

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



Continuous Short  
Circuit Protection



**UL** **CE** **CB** Patent Protection **RoHS**

## FEATURES

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating ambient temperature range: -40°C to +105°C
- I/O isolation test voltage 3k VDC
- High efficiency up to 85%
- Industry standard pin-out
- Compact DIP package
- IEC62368, UL62368, EN62368 approved

F05\_N-1WR3 series are designed for use in distributed power supply systems and especially suitable in applications such as 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.		
UL/CE/CB	F0503N-1WR3	5 (4.5-5.5)	3.3	303/30	70/74	2400
	F0505N-1WR3		5	200/20	78/82	2400
	F0509N-1WR3		9	111/12	79/83	1000
	F0512N-1WR3		12	84/9	79/83	560
	F0515N-1WR3		15	67/7	79/83	560
	F0524N-1WR3		24	42/4	81/85	220

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC/5VDC output	--	270/5	286/10	mA
	9VDC/12VDC output	--	241/12	254/20	
	15VDC/24VDC output	--	241/18	254/30	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)	5VDC input	-0.7	--	9	VDC
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: ±1%	3.3VDC output	--	--	1.5	%/%
		others output	--	--	1.2	
Load Regulation	10%-100% load	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	
Ripple & Noise*	20MHz bandwidth	24VDC output	--	50	100	mVp-p
		others output	--	30	75	

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.	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 when operating temperature ≥ 85°C, (see Fig. 2)	-40	-	105	°C	
Storage Temperature		-55	-	125		
Case Temperature Rise	Ta=25°C					
			3.3VDC output	-	25	-
			others output	-	15	-
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	-	-	300		
Storage Humidity	Non-condensing	-	-	95	%RH	
Switching Frequency	100% load, nominal input voltage	-	270	-	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	12.70 x 10.16 x 8.20 mm
Weight	1.8g(Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV , Contact ±4kV perf. Criteria B

