DC/DC Converter

H_S-2WR3SG Series

MORNSUN®

2W Fixed input voltage, 5000VAC or 6000VDC isolated & unregulated single output

3 years Warranty

Continuous Short Circuit Protection

Patent Protection

RoHS

FEATURES

- High efficiency up to 85%
- The leakage current < 2μA
- Isolation Capacitance as low as 4pF
- Creepage & Clearance Distance > 5mm
- Reinforced insulation, Isolation voltage: 5000VAC or 6000VDC
- Operating ambient temperature range: -40℃ to +105℃
- Continuous short circuit protection
- Meet IEC60601 standard

H_S-2WR3SG series meet reinforced insulation requirements. They are specially designed for applications where require compact size, high isolation, low isolation capacitor and low leakage current power. They are widely used in medical, electricity, IGBT driver and so on. They are suitable for:
1.Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);
2.Where isolation is necessary between input and output (isolation voltage ≤5000VAC or 6000VDC);
3.Where do not has high requirement of line regulation and the ripple & noise of the output voltage;
Such as, medical collection isolation, high voltage collection circuit and IGBT drive circuit.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Typ.	Capacitive Load(μF)* Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	H0503S-2WR3SG	5 (4.5-5.5)	3.3	400/40	66/70	2200
	H0505S-2WR3SG		5	400/40	70/74	2200
	H0509S-2WR3SG		9	222/22	73/77	1000
	H0512S-2WR3SG		12	167/17	75/79	470
	H0515S-2WR3SG		15	133/13	78/82	470
	H1203S-2WR3SG	12 (11.8-13.2)	3.3	400/40	66/70	2200
	H1205S-2WR3SG		5	400/40	73/77	2200
	H1209S-2WR3SG		9	222/22	74/78	1000
	H1212S-2WR3SG		12	167/17	75/79	470
	H1215S-2WR3SG		15	133/13	78/82	470

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	5V input	--	541/14	606/--	mA
	12V input	--	216/10	253/--	
Surge Voltage (1sec. max.)	5V input	-0.7	--	9	VDC
	12V input	-0.7	--	18	
Reflected Ripple Current*		--	200	--	mA
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Note: * 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
Voltage Accuracy			See output regulation curve(Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3V output	--	--	±1.5	--
		Other output	--	--	±1.2	

Load Regulation	10%-100% load	--	--	20	%
Ripple & Noise*	20MHz bandwidth	--	100	180	mVp-p
Temperature Coefficient	100% full load	--	±0.02	--	%/℃
Short Circuit Protection		Continuous, self-recovery			
Note: *The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.					

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output, Test for 1 minute, the leakage current < 1mA		5000	--	--	VAC
			6000	--	--	VDC
Patient Leakage Current*	250VAC, 50/60Hz		--	--	2	μA
Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	4	--	pF
Operating Temperature	Derating when operating temperature≥85℃ (see Fig. 2)		-40	--	+105	℃
Storage Temperature			-55	--	+125	
Case Temperature Rise	Ta=25℃		--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
	Wave-soldering, max. 10 seconds		255	260	265	
Storage Humidity	Non-condensing		5	--	95	%RH
Switching Frequency	100% load, nominal input voltage	5V input	--	200	--	kHz
		12V input	--	260	--	
MTBF	MIL-HDBK-217F@25℃		19360	--	--	k hours
Creepage & Clearance Distance			5	--	--	mm
Note: * Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage.						

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 7.90x 10.16mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

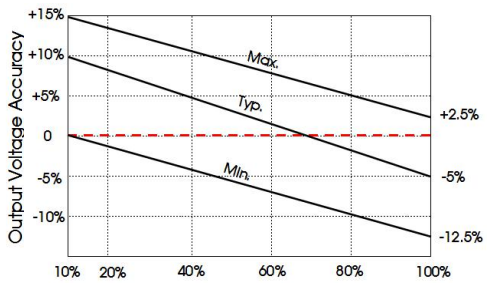
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD	EN60601-1-2 (IEC/EN61000-4-2) Air ±15kV, Contact ±8kV perf. Criteria B

Typical Characteristic Curves

3.3VDC output

Output Regulation Curve



Other output

Output Regulation Curve

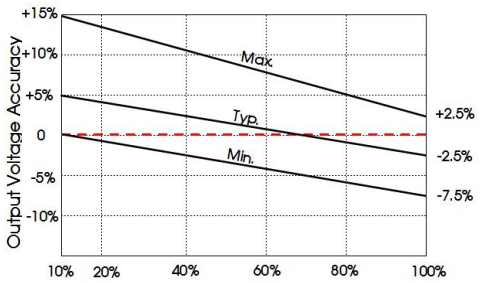


Fig. 1

Temperature Derating Curve

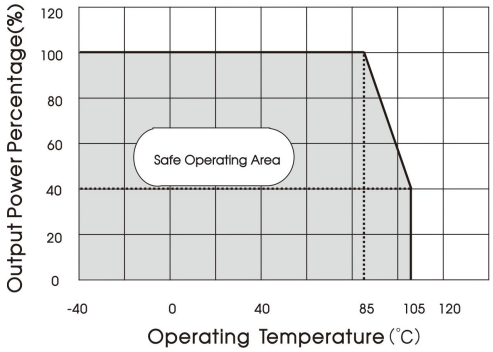


Fig. 2

Design Reference

1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat

Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	单路 Vout	Cout
5VDC	10μF/10V	3.3/5VDC	10μF/16V
12VDC	10μF/25V	9VDC	10μF/16V
--	--	12VDC	2.2μF/25V
--	--	15VDC	1μF/25V

