

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

Patent Protection RoHS



E05_D-2WR3 & F05_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*(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
	F0503D-2WR3		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

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)	5VDC input	3.3VDC output	--	513/8	541/--	mA
		5VDC output	--	477/8	500/--	
		9VDC/12VDC output	--	471/8	494/--	
		15VDC/24VDC output	--	466/8	488/--	
Reflected Ripple Current*		--	15	--		
Surge Voltage (1sec. max.)		-0.7	--	9	VDC	
Input Filter		Capacitance filter				
Hot Plug		Unavailable				

Note: * Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

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	--

Linear Regulation	Input voltage change: $\pm 1\%$	5VDC/9VDC/12VDC/ 15VDC/24VDC output	--	--	± 1.2	--
Load Regulation	10%-100% load	3.3VDC output	--	11	20	%
		5VDC output	--	10	15	%
		9VDC/12VDC/15VDC output	--	8	10	
		24VDC output	--	6	10	
Ripple & Noise*	20MHz bandwidth		--	75	200	mVp-p
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	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 $\geq 85^\circ\text{C}$, (see Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	T _a =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	--	220	--	kHz
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)

Emissions	CE	CISPR32/EN55032	CLASS B(see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032	CLASS B(see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Air $\pm 8\text{kV}$, Contact $\pm 6\text{kV}$ perf. Criteria B

Typical Characteristic Curves

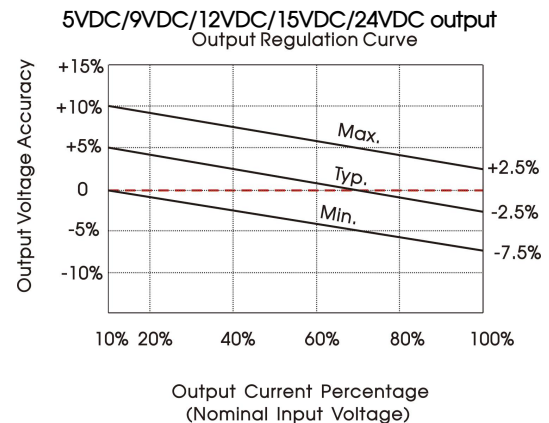
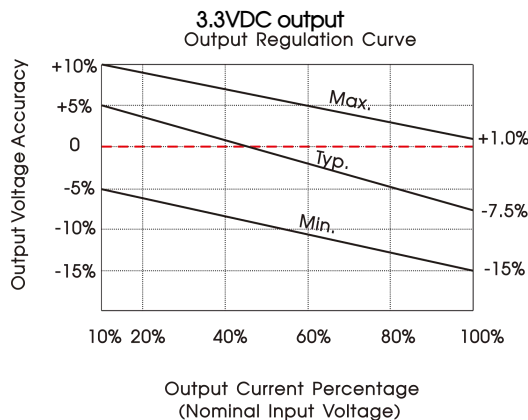
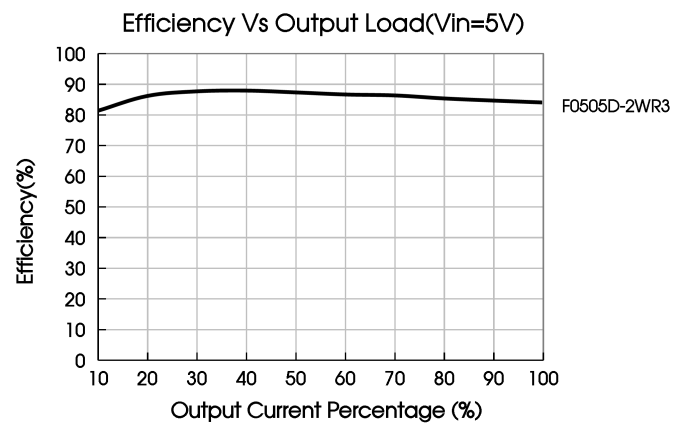
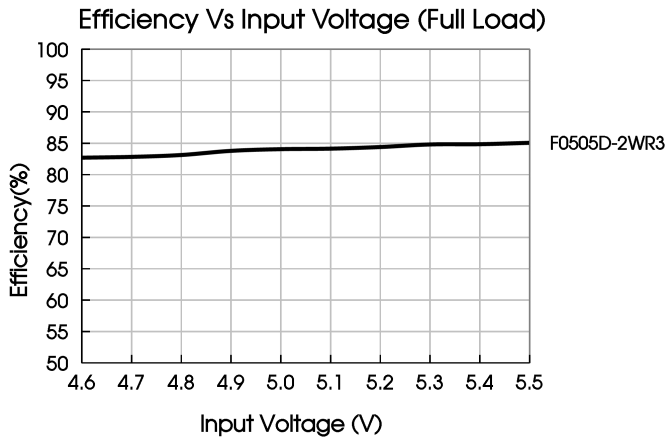
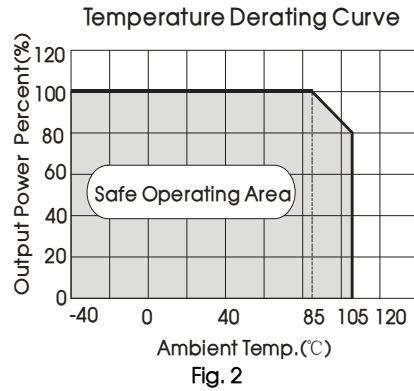


Fig. 1



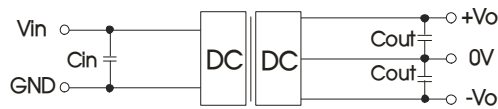
Design Reference

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.

