

3W Isolated DC-DC converter
Fixed input voltage, unregulated single output



Patent Protection RoHS

FEATURES

- Operating ambient temperature range: -40℃ to +85℃
- Compact SIP package
- I/O isolation test voltage 3k VDC
- High power density
- No extra components required
- Industry standard pin-out

F_S-3WR2 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, where:

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.

Selection Guide

Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
	Nominal (Range)	Voltage (VDC)	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		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: $\pm 1\%$		--	--	± 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		--	--	± 0.03	%/℃
Short-circuit Protection**			--	--	1	s

Notes: * The "parallel cable" method is used for Ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.

** At the end of the short circuit duration, the supply voltage must be disconnected from the modules.

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 up to 71°C (see Fig. 2)	-40	--	85	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C, nominal input, full load output	--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 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

Mechanical Specifications

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

Typical Characteristic Curves

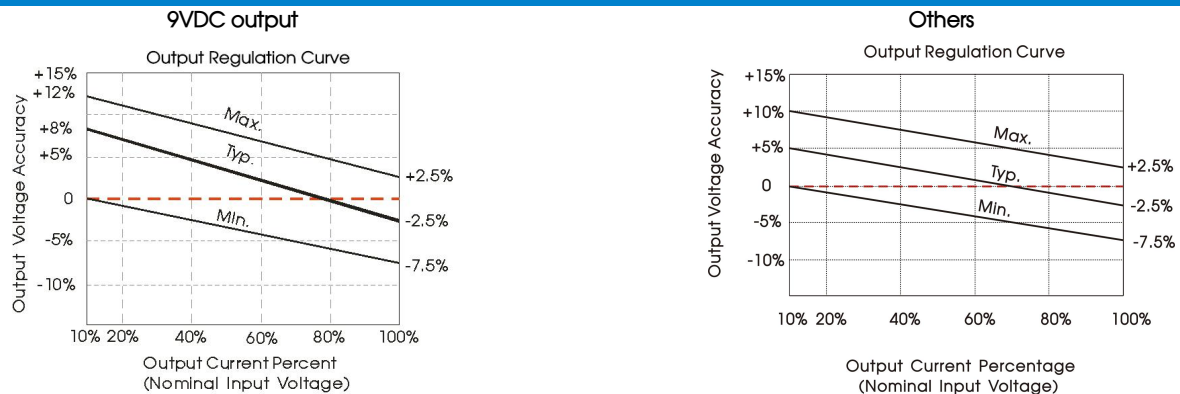


Fig. 1

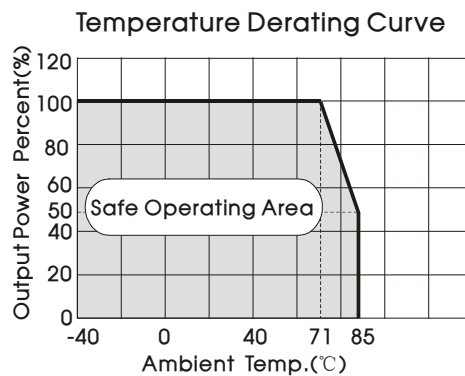
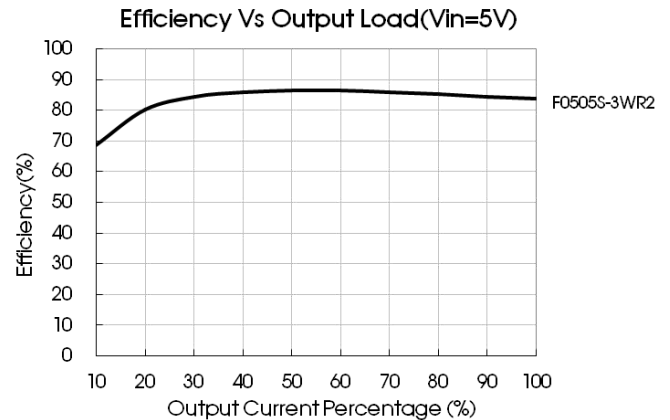
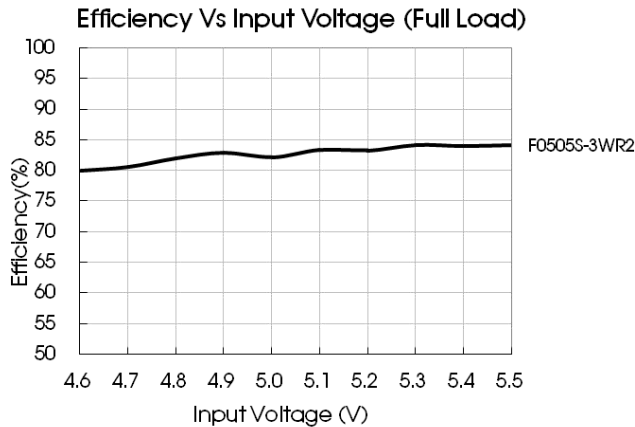


