

10W Isolation DC-DC Converter with Ultra-wide ,ultra-high 200-1200V DC input for Renewable Energy



RoHS



FEATURES

- Ultra-wide 200 - 1200VDC input voltage range
- Industrial grade operating temperature -40°C to +70°C
- High I/O isolation test voltage of 4000VAC (Input-output), three-way isolation output of 3500VAC
- Meets reinforced insulation
- High efficiency, Low ripple & noise
- High reliability, Long service life
- Input reverse polarity and undervoltage protection, output short circuit, overcurrent and overvoltage protection
- Meets 5000m altitude requirements

PV10-27C050524 is a regulated DC-DC converter with an ultra-wide and ultra-high DC input of 200-1200VDC, which design to meet standards of CSA-C22.2 No. 107.1, EN62109. 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

Part No.	Output Power	Nominal Output Voltage and Current			Efficiency at 600VDC(%)Typ.	Capacitive Load (μF) Max.		
		Vo1/Io1	Vo2/Io2	Vo3/Io3		Vo1	Vo2	Vo3
PV10-27C050524	10W	5V/1000mA	5V/400mA	24V/100mA	72	2200	470	330

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range		200	--	1200	VDC
Input current	300VDC	--	--	0.12	A
	600VDC	--	--	0.08	
Inrush current	600VDC	--	60	--	
	1200VDC	--	140	--	
Undervoltage protection hysteresis		Lockout activation range: 140 - 170VDC Lockout deactivation range: 170 - 200VDC			
External Input Fuse		3.15A/1200VDC required			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	10% - 100% load	Vo1	--	±2	--	%
		Vo2/Vo3	--	±5	±10	
Line Regulation	Full load	Vo1	--	±2	--	
		Vo2/Vo3	--	±10	--	
Load Regulation	10% - 100% load	Vo1	--	±2	--	mV
		Vo2/Vo3	--	±10	--	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	Vo1	--	--	200	
		Vo2/Vo3	--	--	300	
Temperature Drift Coefficient			--	±0.02	--	%/°C
Short Circuit Protection			Hiccup, continuous, self-recovery			
Overcurrent Protection			≥ 110%Io, Hiccup, self-recovery			
Overvoltage Protection	Vo1		≤ 10VDC			
Minimum Load	Balanced load		10	--	--	%
Hold-up Time	Room temperature, full load	600VDC input	--	3	--	ms

Note: * The "Tip and barrel 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, leakage current ≤5mA		4000	--	--	VAC
	Vo1-Vo2			3500	--	--	
	Vo1-Vo3			3500	--	--	
	Vo2-Vo3			3500	--	--	
Insulation resistance		500VDC		≥50x10 ⁶ Ω			
Operating Temperature				-40	--	+70	℃
Storage Temperature				-40	--	+85	
Storage Humidity				--	--	95	%RH
Power Derating		-40℃ to -25℃	200 - 300VDC	3.0	--	--	% /℃
		+50℃ to +70℃		3.0	--	--	
		200VDC - 300VDC		0.6	--	--	%/VDC
		2000m - 5000m		13.3	--	--	%/Km
Safety Standard				CSA-C22.2 No.107.1, EN62109			
Switching Frequency				--	65	--	kHz
Altitude				--	--	5000	m
MTBF				MIL-HDBK-217F@25℃ ≥ 300,000 h			

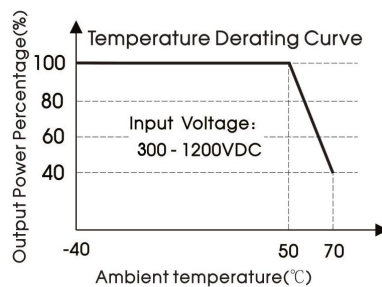
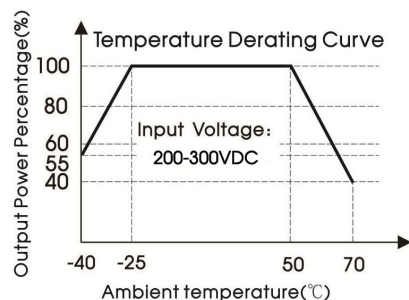
Mechanical Specifications

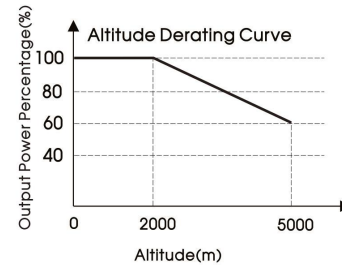
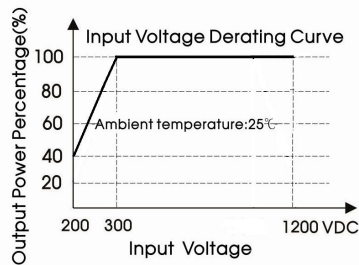
Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)
Dimensions	70.00 x 48.00 x 23.50 mm
Weight	100g(Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

