DC/DC Converter

PVxx-27BxxR2 Series

MORNSUN®

5-15W Isolation DC-DC converter with ultra-wide, ultra-high 100-1000V DC input for Renewable Energy

CE RoHS

EN62109-1

3 years Warranty

FEATURES

- Input voltage up to 1000VDC
- Wide 10:1 input voltage range of 100 -1000VDC
- Industrial grade operating temperature -40℃ to +70℃
- High I/O isolation test voltage of 4000VAC
- High efficiency, low ripple & noise
- Input reverse polarity protection, output short circuit, over–voltage protection
- High reliability, long service life
- Mounting options available for PCB mounting, chassis mounting and DIN-Rail mounting

PVxx-27BxxR2 series is regulated DC-DC converters with an ultra-wide and ultra-high DC input of 100-1000VDC. The products feature high efficiency, high reliability, high insulation and a high level of safety protection. This type of power supply is widely used in renewable energy industries such as photovoltaic, power generation, energy storage, inverters and high-voltage DC conversions. The converters provide multiple protection features and guarantee stable and safe operating environments even under abnormal working conditions. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Model*	Output Power	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 200VDC (%) Typ.	Capacitive Load (μF) Max.
EN	PV05-27B05R2 (A2C/A4C)	5W	5V/1.00A	72	6000
	PV10-27B05R2 (A2C/A4C)	10W	5V/2.00A	72	6000
	PV10-27B09R2 (A2C/A4C)		9V/1.11A	76	4000
	PV10-27B24R2 (A2C/A4C)		24V/0.42A	80	470
	PV15-27B12R2 (A2C/A4C)	15W	12V/1.25A	77	2000
	PV15-27B15R2 (A2C/A4C)		15V/1.00A	78	1200
	PV15-27B24R2 (A2C/A4C)		24V/0.625A	80	470

Note: *Use suffix "A2C" for chassis mounting and suffix "A4C" for DIN-Rail mounting. The A2C and A4C suffix parts include CE certification.

Input Specifications

Item		Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range			100	--	1000	VDC
Input Current	PV05 model	200VDC	--	--	38	mA
		600VDC	--	--	15	
		1000VDC	--	--	10	
	PV10 model	200VDC	--	--	75	
		600VDC	--	--	25	
		1000VDC	--	--	16	
	PV15 model	200VDC	--	--	120	
		600VDC	--	--	40	
		1000VDC	--	--	22	
Inrush Current		200VDC	--	7	--	A
		600VDC	--	20	--	
		1000VDC	--	30	--	
External Input Fuse		PV05/ PV10 model	1A/1500VDC, required			
		PV15 model	2A/1500VDC, required			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±2	%
Line Regulation		--	±0.5	±1	
Load Regulation		--	±0.5	±1	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	100	200	mV
Temperature Drift Coefficient		--	±0.02	--	%/℃
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥110%Io self-recovery			
Over-voltage Protection	PVxx-27B05R2	≤7.5VDC			
	PVxx-27B09R2	≤12VDC			
	PVxx-27B12R2	≤ 15VDC			
	PVxx-27B15R2	≤ 19VDC			
	PVxx-27B24R2	≤28VDC			
Minimum Load		0	--	--	%
Start-up Delay Time	200-1000VDC	--	--	1	s

Note: * The "parallel cable" method is used for ripple and noise test, please refer to PV Converter Application Notes for specific information.

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output	Electric Strength Test for 1min.		4000	--	--	VAC
Operating Temperature				-40	--	+70	℃
Storage Temperature				-40	--	+105	
Storage Humidity				--	--	95	%RH
Soldering Temperature		Wave-soldering		260±5℃; time:5 - 10s			
		Manual-welding		360±10℃; time:3 - 5s			
Switching Frequency				--	--	75	kHz
Power Derating		+50℃ to +70℃	PV10/15-27BxxR2	2	--	--	%/℃
Safety Standard				EN62109-1			
MTBF				MIL-HDBK-217F@25℃ > 300,000 h			