2. EMC compliance circuit

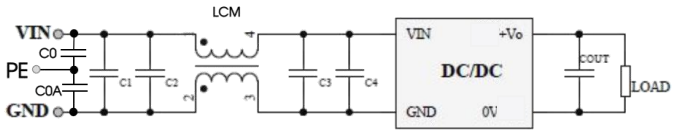


Fig. 4

EMC recommended circuit value table (Table 2)
H05_S-2WR3SG

Series		H05_2WR3
EMI	C1/C2/C3/C4	4.7μF /16V
	C0/C0A	--
	Cout	Refer to the Cout in table 1
	LCM1	FL2D-30-472

H12_S-2WR3SG

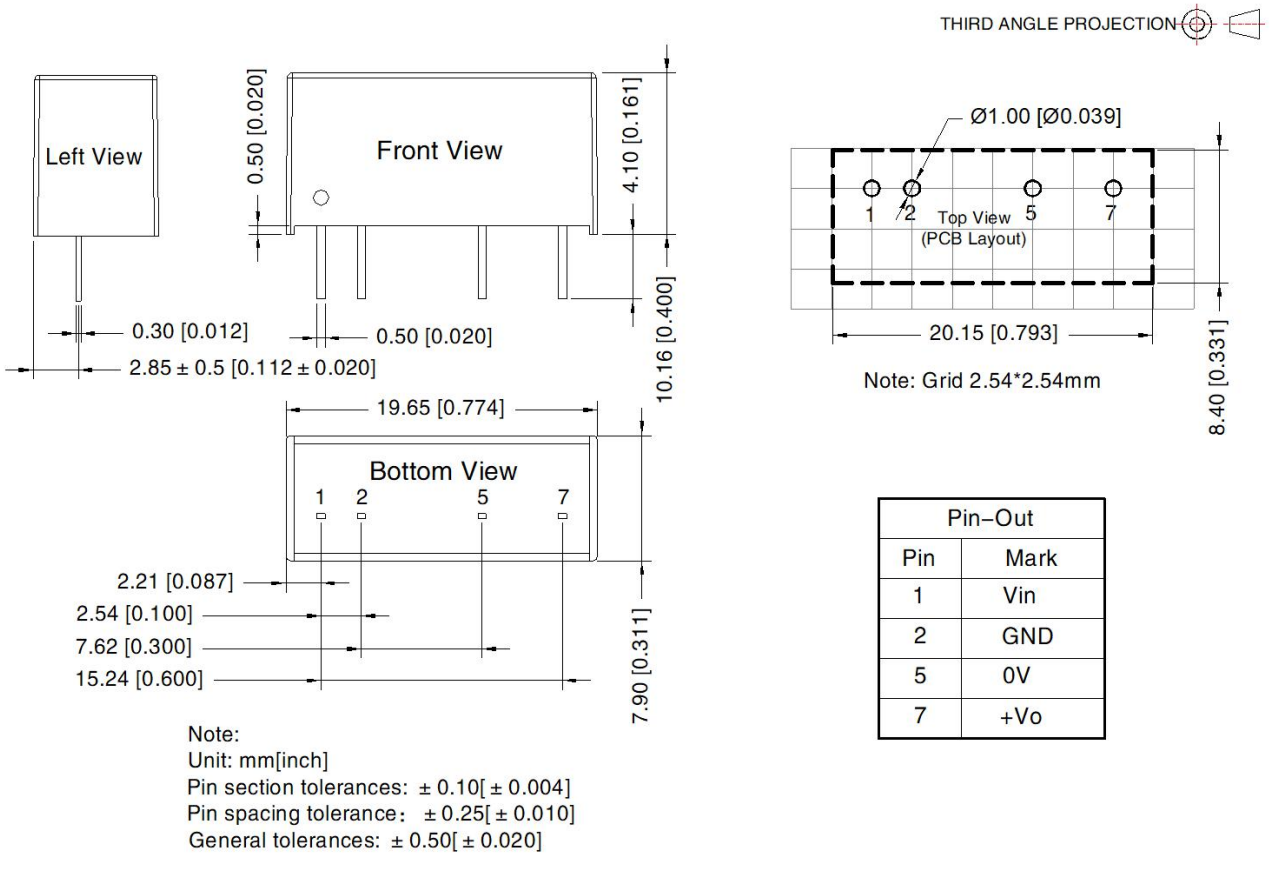
Series		Other	H1212S-2WR3SG	H1215S-2WR3SG
EMI	C1/C2/C3/C4	4.7μF /25V		
	C0/C0A	--	100pF/25V	100pF/25V
	Cout	Refer to the Cout in table 1		
	LCM1	FL2D-30-472		

3. Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

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

Dimensions and Recommended Layout



Pin-Out	
Pin	Mark
1	Vin
2	GND
5	0V
7	+Vo

Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
Pin spacing tolerance: ± 0.25[± 0.010]
General tolerances: ± 0.50[± 0.020]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200160;
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. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. 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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