MORNSUN®

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

Patent Protection RoHS

3 years Warranty

Continuous Short Circuit Protection

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 81%
- High power density
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out
- DIP Package

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*(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
--	A0503D-1WR3	5 (4.5-5.5)	±3.3	±152/±15	70/74	1200
	A0505D-1WR3		±5	±100/±10	76/80	1200
	A0509D-1WR3		±9	±56/±6	77/81	470
	A0512D-1WR3		±12	±42/±5	77/81	220
	A0515D-1WR3		±15	±34/±4	77/81	220
	A1205D-1WR3	12 (10.8-13.2)	±5	±100/±10	76/80	1200
	A1212D-1WR3		±12	±42/±5	77/81	280
	A1224D-1WR3		±24	±21/±2	76/80	110
	A1524D-1WR3	15 (13.5-16.5)	±24	±21/±2	77/81	110
	A2409D-1WR3	24 (21.6-26.4)	±9	±56/±6	74/80	500
	A2412D-1WR3		±12	±42/±4	75/81	280
	A2415D-1WR3		±15	±33/±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)	5VDC input	3.3VDC output	--	270/8	286/--	mA
		5VDC output	--	251/8	264/--	
		9VDC/12VDC/15VDC output	--	247/8	260/--	
	12VDC input	5VDC output	--	104/8	110/--	
		12VDC output	--	103/8	109/--	
		24VDC output	--	104/8	110/--	
	15VDC input		--	83/8	87/--	
	24VDC input	9VDC output	--	52/8	57/--	
		12VDC output	--	52/8	56/--	
		15VDC output	--	53/8	58/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
	12VDC input		-0.7	--	18	
	15VDC input		-0.7	--	21	
	24VDC 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: ±1%		3.3VDC output	--	--	1.5	--
			Other output	--	--	1.2	
Load Regulation	10%-100% load	5VDC input	3.3VDC output	--	15	20	%
			5VDC output	--	10	15	
			9VDC output	--	9	10	
			12VDC output	--	8	10	
			15VDC output	--	7	10	
		Other intput	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			--	±0.02	--	%/℃
Short-circuit Protection				Continuous, self-recovery			
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≥85℃ (see Fig. 2)		-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃	3.3VDC output	--	25	--	
		Other output	--	15	--	
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	5VDC input	--	300	--	kHz
		Other intput	--	260	--	
MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours

Mechanical Specifications

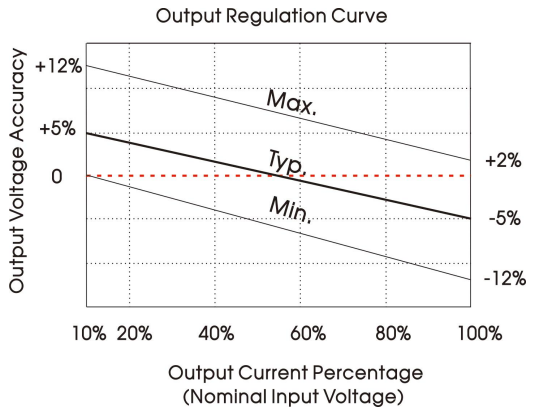
Case Material	Black plastic; flame-retardant and heat-resistant (UL94 -V0)
Dimensions	20.00 x 10.00 x 7.00 mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

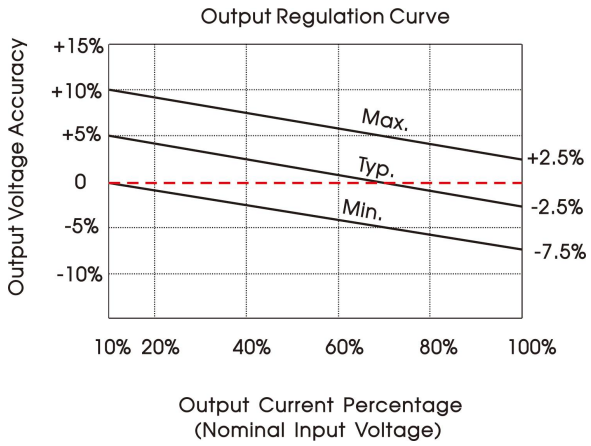
Emissions	CE	CISPR32/EN55032	CLASS B
	RE	CISPR32/EN55032	CLASS B
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV perf. Criteria B
Note: Refer to Fig. 4 for recommended circuit test.			