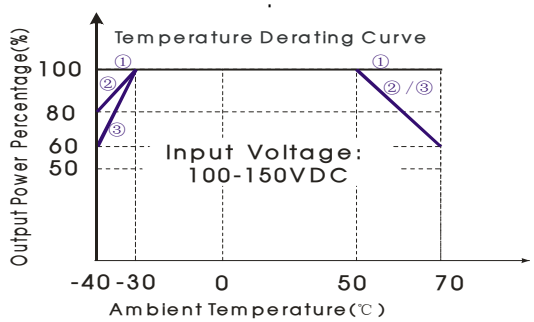
Mechanical Specifications

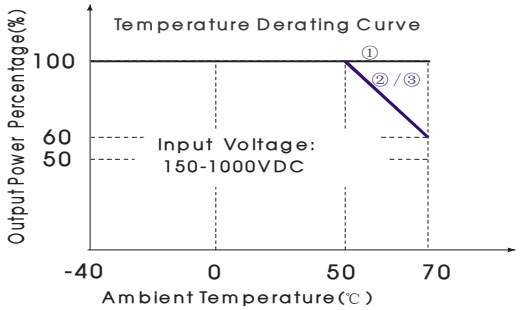
Case Material		Black flame-retardant and heat-resistant plastic (UL94V-0)
Dimensions	Horizontal package	70.0 x 48.0 x 23.5 mm
	A2C chassis mounting	96.1 x 54.0 x 32.0 mm
	A4C DIN-Rail mounting	96.1 x 54.0 x 36.6 mm
Weight	Horizontal package	95g (Typ.)
	A2C chassis mounting	150g (Typ.)
	A4C DIN-Rail mounting	190g (Typ.)
Cooling method		Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (See Fig. 2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (See Fig. 2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A

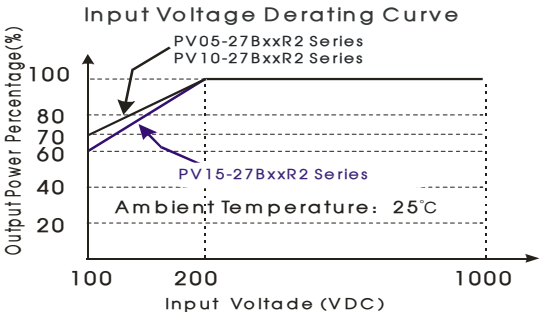
Product Characteristic Curve



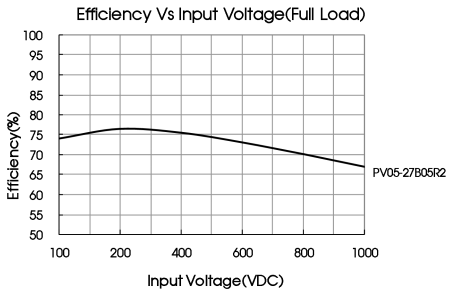


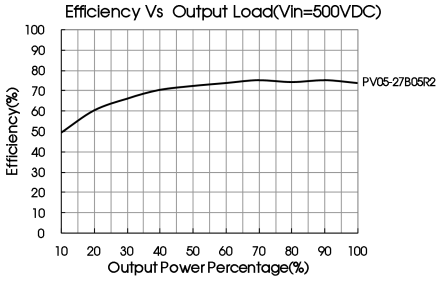
Note: The output power must be derated as per temperature derating curves

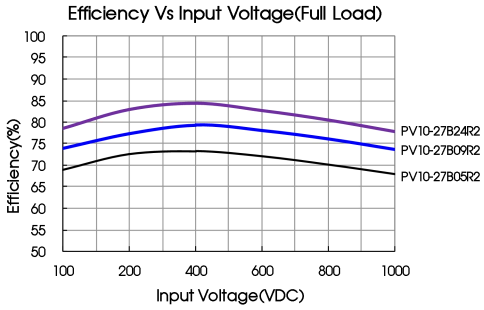
1. PV05-27BxxR2 models derating curve is line ①;
   PV10-27BxxR2 models derating curve is line ②;
   PV15-27BxxR2 models derating curve is line ③.
2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.

