

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



CE Report **UKCA** Report Patent Protection **RoHS**
EN 62368-1 BS EN 62368-1

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.

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

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.		
--	E0503D-2WR3	5 (4.5-5.5)	±3.3	±303/±30	74/78	1200
	E0505D-2WR3		±5	±200/±20	80/84	1200
	E0509D-2WR3		±9	±111/±11	81/85	470
	E0512D-2WR3		±12	±83/±8	81/85	220
	E0515D-2WR3		±15	±67/±7	82/86	220
	E0524D-2WR3		±24	±42/±4	82/86	100
EN/BS EN	F0503D-2WR3	5 (4.5-5.5)	3.3	400/40	74/78	2400
	F0505D-2WR3		5	400/40	80/84	2400
	F0509D-2WR3		9	222/22	81/85	1000
	F0512D-2WR3		12	167/17	81/85	560
	F0515D-2WR3		15	133/13	82/86	560
	F0524D-2WR3		24	83/8	82/86	220
EN/BS EN	E1203D-2WR3	12 (10.8-13.2)	±3.3	±303/±30	71/75	1200
	E1205D-2WR3		±5	±200/±20	76/80	
	E1212D-2WR3		±12	±83/±8	79/83	220
	E1215D-2WR3		±15	±67/±7	79/83	
--	E1224D-2WR3	12 (10.8-13.2)	±24	±42/±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)	±9	±111/±11	77/81	560
	E1512D-2WR3		±12	±83/±8	77/81	220
	E1515D-2WR3		±15	±67/±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
EN/BS EN	E2405D-2WR3	24 (21.6-26.4)	±5	±200/±20	74/80	1200
--	E2412D-2WR3	24 (21.6-26.4)	±12	±83/±8	79/83	220

EN/BS EN	E2415D-2WR3	24 (21.6-26.4)	±15	±67/±7	77/83	220
	E2424D-2WR3		±24	±42/±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)	5V input	3.3VDC output	--	513/8	541/--	mA
		5VDC output	--	477/8	500/--	
		9/12VDC output	--	471/8	494/--	
		15/24VDC output	--	466/8	488/--	
	12V input	3.3VDC output	--	222/8	235/--	
		5VDC output	--	203/8	214/--	
		12VDC output	--	198/8	208/--	
		15VDC output	--	196/8	206/--	
		24VDC output	--	194/8	203/--	
	15V input	5/15VDC output	--	169/8	178/--	
		9VDC output	--	163/8	171/--	
	24V input	5/9VDC output	--	104/8	110/--	
		12VDC output	--	99/8	104/--	
		15/24VDC output	--	97/8	102/--	
Reflected Ripple Current			--	15	--	mA
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	
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%		3.3VDC output	--	--	±1.5	--
			Others	--	--	±1.2	
Load Regulation	10%-100% load	5V input	3.3VDC output	--	11	20	%
			5VDC output	--	10	15	
			9/12/15VDC output	--	8	10	
			24VDC output	--	6	10	
		12/15/24V input	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	5V input		--	75	200	mVp-p
		12/15/24V input	Others	--	75	180	
			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 Wave-soldering, max. 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	5V input	--	220	kHz
		12/15/24V input	--	260	
MTBF	MIL-HDBK-217F@25°C	3500	--	--	k hours

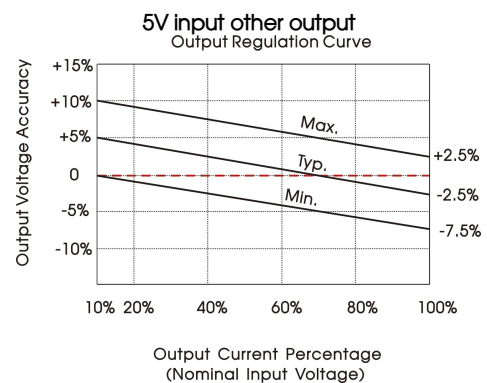
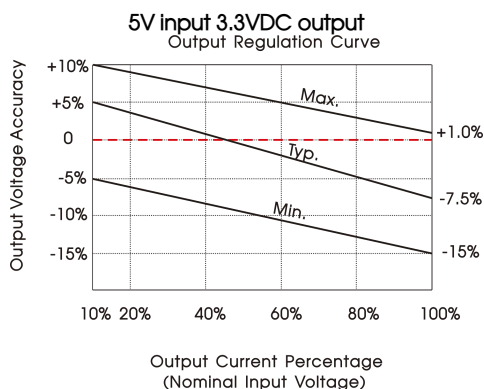
Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-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 Fig. 4 for recommended circuit test.			

