

3W, fixed input voltage, isolated & unregulated single output



Patent Protection RoHS

## FEATURES

- Operating temperature range: -40°C to +85°C
- Compact SIP package
- Isolation voltage: 3K VDC
- High power density
- No external component required
- International standard pin-out

F\_S-3WR2 series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for

1. Where the voltage of the input power supply is stable (voltage variation:  $\pm 10\%V_{in}$ );
2. Where isolation between input and output is necessary (isolation voltage  $\leq 3000VDC$ );
3. Where the output voltage regulation and the ripple & noise of the output voltage is not strictly required;
4. Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit condition, etc.

## Selection Guide

Part No.	Input Voltage (VDC)	Output		Efficiency (%Min./Typ.) @ Full Load	Max. Capacitive Load ( $\mu F$ )
	Nominal (Range)	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
F0505S-3WR2	5 (4.5-5.5)	5	600/60	80/84	220
F0509S-3WR2		9	333/33	80/84	
F1205S-3WR2	12 (10.8-13.2)	5	600/60	77/81	
F1212S-3WR2		12	250/25	84/88	
F1515S-3WR2	15 (13.5-16.5)	15	200/20	81/85	

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	--	714/40	--/80	mA
	12VDC input	--	308/20	--/40	
	15VDC input	--	230/20	--/40	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)	5VDC input	-0.7	--	9	VDC
	12VDC input	-0.7	--	18	
	15VDC input	-0.7	--	21	
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: $\pm 1\%$	--	--	$\pm 1.2$	--	
Load Regulation	10%-100% load	--	8	--	%	
Ripple & Noise*	20MHz bandwidth	5/9VDC output	--	150	300	mVp-p
		12VDC output	--	150	250	
		15VDC output	--	150	300	
Temperature Coefficient	Full load	--	--	$\pm 0.03$	%/°C	
Short Circuit Protection**		--	--	1	s	

Note: \* Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

\*\*Supply voltage must be discontinued at the end of short circuit duration.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	3000	--	--	VDC
Insulation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating if the temperature ≥71°C. (see Fig. 2)	-40	--	85	°C
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25°C, nominal input, full load output	--	25	--	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	Full load, nominal input voltage	--	100	--	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours

Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Dimensions	19.65*7.05*10.16mm
Weight	2.4g(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 Contact ±6KV perf. Criteria B

Product Characteristic Curve

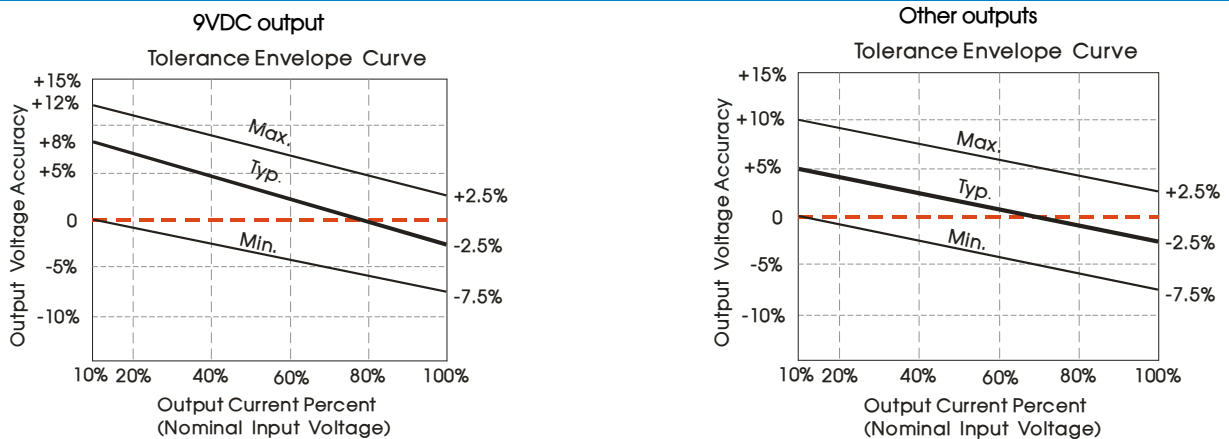


Fig. 1

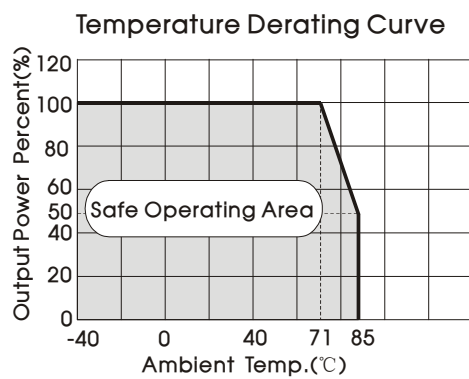
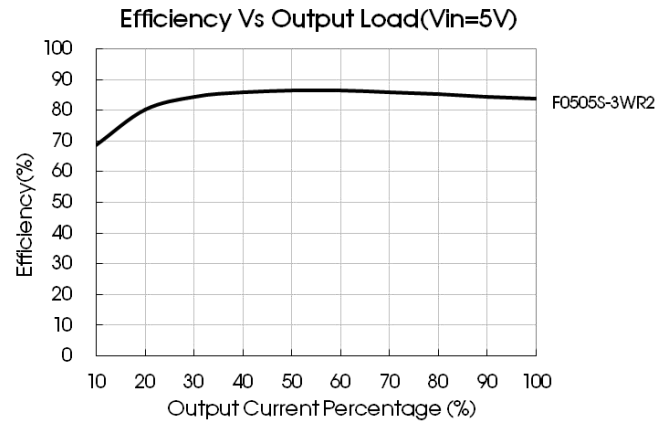
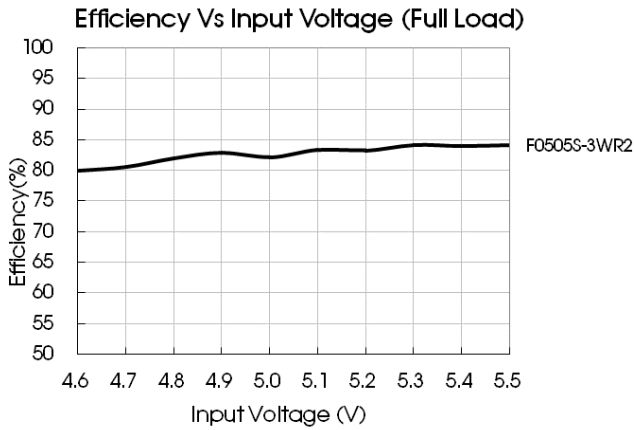