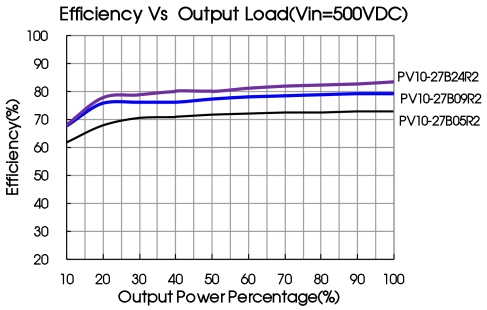


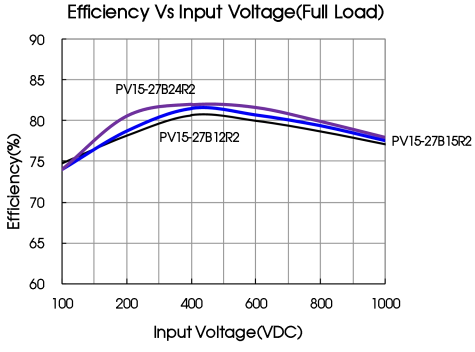
Note: Calculating the actual output power = Nominal output power x Temperature derating x Input voltage derating.

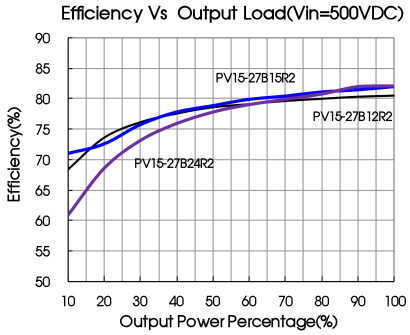












Design Reference

1. Typical application

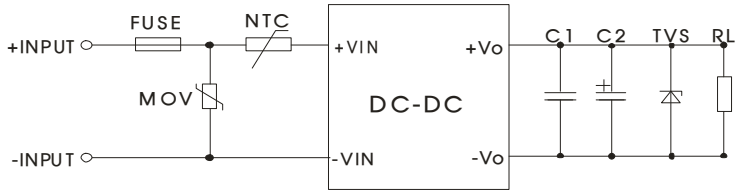


Fig. 1

Model	FUSE	MOV	NTC	C1(μF)	C2(μF)	TVS
PV05-27B05R2	1A/1500VDC	S14K880	10D-11 (10Ω)	1uF/16V	220uF/16V	SMBJ7.0A
PV10-27B05R2				1uF/16V	220uF/16V	SMBJ7.0A
PV10-27B09R2				1uF/16V	120uF/16V	SMBJ12A
PV10-27B24R2				1uF/35V	68uF/35V	SMBJ33A
PV15-27B12R2	2A/1500VDC			1uF/25V	120uF/25V	SMBJ15A
PV15-27B15R2				1uF/25V	120uF/25V	SMBJ20A
PV15-27B24R2				1uF/35V	68uF/35V	SMBJ33A

Note on filter components:
We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor, used to filter high-frequency noise. TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

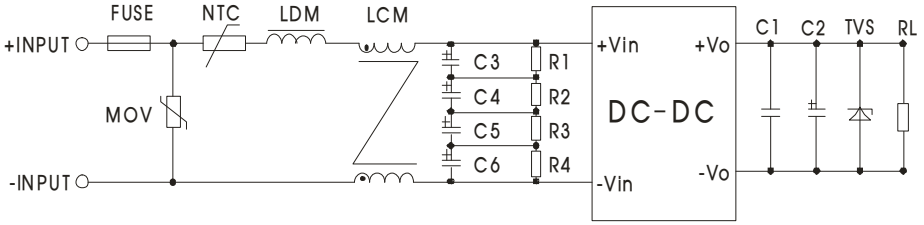
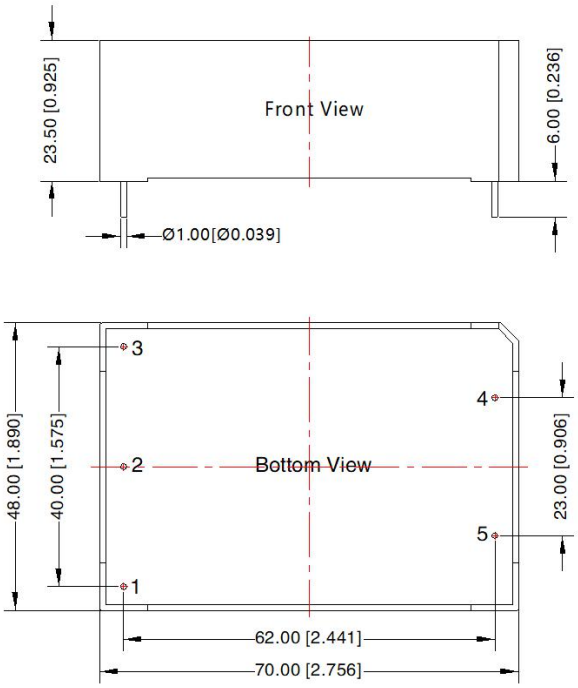