### Typical Characteristic Curves

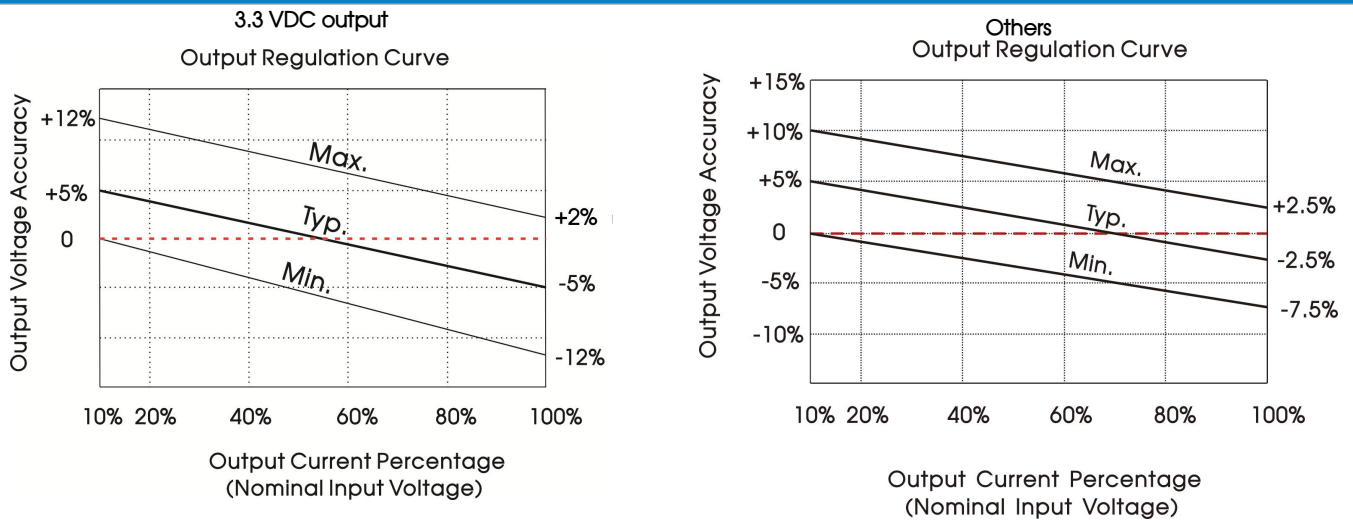


Fig. 1

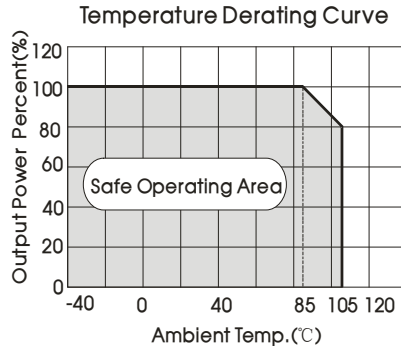
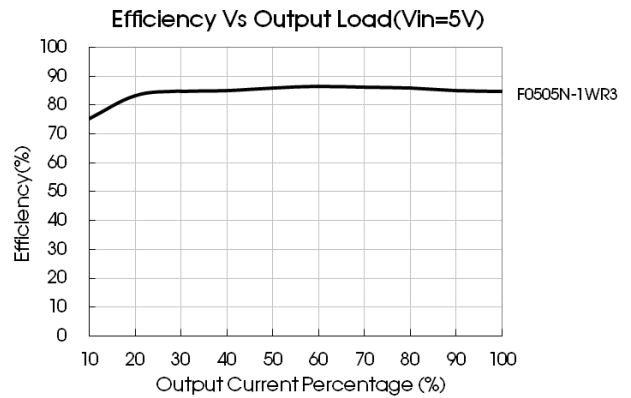
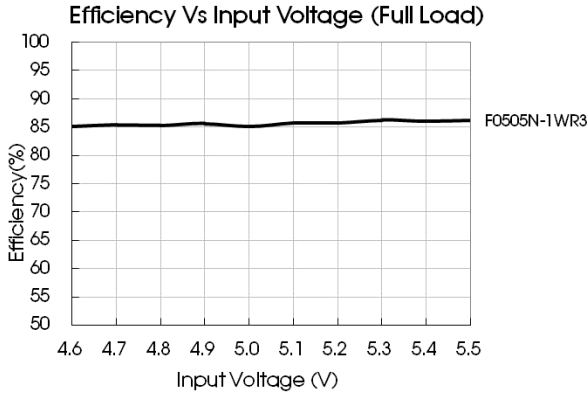


Fig. 2



## 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

Vin(VDC)	Cin(μF)	Vo (VDC)	Cout(μF)
5	4.7	3.3/5	10
--	--	9/12	2.2
--	--	15/24	1

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

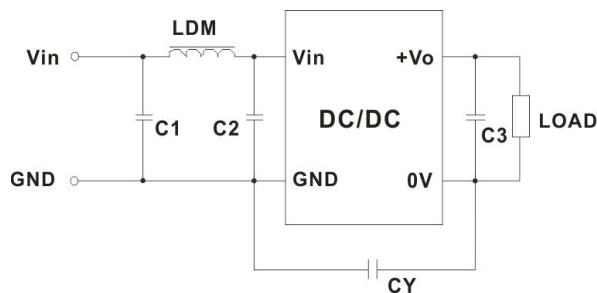


Fig. 4

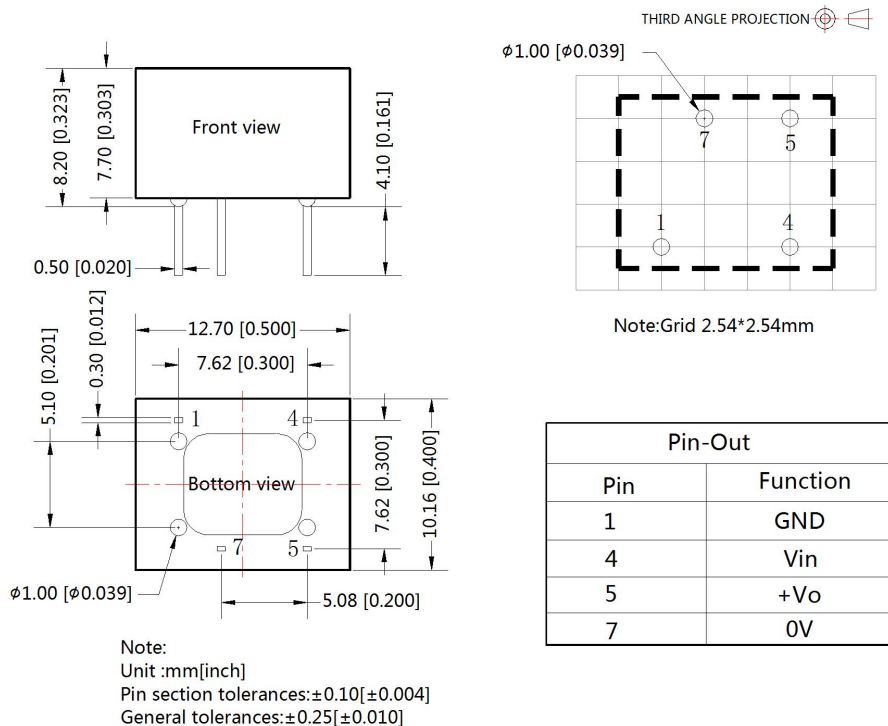
Table 2: Recommended EMC filter values

Input voltage 5VDC	Output voltage (VDC)	3.3/5/9	12/15/24
	EMI	C1/C2	4.7μF /25V
		CY	–
		C3	Refer to the Cout in table 1
LDM	6.8μH	6.8μH	

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

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:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58200011;
- 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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