350W isolated DC-DC converter with ultra-wide, ultra-high 200(300) -1500VDC input for Renewable Energy



FEATURES

- Input voltage up to 1700VDC (Transient, duration: 10s)
- Ultra-wide input voltage range of 200(300) 1500VDC
- Industrial grade operating temperature -40°C to +85°C
- High I/O isolation voltage up to 4000VAC
- High efficiency, low ripple & noise
- High reliability, long lifespan
- Input under-voltage protection, input reverse polarity protection, over-temperature protection, output short circuit, over-current, over-voltage protection
- Operating up to 5000m altitude
- Safety according to CSA-C22.2 No.107.1

PV350-29Bxx is a regulated DC-DC series converter with an ultra-wide and ultra-high DC input of 200(300)-1500VDC, which design based on standard of CSA-C22.2 No. 107.1, EN/IEC62109, UL1741. The products feature high efficiency, high reliability, high insulation and a high level of safety protection. It is widely used in renewable energy industries, such as photovoltaic inverter, energy storage systems, industrial control. 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	Part No.*	Output Power(W)**	Nominal Output Voltage and Current (Vo/Io)	Output Voltage Adjustable Range ADJ (V)	Efficiency at 1100VDC (%) Typ.	Capacitive Load (µF) Max.		
EN	PV350-29B12	250.8	12V/20.9A	/	90	10000		
UL/EN/IEC	PV350-29B24	250.4	24V/14.6A	21.6-26.4		2200		
	PV350-29B28		28V/12.5A	25.2-30.8	00	1500		
	PV350-29B32	330.4	32V/10.95A	28.8-35.2	92	1500		
/	PV350-29B48		48V/7.3A	43.2-52.8		1500		
Note: *P/350-20824/28/32/48 use suffix "W" for wire output version; For 12// version the input terminals are cold pressed pin type, the output is wire type;								

**If need parallel connection to increase the power, please consult Mornsun FAE for solution.

Input Specifications

Item	Operating Conditions	Min.	Тур.	Max.	Unit	
	Transient (10s)			1700		
Input Voltage Range	12V				1500	VDC
	24V/28V/32V/48V	300		1500		
	300VDC			2	Α	
Input Current	1100VDC			0.75		
	1500VDC			0.6		
Inrush Current	1500VDC		300			
	Lockout activation range	10)/	140		195	VDC
In a state de la colta de Drote objet	Lockout deactivation range	12V	165		205	
input under-voltage Protection	Lockout activation range		240		295	
	Lockout deactivation range	240/200/320/400	265		305	
Input Reverse Polarity Protection			Available			
External Input Fuse			6A/1500VDC, required			
Hot Plug			Unavailable			

Output Specifications							
Item	Operating Conditions	Min.	Typ.	Max.	Unit		
Output Voltage Accuracy	All load range, constant voltage mode		±l	±2	0/		
Line Regulation	Rated load		±0.25	0.5	70		
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DC/DC Converter

PV350-29Bxx Series



Load Regulation	0% - 100% load		±0.5	±l		
	20MHz bandwidth	12V			200	mV
	(peak-to-peak value)	24V/28V/32V/48V			300	
Temperature Coefficient				±0.02		%/ ℃
Instantaneous overload capability**	Full voltage range, for 1s		150%lo	200%10		
		Normal temperature, high temperature	110% - 300% Io, hiccup, constant current lasts for 1s before turn off, self-recovery			
Over-current Protection	All input voltage range	Low temperature	≥110% Io, hiccup, constant current lasts for 1s before turn off, self-recoverv			
Short Circuit Protection	Recovery time < 15s after th	Hiccup, c turn	Hiccup, constant current lasts for 1s before turn off, continuous, self-recovery			
	12V output	≤16VDC	C C C Output voltage clamp or hiccup C C			
	24V output	≤35VDC				
Over-voltage Protection	28V output	≤40VDC				
	32V output					≪45VDC
	48V output	≤58VDC				
Over-temperature Protection***			Output voltage turn off, self-recovery			ecovery
Minimum Load	nimum Load		0			%
Hold-up Time	Room temperature, full load	d 1100VDC input		8		ms
Start-up Delay Time****	Room temperature		3	5	S	

Note: "The "Tip and barrel method" is used for ripple and noise test, please refer to PV Converter Application Notes for specific information; **When the output current is less than the trigger point of the over-current protection, the normal output can be maintained. When the output current is greater than the trigger point of the over-current protection, the output voltage will drop with the increase of the current, which belongs to the normal working mode; the over-current can be restored within 1s is normal working state, otherwise it enters the hiccup state of overcurrent protection, which belongs to the normal protection mode. It is suitable for short-term high-current applications such as closing coils and capacitors; ***Output voltage turn off, self-recovery after fault conditions is removed;

****Full input voltage / output load range (The cooling-time between input power-off and power-on again is greater than 15s).