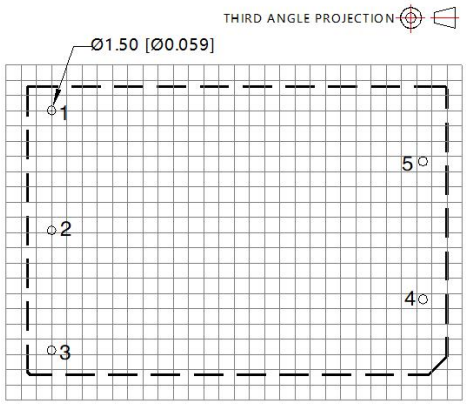
Fig. 2: EMC Recommended circuit (for output components also refer to typical application)

Component	Recommended value
MOV	S14K880
C3, C4, C5, C6	47μF/400VDC
R1, R2, R3, R4	1MΩ/2W
NTC	10D-11
LDM	4.7mH/0.38A
LCM	10mH, recommended to use MORNSUN's FL2D-Z5-103
FUSE	1A/1500VDC, required for PV05-27BxxR2/ PV10-27BxxR2
	2A/1500VDC, required for PV15-27BxxR2

3. For additional information please refer to application notes on www.mornsun-power.com

Dimensions and Recommended Layout



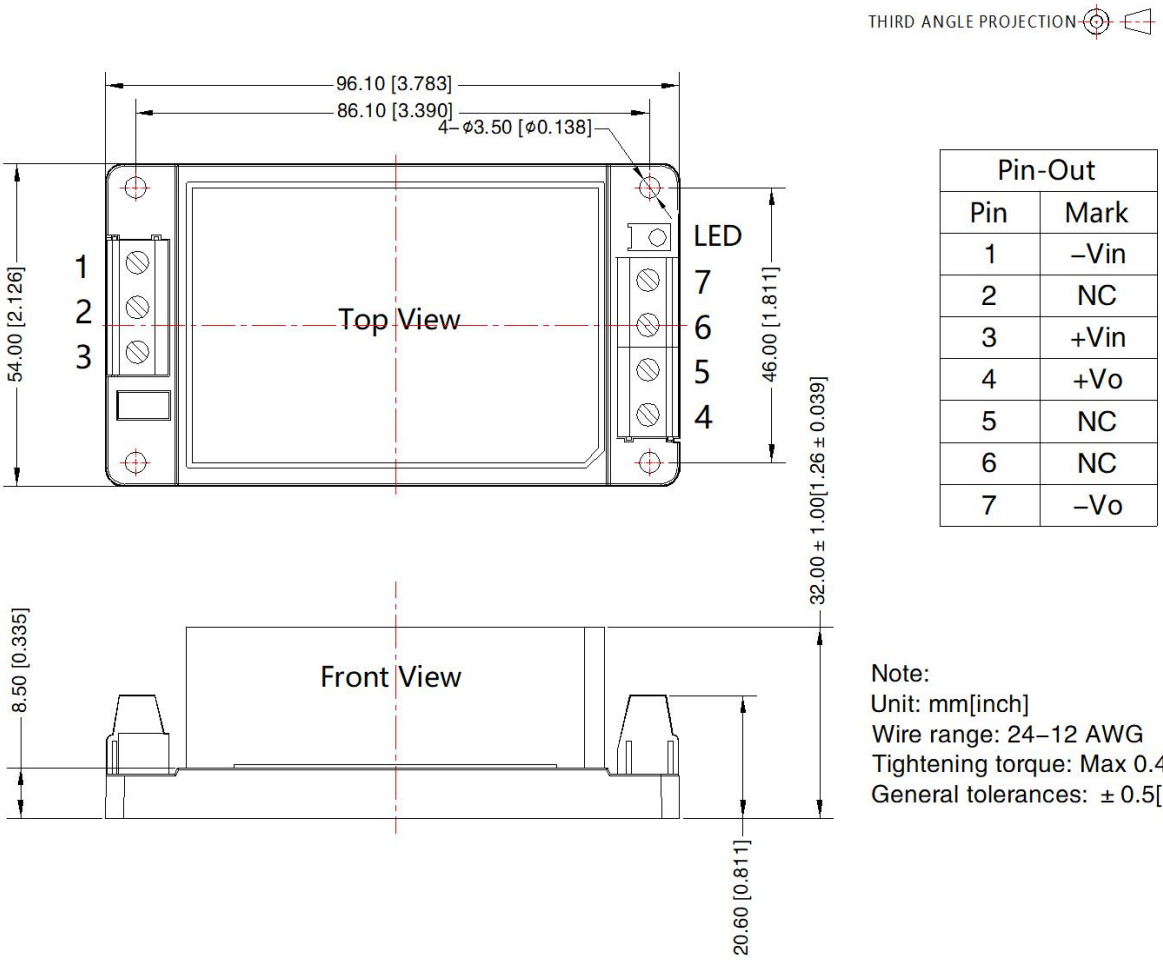


Note: Grid 2.54*2.54mm

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

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

A2C chassis mounting Dimensions

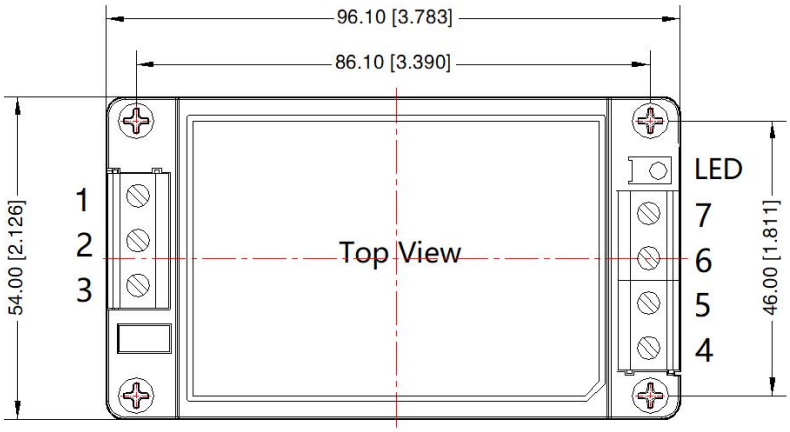


Pin-Out	
Pin	Mark
