

20W, Isolated DC-DC converter with ultra-wide, ultra-high voltage input



FEATURES

- Ultra-wide input voltage range: 60-750VDC(PV20-25B12) /80-745VDC(PV20-25B24)
- Operating ambient temperature range : -40°C to +85°C
- High efficiency, high reliability
- Input reverse polarity protection, output short circuit/over-current/over-voltage protection
- I/O isolation test voltage up to 4000VAC

PV20-25Bxx series is a Mornsun's highly efficient green power DC-DC Converters. The converters feature ultra-wide input range , low power consumption, high efficiency, high reliability and reinforced isolation. The isolation voltage is 4000VAC between input and output. The converters meet IEC/EN61000-4, CISPR32/EN55032 standards and there are used in electrical, instrumentation, household energy storage applications. Suitable for demanding high isolation voltage and strict electromagnetic compatibility of various terminal applications. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Selection Guide

Certification	Part No.*	Output Power(W)	Nominal Output Voltage and Current(Vo/Io)	Efficiency at 300VDC (%) Typ.	Capacitive Load (uF) Max.
EN (Pending)	PV20-25B12	20	12V/1670mA	84	3000
UL/EN/IEC	PV20-25B24		24V/833mA	86	800

Note: *The product picture is for reference only. For details, please refer to the actual product.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	Rated input (Certified voltage)	100	--	600	VDC
	12V	60	--	750	
	24V	80	--	745	
Input Current	200VDC	--	--	0.25	A
	600VDC	--	--	0.08	
Inrush Current	200VDC	--	30	--	
	600VDC	--	65	--	
Leakage Current	600VDC/50Hz	0.5mA RMS Max.			
Recommended External Input Fuse		3A/1100VDC, slow-blow, required			
Input Reverse Polarity Protection		Available			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±2	--	%
Line Regulation	Full load	--	±0.5	--	
Load Regulation	0% - 100% load	--	±1.0	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	--	--	150	mV
Temperature Coefficient		--	±0.02	--	%/°C
Stand-by Power Consumption	300VDC	--	--	0.7	W
Short Circuit Protection		Hiccup, continuous, self-recover			
Over-current Protection		110 - 400% Io, self-recover			
Over-voltage Protection	12V output	≤ 20V (Output voltage hiccup or clamp)			
	24V output	≤ 35V (Output voltage hiccup or clamp)			
Minimum Load		0	--	--	%
Hold-up Time	200VDC	--	3	--	ms
	600VDC	--	50	--	

Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 47uF electrolytic capacitor and 1uF ceramic capacitor, 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., leakage current<5mA	4000	--	--	VAC
Operating Temperature	Work in the power drating curve range		-40	--	+85	°C
Storage Temperature			-40	--	+85	
Storage Humidity	Non-condensing		--	--	95	%RH
Soldering Temperature	Wave-soldering		260 ± 5°C; time: 5 - 10s			
	Manual-welding		360 ± 10°C; time: 3 - 5s			
Switching Frequency			--	65	--	kHz
Power Derating	PV20-25B12	+55°C to +85°C (80-675VDC Input)	3.0			% / °C
		+55°C to +80°C (675-750VDC Input)	3.0			
		+80°C to +85°C (675-750VDC Input)	3.6			
		-40°C to -10°C	1.0			% / VDC
		60VDC-80VDC	0.75			
		80VDC-155VDC	0.47			
	PV20-25B24	+55°C to +85°C (80-675VDC Input)	3.0	--	--	% / °C
		+55°C to +80°C (675-745VDC Input)	3.0	--	--	
		+80°C to +85°C (675-745VDC Input)	3.6	--	--	
		-40°C to -10°C	1.0	--	--	% / VDC
		80VDC-155VDC	0.47	--	--	
		675VDC-745VDC	0.29	--	--	
Safety Standard	12V		Design refer to IEC/EN62368-1			
	24V		UL1741, IEC62368-1 safety approved & EN62368-1 (Report)			
Safety Class			CLASS II			
MTBF	MIL-HDBK-217F@25°C		≥ 300,000 h			

