

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



FEATURES

- Continuous short-circuit protection
- Operating temperature range: -40°C to +105°C
- High efficiency up to 78%
- I/O isolation test voltage 1.5k VDC, O/O isolation test voltage 1k VDC
- Compact SIP package

Patent Protection RoHS



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.

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			
--	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)	12VDC input	--	107/8	113/--	mA
	24VDC input	--	54/8	58/--	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)	12VDC input	-0.7	--	18	VDC
	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%	--	--	±1.2	--	
Load Regulation	10%-100% load	5VDC output	--	6	15	%
		12VDC output	--	3	10	
		15VDC output	--	2	10	
Ripple & Noise*	20MHz bandwidth	--	50	100	mVp-p	
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.

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	--	20	--	pF
Operating Temperature	Derating when operating temperature ≥ 85°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 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
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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

Output Regulation Curve

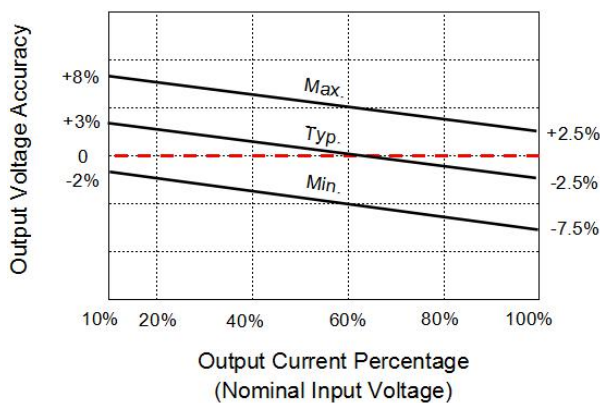


Fig. 1

Temperature Derating Curve

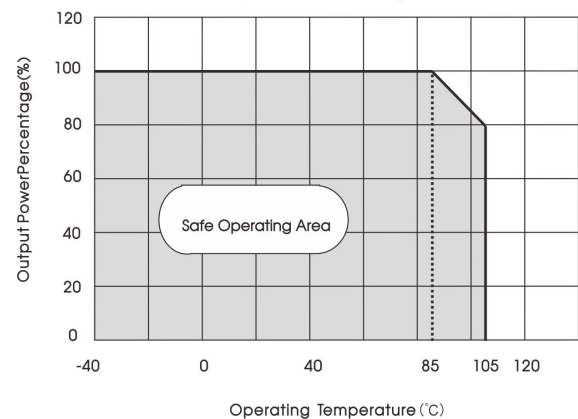
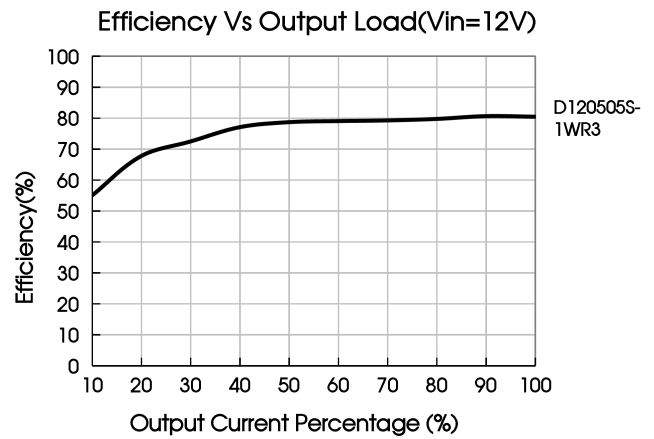
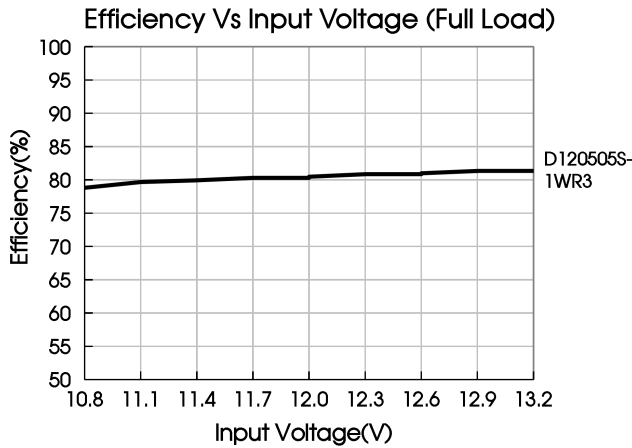


