

2W, Fixed input voltage, isolated & unregulated dual /single output



FEATURES

- Operating temperature range: -40°C to +85°C
- High efficiency up to 85%
- High power density
- DIP package
- Isolation voltage: 3K VDC
- No external component required
- International standard pin-out
- IEC60950, UL60950, EN60950 approval

UL US CE CB Patent Protection RoHS 

E\_D-2WR2 & F\_D-2WR2 series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for

1. Where the voltage of the input power supply is stable (voltage variation:  $\pm 10\%V_{in}$ );
2. Where isolation between input and output is necessary (isolation voltage  $\leq 3000VDC$ );
3. Where the output voltage regulation and the ripple & noise of the output voltage is not strictly required;
4. Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit and data switching circuit condition, etc.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Efficiency (%Min./Typ.) @ Full Load	Max. Capacitive Load( $\mu F$ )*
		Nominal (Range)	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
UL/CE/CB	E0505D-2WR2	5 (4.5-5.5)	$\pm 5$	$\pm 200/\pm 20$	76/80	100
	E0509D-2WR2		$\pm 9$	$\pm 111/\pm 11$	80/84	
	E0512D-2WR2		$\pm 12$	$\pm 83/\pm 8$	80/84	
	E0515D-2WR2		$\pm 15$	$\pm 67/\pm 7$	80/84	
	F0505D-2WR2		5	400/40	76/80	220
	F0509D-2WR2		9	222/22	80/84	
	F0512D-2WR2		12	167/17	80/84	
	F0515D-2WR2		15	133/13	80/84	
	F0524D-2WR2		24	83/8	80/84	
UL/CE/CB	E1205D-2WR2	12 (10.8-13.2)	$\pm 5$	$\pm 200/\pm 20$	76/80	100
	E1212D-2WR2		$\pm 12$	$\pm 83/\pm 8$	79/83	
	E1215D-2WR2		$\pm 15$	$\pm 67/\pm 7$	81/85	
	E1224D-2WR2		$\pm 24$	$\pm 42/\pm 4$	81/85	220
	F1205D-2WR2		5	400/40	76/80	
	F1212D-2WR2		12	167/17	78/82	
	F1215D-2WR2		15	133/13	80/84	
	F1224D-2WR2		24	83/8	81/85	
-	E1509D-2WR2	15 (13.5-16.5)	$\pm 9$	$\pm 111/\pm 11$	77/81	100
	E1515D-2WR2		$\pm 15$	$\pm 67/\pm 7$	77/81	
	F1505D-2WR2		5	400/40	75/79	220
	F1509D-2WR2		9	222/22	78/82	
	F1515D-2WR2		15	133/13	75/79	
UL/CE/CB	E2405D-2WR2	24 (21.6-26.4)	$\pm 5$	$\pm 200/\pm 20$	75/79	100
	E2412D-2WR2		$\pm 12$	$\pm 83/\pm 8$	79/83	
	E2415D-2WR2		$\pm 15$	$\pm 67/\pm 7$	80/84	
	E2424D-2WR2		$\pm 24$	$\pm 42/\pm 4$	80/84	
	F2405D-2WR2		5	400/40	76/80	220
	F2409D-2WR2		9	222/22	81/85	

UL/CE/CB	F2412D-2WR2	24 (21.6-26.4)	12	167/17	79/83	220
	F2415D-2WR2		15	133/13	80/84	
	F2424D-2WR2		24	83/8	81/85	

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	--	500/25	--/60	mA
	12V input	--	208/15	--/50	
	15V input	--	167/15	--/35	
	24V input	--	105/10	--/30	
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		Filter capacitor			
Hot Plug		Unavailable			

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy		See tolerance envelope graph (Fig. 1)				
Line Regulation	Input voltage change: $\pm 1\%$	--	--	$\pm 1.2$	--	
Load Regulation	10%-100% load	5VDC output	--	10	--	%
		9VDC output	--	9	--	
		12VDC output	--	8	--	
		15VDC output	--	7	--	
		24VDC output	--	6	--	
Ripple & Noise*	20MHz bandwidth	--	75	200	mVp-p	
Temperature Coefficient	Full load	--	--	$\pm 0.03$	%/°C	
Short Circuit Protection**	E24xxD-2WR2/F24xxD-2WR2 E12xxD-2WR2/F12xxD-2WR2 E15xxD-2WR2/F15xxD-2WR2 E0512D-2WR2/E0515D-2WR2 E0524D-2WR2/F0524D-2WR2	--	--	1	s	
	Others	Continuous, self-recovery				

Note: \* Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation;

\*\*For the products E24xxD-2WR2/F24xxD-2WR2/ E12xxD-2WR2/F12xxD-2WR2/ E15xxD-2WR2/F15xxD-2WR2 series,

E0512D-2WR2/E0515D-2WR2/E0524D-2WR2/F0524D-2WR2 models, supply voltage must be discontinued at the end of short circuit duration.