Typical Characteristic Curves

A0503D-1WR3



A15_D-1WR3/A05_D-1WR3 (Except A0503D-1WR3)



Others

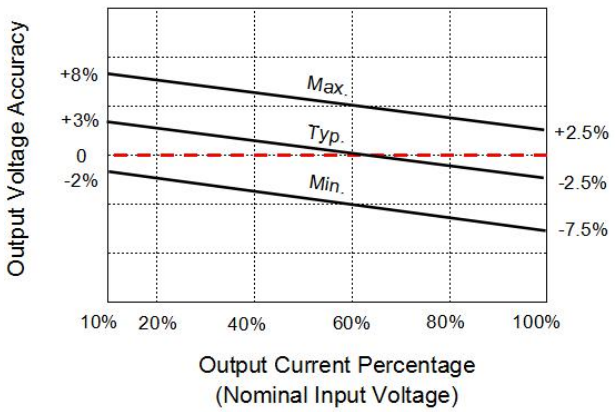
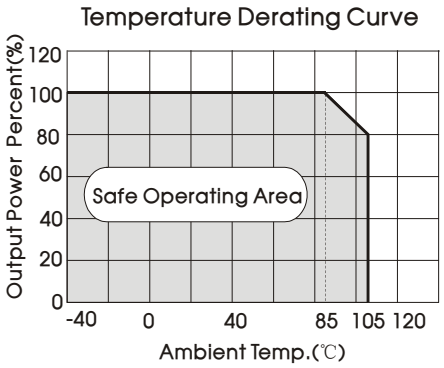


