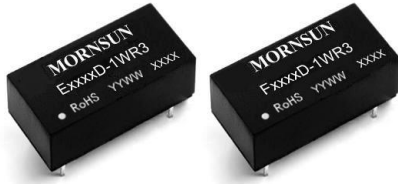


1W isolated DC-DC converter,  
Fixed input voltage and unregulated dual or single  
output



Patent Protection RoHS

E\_D-1WR3&F\_D-1WR3 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 81%
- 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.		
-	E1205D-1WR3	12 (10.8-13.2)	±5	±100/±10	76/80	1200
	E1209D-1WR3		±9	±55/±6	76/80	560
	E1212D-1WR3		±12	±42/±5	77/81	220
	E1215D-1WR3		±15	±34/±4	77/81	220
	F1205D-1WR3		5	200/20	76/80	2400
	F1212D-1WR3	12	83/9	77/81	560	
	F1215D-1WR3	15	67/7	77/81	560	
	E1515D-1WR3	15 (13.5-16.5)	±15	±33/±4	77/81	220
	F1515D-1WR3		15	67/7	77/81	560
	E2405D-1WR3	24 (21.6-26.4)	±5	±100/±10	74/80	1200
	E2409D-1WR3		±9	±55/±6	74/80	560
	E2412D-1WR3		±12	±42/±5	75/81	220
	E2415D-1WR3		±15	±34/±4	73/79	220
	F2405D-1WR3		5	200/20	73/79	2400

Note: \* The capacitive load for positive and negative outputs is identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit	
Input Current (full load / no-load)	12VDC input	5VDC/9VDC output	--	104/8	109/--	mA	
		12VDC/15VDC output	--	103/8	108/--		
	15VDC input	15VDC output	--	103/8	111/--		
		24VDC input	5VDC/9VDC output	--	52/8		56/--
			12VDC output	--	51/8		55/--
		15VDC output	--	53/8	57/--		
Reflected Ripple Current*			--	15	--		
Input Filter			Capacitance Filter				
Hot Plug			Unavailable				

Note: \* Please refer to DC-DC Converter Application Note for detailed description of Reflected ripple current testing method.

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy		See Output Regulation Curve (Fig. 1)			

Linear Regulation	Input voltage change: $\pm 1\%$	--	--	1.2	--
Load Regulation	10%-100% load	5VDC output	--	5	15
		9VDC output	--	3	10
		12VDC output	--	3	10
		15VDC output	--	3	10
Ripple & Noise *	20MHz bandwidth		30	75	mVp-p
Temperature Coefficient	Full load	--	$\pm 0.02$	--	%/°C
Short-circuit Protection		Continuous, self-recovery			
Note:* 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 if the temperature $\geq 85^\circ\text{C}$ , (see Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C	--	25	--	°C
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	--	260	--	kHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	k hours

**Mechanical Specifications**

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	20.00 x 10.00 x 7.00mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

**Electromagnetic compatibility (EMC)**

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

Note:Refer to Figure 4 for recommended circuit test.

**Typical Characteristic Curves**

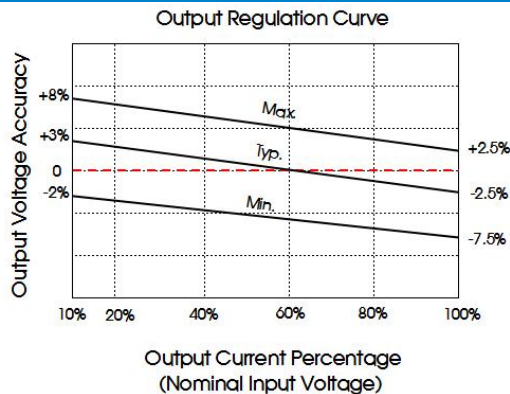


Fig. 1

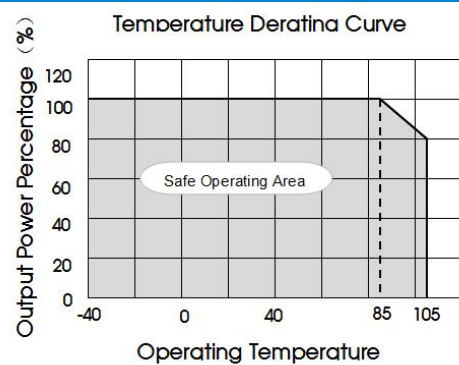
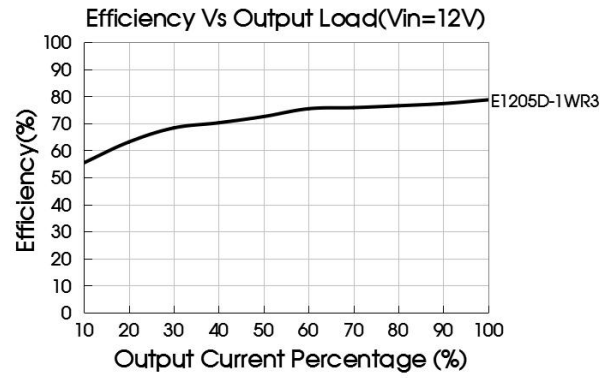
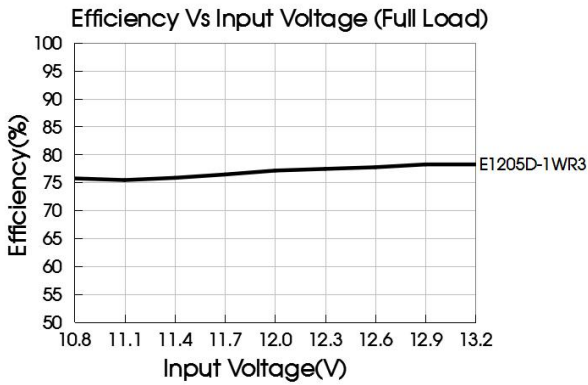