Typical Characteristic Curves



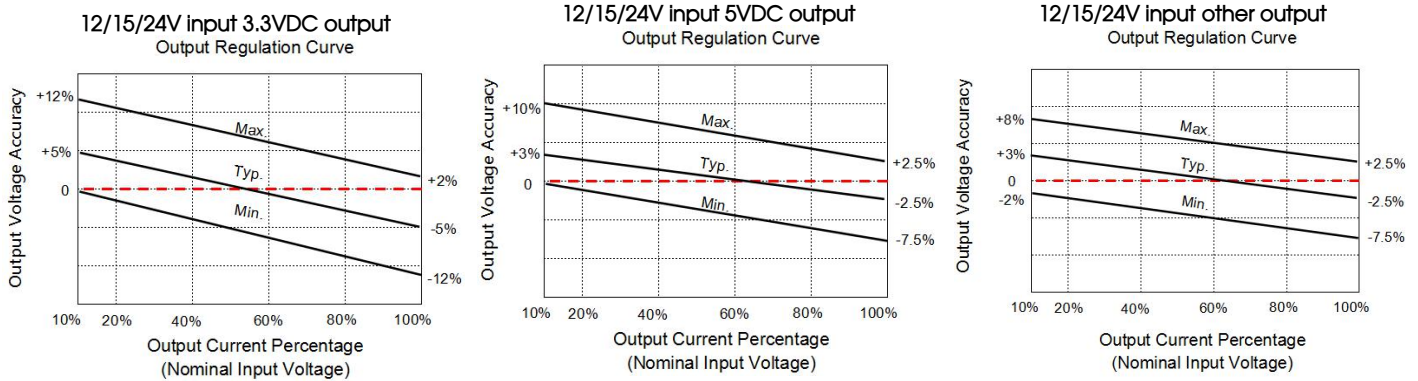


Fig. 1

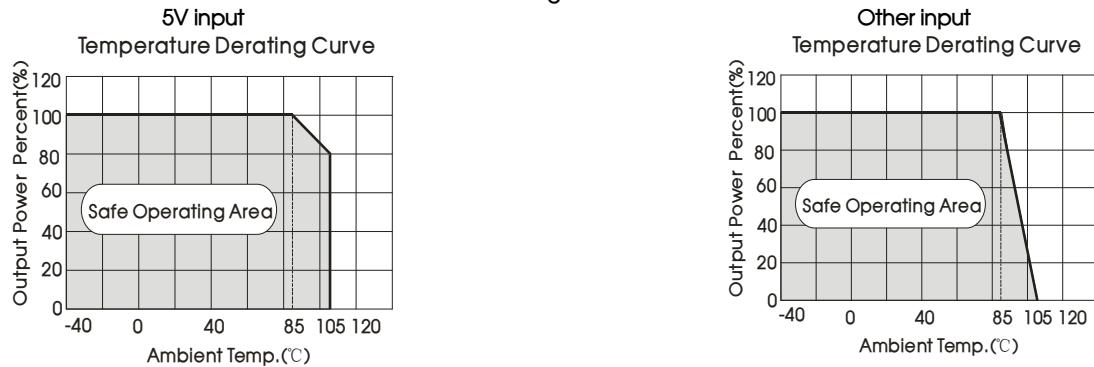
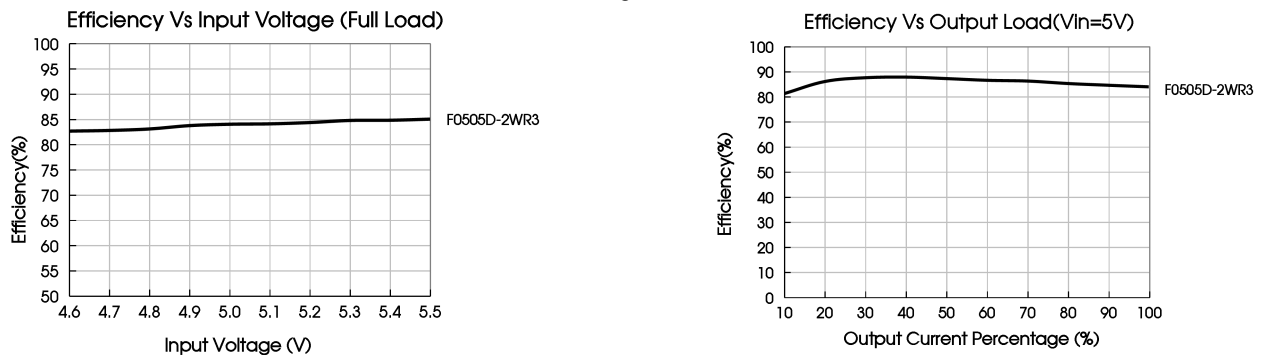


