DC/DC Converter

SF05_XT-1WR3 Series

1W, Fixed input voltage, isolated & unregulated single output

Continuous Short Circuit Protection

Patent Protection RoHS

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating temperature range: -40℃ to +105℃
- High efficiency up to 85%
- Compact SMD package
- Isolation voltage: 3K VDC
- International standard pin-out
- UL62368, EN62368 approval

SF05_XT-1WR3 series are specially designed for applications where an 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		Efficiency (%,Min./Typ.) @ Full Load	Max. Capacitive Load (μF)
		Nominal (Range)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)		
UL/CE	SF0503XT-1WR3	5 (4.5-5.5)	3.3	303/30	70/74	2400
	SF0505XT-1WR3		5	200/20	78/82	2400
	SF0509XT-1WR3		9	111/12	79/83	1000
	SF0512XT-1WR3		12	84/9	79/83	560
	SF0515XT-1WR3		15	67/7	79/83	560
	SF0524XT-1WR3		24	42/4	81/85	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	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	--	mA
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
Input Filter			Filter capacitor			
Hot Plug			Unavailable			
Note: * Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.						

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope curve(Fig. 1)			
Line Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	%/%
		Other outputs	--	--	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	Other outputs	--	30	75	mVp-p
		24VDC output	---	50	100	

Temperature Coefficient	Full load	--	±0.02	--	%/℃
Short Circuit Protection		Continuous, self-recovery			
Note:*Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.					

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA		3000	--	--	VDC
Isolation Resistance	Input-output, isolation voltage 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V		--	20	--	pF
Operating Temperature	Derating when operating temperature up to 100℃, (see Fig. 2)		-40	--	105	℃
Storage Temperature			-55	--	125	
Casing Temperature Rise	Ta=25℃	3.3VDC output	--	25	--	
		Other outputs	--	15	--	
Storage Humidity	Non-condensing		--	--	95	%RH
Reflow Soldering Temperature*			Peak temp.≤245℃, maximum duration time≤60s at 217℃			
Switching Frequency	Full load, nominal input voltage		--	270	--	KHz
MTBF	MIL-HDBK-217F@25℃		3500	--	--	K hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1		Level 2			
Note: * For actual application, please refer to IPC/JEDEC J-STD-020D.1.						

Physical Specifications

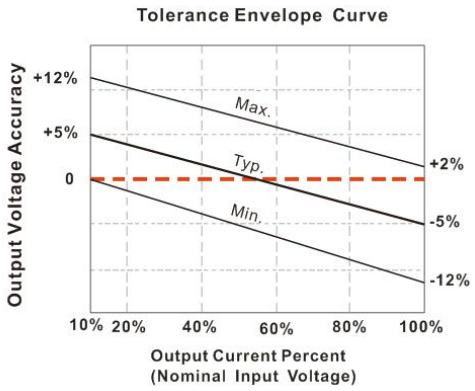
Casing Material	Black flame-retardant and heat-resistant plastic(UL94 V-0)
Dimensions	13.20*11.40*7.25 mm
Weight	1.4g(Typ.)
Cooling Method	Free air convection