General Spe	ecifications							
Item		Operating Conditions			Min.	Тур.	Max.	Unit
	Input - output	Electric Strength Test for 1min.,			4000			VAC
Isolation	Input - PE				4000			
	Output - PE		leakage cullent < romA					
Insulation Type					Primary and secondary meet reinforced insulation			
Insulation Resistance	Input - output	500VDC			50			MΩ
Operating Temper	rature				-40		+85	°C
Storage Temperat	ure				-40		+85	C
Storage Humidity							95	%RH
		-40°C to 0°C	200-300VDC	12V	0.50			%/°C
		+50 °C to +70 °C			2.50			
		+55 °C to +70 °C	300-1400VDC		3.33			
		+50 °C to +70 °C	1400-1500VDC		2.50			
		+70 °C to +85 °C	200-1500VDC		3.00			
		-40°C to 0°C	300 400\/DC		0.50			
Dec use Demetting a		+50 °C to +70 °C	300-400VDC		2.50			
Power Derating		+55°C to +70°C	400-1400VDC	24V/28V/32V /48V	3.33			
		+50 °C to +70 °C	1400-1500VDC	7401	2.50			%/VDC
		+70 °C to +85 °C	300-1500VDC		3.00			
		200-300VDC	12V		0.20			
		300-400VDC	24V/28V/32V/48V	/	0.20			
		1400-1500VDC	1400-1500VDC		0.20			
		3000- 5000m		10.00			%/Km	

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Switching Frequency			65		kHz		
	12V	EN62109-1, BS EN62109-1 (Report); Design refer to CSA-C22.2 No.107.1-16, UL1741, IEC62109-1					
Safety Standard	24V/28V/32V UL1741, IEC62109-1 safety approv 24V/28V/32V EN62109-1, BS EN62109-1 (Report) Design refer to CSA-C22.2 No.107				ed & 1-16		
	48V	Design refer to CSA-C22.2 No.107.1-16, UL1741, EN/IEC/BS EN62109-1					
MTBF	MIL-HDBK-217F@25°C	≥300,000	h				

Mechanical Specifications					
Case Material	Metal				
Dimensions	215.00 x 125.00 x 50.00mm				
Weight	1500g (Typ.)				
Cooling Method	Free air convection				

Electromagnetic Compatibility (EMC)							
Emissions*	CE	CISPR32/EN55032	CLASS A				
	RE	CISPR32/EN55032	CLASS A				
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria A			
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A			
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria A			
	Surge	IEC/EN61000-4-5	Line to line ±1KV/line to PE ±2KV	Perf. Criteria A			
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A			
Note: "During conduction and radiation testing, in order to avoid new interference brought by the input line, it is necessary to cover the input line with a							

Note: "During conduction and radiation testing, in order to avoid new interference brought by the input line, it is necessary to cover the input line with nickel-zinc ferrite or nanocrystalline magnetic ring.

Product Characteristic Curve



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Note: 1) With an input between 200-300VDC(12V)/300-400VDC(24V/28V/32V/48V)/1400 -1500VDC, the output power of PV350-29Bxx parts must be derated as per temperature derating curves;

② This product is suitable for applications using natural free air convection; For applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application circuit



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Note: 1.The rectified DC signal of 380VAC three-phase power needs to be filtered by C1 and C2 capacitors; 2.Please consult FAE if it needs to be applied in other environments.

3. IMPORTANT SAFETY INSTRUCTIONS

Additional protective devices, such as lightning protector need to be added if there is an transient pulse voltage greater than 6KV at the input of PV products in system applications.

4. For more information Please find the application notes on <u>www.mornsun-power.com.</u>

Dimensions and Recommended Layout (PV350-29Bxx)



Front View

Unit: mm[inch] ADJ: Output adjustable resistor Wire range: 16–12 AWG(At least 3 pins) 14–12 AWG(At least 2 pins) Connector tightening torque: 0.5 ± 0.05 N · m General tolerances: ± 1.00[± 0.039] Tightening torque: Max 0.4 N · m

The product must be installed in prevent fire and electric shock of enclosure for terminal use It may appear that the input wire sleeves are all black when shipped



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PV350-29B24/28/32/48



Tightening torque: Max 0.4 N · m

The product must be installed in prevent fire and electric shock of enclosure for terminal use It may appear that the input wire sleeves are all black when shipped



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Dimensions and Recommended Layout (PV350-29B24/28/32/48W)

PV350-29B24/28/32/48W

THIRD ANGLE PROJECTION



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- 1. CAUTION: "To reduce the risk of fire, connect only to a circuit provided with 6 amperes maximum branch-circuit over-current protection in accordance with the National Electrical Code, ANSI/NFPA70."
- 2. WARNING: REPLACE ONLY WITH THE SAME RATINGS AND TYPE OF FUSE.
- 3. DANGER HIGH VOLTAGE.

AVERTISSEMENT:

- 1. Avertissement: Pour réduire le risque d'incendie, veuillez connecter uniquement à des circuits de dérivation avec protection contre les surintensités conformes au code électrique national ANSI/ NFPA 70.
- 2. AVERTISSEMENT : N'UTILISER QUE DES FUSIBLES DE MÊMECALIBRE ET DE MÊME TYPE QUE LE FUSIBLE DORIGINE.

3. DANGER : HAUTE TENSION.

Note:

- 1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220053;
- 2. 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;
- 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. Products are related to laws and regulations: see "Features" and "EMC";
- 6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
- 7. If the final product application is connected to a photovoltaic array, the array needs to be grounded and The voltage between the positive and negative poles of the product shall not be greater than 1500VDC.

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Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. ChinaTel: 86-20-38601850Fax: 86-20-38601272E-mail: info@mornsun.cnwww.mornsun-power.com

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