

2W isolated DC-DC converter  
Fixed input voltage, unregulated dual or single output



### FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 86%
- High power density
- I/O isolation test voltage 3k VDC
- Industry standard pin-out
- EN62368 approved
- Meets UL62368

CE Patent Protection RoHS



*E\_D-2WR3 & F\_D-2WR3 series are specially designed for applications where an (two) isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.*

### Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load*( $\mu$ F) Max.			
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.					
CE	E1203D-2WR3	12 (10.8-13.2)	$\pm 3.3$	$\pm 303/\pm 30$	71/75	1200			
	E1205D-2WR3		$\pm 5$	$\pm 200/\pm 20$	76/80				
	E1212D-2WR3		$\pm 12$	$\pm 83/\pm 8$	79/83				
	E1215D-2WR3		$\pm 15$	$\pm 67/\pm 7$	79/83				
--	E1224D-2WR3		12 (10.8-13.2)	$\pm 24$	$\pm 42/\pm 4$	81/85	100		
	F1205D-2WR3			5	400/40	78/82	2400		
	F1209D-2WR3			9	222/23	78/82	1200		
	F1212D-2WR3			12	167/17	80/84	560		
	F1215D-2WR3			15	133/13	81/85			
	F1224D-2WR3			24	83/8	82/86	220		
	--			E1509D-2WR3	15 (13.5-16.5)	$\pm 9$	$\pm 111/\pm 11$	77/81	560
				E1512D-2WR3		$\pm 12$	$\pm 83/\pm 8$	77/81	220
		E1515D-2WR3		$\pm 15$		$\pm 67/\pm 7$	77/81		
		F1505D-2WR3		5		400/40	75/79	2400	
F1509D-2WR3		9	222/23	78/82		1200			
F1515D-2WR3		15	133/13	75/79		560			
CE	E2405D-2WR3	24 (21.6-26.4)	$\pm 5$	$\pm 200/\pm 20$	74/80	1200			
--	E2412D-2WR3		$\pm 12$	$\pm 83/\pm 8$	79/83	220			
CE	E2415D-2WR3		$\pm 15$	$\pm 67/\pm 7$	77/83				
--	E2424D-2WR3		24 (21.6-26.4)	$\pm 24$	$\pm 42/\pm 4$	80/84	100		
	F2405D-2WR3			5	400/40	76/80	2400		
	F2409D-2WR3			9	222/23	76/80	1200		
	F2412D-2WR3			12	167/17	80/84	560		
	F2415D-2WR3			15	133/13	82/86			
	F2424D-2WR3			24	83/8	82/86	220		

Note: \* The specified maximum capacitive load for positive and negative output is identical.

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12V input	--	208/8	219/--	mA
	15V input	--	169/8	178/--	

	24V input	--	104/8	113--	
Reflected Ripple Current		--	15	--	mA
Surge Voltage (1sec. max.)	12V input	-0.7	--	18	VDC
	15V input	-0.7	--	21	
	24V input	-0.7	--	30	
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

### Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	See output regulation curve (Fig. 1)					
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	±1.5	--
		Others	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	15	20	%
		5VDC output	--	7	15	
		9VDC output	--	5	10	
		12VDC output	--	5	10	
		15VDC output	--	4	10	
		24VDC output	--	3	10	
Ripple & Noise*	20MHz bandwidth	Others	--	75	180	mVp-p
		24VDC output	--	75	200	
Temperature Coefficient	Full load		--	±0.02	--	%/°C
Short-circuit Protection	Continuous, self-recovery					

Notes: \* 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 Voltage	Input-output Electric strength test for 1 minute with a leakage current of 1mA max.	3000	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature ≥ 85°C ( see Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C	--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Storage Humidity	Non-condensing	5	--	95	%RH
Vibration		10-150Hz, 5G, 0.75mm, along X, Y and Z			
Switching Frequency	100% load, nominal input voltage	--	260	--	kHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours

### Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	20.32 x 10.16 x 8.20mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

Emission	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV ,Contact ±6kV perf. Criteria B

Note: Refer to Figure 4 for recommended circuit test.