1	–Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	NC
7	–Vo

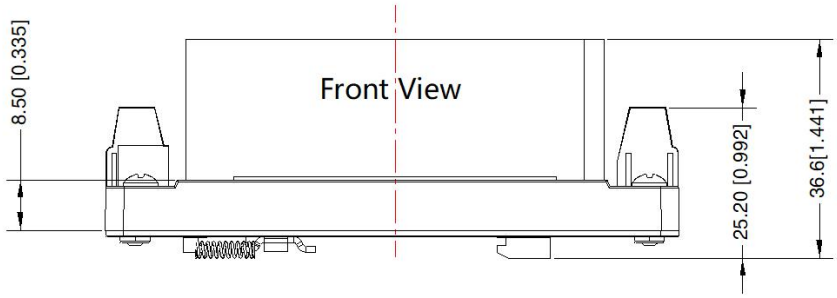
Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N・m
General tolerances: ±0.5[±0.020]

A4C Din-Rail mounting Dimensions

THIRD ANGLE PROJECTION



Pin-Out	
Pin	Mark
1	–Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	NC
7	–Vo



Note:
Unit: mm[inch]
Mounting rail: TS35, rail needs to connect safety ground
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N・m
General tolerances: ± 1.00[± 0.039]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220006; the Packing bag number of A2C/A4C package: 58220192;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Specifications are subject to change without prior notice.

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