Fig. 2



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.

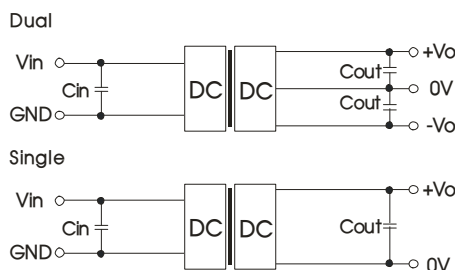


Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout*	Dual Vout	Cout*
5VDC	4.7μF/16V	3.3VDC	10μF/16V	±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	±9/±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

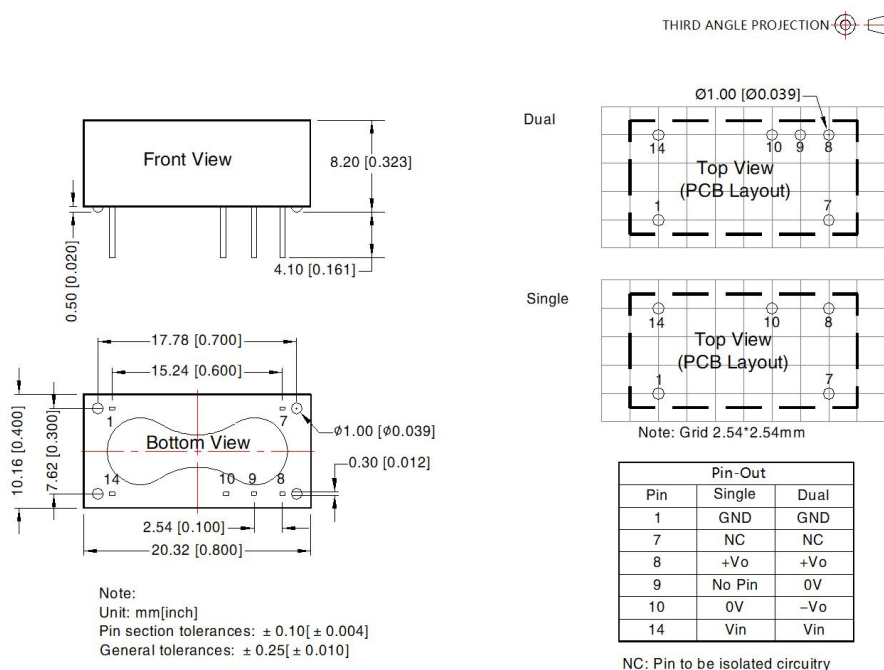


Fig. 4

Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7μF/16V	4.7μF /50V
	CY	270pF/4kV	270pF /3kV
	C3/C4	Refer to the Cout in Fig.3	Refer to the Cout in Fig. 3
	LDM	6.8μH	6.8μH

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

Dimensions and Recommended Layout



Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. The Packaging bag number of Horizontal packaging: 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. 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