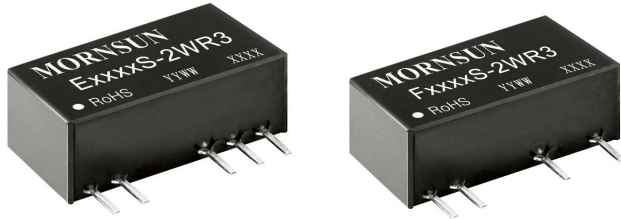


2W isolated DC-DC converter  
Fixed input voltage, unregulated dual/ single output



Patent Protection RoHS

E05\_S-2WR3 & F05\_S-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.		
--	E0503S-2WR3	5 (4.5-5.5)	±3.3	±303/±30	71/75	1200
	E0505S-2WR3		±5	±200/±20	80/84	1200
	E0509S-2WR3		±9	±111/±11	81/85	470
	E0512S-2WR3		±12	±83/±8	81/85	220
	E0515S-2WR3		±15	±67/±7	82/86	220
	E0524S-2WR3		±24	±42/±4	82/86	100
	F0503S-2WR3		3.3	400/40	74/78	2400
	F0505S-2WR3		5	400/40	80/84	2400
	F0507S-2WR3		7.2	278/28	80/84	1000
	F0509S-2WR3		9	222/22	81/85	1000
	F0512S-2WR3		12	167/17	81/85	560
	F0515S-2WR3		15	133/13	82/86	560
	F0524S-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	--	534/8	564/--	mA
		5VDC/7.2VDC 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	--
		5VDC/7.2VDC/9VDC/12VDC/15VDC/24VDC output	--	--	±1.2	

Load Regulation	10%-100% load	3.3VDC output	--	10	20	%
		5VDC/7.2VDC output	--	8	15	
		9VDC/12VDC/15VDC output	--	7	10	
		24VDC output	--	5	10	
Ripple & Noise*	20MHz bandwidth	--	75	200	mVp-p	
Temperature Coefficient	Full load	--	±0.02	--	%/°C	
Short-circuit Protection		Continuous, self-recovery				
Note: * The "parallel cable" method is used for ripple and noise test, please refer to <i>DC-DC Converter Application Notes</i> 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 ≥ 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	Full 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	19.65 x 7.05 x 10.16 mm
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 ±8kV, Contact ±6kV perf. Criteria B

### Typical Performance Curves

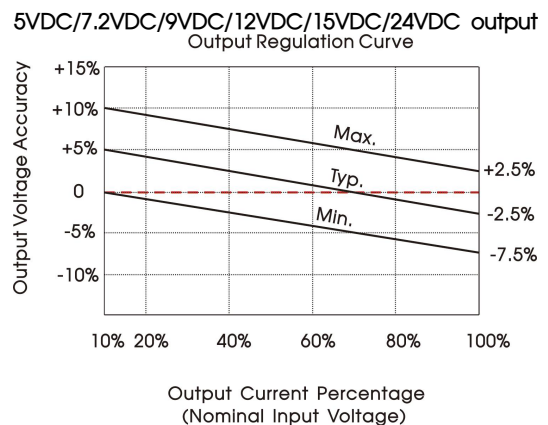
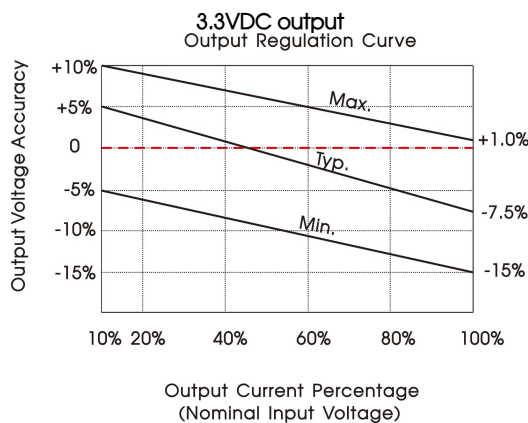


Fig. 1

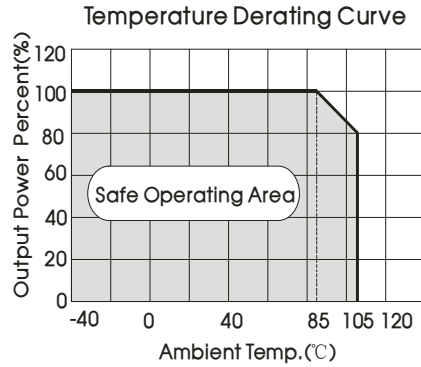
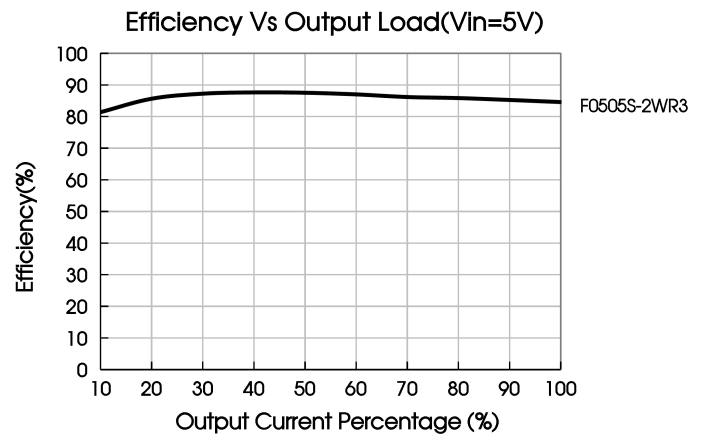
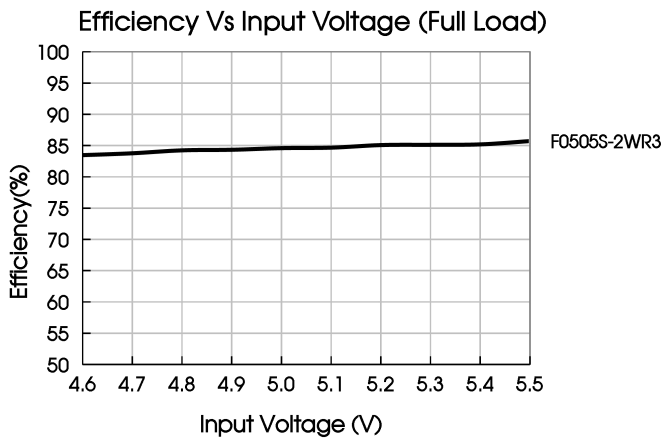