### General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Insulation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	3000	--	--	VDC	
Insulation Resistance	Input-output, insulation voltage 500VDC	1000	--	--	M $\Omega$	
Isolation Capacitance	Input-output, 100KHz/0.1V	24V input	--	50	--	pF
		Other input	--	20	--	
Operating Temperature	Derating if the temperature $\geq 85^\circ\text{C}$ (see Fig. 2)	-40	--	85	°C	
Storage Temperature		-55	--	125	°C	
Casing Temperature Rise	Ta=25°C	--	25	--		
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300		
Storage Humidity	Non-condensing	--	--	95	%RH	

Switching Frequency	100% load, nominal input voltage	--	100	--	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours

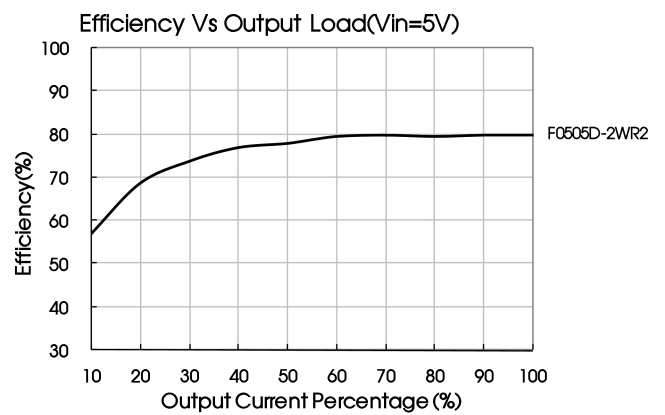
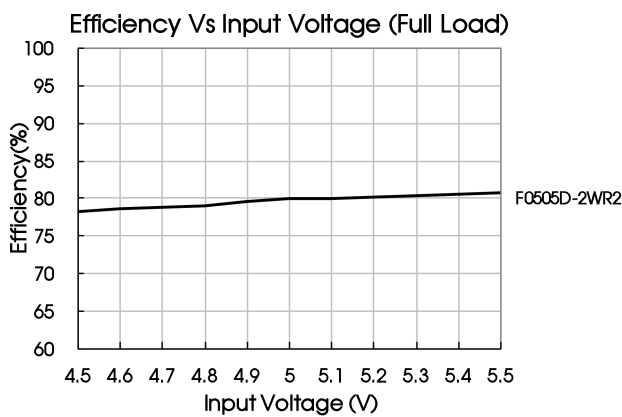
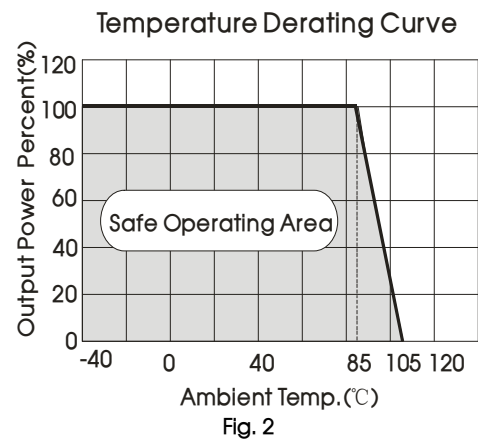
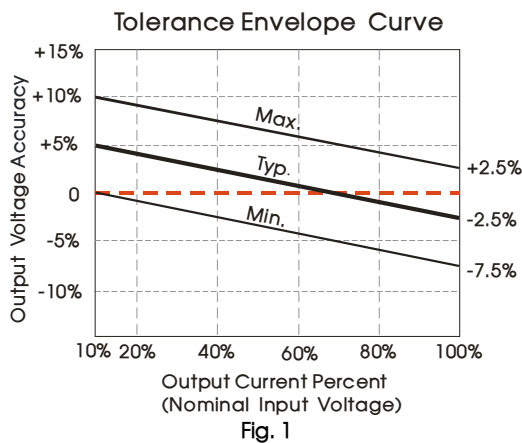
Physical Specifications

