

# DC/DC Converter

## HO1-P401V-10C

# MORNSUN®

Non-isolated DC-DC converter  
Fixed input voltage and regulated adjustable single output



Patent Protection RoHS



## FEATURES

- Continuous output voltage with linear adjustable function
- Six-sided metal shielding package, output ripple as low as 50mV
- Ultra wide operating ambient temperature range: -40°C to +85°C
- Input reverse polarity protection, Input under-voltage protection
- Output short-circuit protection, over-current protection
- EMI meet CISPR32/EN55032 CLASS B

HO1-P401V-10C offers output power 4W, it features with ultra wide operating ambient temperature range -40°C to +85°C, input reverse polarity protection, Input under-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 ultrasonic crack detection, ultrasonic thickness measurement, avalanche diodes, solid-state detector, piezoelectric equipment.

## Selection Guide

Certification	Product Type	Input Voltage (VDC)	Input Current <sup>①</sup> (mA) Full load/No-load	Output Voltage (VDC)			Current (mA) Max./Min.
		Nominal (Range)	Max	Nominal <sup>②</sup>	Range	Guaranteed range <sup>③</sup>	
--	HO1-P401V-10C	12 (10.8-13.2)	463/50	400	0~+400	+100~+400	10/0

Note:  
① At the nominal input voltage and nominal output voltage.  
② When the Vadj control voltage is equal to 5VDC (Typ.), the output voltage is 400V. 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.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Surge Voltage (1sec. max.)		--	--	16	VDC
Starting voltage		--	--	10.8	
Undervoltage shutdown		8	--	--	
Ctrl pin	Module on	Ctrl pin open or TIL pulled high (3-12VDC)			
	Module off	Ctrl pin pulled GND or pulled low (0-1.2VDC)			
Input Filter Type		PI filter			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Adjust-point Tolerance	Output voltage guaranteed range : 100-400VDC, see fig.2	--	±1	±2	%
	Output voltage guaranteed range : 0-100VDC, see fig.2	--	±3	±5	
Reference Voltage Accuracy	0%-100% load, reference 5.15VDC output	--	±1	±2	
Linear Regulation	nominal output voltage	--	±0.3	±0.5	

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2022.7.14-A/0

Page 1 of 4

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Load Regulation	Nominal input voltage,nominal output voltage,10%-100% load	--	±0.3	±0.5	
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	--	±0.01	±0.03	%/℃
Ripple & Noise <sup>①</sup>	20MHz bandwidth, Input voltage range,nominal output voltage, 10%-100% load	--	50	100	mvp-p
Over-current Protection / Short-circuit Protection	Input voltage range	110	140	180	%Io
		Constant current mode, continuous, self-recovery			
Maximum allowable voltage of Vadj <sup>②</sup>	Input voltage range	--	--	5.2	VDC

Note:  
<sup>①</sup> Please refer to fig.4 for the test method of ripple and noise, the product is working by the linear power source;  
<sup>②</sup> Vadj voltage can not exceed its maximum allowable voltage of 5.2V, otherwise the product will be permanently damaged.

## General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	+85	℃
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	--	230	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

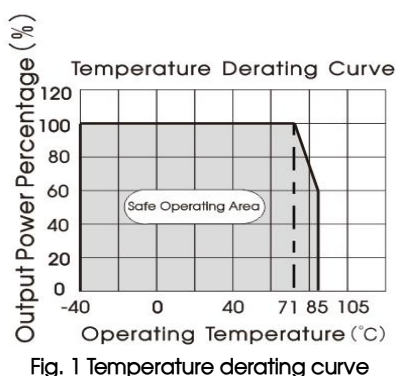
## Mechanical Specifications

Case Material	Aluminum alloy
Dimensions	45.50 x 23.00 x 12.50 mm
Weight	20g (Typ.)
Cooling Method	Free air convection

## Electromagnetic Compatibility (EMC)

EMI	CE	CISPR32/EN55032	CLASS B (see Fig.5-②)	
	RE	CISPR32/EN55032	CLASS B (see Fig.5-②)	
EMS	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.5-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig.5-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria B

## Product Characteristic Curve



## 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.

Parameter description:

R0	Adjustable resistance $\geq 10K\Omega$
R1	2k $\Omega$
C1	4.7nF/630V
Vref	5.15VDC
Control Voltage	0-5VDC

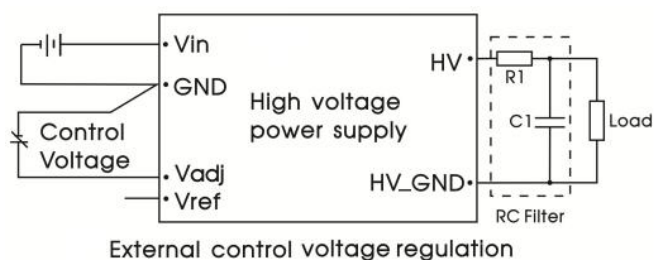
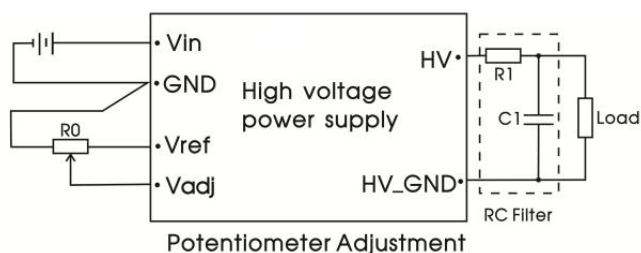