EMC Specifications

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

Product Characteristic Curve

3.3VDC output



Other output

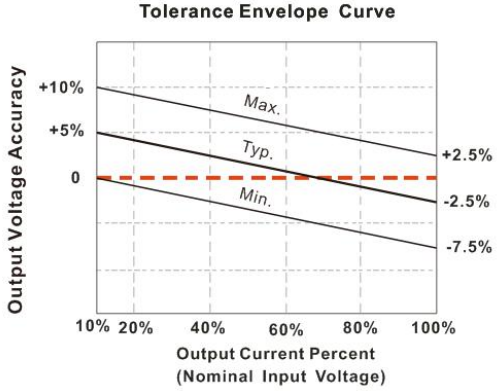


Fig. 1

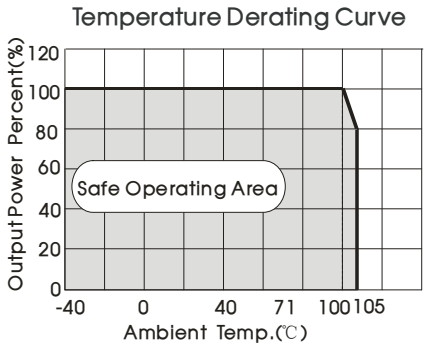
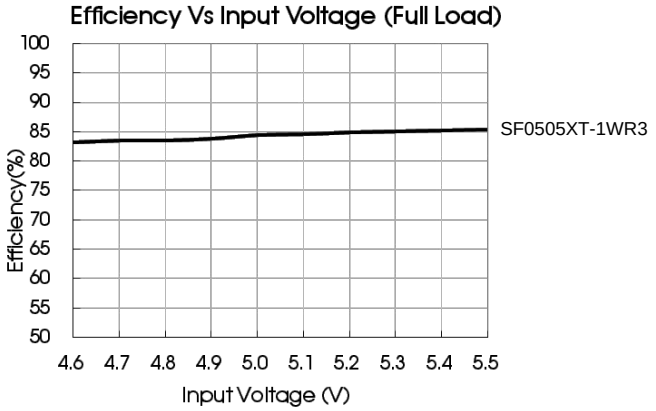
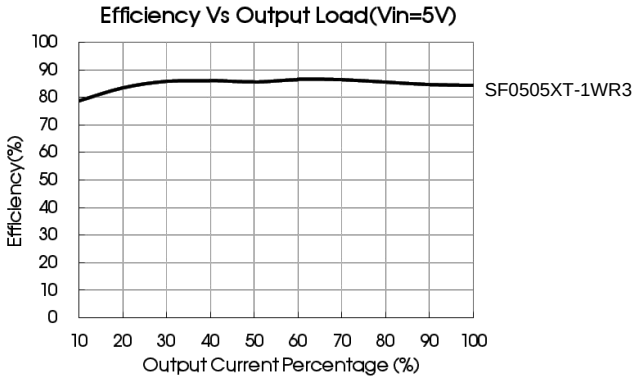


Fig. 2





Design Reference

1. Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

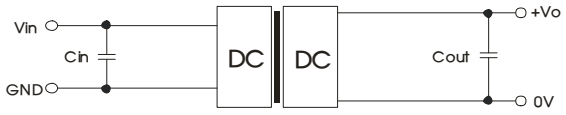


Fig.3

Recommended capacitive load value table (Table 1)

Vin(VDC)	Cin(μF)	Vo (VDC)	Cout(μF)
5	4.7	3.3/5	10
		9	4.7
		12	2.2
		15	1
		24	0.47

2. EMC solution-recommended circuit

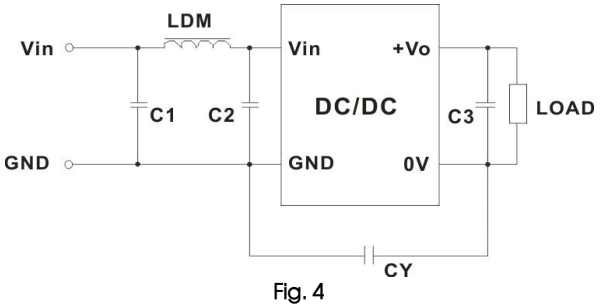


Fig. 4

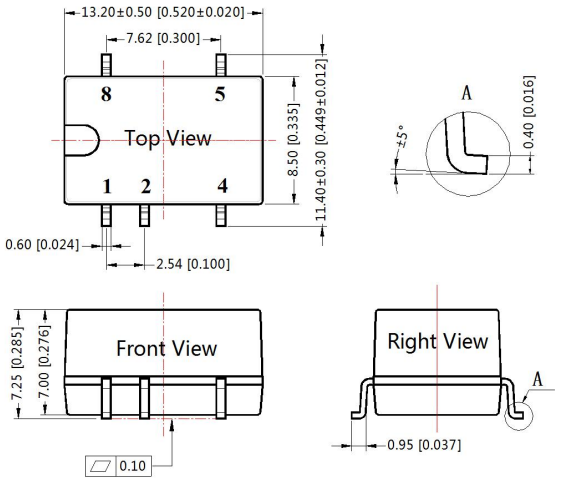
EMC recommended circuit value table (Table 2)

Input voltage 5VDC	Output voltage(VDC)		3.3/5/9	12/15/24
	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

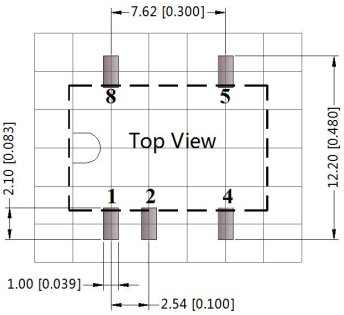
Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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	Function
1	GND
2	Vin
4	0V
5	+Vo
8	NC

NC: Pin to be isolated from circuitry

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's 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.