DC/DC Converter

HO1-P(N)xxxxS-0.5C Series

MORNSUN®

Non-isolated DC-DC converter

Fixed input voltage and regulated adjustable single high-voltage output

Patent Protection RoHS

3 years Warranty

FEATURES

- No-load input current as low as 8mA
- Continuous output voltage with linear adjustable function
- Five-sided metal shielding package, output ripple as low as 8mV
- 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, control voltage over-voltage protection
- Output short-circuit protection, over-current protection
- EMI meet CISPR32/EN55032 CLASS B
- Meet EN62368 standards

HO1-P(N)xxxxS-0.5C series offer 0.625W 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, five-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 range③	
--	HO1-P1251S-0.5C	12 (10.8-13.2)	85/8	90/12	1250	0~+1250	+200~+1250	0.5/0
	HO1-N1251S-0.5C		85/8	90/12	-1250	0~-1250	-200~-1250	

Note:
① At the nominal input voltage and nominal output voltage;
② When the Vadj control voltage is equal to 5VDC (Typ.) voltage, the output voltage can be nominal output voltage. The relationship curve between output voltage and control voltage is shown in Fig.3;
③ Within this range, the product meets the adjust-point tolerance;
④ All indicators in this technical manual are tested when the shell is connected to pin 3 (Case).

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Reflected Ripple Current①		--	30	--	mA
Surge Voltage (1sec. max.)	HO1-P(N)xxxxS-xxC series	--	--	18	VDC
Input Filter Type		PI filter			
Hot Plug		Unavailable			
Vadj Control Terminal Input Impedance		1	--	--	MΩ

Note:
① Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Adjust-point Tolerance	Output voltage guaranteed range, see fig.3	--	±1	±2	%
Reference Voltage Accuracy	0%-100% load, reference 5.15VDC output	--	±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%	--	±0.01	±0.03	
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, -40 to +95℃	--	±100	--	PPM/℃
Ripple & Noise①	20MHz bandwidth, nominal input voltage, 0%-100% load, output voltage from 0 to +1000VDC or from -1000 to 0VDC	--	8	--	mV p-p
	20MHz bandwidth, nominal input voltage, 0%-100% load	--	15	--	
Over-current Protection / Short-circuit Protection	Input voltage range	110	140	180	%Io
		Constant current mode, continuous, self-recovery			
Over-voltage Protection of Vadj②	Input voltage range	5.1	5.2	5.3	VDC
Maximum allowable voltage of Vadj③		--	--	10	

Note:
① Please refer to fig.4 for the test method of ripple and noise, the product is working by the linear power source, ensuring that the shell is connected to pin 3. Oscilloscope probe uses x1 gear to test;
② When the Vadj voltage is higher than or equal to the over-voltage protection voltage point of Vadj, the product without output;
③ Vadj voltage can not exceed its maximum allowable voltage of 10V, otherwise the product will be permanently damaged.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	+105	℃
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	85	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	℃
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Nominal input voltage, full load	--	200	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Mechanical Specifications

Case Material	Copper alloy
Dimensions	45.50 x 12.00 x 24.50 mm
Weight	33g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (with external 10uF/25V MLCC capacitor at the input)	
	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 for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2kV (see Fig.5 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria B

Product Characteristic Curve

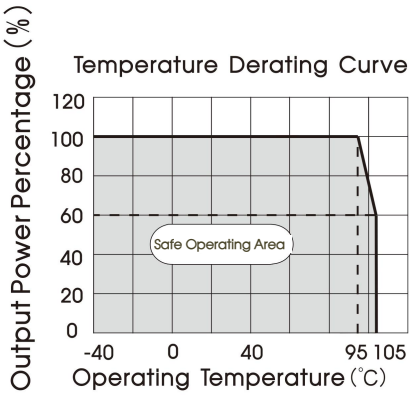


Fig. 1

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.

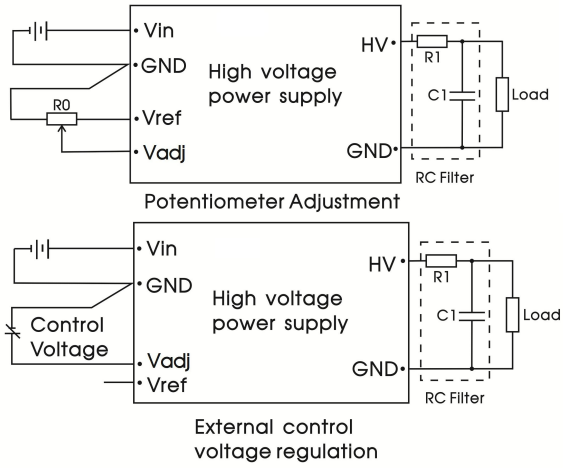
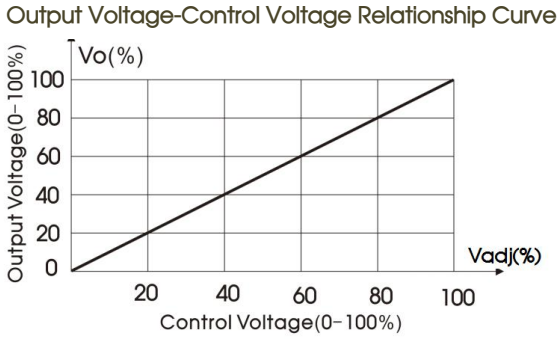