Mechanical Specifications

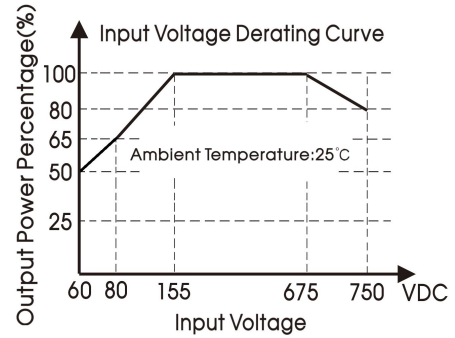
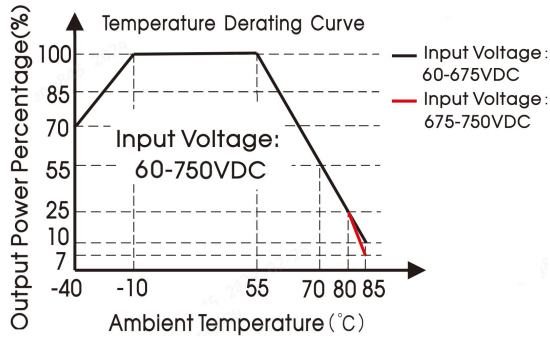
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimension	70.00 x 48.00 x 30.00mm
Weight	140g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

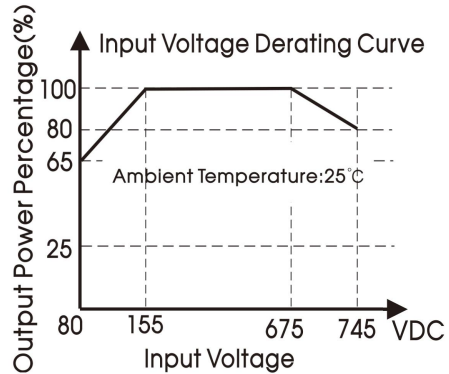
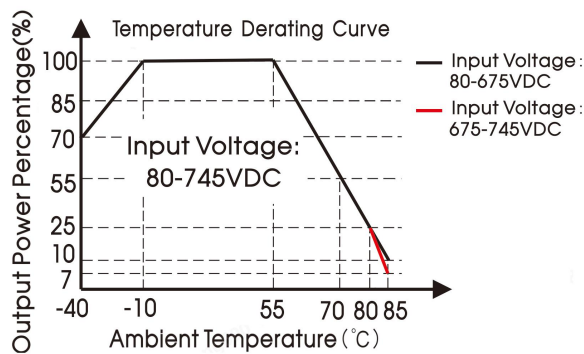
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2KV	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s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

Product Characteristic Curve

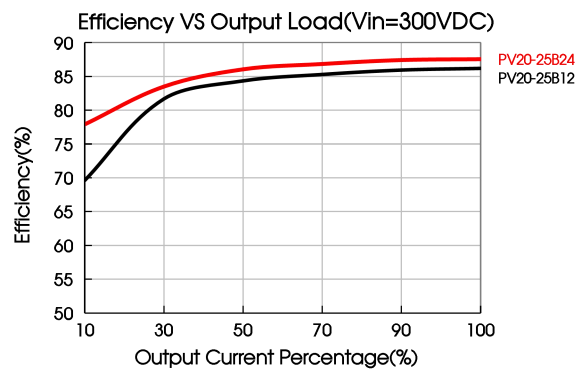
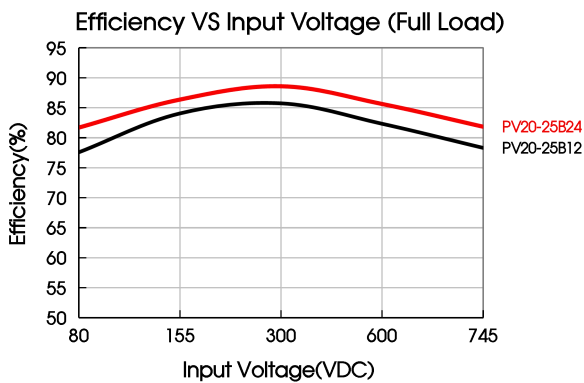
PV20-25B12 Derating Curve:



PV20-25B24 Derating Curve:



Note:
 ① DC input between 60-155VDC/675-750VDC(12V) or 80-155VDC/675-745VDC(24V), the output power must be derated as per temperature derating curves.
 ② This product is suitable for applications using natural air cooling; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application

