

DC/DC Converter

D_(N)S-1WR3 Series

MORNSUN®

1W isolated DC-DC converter

Fixed input voltage, unregulated dual output



Continuous Short
Circuit Protection



RoHS



Report

Patent Protection

EN 62368-1

D_(N)S-1WR3 series are specifically designed for applications that require two independent sets of power supplies that are isolated from the input power supply. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

FEATURES

- Continuous short-circuit protection
- Operating temperature range: -40°C to +105°C
- High efficiency up to 85%
- I/O isolation test voltage 1.5k VDC, O/O isolation test voltage 1k VDC
- Compact SIP package

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.			
			Vo1	Vo2	Io1	Io2		
EN	D050505NS-1WR3	5 (4.5-5.5)	5	5	100/10	100/10	80/85	680
--	D050505S-1WR3							
	D051212S-1WR3		12	12	42/4	42/4	74/78	330
	D120505S-1WR3	12 (10.8-13.2)	5	5	100/10	100/10	74/78	680
	D121212S-1WR3		12	12	42/4	42/4	74/78	330
	D240505(N)S-1WR3	24 (21.6-26.4)	5	5	100/10	100/10	72/78	680
D241515S-1WR3	15		15	33/3	33/3	72/78	220	

Note: * The specified maximum capacitive load for dual output is identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	5VDC output	--	235/10	250/--	mA
		Other output	--	260/8	271/--	
	12VDC input		--	107/8	113/--	
	24VDC input		--	54/8	58/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
	12VDC input		-0.7	--	18	
	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.

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Output Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
Voltage Accuracy				See output regulation curve(Fig. 1)			
Linear Regulation	Input voltage change: ±1%			--	--	±1.2	--
Load Regulation	10%-100% load	5VDC input	5VDC output	--	--	15	%
			12VDC output	--	3	10	
		12/24VDC input	5VDC output	--	6	15	
			12VDC output	--	3	10	
			15VDC output	--	2	10	
Ripple & Noise*	20MHz bandwidth	5VDC input	5VDC output	--	50	75	mVp-p
			12VDC output	--	50	100	
		12/24VDC input		--	50	100	
Temperature Coefficient	100% load			--	±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.							

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	Input-output electric strength test for 1 minute with a leakage current of 1mA max.			1500	--	--	VDC
	Output1-output2 electric strength test for 1 minute with a leakage current of 1mA max.			1000	--	--	
Insulation Resistance	Input-output/Output1-output2 resistance at 500VDC			1000	--	--	MΩ
Isolation Capacitance	Input-output/Output1-output2 capacitance at 100kHz/0.1V	5V input, 5V output		--	10	--	pF
		Other		--	20	--	
Operating Temperature	Derating when operating temperature≥85℃, (see Fig. 2)			-40	--	105	℃
Storage Temperature				-55	--	125	
Case Temperature Rise	Ta=25℃	5VDC input, 5VDC output		--	15	--	
		other		--	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	5VDC input, 12VDC output			10-150Hz, 5G, 0.75mm. along X, Y and Z			
	12/24VDC input						
Switching Frequency	100% load, nominal input voltage	5VDC input	5VDC output	--	315	--	kHz
			12VDC output	--	300	--	
		12/24VDC input		--	260	--	
MTBF	MIL-HDBK-217F@25℃			3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)					
Dimensions	19.65 x 6.00 x 10.16mm					
Weight	2.1 g(Typ.)					
Cooling Method	Free air convection					

Electromagnetic Compatibility (EMC)

Emissions	CE		CISPR32/EN55032 CLASS B			
	RE		CISPR32/EN55032 CLASS B			
Immunity	ESD	D050505(N)S-1WR3	IEC/EN61000-4-2 Contact $\pm 4\text{kV}$ perf. Criteria B			

