) perf. Criteria B
	Surge	IEC/EN61000-4-5	±2KV(Recommended Circuit Refer to Figure2) perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s perf. Criteria A
	PFM	IEC/EN61000-4-8	10A/m perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-11	0%-70% perf. Criteria B

Product Characteristic Curve



Note: ① Input voltage should be derated based on temperature derating when it is 1000-1200VDC;

② This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



## Design Reference

### 1. Typical application circuit

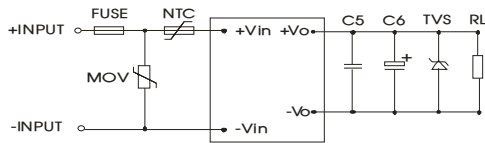


Fig. 1: Typical application circuit

Model	FUSE	MOV	NTC	C5(μF)	C6(μF)	TVS tube
PV40-27B12	3.15A	S20K1000	10D-20	1	220	SMBJ20A
PV40-27B15	slow					
PV40-27B24	fusing				120	SMBJ30A

Note:  
Output filtering capacitor C5 is ceramic capacitor, recommend parameter is 1μF; Output filtering capacitor C6 is electrolytic capacitors, It is recommended to use high frequency and low impedance electrolytic capacitors. For capacitance and current of capacitor please refer to manufacture's datasheet. Voltage derating of capacitor should be 80%. TVS is a recommended component to protect post-circuits (if converter fails).

### 2. EMC solution-recommended circuit

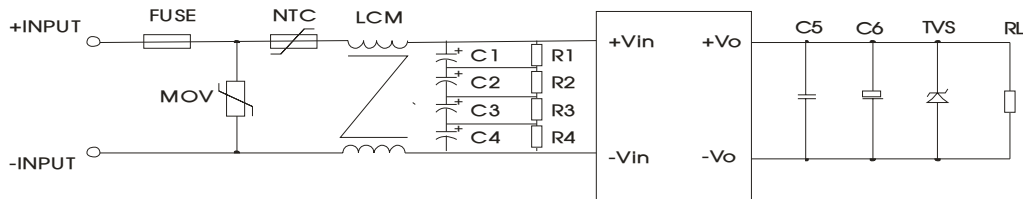


Fig 2: EMC Recommended circuit (Output external circuit refer to the typical application circuit)

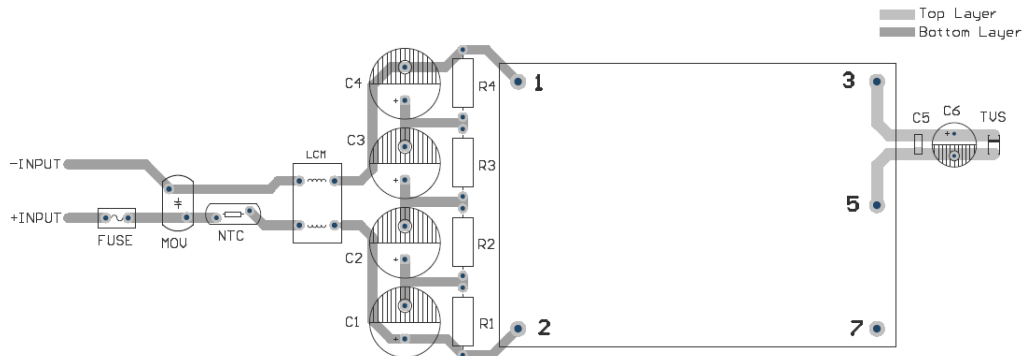


Fig 3: Recommended EMC circuit-PCB layout

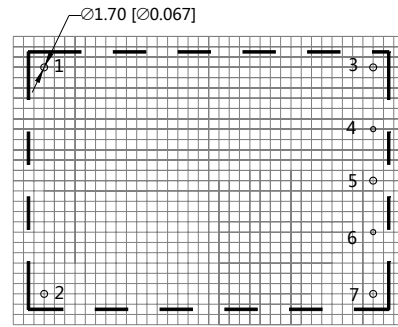
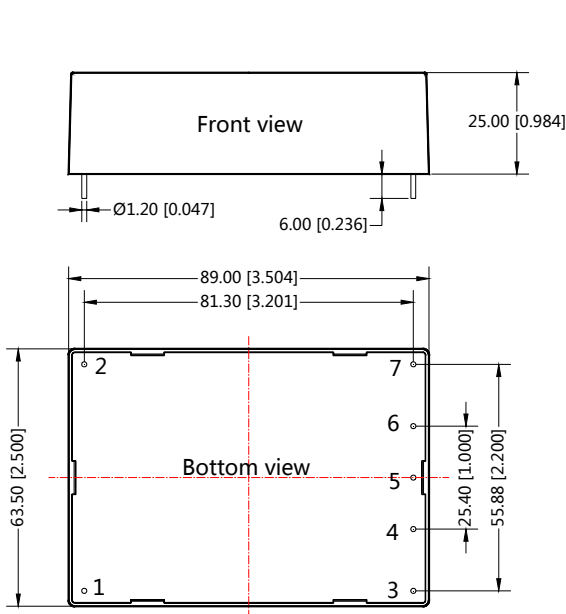
Suggestions for safety regulation and wiring width: wire width  $\geq 3\text{mm}$ , distance between wires  $\geq 6\text{mm}$ , and distance between wire and ground  $\geq 6\text{mm}$