Fig. 2



## 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.

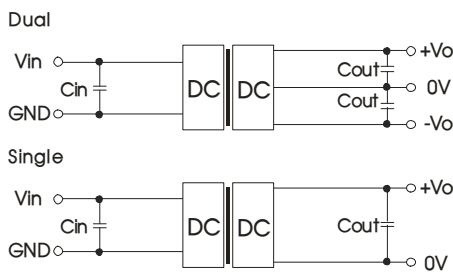


Fig. 3

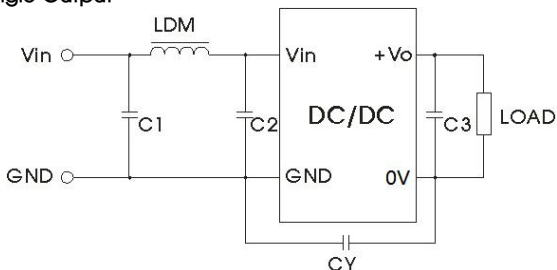
Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
5VDC	10μF/16V	3.3VDC	10μF/16V	±3.3VDC	4.7μF/16V
--	--	5VDC	10μF/16V	±5VDC	4.7μF/16V
--	--	7.2VDC	10μF/16V	±9VDC	1μF/25V
--	--	9VDC	2.2μF/25V	±12VDC	1μF/25V
--	--	12VDC	2.2μF/25V	±15VDC	0.47μF/25V
--	--	15VDC	1μF/25V	±24VDC	0.47μF/50V
--	--	24VDC	1μF/50V	--	--

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

### 2. EMC compliance circuit

Single Output



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

Dual Output

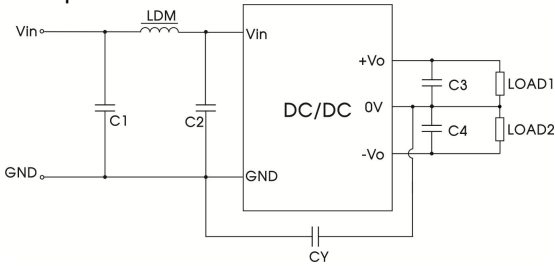
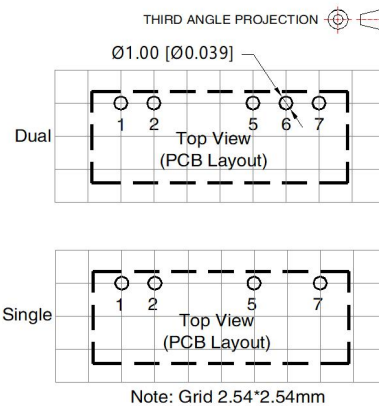
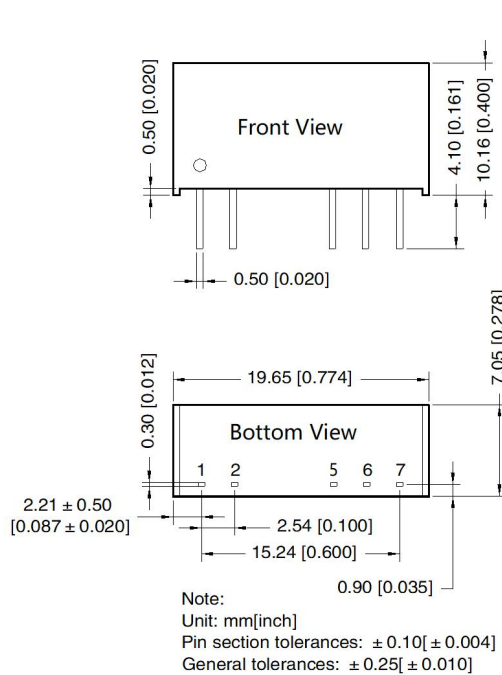


Fig. 4

	Input voltage	5VDC
Emissions	C1/C2	4.7μF /16V
	CY	270pF/4kV
	C3/C4	Refer to 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



Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+Vo	+Vo

Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58200001;
- 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  $T_a=25^{\circ}\text{C}$ , 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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