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

Patent Protection

3 years Warranty

Continuous Short Circuit Protection

CE Report EN 60601-1

UKCA Report BS EN 60601-1

RoHS

FEATURES

- High efficiency up to 85%
- 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
- Meet IEC60601 standards

G_WS-2WR3 & H_WS-2WR3(G) 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.		
--	H0505WS-2WR3G	5 (4.5-5.5)	5	400/40	77	2200
	H0509WS-2WR3G		9	222/22	78	1000
	H0512WS-2WR3G		12	167/17	80	470
	H0515WS-2WR3G		15	133/13	83	470
	H0524WS-2WR3G		24	83/8	85	220
--	G1203WS-2WR3	12 (10.8-13.2)	±3.3	±303/±30	69/73	1000
EN/BS EN	G1205WS-2WR3		±5	±200/±20	76/80	1000
	G1209WS-2WR3		±9	±111/±11	78/82	470
	G1212WS-2WR3		±12	±83/±9	79/83	220
	G1215WS-2WR3		±15	±67/±7	80/84	220
--	G1224WS-2WR3		±24	±42/±5	79/83	220
	H1203WS-2WR3		3.3	400/40	74/78	1000
EN/BS EN	H1205WS-2WR3		5	400/40	76/80	1000
	H1209WS-2WR3		9	222/22	78/82	680
	H1212WS-2WR3		12	167/17	80/84	470
	H1215WS-2WR3		15	133/14	80/84	470
--	H1224WS-2WR3		24	84/8	77/81	470
	G1505WS-2WR3	15 (13.5-16.5)	±5	±200/±20	74/78	1000
	G1509WS-2WR3		±9	±111/±11	76/80	470
	G1515WS-2WR3		±15	±67/±7	76/80	220
	H1505WS-2WR3		5	400/40	76/80	1000
	H1515WS-2WR3		15	133/14	79/83	470

--	G2403WS-2WR3	24 (21.6-26.4)	±3.3	±303/±30	69/73	1000
EN/BS EN	G2405WS-2WR3		±5	±200/±20	75/79	1000
	G2409WS-2WR3		±9	±111/±11	77/81	470
	G2412WS-2WR3		±12	±83/±9	78/82	220
	G2415WS-2WR3		±15	±67/±7	77/81	220
--	G2424WS-2WR3		±24	±42/±5	70/74	220
EN/BS EN	H2405WS-2WR3	24 (21.6-26.4)	5	400/40	75/79	2200
	H2409WS-2WR3		9	222/22	77/81	680
	H2412WS-2WR3		12	167/17	78/82	470
	H2415WS-2WR3		15	133/14	80/84	470
	H2424WS-2WR3		24	83/9	80/84	220

Note: *The capacitive loads of positive and negative outputs are identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	5V input	--	530/20	560/--	mA
	12V input	--	228/15	242/--	
	15V input	--	167/15	176/--	
	24V input	--	114/15	121/--	
Surge Voltage (1sec. max.)	5V input	-0.7	--	9	VDC
	12V input	-0.7	--	18	
	15V input	-0.7	--	21	
	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.

Output Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Output Voltage Accuracy				See output regulation curve(Fig. 1)			
Linear Regulation	Input voltage change: ±1%	5V Input	5V output	--	±1.2	±1.5	--
			Other output	--	--	±1.2	
		Other input	3.3V output	--	--	1.5	
			Other output	--	--	1.2	
Load Regulation	10%-100% load		3.3V/5V output	--	--	20	%
			Other output	--	--	15	
Ripple & Noise*	20MHz bandwidth	5V Input	Other output	--	100	150	mVp-p
			24V output	--	120	180	
		Other input	3.3V/5V output	--	100	150	
			Other output	--	80	120	
Temperature Coefficient	100% full load		5V Input	--	±0.1	--	%/℃
			Other input	--	±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 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℃	5V Input	--	35	--	
		Other input	--	25	--	
Pin Soldering Resistance Temperature	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		--	200	--	kHz
MTBF	MIL-HDBK-217F@25℃	5V Input	3500	--	--	k hours
		Other input	19360	--	--	
Creepage & Clearance Distance			8	--	--	mm
Operating altitude			--	--	5000	m

Note: * Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage.