Fig. 1

A05_D-1WR3



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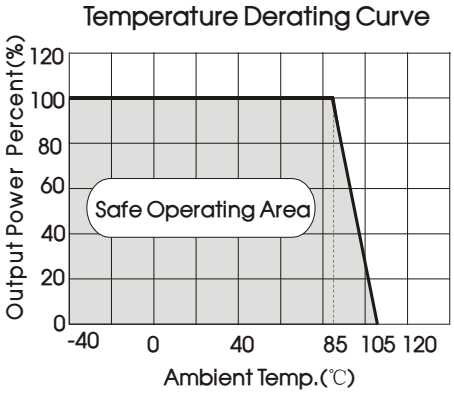
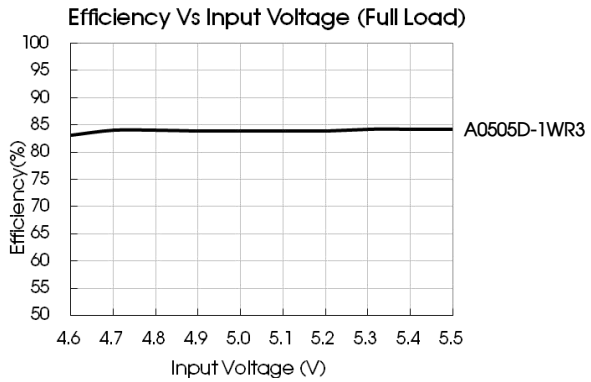
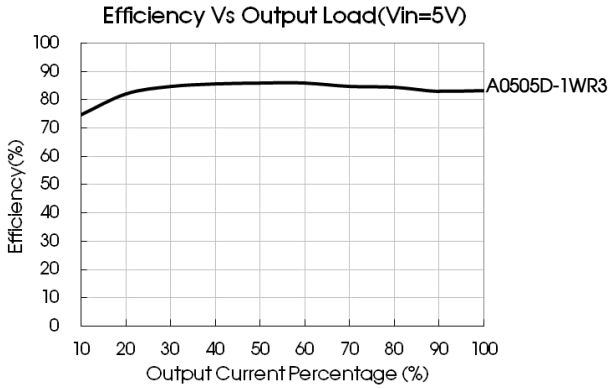
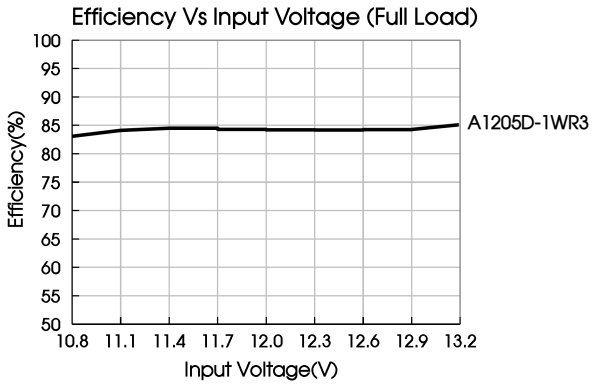
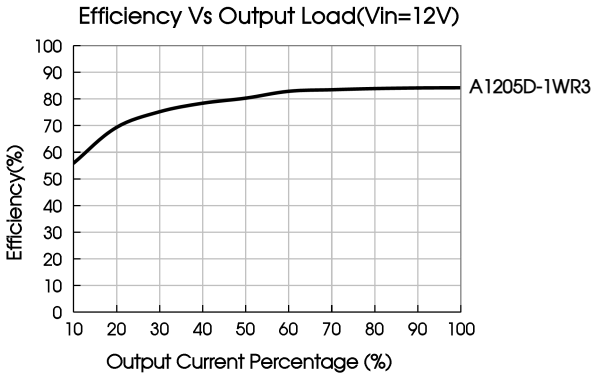


Fig. 2









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.

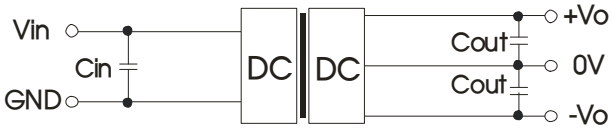


Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vout	Cout*
5VDC	4.7μF/16V	±3.3VDC/±5VDC	4.7μF/16V
--	--	±9/±12VDC	1μF/25V
--	--	±15VDC	0.47μF/50V
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.