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

Typical Characteristic Curves

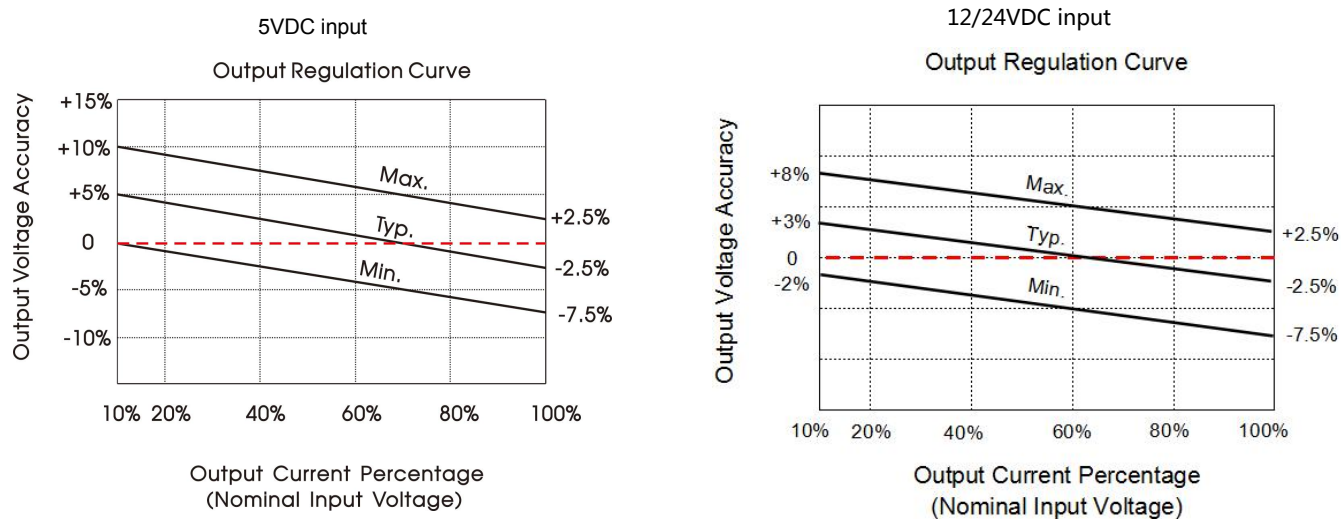


Fig. 1

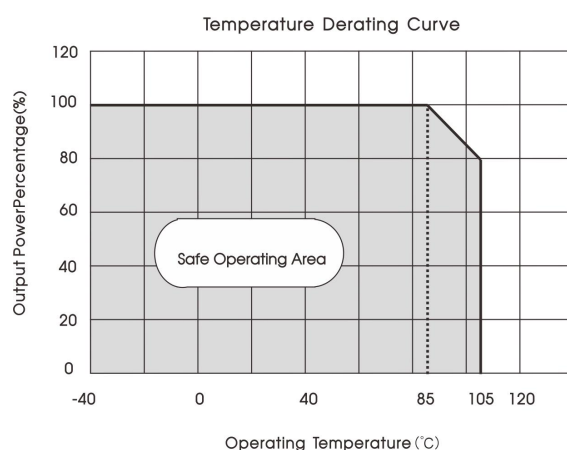
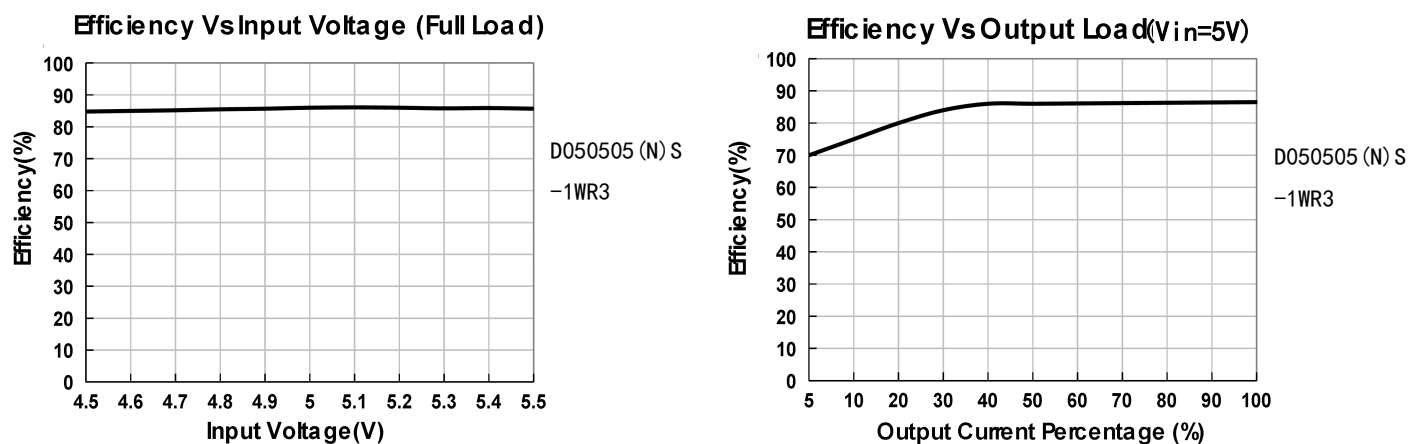
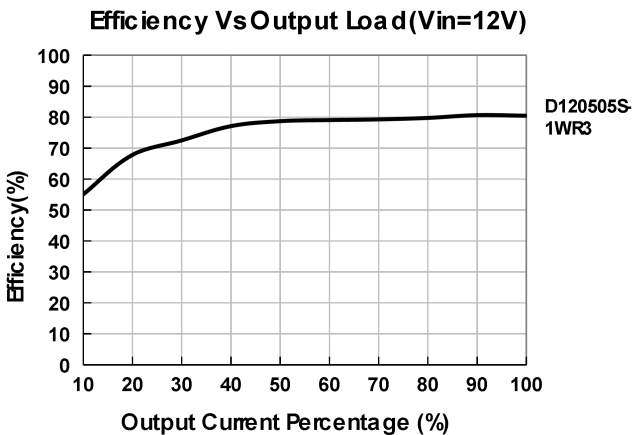
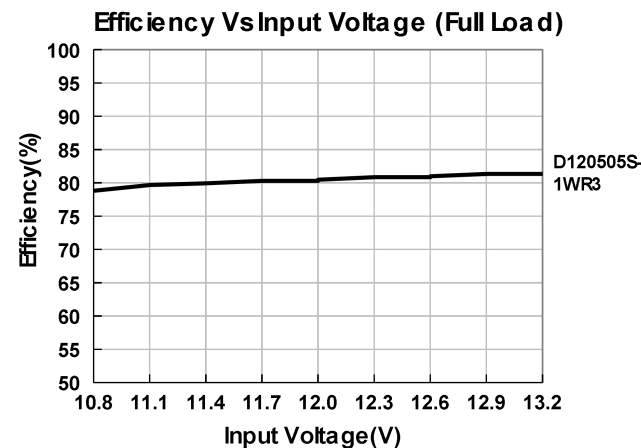


Fig. 2





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.

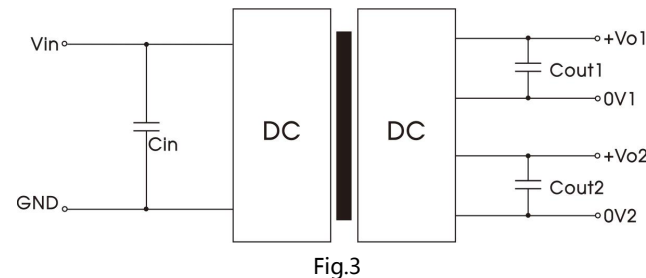


Fig.3

Table 1: Recommended input and output capacitor values

Part No.	Vin	Cin	Vo	Cout
N050505(N)S-1WR3	5VDC	4.7μF/10V	5VDC	10μF/10V
Others	5VDC	2.2μF/25V	5VDC	4.7μF/10V
	12VDC	2.2μF/25V	12VDC	1μF/25V
	24VDC	1μF/50V	5VDC	4.7μF/16V
	--	--	12VDC	1μF/16V
	--	--	15VDC	1μF/25V