Mechanical Specifications

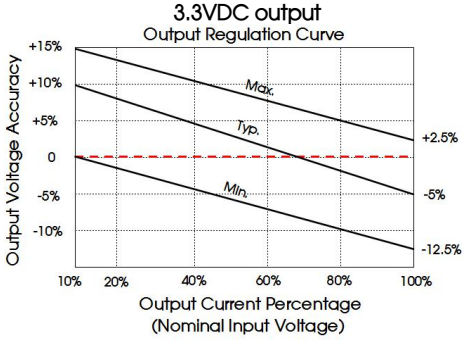
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.50 x 9.80 x 12.50 mm
Weight	4.0g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

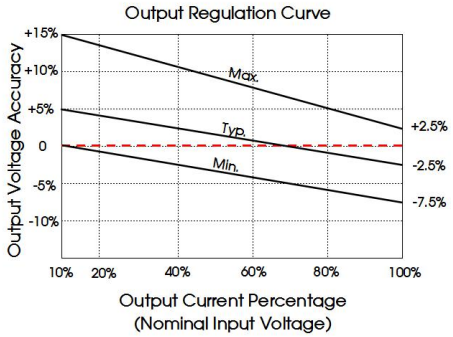
Emissions	CE	Others	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
		G15_WS-2WR3, G24_WS-2WR3	CISPR32/EN55032 CLASS A (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS A (see Fig. 4 for recommended circuit)
	RE	Others	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
		G15_WS-2WR3, G24_WS-2WR3	CISPR32/EN55032 CLASS A (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS A (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



5VDC input, 12/15/24VDC input 5VDC output



12/15/24VDC input other output

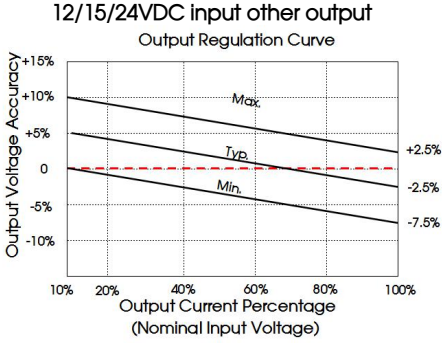


Fig. 1

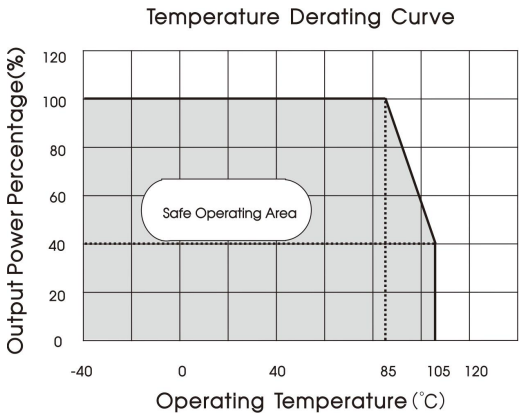


Fig. 2

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.

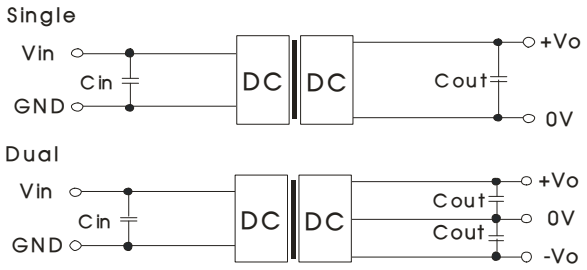


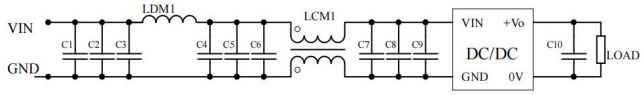
Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout
5VDC	10μF/25V	3.3/5VDC	10μF/16V	±3.3VDC	4.7μF/16V
12VDC	10μF/25V	9VDC	10μF/16V	±5/±9VDC	4.7μF/16V
15VDC	4.7μF/25V	12VDC	2.2μF/25V	±12/±15VDC	1μF/25V
24VDC	2.2μF/50V	15VDC	1μF/25V	--	--
--	--	24VDC	0.47μF/50V	--	--

