DC/DC Converter

E_D-1WR2 & F_D-1WR2 series

MORNSUN®

1W, Fixed input voltage, isolated & unregulated dual /single output

Continuous Short Circuit Protection

3 years Warranty

CE Patent Protection RoHS

FEATURES

- Continuous short-circuit protection
- Operating temperature range: -40℃ to +105℃
- High efficiency up to 81%
- DIP package
- Isolation voltage: 3K VDC
- No external component required
- International standard pin-out
- EN60950 approval

E_D-1WR2 & F_D-1WR2 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: ±10%Vin);*
2. *Where isolation between input and output is necessary (isolation voltage ≤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* (μF)
		Nominal (Range)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)		
CE	F0303D-1WR2	3.3 (2.97-3.63)	3.3	303/31	68/72	220
	E0505D-1WR2	5 (4.5-5.5)	±5	±100/±10	75/79	100
	E0512D-1WR2		±12	±42/±5	76/80	
	E0515D-1WR2		±15	±34/±3	77/81	
	F0503D-1WR2		3.3	303/31	71/75	220
	F0505D-1WR2		5	200/20	76/80	
	F0512D-1WR2		12	83/9	76/80	
	F0515D-1WR2		15	67/7	77/81	
	E1205D-1WR2	12 (10.8-13.2)	±5	±100/±10	76/80	100
	F1205D-1WR2		5	200/20	76/80	220
	F1212D-1WR2		12	83/9	76/80	
	F1215D-1WR2		15	67/7	77/81	
CE	F1515D-1WR2	15 (13.5-16.5)	15	67/7	76/80	
CE	E2412D-1WR2	24 (21.6-26.4)	±12	±42/±5	77/81	100
	E2415D-1WR2		±15	±34/±3	76/80	
	F2405D-1WR2		5	200/20	75/79	220

Note: *The capacitive loads of positive and negative outputs are the same.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V input	--	420/30	--/70	mA
	5V input	--	256/20	--/60	
	12V input	--	106/15	--/50	
	15V input	--	84/10	--/35	
	24V input	--	54/7	--/30	

Reflected Ripple Current		--	15	--	mA
Surge Voltage (1sec. max.)	3.3V input	-0.7	--	5	VDC
	5V input	-0.7	--	9	
	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: ±1%	3.3VDC output	--	--	±1.5	--
		Other output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	18	--	%
		5VDC output	--	12	--	
		12VDC output	--	8	--	
		15VDC output	--	7	--	
Ripple & Noise*	20MHz bandwidth		--	60	150	mVp-p
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Short Circuit Protection**	F0303D-1WR2/E24xxD-1WR2/F24xxD-1WR2		--	--	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;
**Supply voltage must be discontinued at the end of short circuit duration for E24xxD-1WR2/F24xxD-1WR2/F0303D-1WR2 series.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	3000	--	--	VDC
Isolation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature up to 85℃, (see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25℃, nominal input, full load output	--	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	Full load, nominal input voltage	--	100	--	KHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours

Physical Specifications

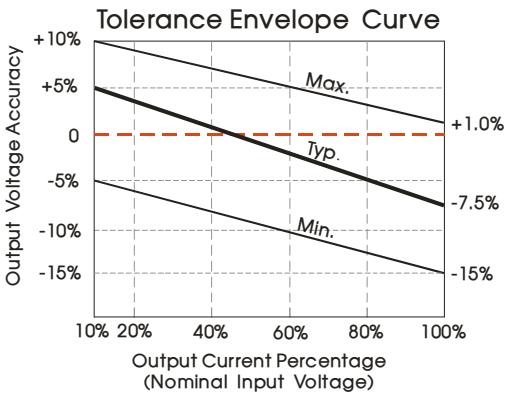
Casing Material	Black flame-retardant heat-proof plastic (UL94 V-0)
Dimensions	20.00*10.00*7.00 mm
Weight	2.4g (Typ.)
Cooling Method	Free air convection

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-1WR2	IEC/EN61000-4-2	Contact ±6KV perf. Criteria B
		F_D-1WR2	IEC/EN61000-4-2	Contact ±8KV perf. Criteria B

