

1W, Fixed input voltage, 5000VAC or 6000VDC isolated & unregulated single output



Continuous Short  
Circuit Protection

Patent Protection RoHS

### FEATURES

- 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

H\_S-1WR3SG 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:  $\pm 10\%V_{in}$ );
2. Where isolation is necessary between input and output (isolation voltage  $\leq 5000VAC$  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 (%) Min./Typ.	Capacitive Load(μF)* Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	H1203S-1WR3SG	12 (11.8-13.2)	3.3	303/31	67/71	2200
	H1205S-1WR3SG		5	200/20	73/77	2200
	H1209S-1WR3SG		9	111/11	76/80	1000
	H1212S-1WR3SG		12	84/9	74/78	470
	H1215S-1WR3SG		15	67/7	75/79	470

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	12V input	--	108/8	125/--	mA
Surge Voltage (1sec. max.)	12V input	-0.7	--	18	VDC
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
Output 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	3.3V output	--	--	20	%
		Other output	--	--	15	
Ripple & Noise*	20MHz bandwidth	3.3V output	--	100	150	mVp-p
		Other output	--	80	120	
Temperature Coefficient	100% full load		--	±0.02	--	%/℃
Output 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, with the test time of 1 minute, the leakage current < 1mA	5000	--	--	VAC
		6000	--	--	VDC
Patient Leakage Current*	250VAC, 50/60Hz	--	--	2	μA
Insulation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 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	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	5V input, 100% load	--	260	--	kHz
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

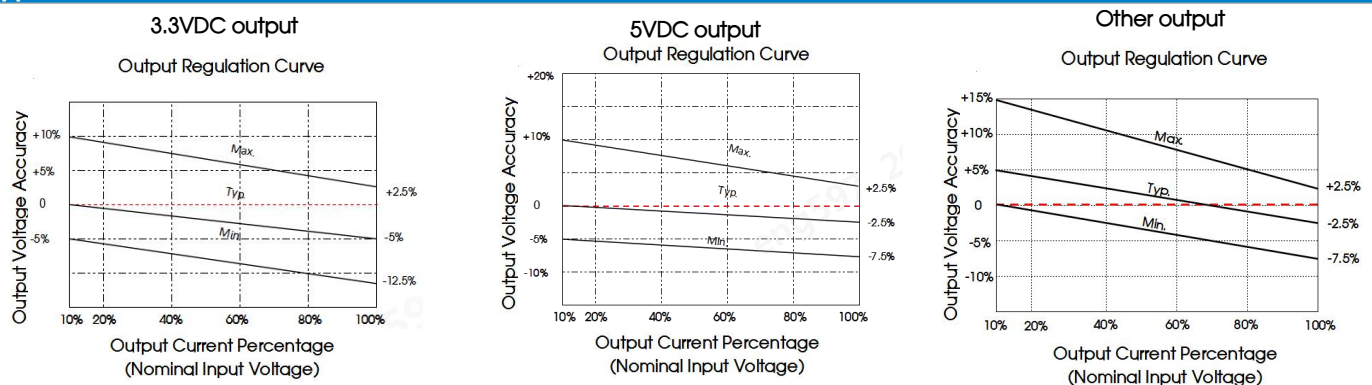
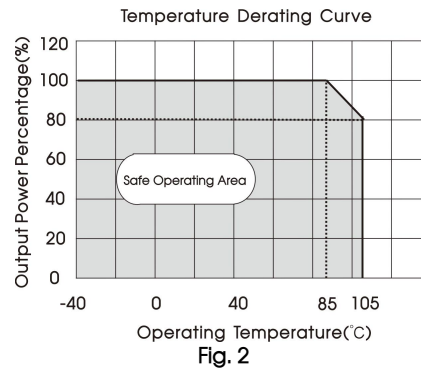


Fig. 1



## Design Reference

### 1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running well, the recommended capacitive load values as shown in Table 1.