Dual Output



Single Output

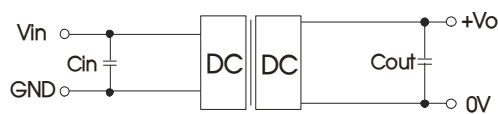


Fig.3

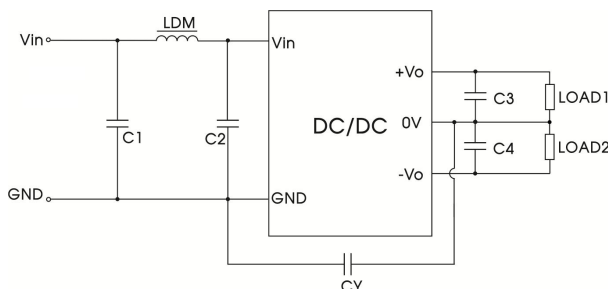
Table 1: Recommended input and output capacitor values

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

Dual Output



Single Output

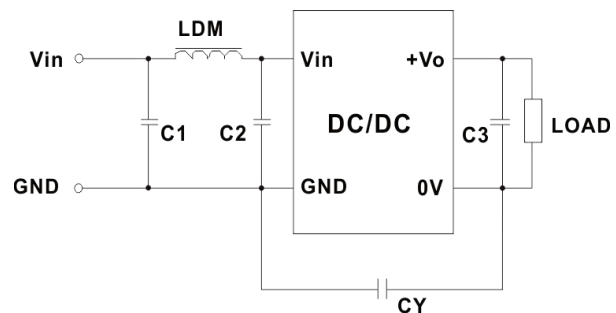
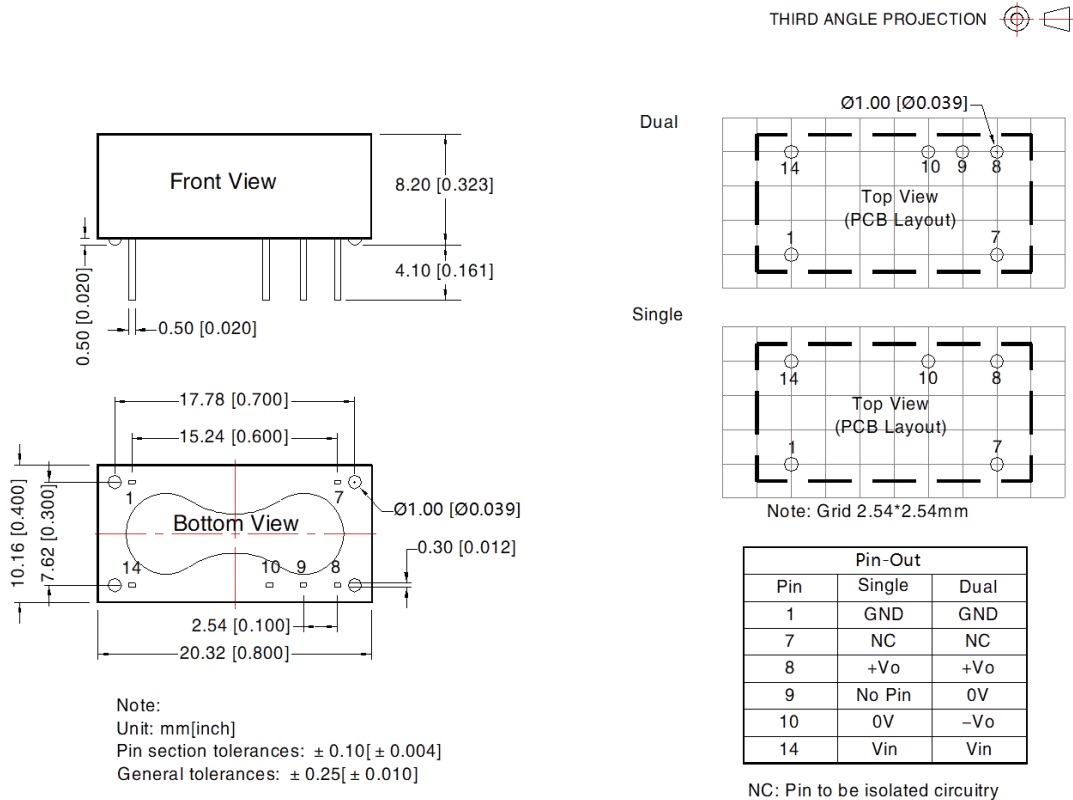


Fig. 4

Input voltage		5VDC
Emissions	C1, C2	4.7μF/16V
	CY	270pF/4kV
	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

Dimensions and Recommended Layout



Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200009;
- 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 Ta=25°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.

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