DC/DC Converter

HO1-PN202-0.5C

MORNSUN®

Non-isolated DC-DC converter

Fixed input voltage and regulated adjustable dual high voltage output

Patent Protection RoHS

FEATURES

- Positive and negative 2kV regulated adjustable dual high voltage output independently
- Six-sided metal shielding package, output ripple as low as 50mV
- Output voltage with high stability, low time coefficient and temperature coefficient
- Operating ambient temperature range: -40℃ to +105℃
- Vadj control terminal input impedance is greater than 1MΩ
- Input reverse polarity protection
- Output short-circuit protection, over-current protection

HO1-PN202-0.5C offer 2W of output, with operating ambient temperature range -40℃ to +105℃, input reverse polarity protection, control voltage over-voltage protection, output short circuit protection, over-current protection, six-sided metal shielding package, low ripple, low time coefficient and temperature coefficient, which are specifically designed for applications in board power systems where high voltages are required and output ripple requirements are high and output voltage stability is critical. They are widely used in fields such as photomultiplier tubes, mass spectrum, light spectrum, electron beam, ion beam, avalanche diodes.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Input Current ①(mA) Full load/No-load		Output Voltage (VDC)			Output Current (mA) Max./Min.
		Nominal (Range)	Typ.	Max.	Nominal ②	Range	Guaranteed range	
--	HO1-PN202-0.5C	12 (10.8-13.2)	285/50	320/80	±2000	0~±2000	±200~±2000	0.5/0

Note:
① At the nominal input voltage and nominal output voltage;
② When the Vadj control voltage is equal to 5VDC (Typ.). The relationship curve between output voltage and control voltage is shown in Fig.3; dual output voltage are independent and adjustable;
③ Within this range, the product meets the adjust-point tolerance.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Reflected Ripple Current①		--	250	--	mA
Surge Voltage (1sec. max.)		--	--	18	VDC
Input Filter Type		Capacitance filter			
Hot Plug		Unavailable			
Ctrl1, Ctrl2②	Module on	Ctrl1, Ctrl2 pin open or pulled low to GND (0-1.2VDC)			
	Module off	Ctrl1, Ctrl2 pin pulled high (3-12VDC)			
	Input current when off	--	25	40	mA
Input Reverse Polarity protection	The voltage between Vin and GND	-36	--	0	VDC

Note:
① Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method;
② The voltage of the Ctrl1 and Ctrl2 control pins are all relative to the input pin GND.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Adjust-point Tolerance	Output voltage guaranteed range, see Fig.4	--	±1	±2	%
Reference Voltage Accuracy	0%-100% load	--	±1	±2	
Linear Regulation	Input voltage range, nominal output voltage, full load	--	±0.01	±0.03	
Load Regulation	Nominal input voltage, nominal output voltage, 10%-100% load	--	±0.03	±0.05	%
Time Coefficient	Nominal input voltage, nominal output voltage, full load, after warming up for 30 minutes	--	±0.001	±0.003	%/Hr

Temperature Coefficient	Nominal input voltage, nominal output voltage, full load	--	±0.001	±0.003	%/℃
Ripple & Noise①	20MHz bandwidth, nominal input voltage, 0%-100% load	--	50	--	mV p-p
Over-current Protection	Input voltage range	110	140	180	%Io
Short-circuit Protection		Constant current mode, continuous, self-recovery			
Vadj1, Vadj2 (Output Voltage Adjustment Function)		0-5V linear adjustment, set the product output voltage by setting the voltage of Vadj pin			

Note:
① Please refer to Fig.4 for the test method of ripple and noise, the product is working by the linear power source.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	+105	℃
Storage Temperature		-40	--	+105	
Storage Humidity	Non-condensing	5	--	85	%RH
Pin Soldering Resistance Temperature	Wave-soldering, 10 seconds	--	--	260	℃
	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Pollution degree		PD2, used in applications where no pollution conduction occurs but temporary pollution conduction may occur due to accidental condensation, such as office environment.			
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Nominal input voltage, full load	--	170	--	kHz
Altitude		Altitude: ≤2000m			
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Mechanical Specifications

Case Material	Aluminum alloy
Dimensions	45.00 x 35.00 x 12.50 mm
Weight	33g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig.5-① for recommended circuit)	
	RE	CISPR32/EN55032 CLASS B (without extra components)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±4kV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria B
	EFT	IEC/EN61000-4-4 100kHz ±2kV (see Fig.5-② for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2kV (see Fig.5-② for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria B