Product Characteristic Curve

3.3VDC output



Other output

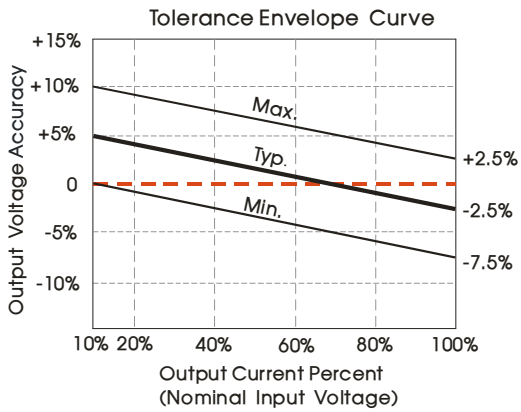


Fig. 1

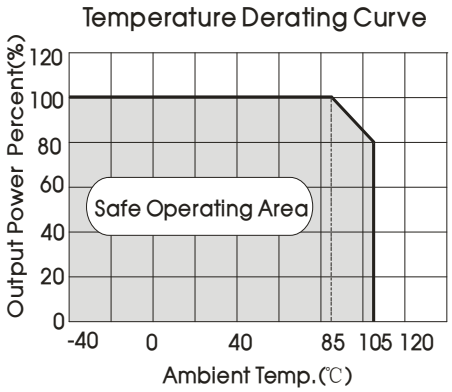
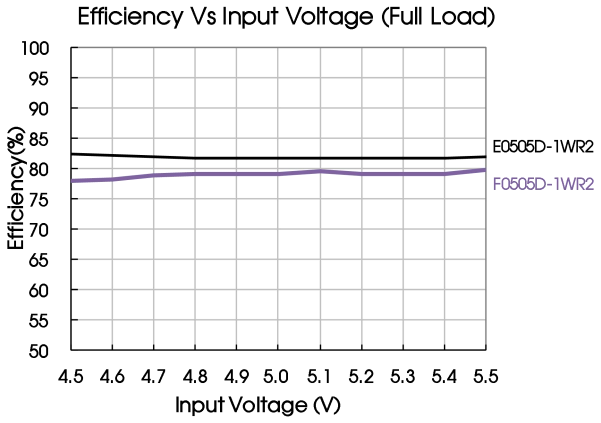
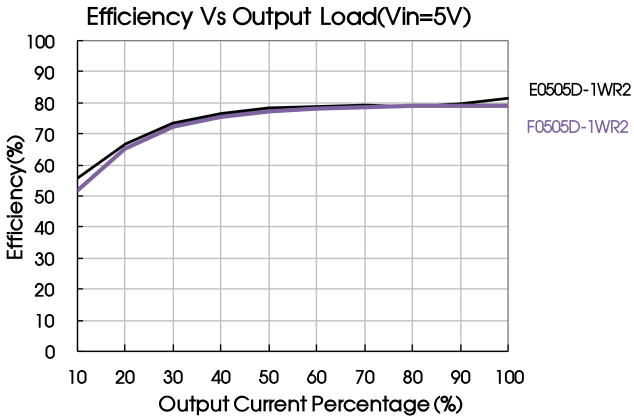
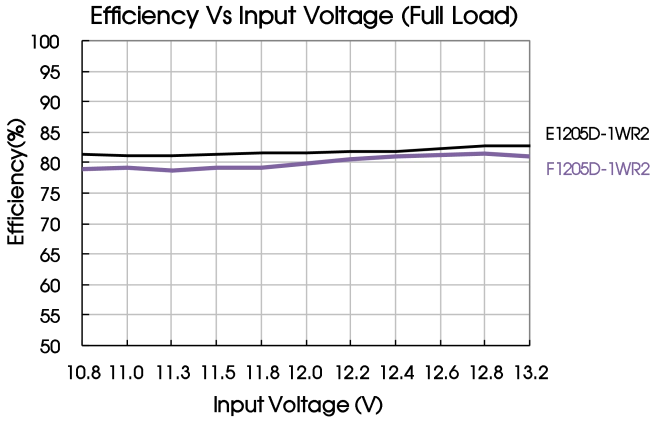
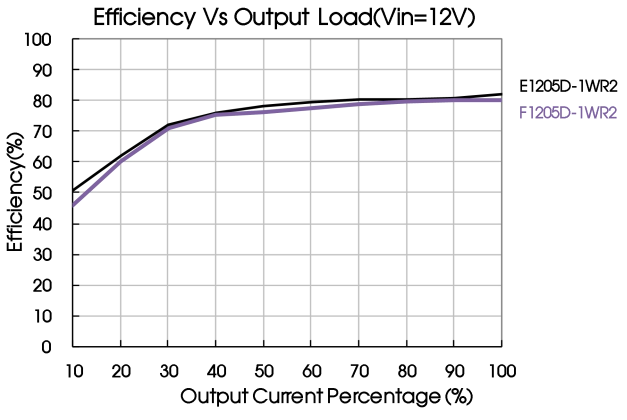