Fig. 2 External adjustment method of output voltage

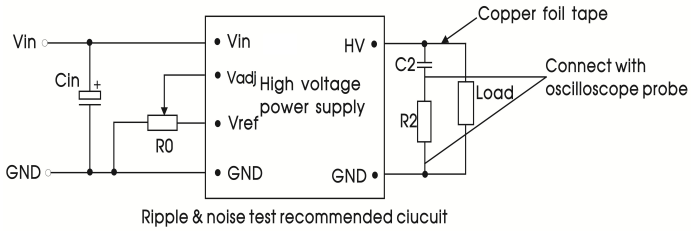
Parameter description:

R0	Adjustable resistance≥10kΩ
R1	2kΩ
C1	472K/2000V
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



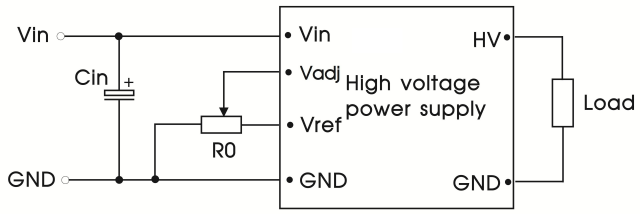
Ripple & noise test recommended ciucuit

Fig.4

Parameter description:

Cin	100 μF/50V Aluminum electrolytic capacitor
R0	Adjustable resistance≥10kΩ
R2	1kΩ/2W Resistance
C2	472K/2000V Capacitance

3. EMC compliance circuit



EMC recommended ciucuit

Fig. 5

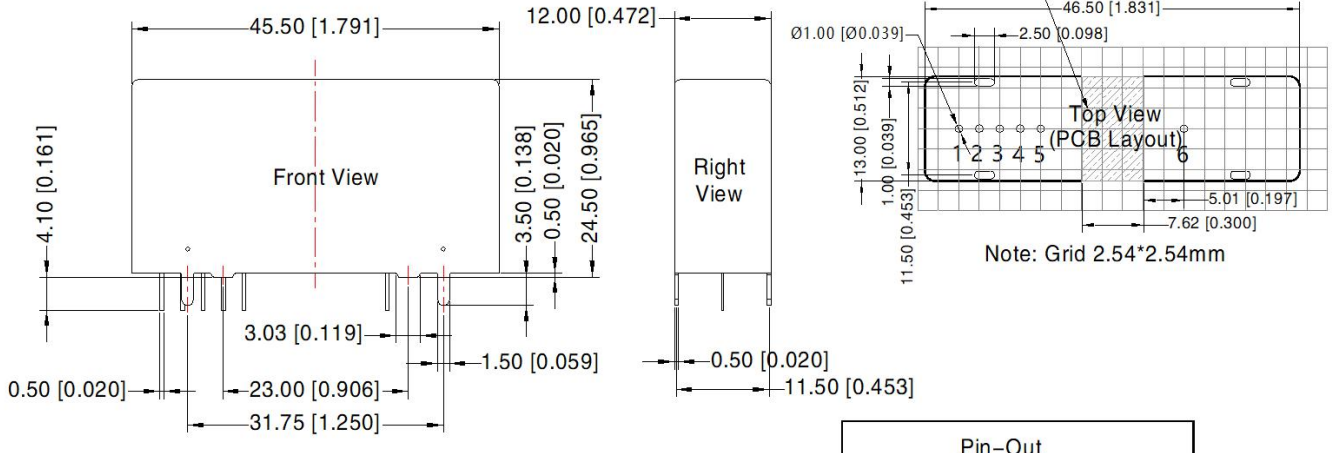
Parameter description:

Cin	680 μF/50V Aluminum electrolytic capacitor
R0	Adjustable resistance≥10kΩ

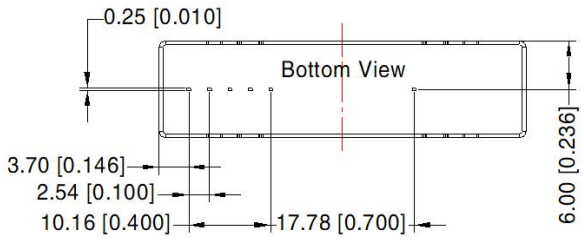
4. For additional information please refer to DC-DC converter application notes on www.mornsun.cn

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm



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

Pin-Out	
Pin	Mark
1	Vin
2	GND
3	Case
4	Vadj
5	Vref
6	HV

Case: Connected to the internal GND
GND: Vin's and HV's GND are connected internally

Notes:

1. For additional information please refer to Product Packaging Information. Packaging bag number: 58220085;
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 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;
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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