Product Characteristic Curve

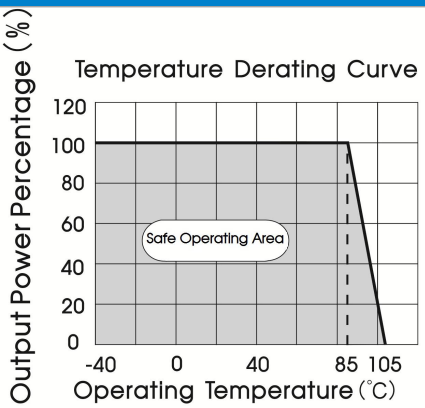


Fig. 1

Design Reference

1. Typical application

The output voltage of the product can be adjusted by an external circuit. There are two adjustment methods, as shown in Fig.2. The relationship curve between output voltage of the product and control voltage is shown in Fig.3.
Output ripple can be further reduced by connect the RC filter on the output end of the product.

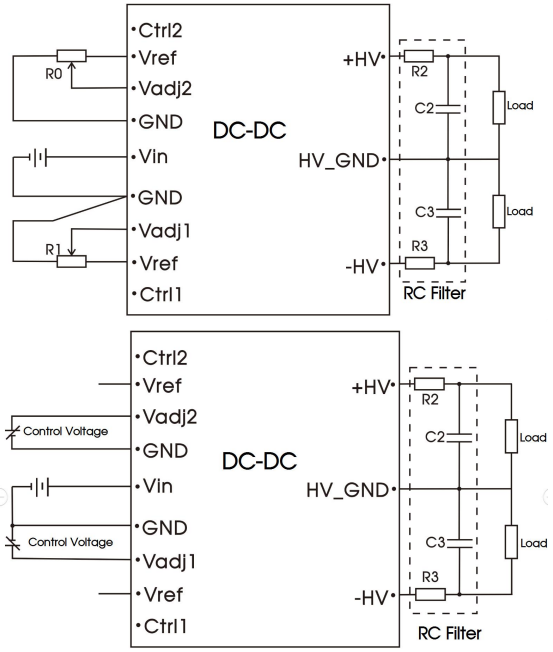
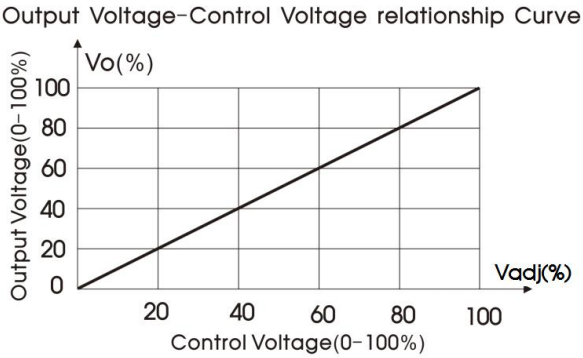


Fig. 2

Parameter description:

R0, R1	Adjustable resistance≥10kΩ
R2, R3	2kΩ
C2, C3	4.7nF/3000V
Vref	5.15VDC
Control voltage	0-5VDC



(Note: 100% Vadj is equal to 5.0VDC (Typ.)

Fig. 3 The relationship curve of output voltage and control voltage

2. Ripple & Noise testing compliance circuit

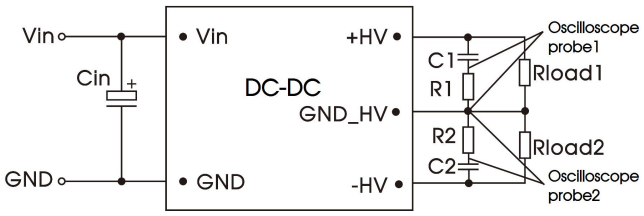


Fig.4 Ripple and noise test recommended circuit

Parameter description:

Cin	100μF/50V Aluminum electrolytic capacitor
R1, R2	1kΩ/2W
C1, C2	4.7nF/3000V

3. EMC compliance circuit

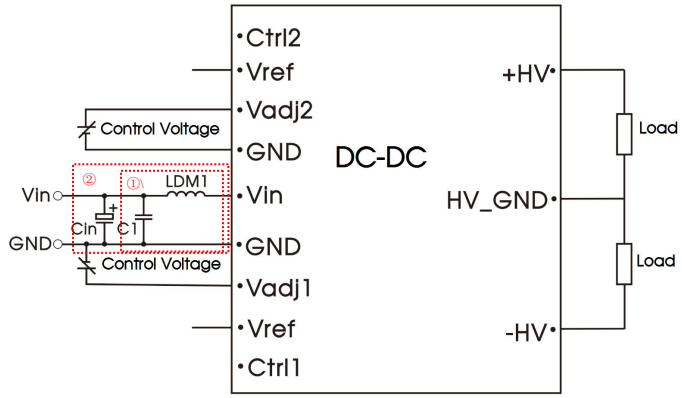


Fig. 5 EMC compliance circuit

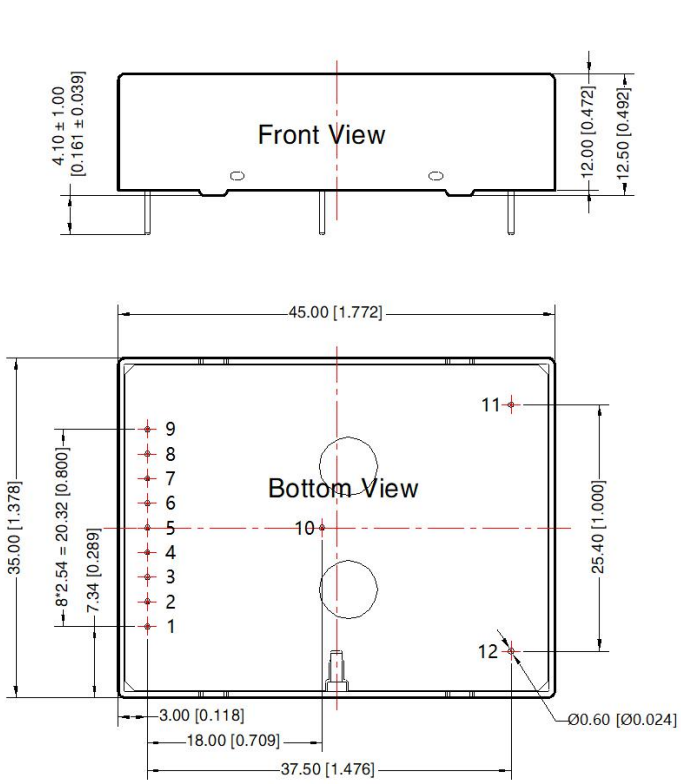
Parameter description:

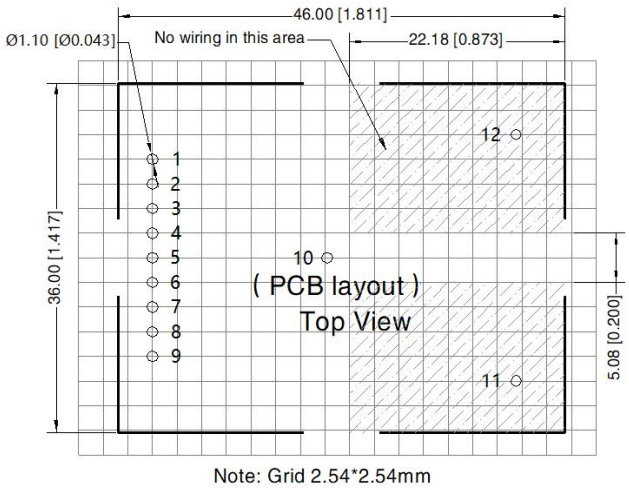
Cin	680μF/50V Aluminum electrolytic capacitor
C1	10μF/25V
LDM1	4.7μH
Control voltage	0-5VDC

4. For additional information please refer to DC-DC converter application notes on www.mornsun.cn

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm

Pin-Out			
Pin	Mark	Pin	Mark
1	Ctrl 2	7	Vadj 1
2	Vref	8	Vref
3	Vadj 2	9	Ctrl 1
4	GND	10	HV_GND
5	Vin	11	+HV
6	GND	12	-HV

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

Notes:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210122;
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℃, humidity<75%RH with nominal input voltage, nominal output 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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