Fig. 2



## Design Reference

### 1. Typical application circuit

Input and/or output ripple can be further reduced by connecting capacitor filters to the input and/or output terminals of the DC-DC converter as shown in Figure 3. Also, the capacitance of the output filter capacitor must be properly selected. If the capacitor value that is too high, the converter may not be able to properly start up. To ensure safe and reliable operation, the specified filter capacitor value in Table 1 must not be exceeded.

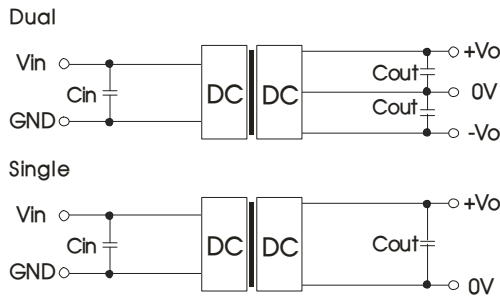


Fig. 3

Table 1 Recommended capacitive load value table

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

### 2. EMC compliance circuit

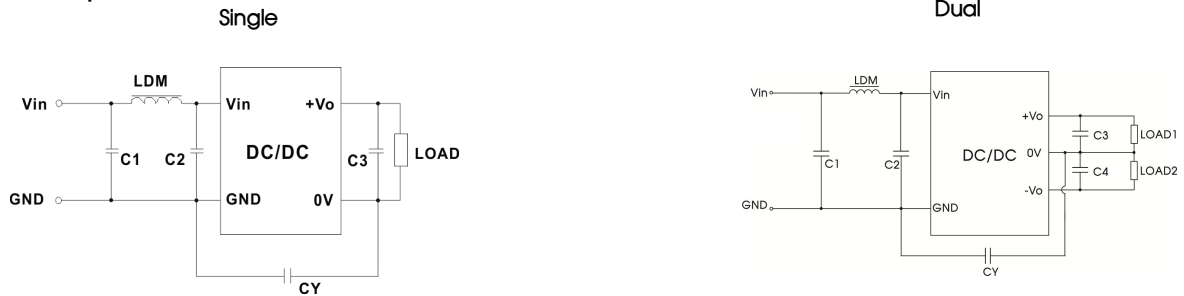
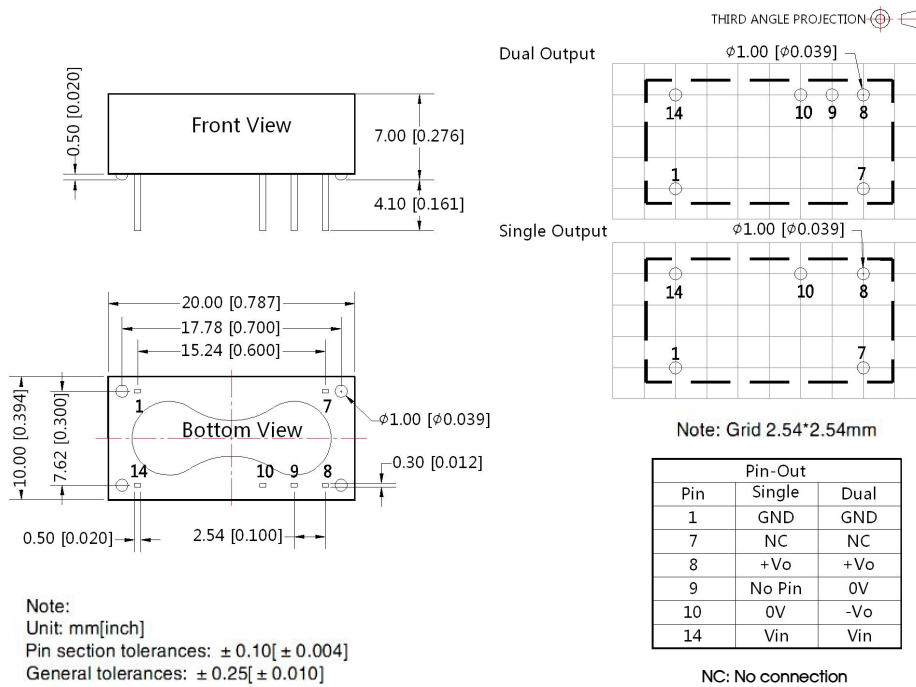


Fig.4

EMI	C1/C2	4.7μF /50V
	C3/C4	Refer to the Cout in table 1
	LDM	6.8μH
	CY	270pF/3kVDC

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



Notes:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging 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 Ta=25°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.

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