Typical Characteristic Curves

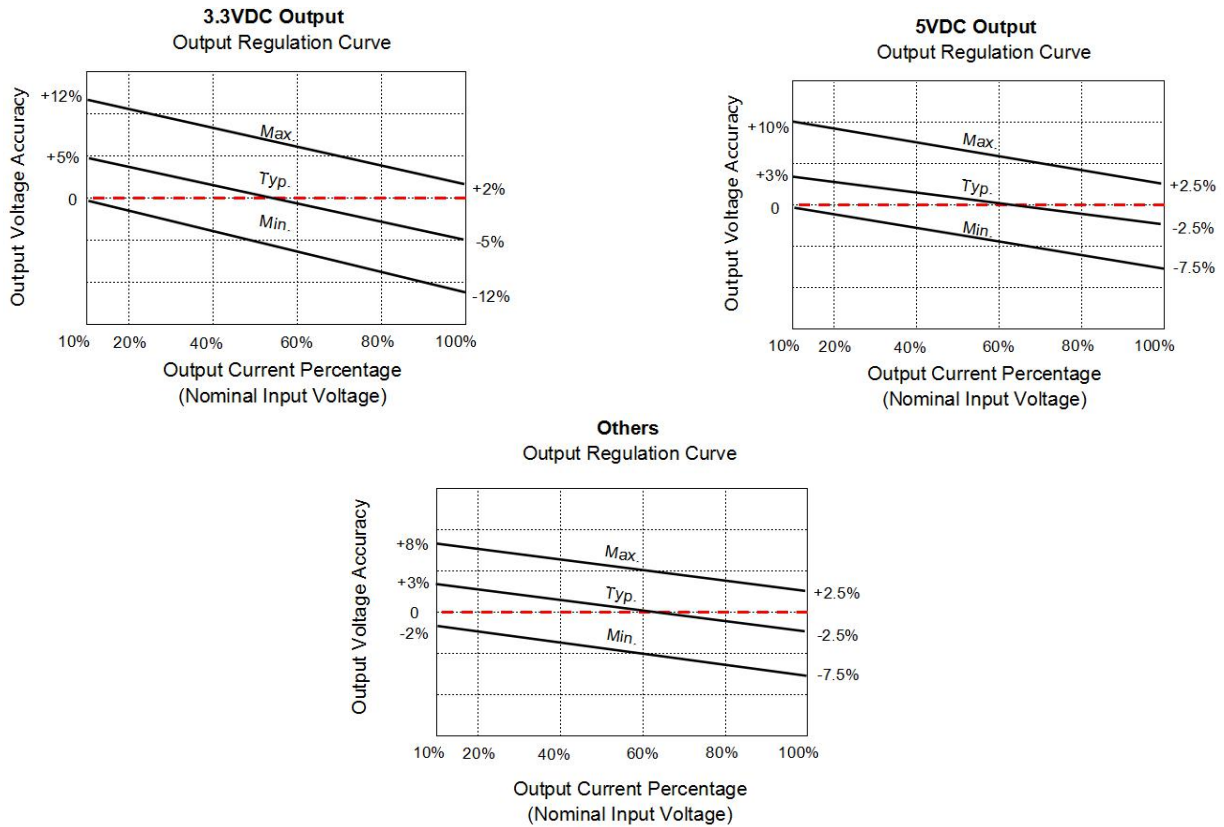


Fig. 1

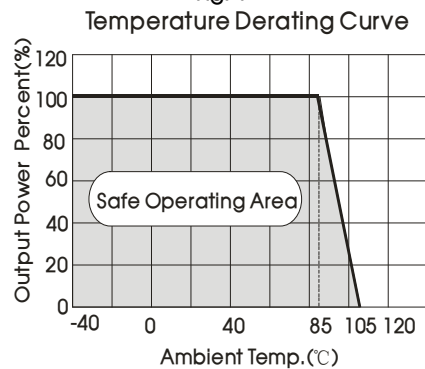


Fig. 2

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.

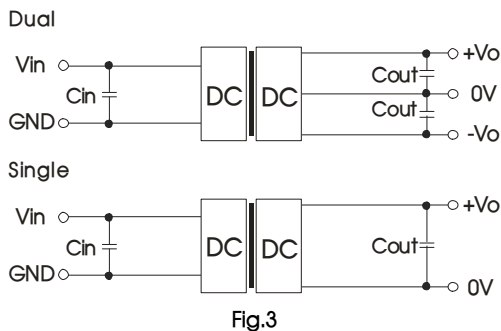


Fig.3

Table 1: Recommended input and output capacitor values

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

Note: \*The capacitor value of the positive and the negative output is identical.

