DC/DC Converter
SF05_N-1WR3 series

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

Continuous Short Circuit Protection

c UL us CE CB Patent Protection RoHS

FEATURES

- Continuous short-circuit protection
- Operating ambient temperature range: -40℃ to +105℃
- I/O isolation test voltage 3k VDC
- High efficiency up to 85%
- Industry standard pin-out
- IEC62368, UL62368, EN62368 approved

SF05_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	SF0503N-1WR3	5 (4.5-5.5)	3.3	303/30	70/74	2400
UL/CE/CB	SF0505N-1WR3		5	200/20	78/82	2400
--	SF0507N-1WR3		7.2	139/13	76/80	1000
UL/CE/CB	SF0509N-1WR3		9	111/12	79/83	1000
UL/CE/CB	SF0512N-1WR3		12	84/9	79/83	560
UL/CE/CB	SF0515N-1WR3		15	67/7	79/83	560
UL/CE/CB	SF0524N-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
	7.2VDC/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/7.2VDC 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	–	%/℃
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 Voltage	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℃, (see Fig. 2)		-40	–	105	℃
Storage Temperature			-55	–	125	
Case Temperature Rise	Ta=25℃	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		5	–	95	%RH
Vibration			10-150Hz, 5G, 0.75mm, along X, Y and Z			
Switching Frequency	100% load, nominal input voltage		–	270	–	kHz
MTBF	MIL-HDBK-217F@25℃		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

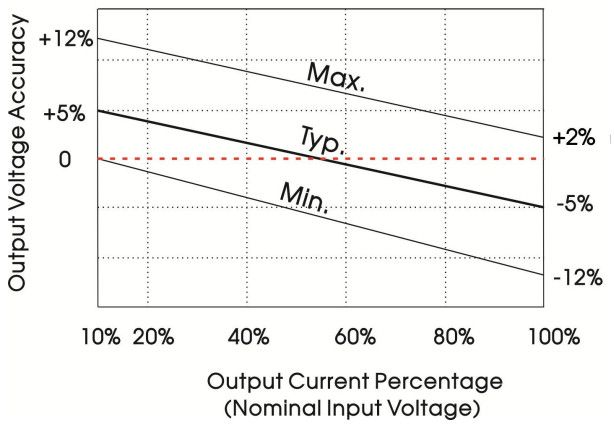
Electromagnetic Compatibility (EMC)

