MORNSUN®

F_S-3WR2 SERIES

3W, *FIXED INPUT, ISOLATED & UNREGULATED SINGLE OUTPUT DC-DC CONVERTER*

Continuous Short Circuit Protection

Patent Protected **RoHS**

FEATURES

- ●Miniature SIP package
- ● Efficiency up to 88%
- ● High power density
- ● 3000VDC isolation
- ● Operating temperature range: -40℃~+85℃
- ● No external component required
- ● Industry standard pinout

PART NUMBER SYSTEM

F0505S-3WR2

- Rated Power
- Package
- Output Voltage
- Input Voltage
- Product Series

APPLICATIONS

The F_S-3WR2 are designed for application where isolated output is required from a distributed power system.

These products apply to where:

1) Input voltage rang :±10%Vin;

2) 3000VDC input and output isolation;

3) Regulated and low ripple noise is not required.

Such as: digital circuits, low frequency analog circuits, and relay drive circuit.

SELECTION GUIDE

Model	Input Voltage(VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA) Max.	Output Current (mA) Max.	Input Current (mA)(Typ.) @Max. Load	Input Current (mA)(Typ.) @No Load	Reflected Ripple Current (mA,Typ.)	Max. Capacitive Load ① (μF)	Efficiency (%, Typ.) @Max. Load
F0505S-3WR2	5 (4.5-5.5)	5	600	60	706	25	15	220	85
F1212S-3WR2	12 (10.8-13.2)	12	250	25	284	20			88
F1205S-3WR2	12 (10.8-13.2)	5	600	60	309	20			81

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec.max.)	5VDC input	-0.7	--	9	VDC
	12VDC input	-0.7	--	18	
Input Filter		Capacitance Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope curve			
Line Regulation	For Vin change of ±1%		--	--	±1.2	%
Load Regulation	10% to 100% load		--	12	--	
Temperature Drift	Full load		--	--	±0.03	%/°C
Ripple & Noise*	20MHz bandwidth	Output Voltage=5VDC	--	100	--	mVp-p
		Output Voltage=12VDC	--	150	--	mVp-p
Short Circuit Protection			Continuous, automatic recovery			

Note: *Ripple and noise tested by “parallel cable” method. See detailed operation instructions at DC-DC Application Notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, tested for 1 minute and leakage current less than 1 mA	3000	--	--	VDC
Isolation Resistance	Input-Output, test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz/0.1V	--	20	--	pF

Switching Frequency	100% load, Input voltage range	--	100	300	KHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Case Material		Plastic (UL94-V0)			
Weight		--	2.4	--	g

ENVIRONMENTAL SPECIFICATIONS

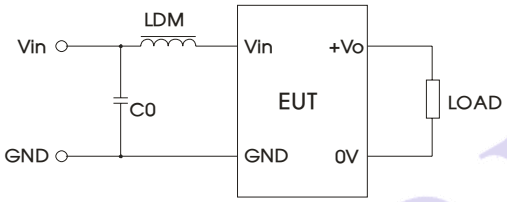
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85℃, see Figure 2)	-40	--	85	℃
Storage Temperature		-55	--	125	
Temp. rise at full load	Ta=25°C	--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B（Recommended Circuit Refer to Figure1）
	RE	CISPR22/EN55022 CLASS B（Recommended Circuit Refer to Figure1）
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B

EMC RECOMMENDED CIRCUIT

EMI Typical Recommended Circuit (CLASS B):

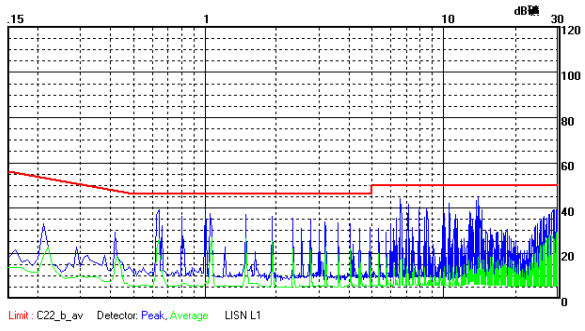


(Figure1)

