

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



Patent Protection RoHS

### 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%
- High power density
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out

A\_D-1WR3 series are specially designed for applications where 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*( $\mu$ F) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	A1205D-1WR3	12 (10.8-13.2)	$\pm 5$	$\pm 100/\pm 10$	76/80	1200
	A1212D-1WR3		$\pm 12$	$\pm 42/\pm 5$	77/81	280
	A1224D-1WR3		$\pm 24$	$\pm 21/\pm 2$	76/80	110
	A1524D-1WR3	15 (13.5-16.5)	$\pm 24$	$\pm 21/\pm 2$	77/81	110
	A2409D-1WR3	24 (21.6-26.4)	$\pm 9$	$\pm 56/\pm 6$	74/80	500
	A2412D-1WR3		$\pm 12$	$\pm 42/\pm 4$	75/81	280
	A2415D-1WR3		$\pm 15$	$\pm 33/\pm 3$	73/79	280

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)	12V input	--	105/8	200/--	mA
	15V input	--	83/8	87/--	
	24V input	--	53/8	57/--	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)	12V input	-0.7	--	18	VDC
	15V input	-0.7	--	21	
	24V input	-0.7	--	30	
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Note: \* Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy		See output regulation curve (Fig. 1)				
Linear Regulation	Input voltage change: $\pm 1\%$	--	--	$\pm 1.2$	--	
Load Regulation	10%-100% load	5VDC output	--	--	15	%
		9VDC output	--	--	10	
		12VDC output	--	--	10	
		15VDC output	--	--	10	
		24VDC output	--	--	10	
Ripple & Noise*	20MHz bandwidth	--	50	100	mVp-p	
Temperature Coefficient	Full load	--	$\pm 0.02$	--	%/°C	

Short-circuit Protection	Continuous, self-recovery
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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.	1500	--	--	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	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	100% 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 -V0)
Dimensions	20.00 x 10.00 x 7.00 mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

EmissionsI	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 Fig. 4 for recommended circuit test.

### Typical Characteristic Curves

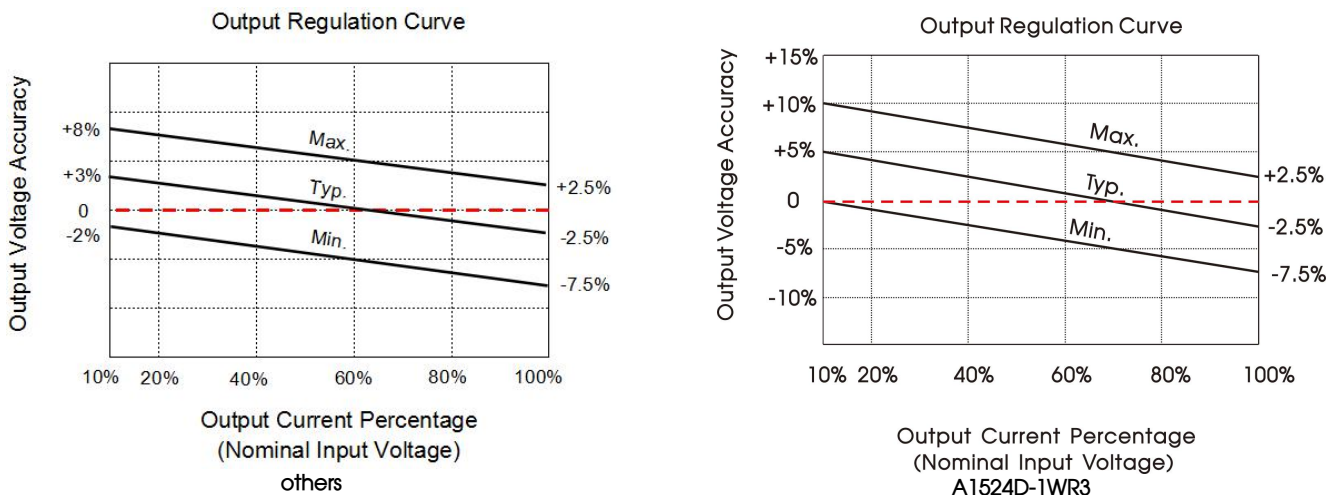
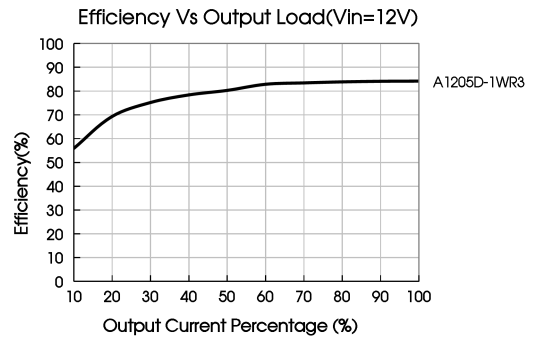
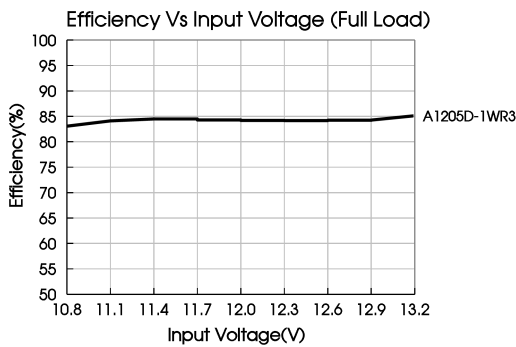
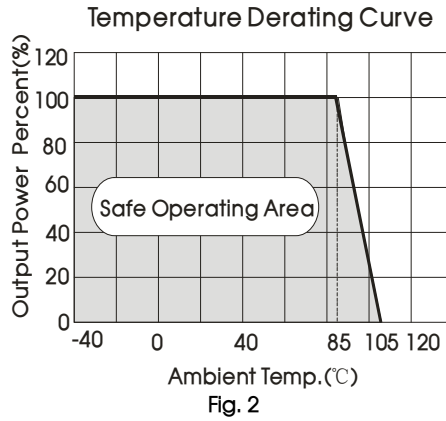