2. EMC compliance circuit

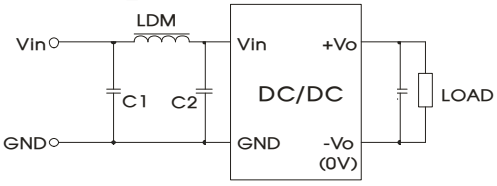
5V input



EMC recommended circuit value table (Table 2)

Input voltage		5 VDC
EMI	C1、C2、C3	22μF /50V
	C4、C5、C6	
	C7、C8、C9	
	C10	Refer to the Cout in table 1
	LDM1	120uH
	LCM1	4.7mH（FL2D-30-472）

G15_WS-2WR3/G24_WS-2WR3 (CLASS A)



Series		G15_WS-2WR3	G24_WS-2WR3		
Output voltage VDC		--	others	3.3V	24V
EMI	C1/C2	4.7μF /50V	4.7μF /50V		
	Cout	Refer to the Cout in table 1			
	LDM	22μH (Nickel zinc inductance)	FL2D-Z5-140		

(Except H1203WS-2WR3/H1224WS-2WR3/G1203WS-2WR3/G1224WS-2WR3)

H12_WS-2WR3/G12_WS-2WR3/H15_WS-2WR3/H24_WS-2WR3 (CLASS B)

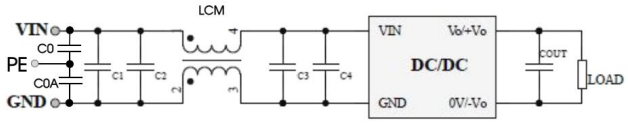


Fig. 4

Series		H12_WS-2WR3	G12_WS-2WR3	H15_WS-2WR3	H24_WS-2WR3	
Output voltage VDC		--	--	--	others	24V
	C0/C0A	--				
EMI	C1/C2	4.7μF /50V				
	C3	4.7μF /50V				100μF /50V
	C4	4.7μF /50V				--
	COUT	Refer to the Cout in table 1				
	LCM	22μH (Nickel zinc inductance)				

Series		H1203WS-2WR3	H1224WS-2WR3	G1203WS-2WR3	G1224WS-2WR3
EMI	C0/C0A	4.7μF /50V			
	C1/C2	4.7μF /50V			
	C3	4.7μF /50V			
	C4	4.7μF /50V			
	COUT	Refer to the Cout in table 1			
	LCM	FL2D-Z5-140			

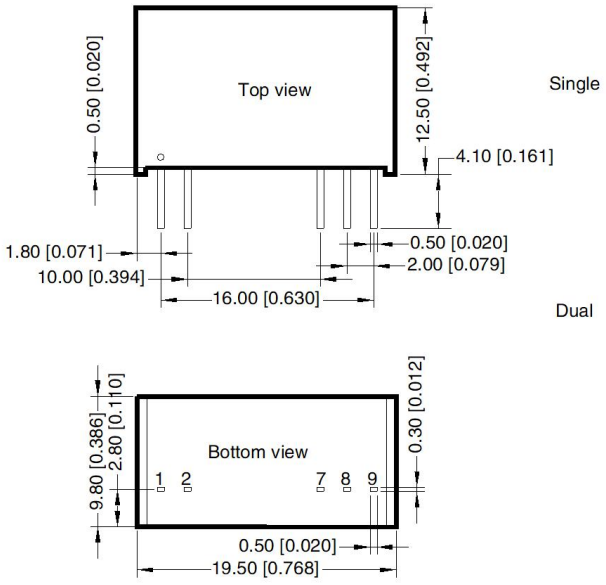
3. Minimum Output Load Requirement

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.

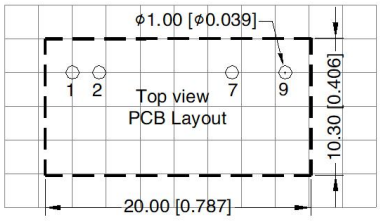
4. For additional information, please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

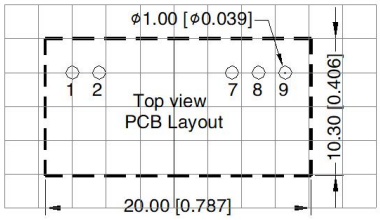
THIRD ANGLE PROJECTION



Single



Dual



Note: Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
7	0V	–Vo
8	No Pin	0V
9	+Vo	+Vo

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

Notes:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200013;
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.

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 www.mornsun-power.com