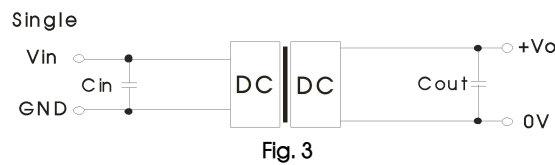
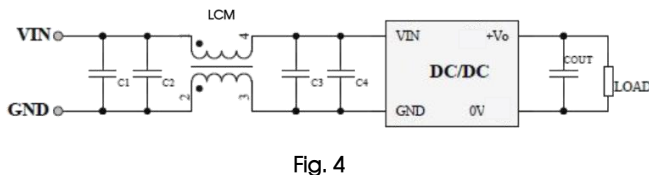


Table 1: Recommended input and output capacitor values

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

### 2. EMC compliance circuit



EMC recommended circuit value table (Table 2)

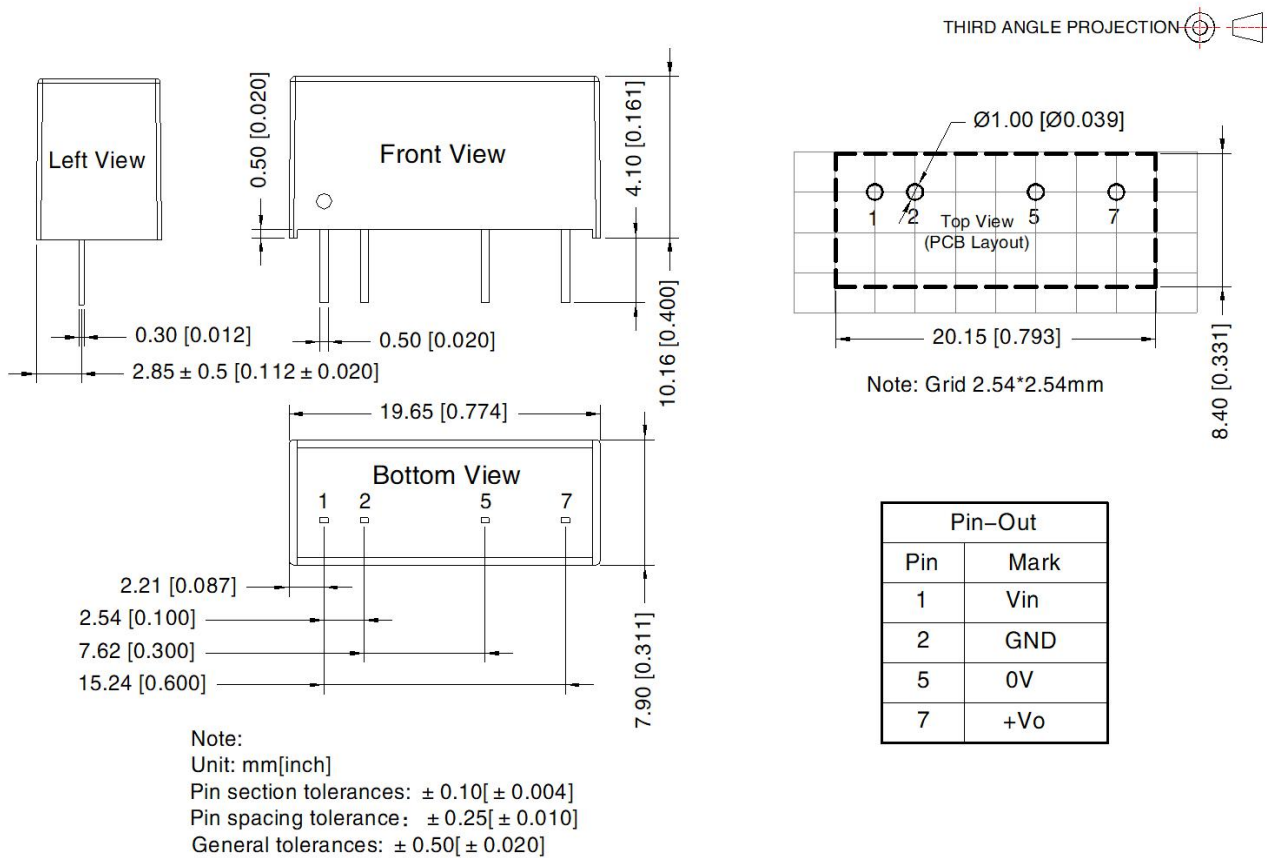
EMI	C1/C2/C3/C4	4.7μF /25V
	Cout	Refer to the Cout in table 1
	LCM1	FL2D-30-102

### 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](http://www.mornsun-power.com)

Dimensions and Recommended Layout



Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58200160 ;
- 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;
- The maximum capacitive load offered were tested at input voltage range and full load;
- 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, please contact our technicians directly for specific information;
- 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.

MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 8 Nanyun 4th Road, Huangpu District, Guangzhou, China

Tel: 86-20-38601850

Fax: 86-20-38601272

E-mail: [info@mornsun.cn](mailto:info@mornsun.cn)

[www.mornsun-power.com](http://www.mornsun-power.com)