Fig. 2 External adjustment method of output voltage

Output Voltage-Control Voltage relationship Curve

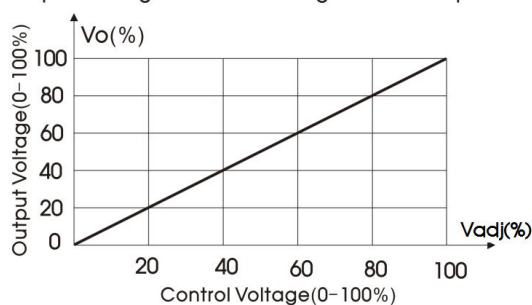
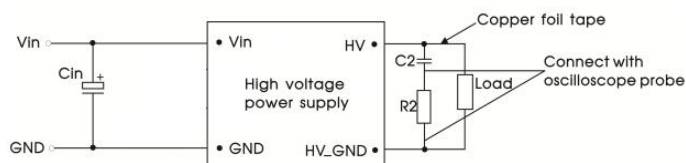


Fig. 3 The relationship curve of output voltage and control voltage

### 2. Ripple & Noise testing compliance circuit

Parameter description:

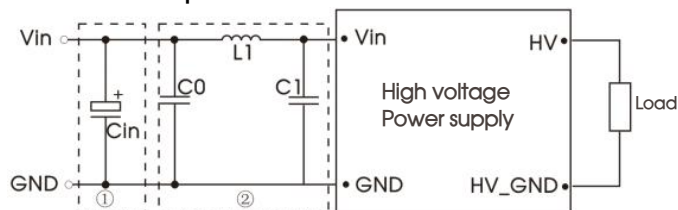
Cin	100 $\mu$ F/50V Aluminum electrolytic capacitor
R2	1k $\Omega$ /2W
C2	472K/250VAC Y2 capacitance



### 3. EMC compliance circuit

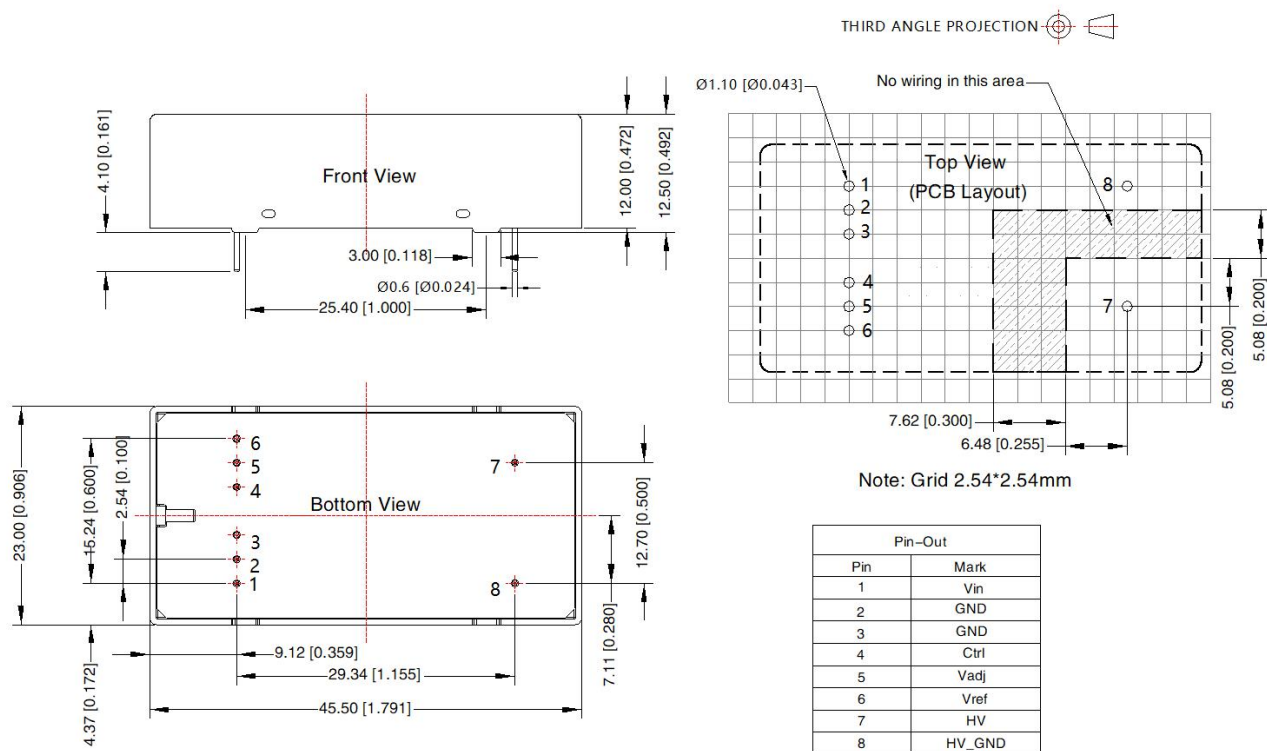
Parameter description:

Cin	1000 $\mu$ F/35V Aluminum electrolytic capacitor
C0	22 $\mu$ F/25V MLCC capacitor
C1	22 $\mu$ F/25V MLCC capacitor
L1	6.8 $\mu$ H Patch capacitor



4. For additional information please refer to DC-DC converter application notes on [www.mornsun.cn](http://www.mornsun.cn)

## Dimensions and Recommended Layout



Note:  
Unit: mm[inch]  
Pin diameter tolerances:  $\pm 0.10 [\pm 0.004]$   
General tolerances:  $\pm 0.50 [\pm 0.020]$

### Notes:

- For additional information please refer to Product Packaging Information. Packaging bag number: 58210107;
- 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;
- Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^\circ\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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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