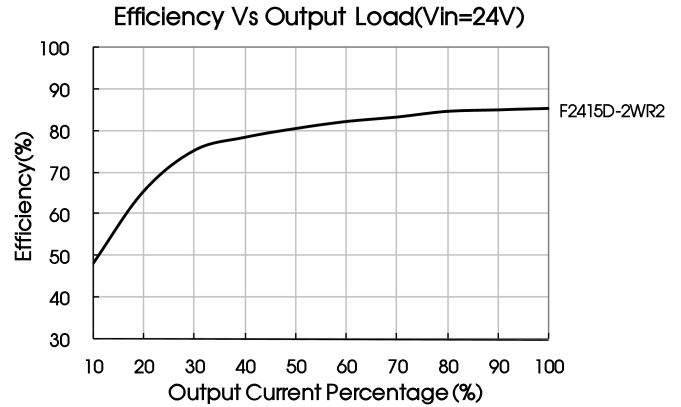
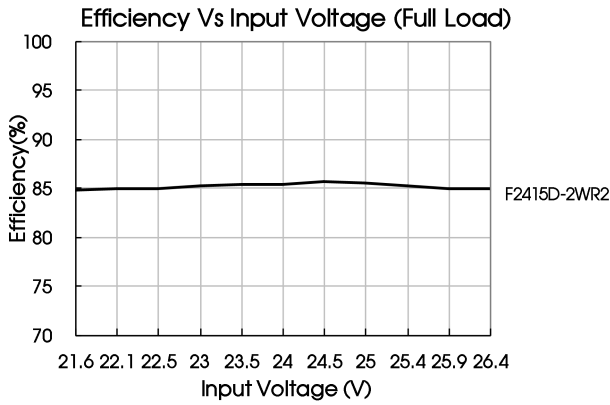
Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimensions	20.32*10.16*8.20mm
Weight	2.8g(Typ.)
Cooling Method	Free convection

EMC Specifications

EMI	CE	CISPR32/EN55032	CLASS B (see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032	CLASS B (see Fig. 4 for recommended circuit)
EMS	ESD	E_D-2WR2	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B
		F_D-2WR2	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

Product Characteristic Curve





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 ensure the modules running well, the recommended capacitive load values as shown in Table 1.

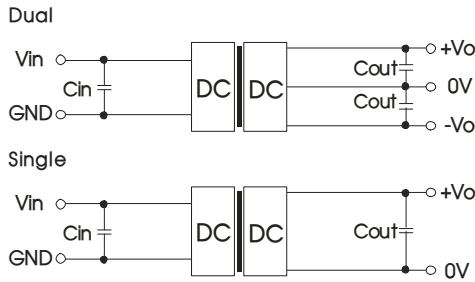


Fig.3

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	Single Vout(VDC)	Cout (μF)	Dual Vout(VDC)	Cout* (μF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	0.47
--	--	24	0.47	±24	0.47

2. EMC typical recommended circuit (CLASS B)

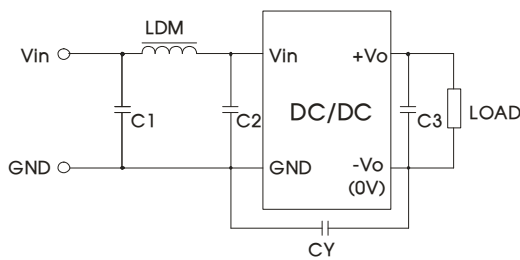


Fig. 4

Input voltage (VDC)		5/12/15	24
EMI	C1/C2	4.7μF/50V	
	CY	--	1nF/3KV
	C3	Refer to the Cout in Fig.3	
	LDM	6.8μH	

Note: 1. 24V input series is subject to CY (CY : 1nF/3KV).  
2. It is not needed to add the component in the peripheral circuit when parameter with the symbol of "--".

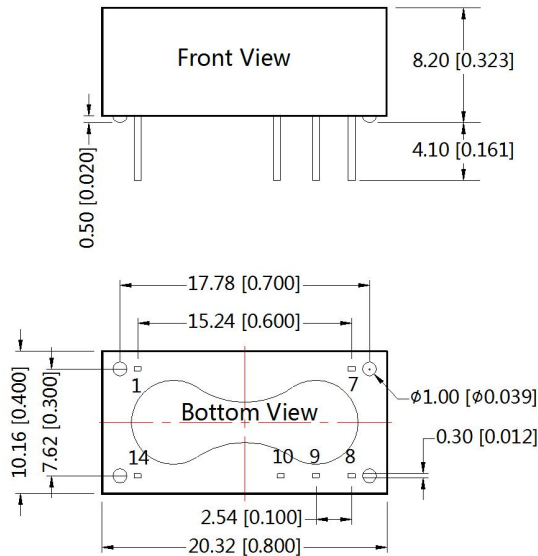
3. Output load requirements

In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

4. For more information please find the application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

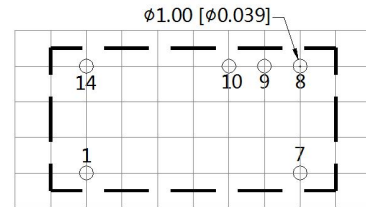
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 

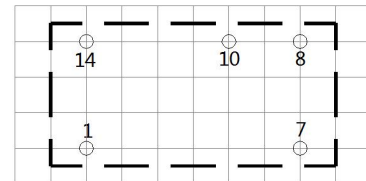


Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.25[\pm 0.010]$

Dual



Single



Note : Grid 2.54\*2.54mm

Pin	Pin-Out	
	Single	Dual
1	GND	GND
7	NC	NC
8	+Vo	+Vo
9	No Pin	0V
10	0V	-Vo
14	Vin	Vin

NC: Pin to be isolated circuitry

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing 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's 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.

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