2. EMC (CLASS B) compliance circuit

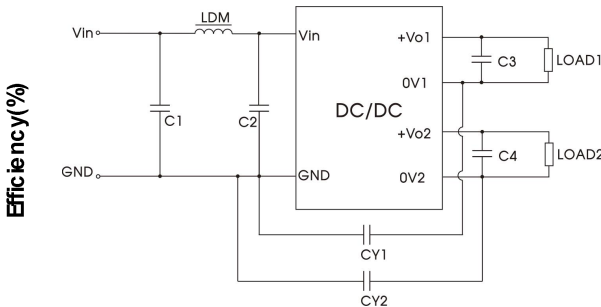


Fig.4

EMC recommended circuit value table (Table 2)

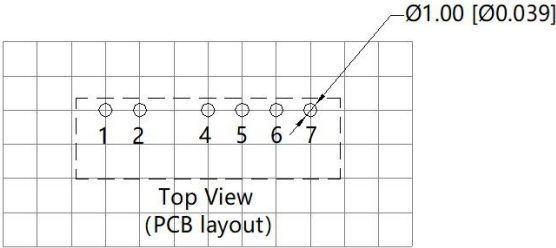
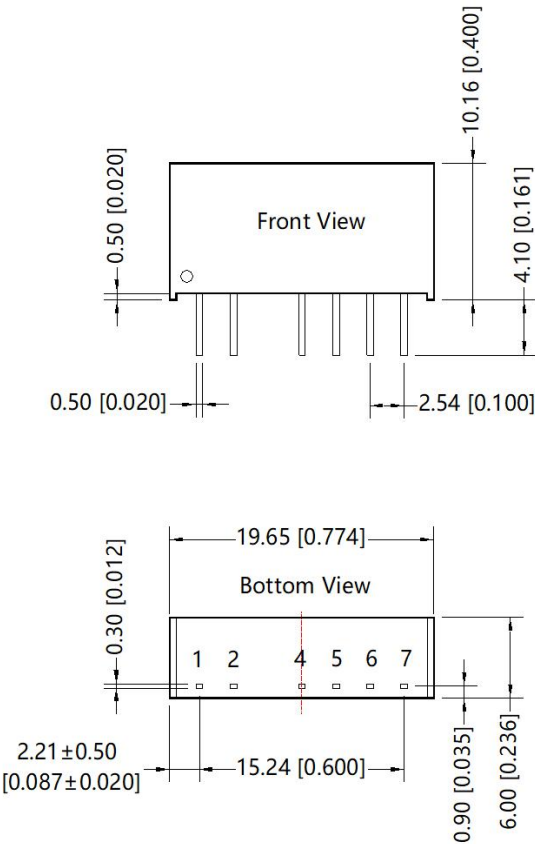
Input voltage		5VDC		12/24VDC
Output voltage		5V	12V	--
EMI	C1/C2	4.7μF /10V	4.7μF /50V	4.7μF /50V
	CY1/CY2	100pF/2kVDC	1000pF/2kVDC	270pF/2kV
	C3/C4	Refer to Cout in Fig.3		
	LDM	6.8μH		

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

www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin	D_S-1WR3	D_NS-1WR3
1	Vin	Vin
2	GND	GND
4	0V1	+Vo1
5	+Vo1	0V1
6	0V2	+Vo2
7	+Vo2	0V2

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

Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200001;
- 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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