Fig. 1



## 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.

Table 1: Recommended input and output capacitor values

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

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



Fig. 3

### 2. EMC compliance circuit

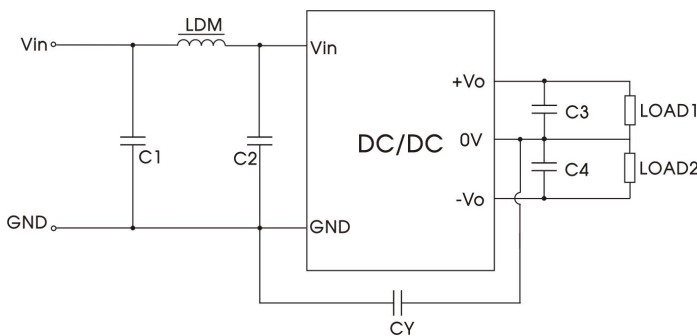


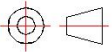
Fig.4

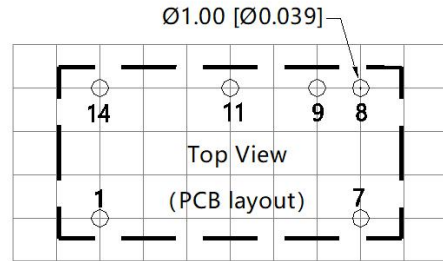
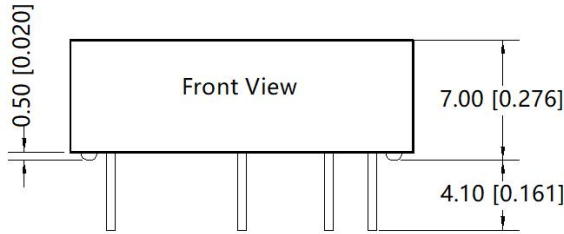
Emissions	C1/C2	4.7μF /50V
	CY	270pF /2kVDC
	C3/C4	Refer to the Cout in Table 1
	LDM	6.8μH

3. For additional information, please refer to DC-DC converter application notes on

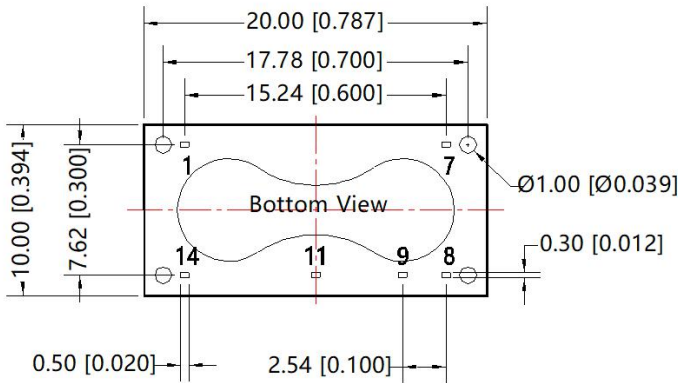
[www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note: Grid 2.54\*2.54mm



Pin	Mark
1	GND
7	NC
8	0V
9	+Vo
11	-Vo
14	Vin

NC: No connection

Note:

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

Notes:

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