Fig. 2



## 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.

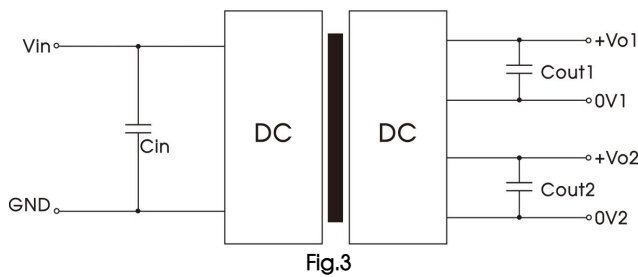
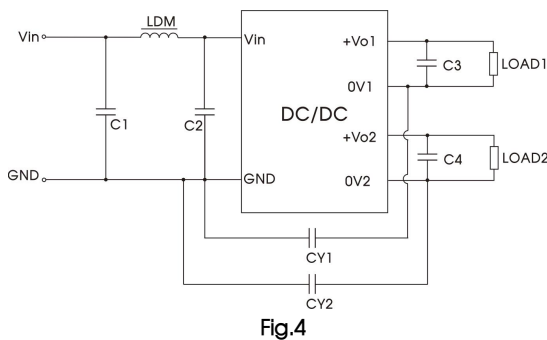


Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
12VDC	2.2μF/25V	5VDC	4.7μF/16V
24VDC	1μF/50V	12VDC	1μF/16V
--	--	15VDC	1μF/25V

### 2. EMC (CLASS B) compliance circuit

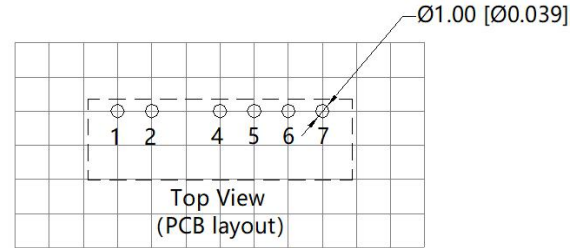
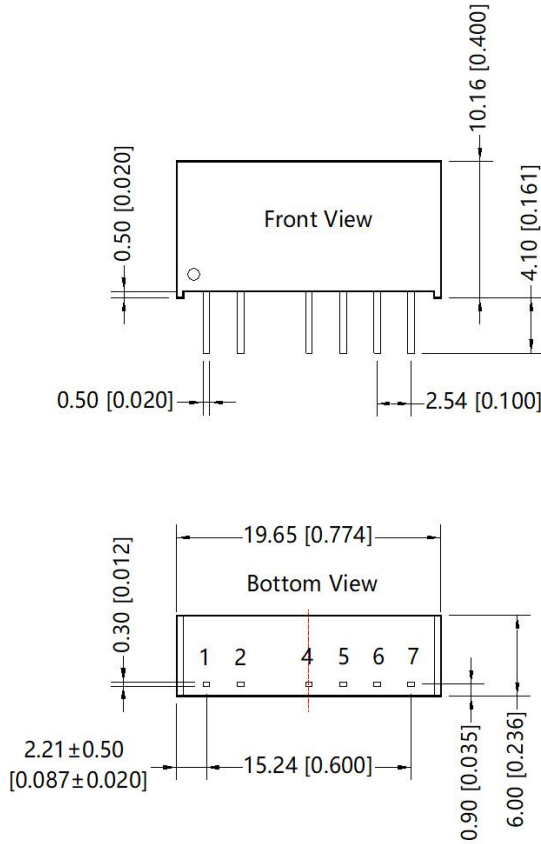


Emissions	C1/C2	4.7μF /50V
	CY1/CY2	270pF/2kV
	C3/C4	Refer to Cout in Fig.3
	LDM	6.8μH

3. For additional information please refer to DC-DC converter application notes on [www.mornsun-power.com](http://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: ±0.10[±0.004]  
General tolerances: ±0.25[±0.010]

Notes:

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