Fig. 2



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	5	10
12/15	2.2	9	4.7
--	--	12/15	2.2

2. EMC (CLASS B) compliance circuit

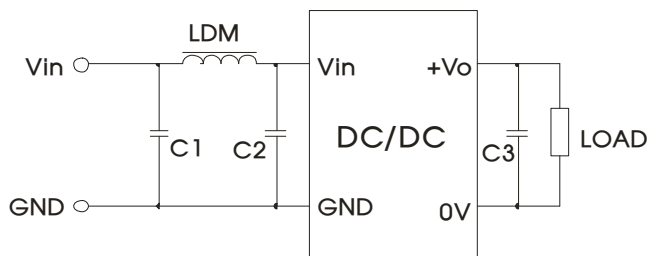


Fig. 4

Table 2: Recommended EMC filter values

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

3. Minimum Output load requirement

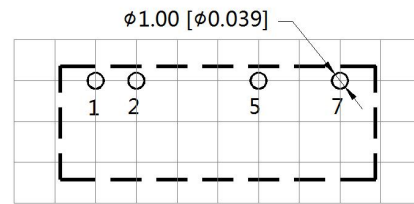
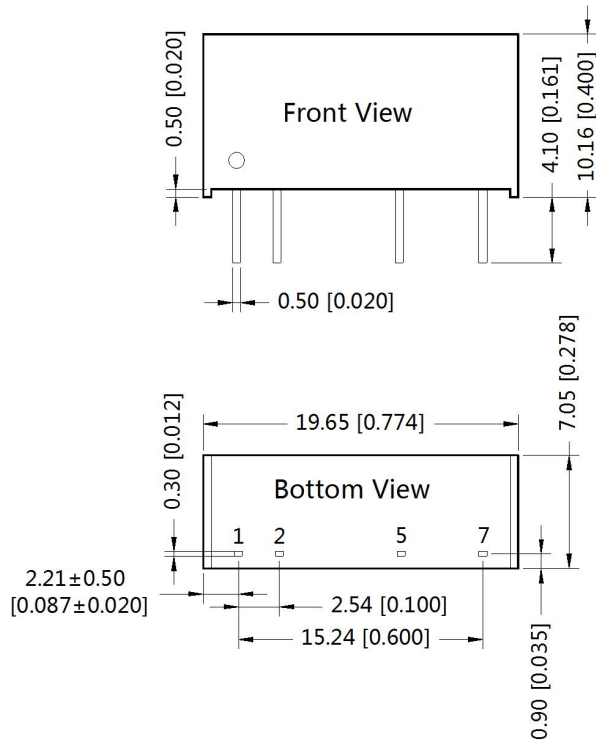
For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

4. For additional information, please refer to DC-DC converter application notes on

www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note : Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	Vin
2	GND
5	0V
7	+Vo

Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.25[\pm 0.010]$

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging 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 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.

MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China

Tel: 86-20-38601850

Fax: 86-20-38601272

E-mail: info@mornsun.cn

www.mornsun-power.com