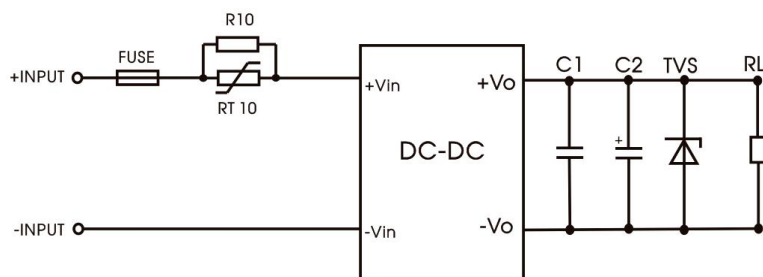


Fig. 1: Typical circuit diagram

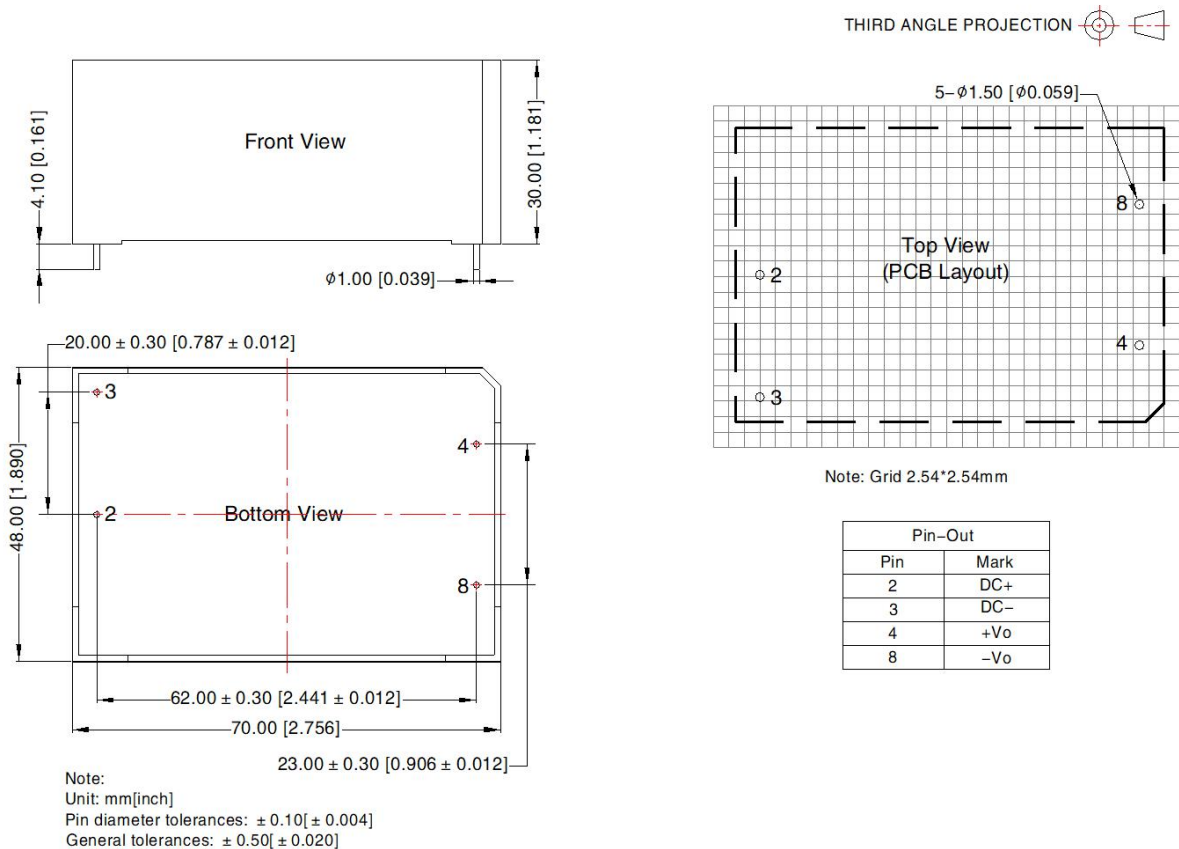
Part no.	FUSE	RT10	R10	C1(uF)	C2(uF)	TVS
PV20-25B12	3A/1100VDC, slow-blow, required	15D-10	2W/12Ω (Wire-wound resistor)	1	220	SMBJ20A
PV20-25B24						SMBJ30A

Output 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 for filtering high-frequency noise and TVS is a recommended suppressor diode to protect the application in case of a converter failure.

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

Dimensions and Recommended Layout



Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220017;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C, humidity<75% with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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