2. EMC compliance circuit

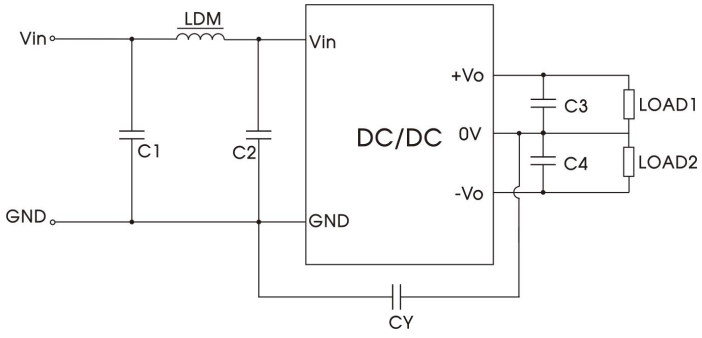


Fig. 4

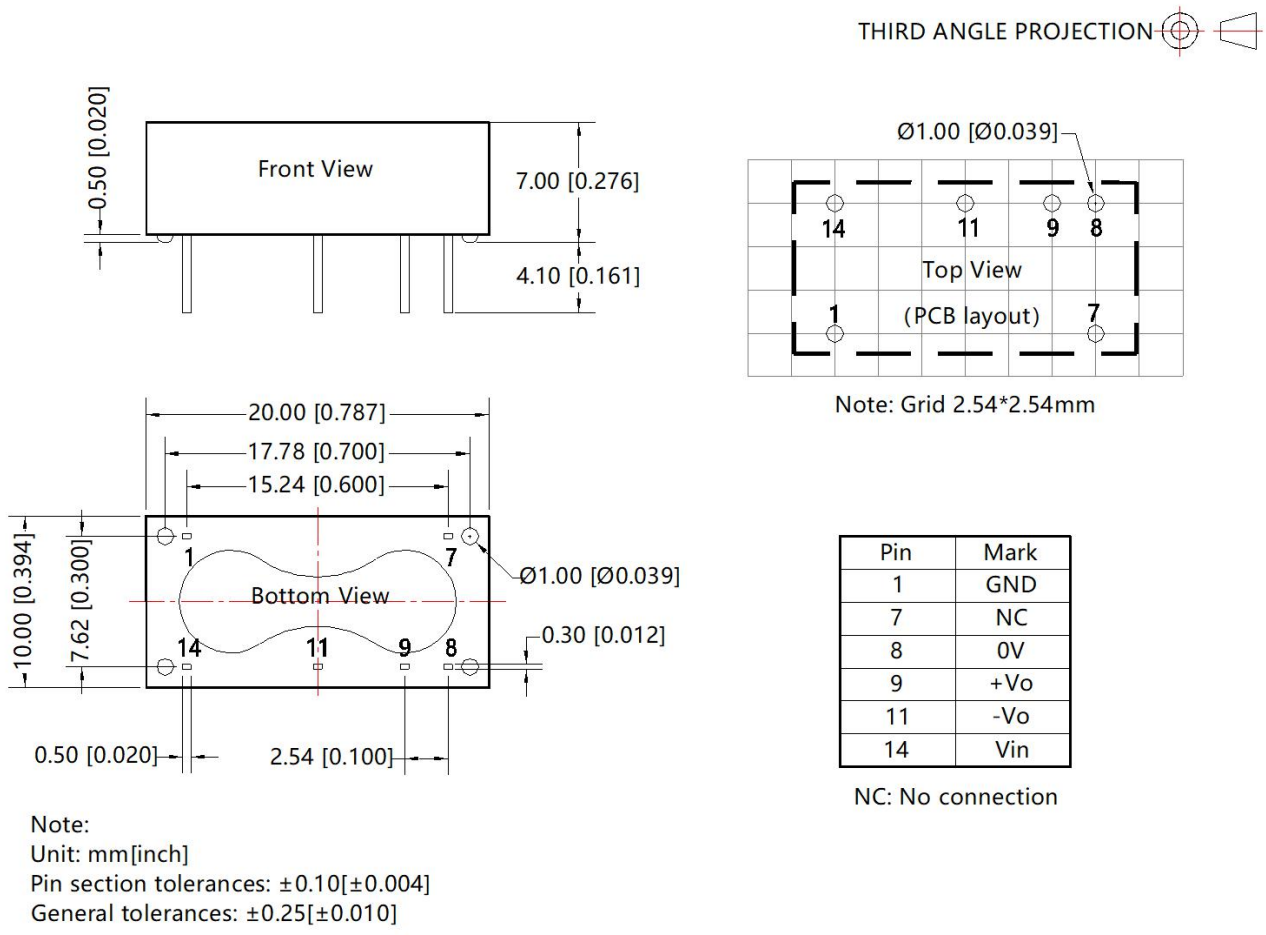
EMC recommended circuit value table (Table 2)

Input voltage		5VDC		Others
Output voltage		3.3/5/9VDC	12/15VDC	5/9/12/15/24VDC
Emissions	C1/C2	4.7μF /25V	4.7μF /25V	4.7μF /50V
	CY	100pF /2kVDC	1000pF /2kVDC	270pF /2kVDC
	C3/C4	Refer to the Cout in table 1		
	LDM	6.8μH		

Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

3. For additional information, please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



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: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Notes:

1. For additional information on Product Packaging please refer to 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℃, 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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