Element model	Recommended value
MOV	S20K1000
C1, C2, C3, C4	47μF/450V
R1, R2, R3, R4	1MΩ/2W
NTC	10D-20
LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
FUSE	3.15A/250V, slow fusing, necessary

3. For more information please find application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



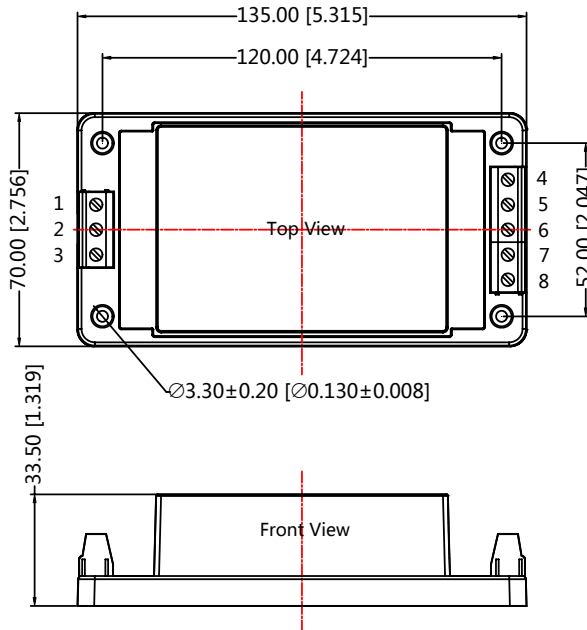
Note : Grid 2.54\*2.54mm

Pin-Out	
Pin	Function
1	-Vin
2	+Vin
3	+Vo
4	No Pin
5	-Vo
6	No Pin
7	NC

Note:  
Unit :mm[inch]  
Pin diameter tolerances : $\pm 0.10[\pm 0.004]$   
General tolerances: $\pm 0.50[\pm 0.020]$

A5 Wiring Package Dimensions

THIRD ANGLE PROJECTION

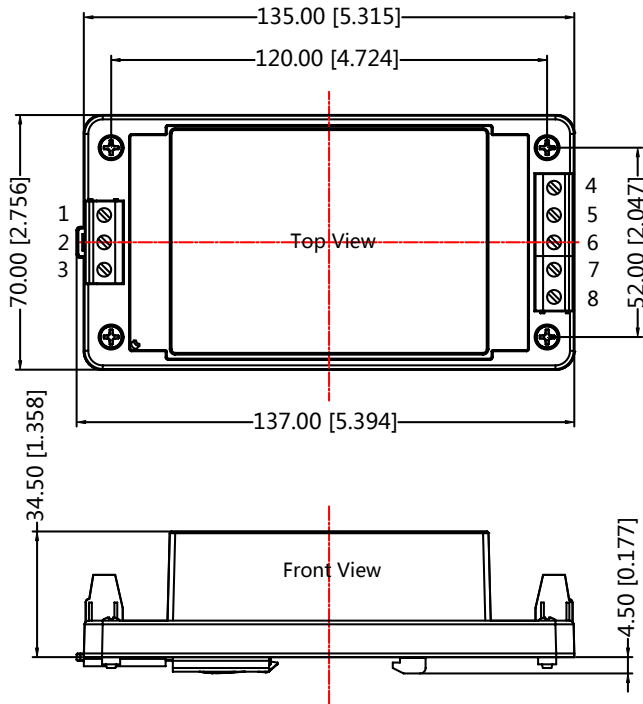


Pin-Out	
Pin	Function
1	-Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	-Vo
7	NC
8	NC

Note:  
Unit:mm[inch]  
Wire range:24~12 AWG  
General tolerances: $\pm 1.00[\pm 0.040]$

A6 Rail Package Dimensions

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	-Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	-Vo
7	NC
8	NC

Note:  
Unit:mm[inch]  
Installed on DIN RAIL TS35  
Wire range:24~12 AWG  
General tolerances:±1.00[±0.040]

- Note:
1. Packing Information please refer to 'Product Packing Information'. Packing bag number: 58220021(Horizontal package), 58220031(A5/A6 package);
  2. Unless otherwise specified, data in this data sheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
  3. All index testing methods in this data sheet are based on our Company's corporate standards;
  4. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technician for specific information;
  5. We can provide product customization service;
  6. Specifications of this product are subject to changes without prior notice.

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