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

3.3 VDC output

Output Regulation Curve



Others

Output Regulation Curve

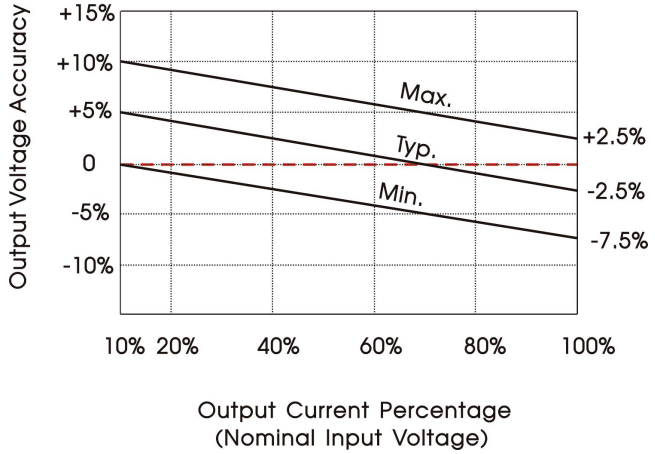


Fig. 1

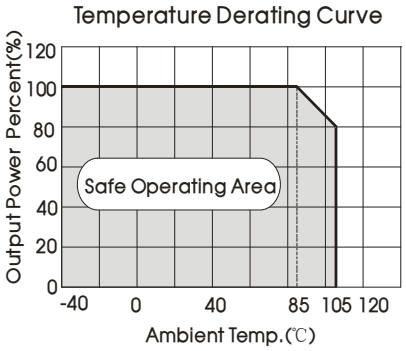
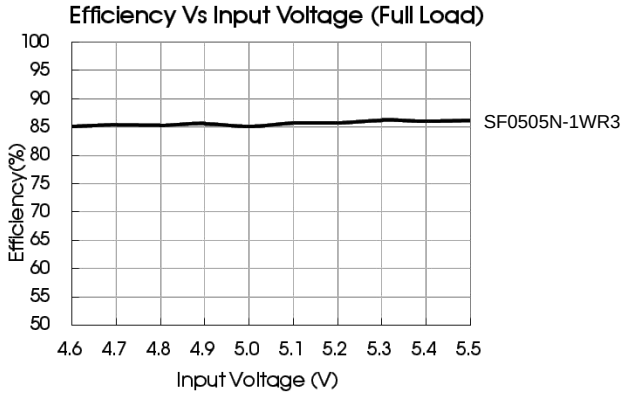
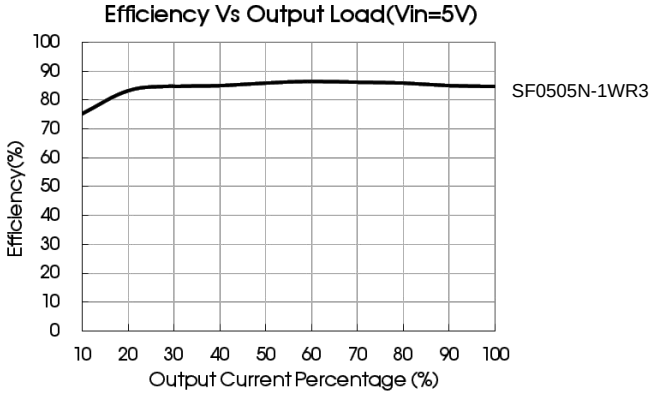


Fig. 2





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.

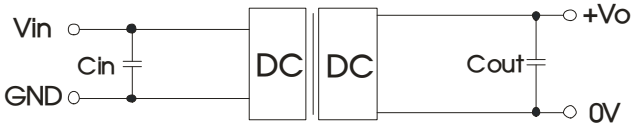


Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
5VDC	4.7μF/16V	3.3/5/7VDC	10μF/16V
--	--	9/12VDC	2.2μF/25V
--	--	15/24VDC	1μF/50V

2. EMC compliance circuit

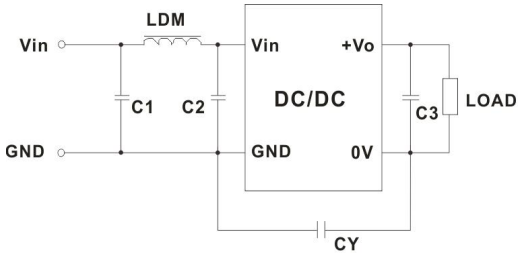


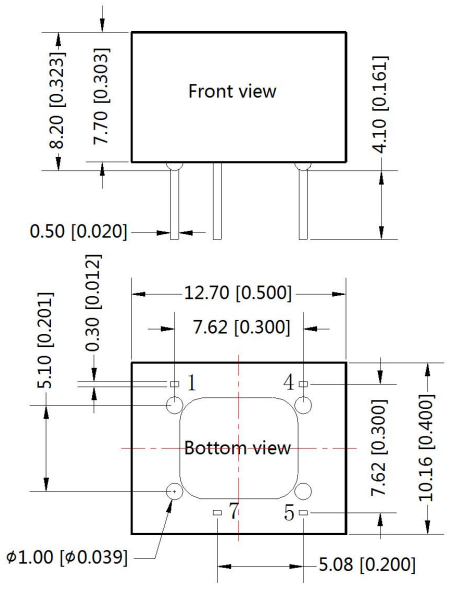
Fig. 4

Table 2: Recommended EMC filter values

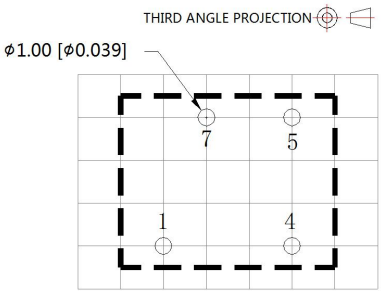
Input voltage 5VDC	Output voltage		3.3/5/7.2/9VDC	12/15/24VDC
	EMI	C1/C2	4.7μF /25V	4.7μF /25V
		CY	--	1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
		C3	Refer to the Cout in table 1	
		LDM	6.8μH	6.8μH

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

Dimensions and Recommended Layout



Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.25[± 0.010]



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	GND
4	Vin
5	+Vo
7	0V

Notes:

1. 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;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. 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;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.