Fig. 2









Design Reference

1. Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

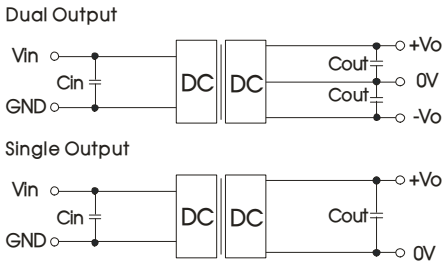


Fig.3

Recommended capacitive load value table (Table 1)

Vin(VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10	±5	4.7
12	2.2	12	2.2	±12	1
15	2.2	15	1	±15	0.47
24	1	--	--	--	--

It is not recommended to connect any external capacitor when output power is less than 0.5W.

2. EMC solution-recommended circuit

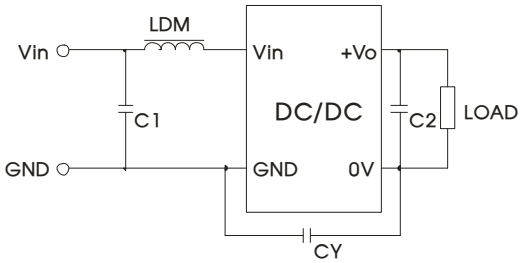


Fig. 4

Input voltage (VDC)		3.3/5/12	15/24
EMI	C1	4.7μF /50V	
	C2	Refer to the Cout in Fig.3	
	LDM	6.8μH	
	CY	--	1nF/3KV

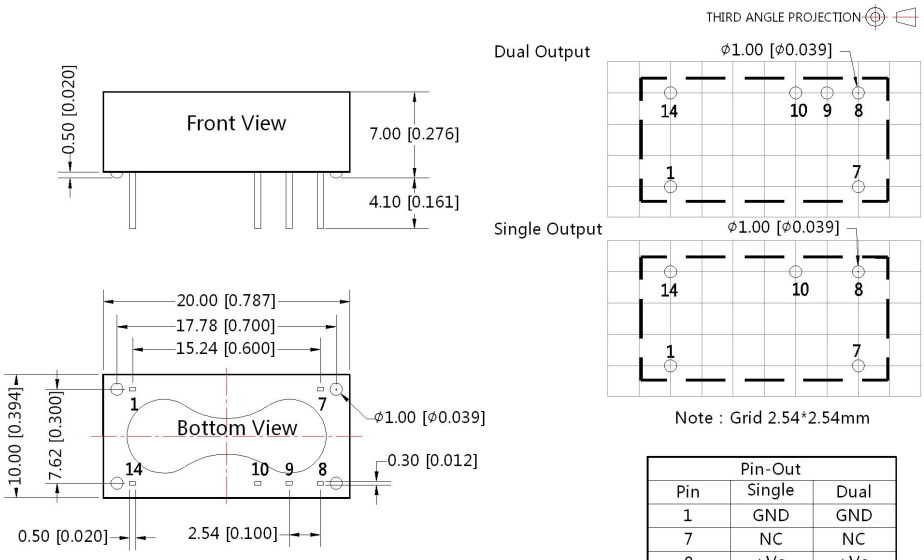
Note: 1. 15/24V input series, is subject to CY (CY : 1nF/3KV).
2. It is not needed to add the component in the peripheral circuit when parameter with the symbol of "--".

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 t the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

4. For more information please find DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



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

NC:No connection

Note:
Unit:mm[inch]
Pin section tolerances:±0.10[±0.004]
General tolerances:±0.25[±0.010]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from 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 nominal input voltage and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, 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. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
7. We can provide product customization service, please contact our technicians directly for specific information;
8. Products are related to laws and regulations: see "Features" and "EMC";
9. 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