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



Patent Protection

Continuous Short Circuit Protection

RoHS

FEATURES

- High efficiency up to 83%
- The leakage current < 2μA
- Isolation Capacitance as low as 4pF
- Creepage & Clearance Distance > 8mm
- Reinforced insulation, Isolation voltage: 5000VAC or 6000VDC
- Operating ambient temperature range: -40℃ to +105℃
- Continuous short circuit protection

H_WS-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 (%) Min./Typ.	Capacitive Load(μF)* Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	H0503WS-2WR3SG	5 (4.5-5.5)	3.3	400/40	66/70	2200
	H0505WS-2WR3SG		5	400/40	70/74	2200
	H0509WS-2WR3SG		9	222/22	73/77	1000
	H0512WS-2WR3SG		12	167/17	75/79	470
	H0515WS-2WR3SG		15	133/13	78/82	470
	H1203WS-2WR3SG	12 (10.8-13.2)	3.3	400/40	66/70	2200
	H1205WS-2WR3SG		5	400/40	73/77	2200
	H1209WS-2WR3SG		9	222/22	74/78	1000
	H1212WS-2WR3SG		12	167/17	75/79	470
	H1215WS-2WR3SG		15	133/13	78/82	470
	H2405WS-2WR3SG	24 (21.6-26.4)	5	400/40	73/77	2200
	H2409WS-2WR3SG		9	222/22	75/79	1000
	H2412WS-2WR3SG		12	167/17	78/82	470
	H2415WS-2WR3SG		15	133/13	79/83	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/--	
	24V input	--	108/7	115/--	
Surge Voltage (1sec. max.)	5V input	-0.7	--	9	VDC
	12V input	-0.7	--	18	
	24V input	-0.7	--	30	
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.

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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		--	--	20	%
Ripple & Noise*	20MHz bandwidth		--	100	180	mVp-p
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
Leakage Current①	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 Temperature②	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
	Wave soldering,10 seconds		255	260	265	
Storage Humidity	Non-condensing		5	--	95	%RH
Switching Frequency	100% load, nominal input voltage	5V input	--	200	--	kHz
		12V/24V input	--	260	--	
MTBF	MIL-HDBK-217F@25℃		19360	--	--	k hours
Creepage & Clearance Distance			8	--	--	mm

Note: ① Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage.
②The pin resistance temperature is not the actual set temperature of the soldering iron, but the temperature required for a good solder joint. The actual set temperature by the customer needs to be determined based on the thickness of the PCB, the size of the copper cladding, the power of the soldering iron, and the selection of the soldering iron tip.

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

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Typical Characteristic Curves

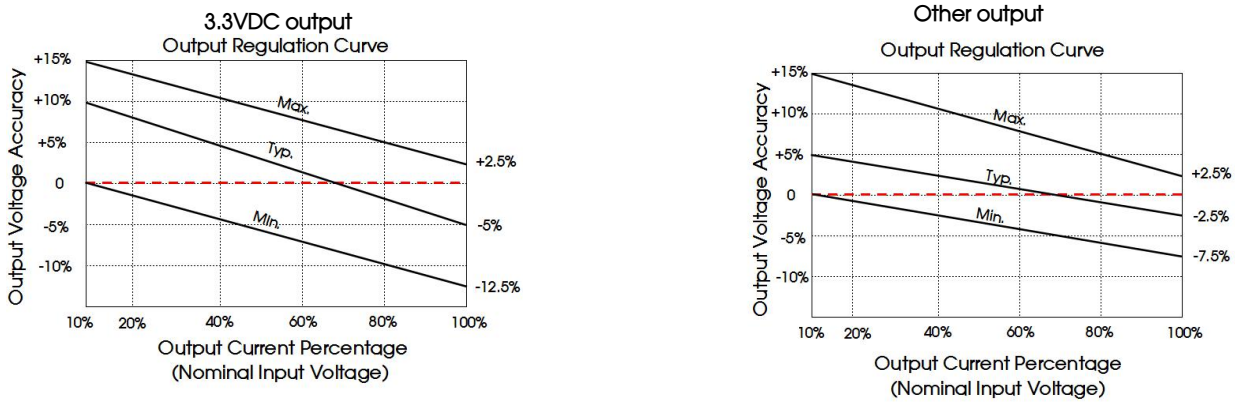

Fig. 1

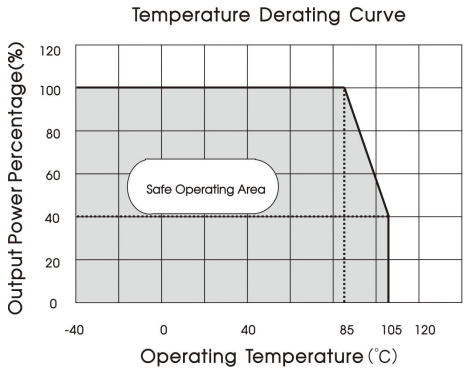

Fig. 2

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 ensured the modules running well, the recommended capacitive load values as shown in Table 1.



Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout
5VDC	10μF/10V	3.3/5VDC	10μF/16V
12VDC	10μF/25V	9VDC	10μF/16V
24VDC	2.2uF/50V	12VDC	2.2μF/25V
--	--	15VDC	1μF/25V

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2. EMC compliance circuit

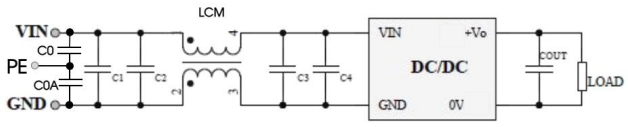

Fig. 4

EMC recommended circuit value table (Table 2)
H05_WS-2WR3SG

Input voltage		H05_WS-2WR3SG
EMI	C1/C2/C3/C4	4.7μF /16V
	C0/C0A	--
	Cout	Refer to the Cout in table 1
	LCM1	FL2D-30-472

H12_WS-2WR3SG

Series		Other	H1212WS-2WR3SG	H1215WS-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		

H24_WS-2WR3SG

Series		Other	H2412S-2WR3SG	H2415S-2WR3SG
EMI	C1/C2/C3/C4	4.7μF /50V		
	C0/C0A	--	100pF/50V	100pF/50V
	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

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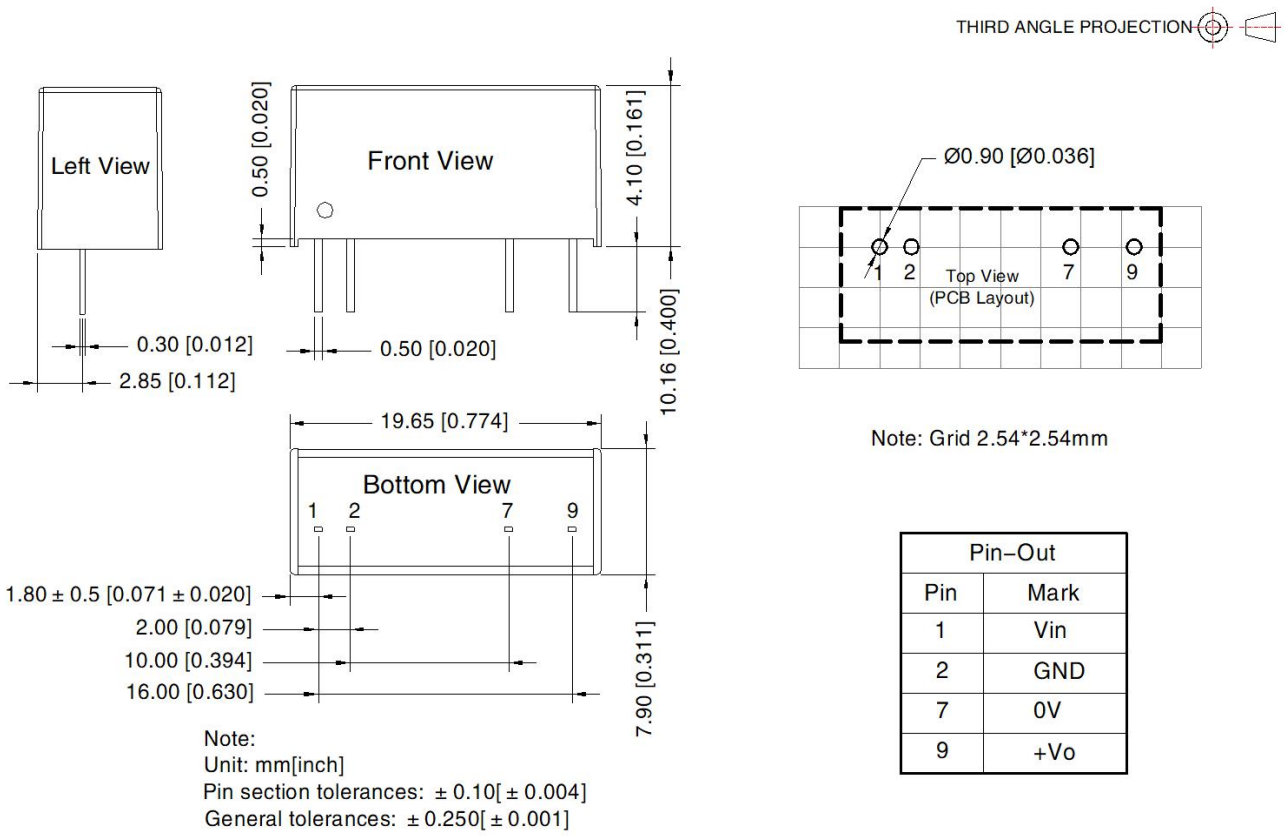
Dimensions and Recommended Layout



Pin–Out	
Pin	Mark
1	Vin
2	GND
7	0V
9	+Vo

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, operating altitude within 2000m, 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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