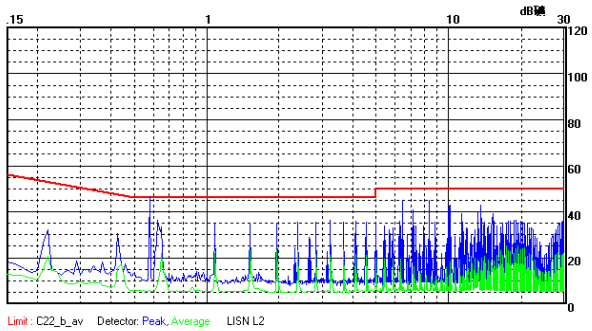
Recommended external circuit parameters:

Vin(V)		5
EMI	C0	4.7μF /50V
	LDM	6.8μH

EMI TEST WAVEFORM (RECOMMENDED CIRCUIT FINGURE 1)

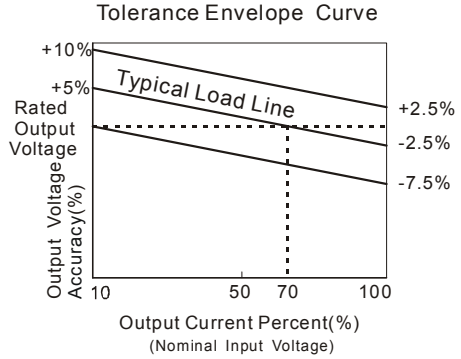


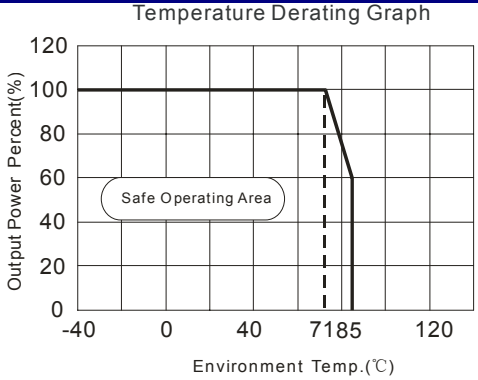
F0505S-3WR2 CE(Class B, Positive line)



F0505S-3WR2 CE(Class B , Negative line)

PRODUCT TYPICAL CURVE

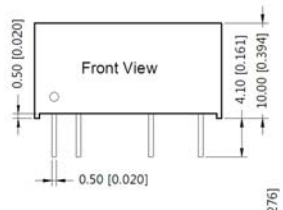


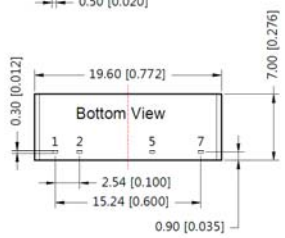


(Figure2)

DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS



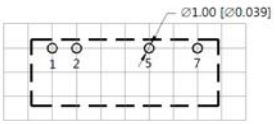


PIN CONNECTION	
Pin	Single
1	Vin
2	GND
5	0V
7	+Vo

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

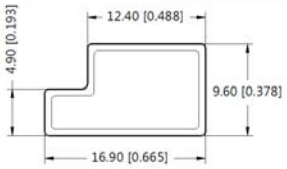
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



Note : Grid 2.54*2.54mm

TUBE PACKAGING DIMENSIONS

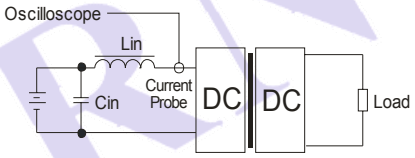


Note:
Unit:mm[inch]
General tolerances:±0.50[±0.020]
L=530[20.866] Tube Quantity:25 pcs
L=220[8.661] Tube Quantity:10 pcs
Inner carton(S): L*W*H=255*170*80
Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)
Inner carton(L): L*W*H=580*200*100
Outer carton(L): L*W*H=600*215*220, 2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325, 3 inner cartons(L)

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is not less than 10% of the full load. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use ou company's products with a lower rated output power.

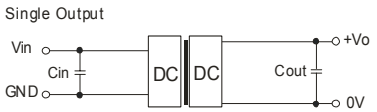
2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to add a circuit breaker to the circuit.

3) Recommended Circuit

If you want to further decrease the input/output ripple, a capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).



(Figure 3)

EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)
5	4.7	5	10

Note: # for each output. It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

4) The input and the output of the product are recommended to be connected to ceramic capacitor or electrolytic capacitor. Using tantalum capacitor may cause risk of failure

5) It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is no hot-swappable

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specifications.
2. Max. Capacitive Load is tested at nominal input voltage and full load.
3. Unless otherwise noted, All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more detail.
6. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

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