2. EMC compliance circuit

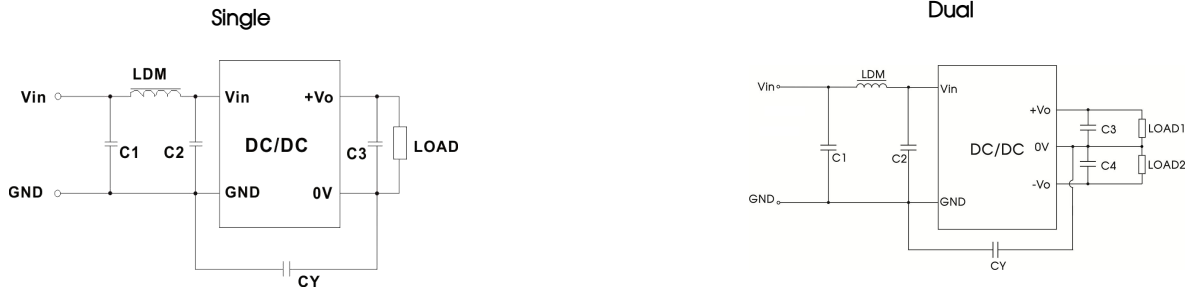
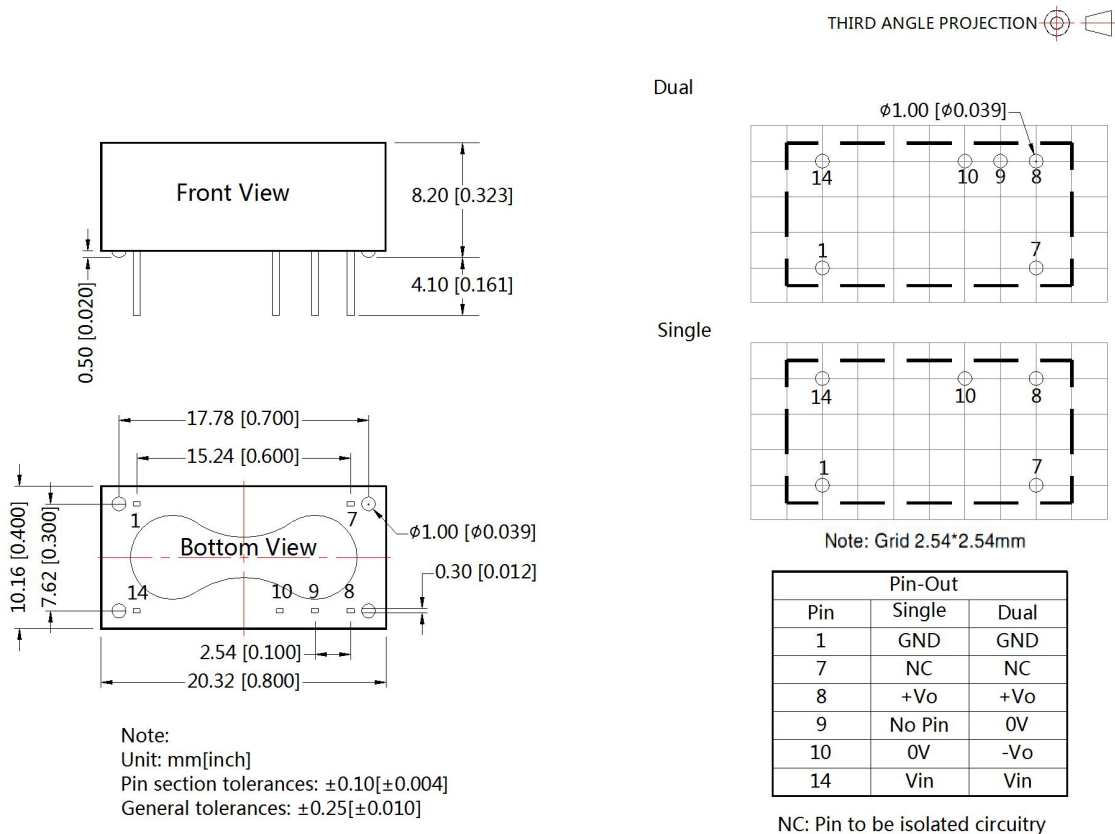


Fig.4

Input voltage		12/15/24VDC
Emissions	C1/C2	4.7μF/50V
	CY	270pF/3kV
	C3/C4	Refer to the Cout in Fig.3
	LDM	6.8μH

3. 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:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58200009;
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  $T_a=25^{\circ}\text{C}$ , 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.

## MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. 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)