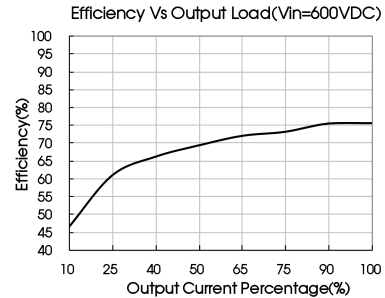
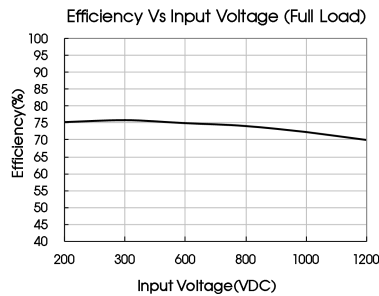
Emissions	CE	CISPR32 EN55032	CLASS A (See Fig.2 for recommended circuit)	
	RE	CISPR32 EN55032	CLASS A (See Fig.2 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$	Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{KV}$	perf. Criteria B
		IEC/EN61000-4-4	$\pm 4\text{KV}$ (See Fig.2 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line $\pm 1\text{KV}$	perf. Criteria B
		IEC/EN61000-4-5	line to line $\pm 2\text{KV}$ (See Fig.2 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations	IEC/EN61000-4-11	0%, 70%	perf. Criteria B

Product Characteristic Curve





- Note:
- ① With an input between 200 - 300VDC, the output power of PV10-27C050524 parts must be derated as per temperature derating curves;
 - ② For operation of this converter series in an altitude between 2000 - 5000m above sea level, the output power must be derated as per the altitude derating curve;
 - ③ This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.



Design Reference

1. Typical application circuit

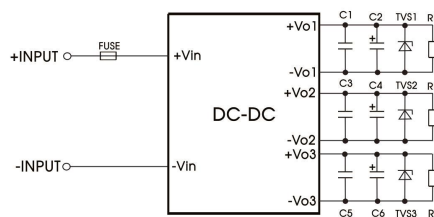


Fig. 1

Model	FUSE	C1/ C3/ C5	C2/ C4/ C6	TVS1	TVS2	TVS3
PV10-27C050524	3.15A/1200VDC required	1uF	10uF	SMBJ7.0A	SMBJ7.0A	SMBJ30A

Note on filter components:

We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2,C4,C6 (refer to manufacture's datasheet). Choose a Capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1,C3,C5 are 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 solution-recommended circuit

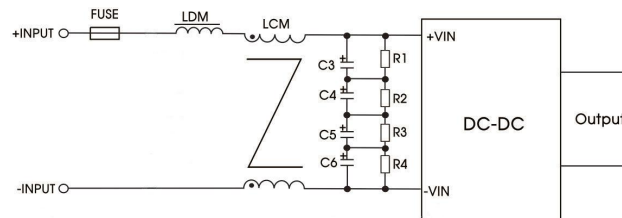


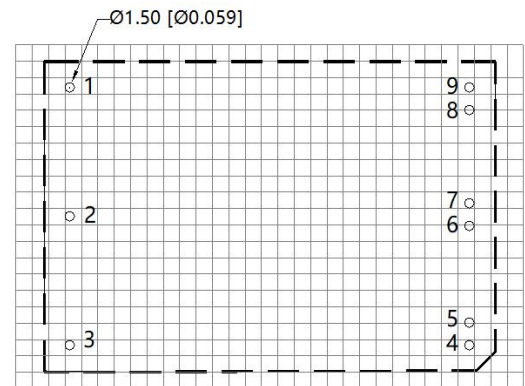
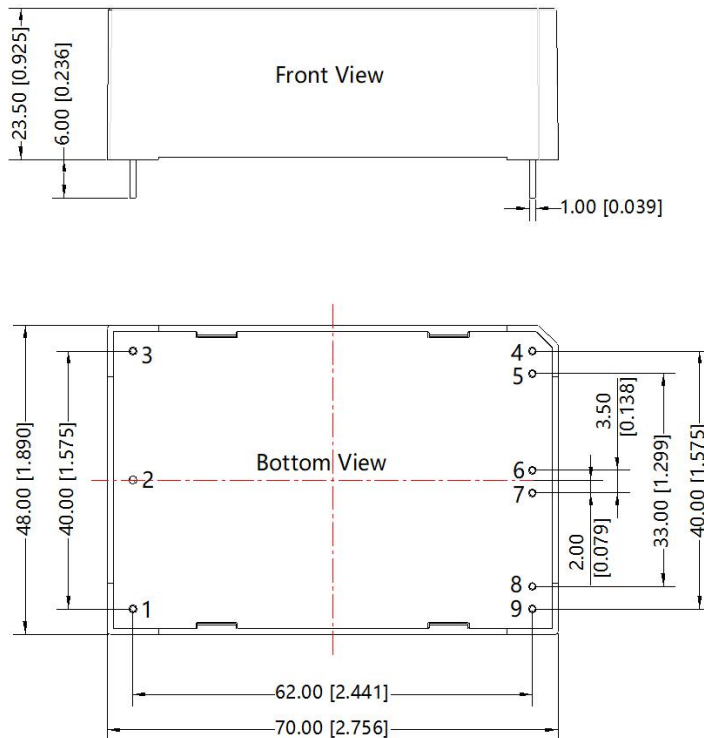
Fig.2(Output parameter are show in Figure 1)

Model	Recommended value
C3、C4、C5、C6	47uF/450VDC
R1、R2、R3、R4	1MΩ/2W
LDM	330uH/0.38A
LCM	7mH/1A
FUSE	15A/1500VDC required

3. For more information Please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: grid 2.54*2.54mm

Pin-Out	
PIN	Function
1	-Vin
2	No Pin
3	+Vin
4	+Vo3
5	-Vo3
6	+Vo2
7	-Vo2
8	+Vo1
9	-Vo1

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

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220006;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. In order to improve the conversion efficiency, when the module is working under high pressure, the module may have certain audio noise, but does not affect the reliability of the product;
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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