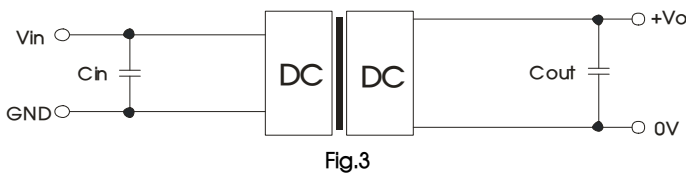
Fig. 2



## Design Reference

### 1. Typical application circuit

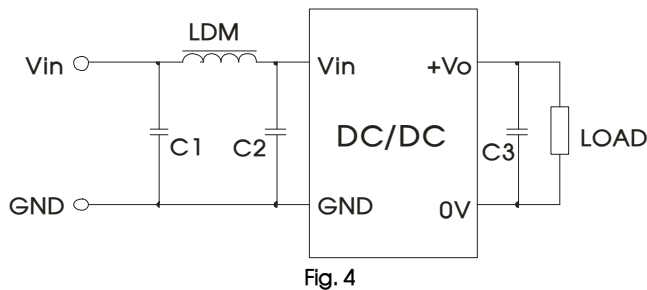
If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe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



Recommended capacitive load value table (Table 1)

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

### 2. EMC solution-recommended circuit



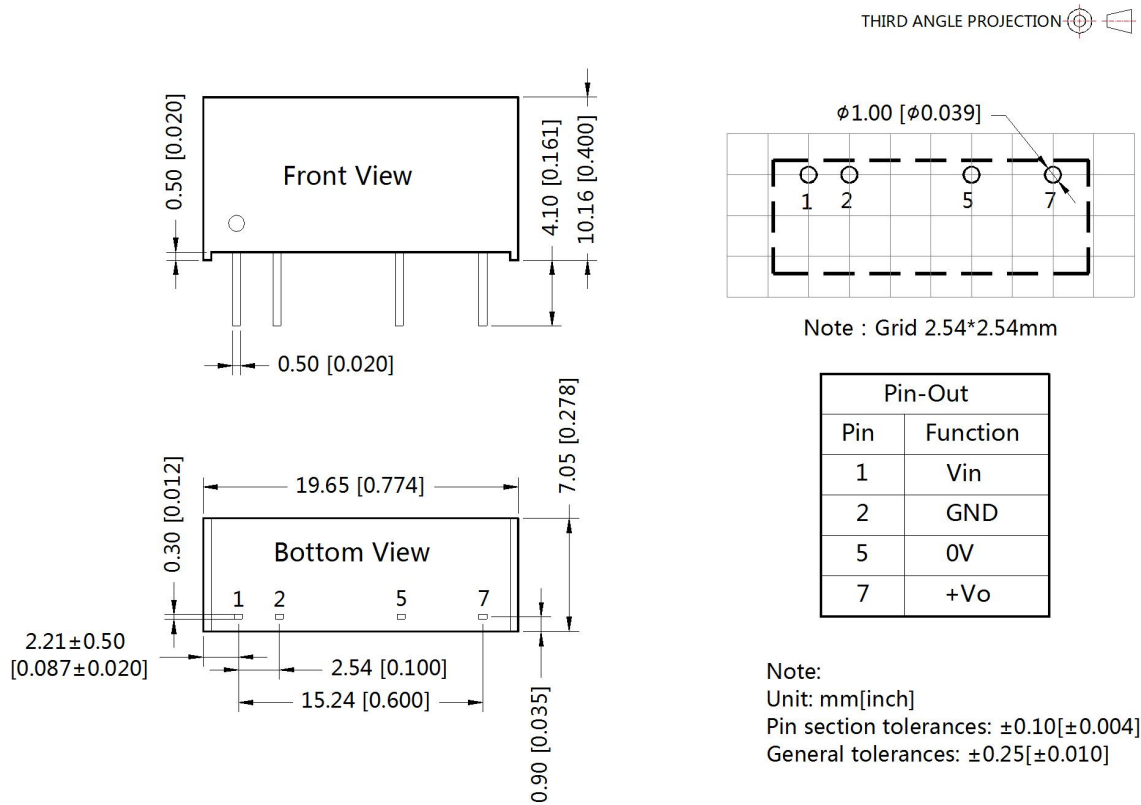
Input voltage (VDC)	5/12	15
C1/ C2	4.7μF /50V	
C3	Refer to the Cout in Fig.3	
LDM	6.8μH	12μH

### 3. Output load requirements

In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side ( The sum of the efficient power and resistor consumption power is not less than 10%).

4. For more information please find DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout



Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from [www.mornsun-power.com](http://www.mornsun-power.com). Packing bag number: 58200001;
2. 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;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. 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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