

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



Patent Protection **RoHS**



## FEATURES

- Continuous short-circuit protection
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 81%
- Compact SMD package
- I/O isolation test voltage 3k VDC
- Industry standard pin-out

*F\_T-R3 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		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current(mA) Max./Min.		
--	F0505T-W2R3	5 (4.5-5.5)	5	50/5	60/66	1000
	F0505T-W75R3		5	150/15	70/74	1000
	F0505T-1WR3		5	200/20	76/80	1000
	F0509T-1WR3		9	111/11	77/81	680

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC output	--	251/--	264/15	mA
	9VDC output	--	247/--	260/25	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)		-0.7	--	9	VDC
Input Filter		Capacitance filter			
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	
Voltage Accuracy		See output regulation curve(Fig. 1)				
Linear Regulation	Input voltage change: ±1%	--	--	±1.2	--	
Load Regulation	10%-100% load	5VDC output	--	--	15	%
		9VDC output	--	--	10	
Ripple & Noise*	20MHz bandwidth	--	50	75	mVp-p	
Temperature Coefficient	Full load	--	±0.02	--	%/°C	
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	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 $\geq 100^{\circ}\text{C}$ , (see Fig. 2)	-40	--	105	$^{\circ}\text{C}$
Storage Temperature		-55	--	125	
Case Temperature Rise	$T_a=25^{\circ}\text{C}$	--	25	--	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature*		Peak temp. $\leq 245^{\circ}\text{C}$ , maximum duration time $\leq 60\text{s}$ over $217^{\circ}\text{C}$			
Switching Frequency	Full load, nominal input voltage	--	300	--	kHz
MTBF	MIL-HDBK-217F@ $25^{\circ}\text{C}$	3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

Note: \* For actual application, please refer to IPC/JEDEC J-STD-020D.1.

### Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	15.24 x 11.40 x 7.25 mm
Weight	1.3g(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 $\pm 8\text{kV}$ , Contact $\pm 6\text{kV}$ perf. Criteria B

### Typical Characteristic Curves

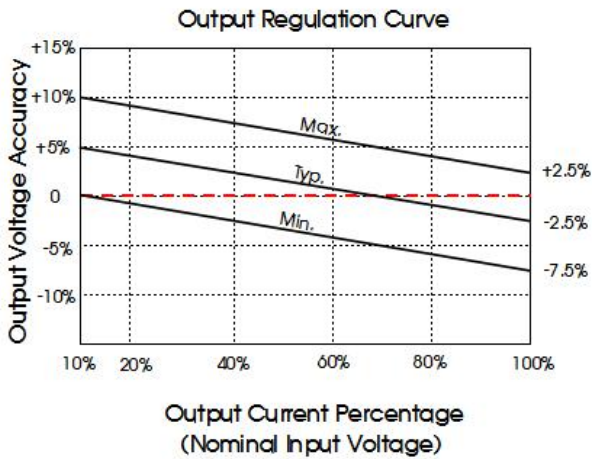


Fig. 1

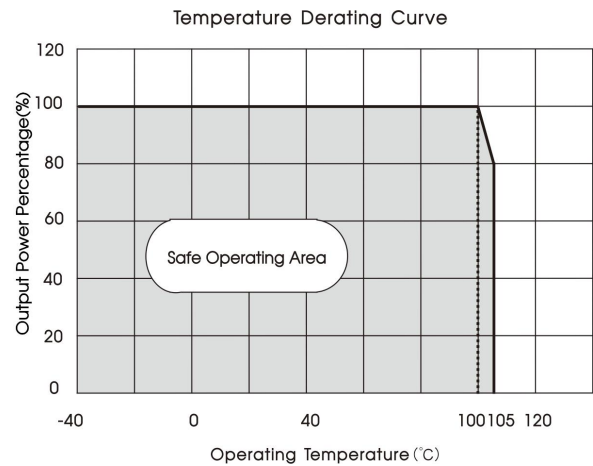


Fig. 2

Design Reference

1. Typical application circuit

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.

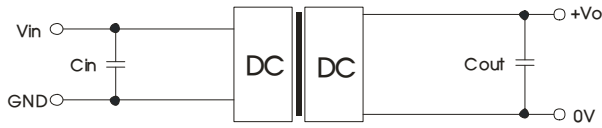


Fig.3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
5VDC	4.7μF/16V	5VDC	10μF/16V
		9VDC	4.7μF/16V

2. EMC compliance circuit

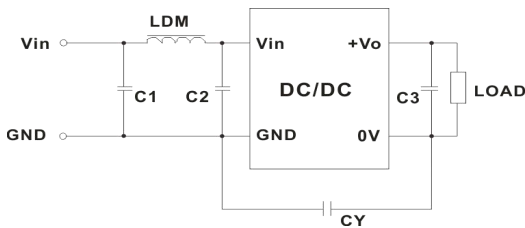


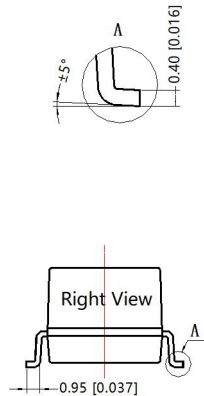
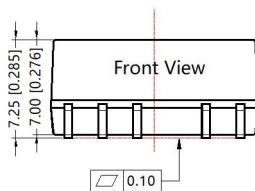
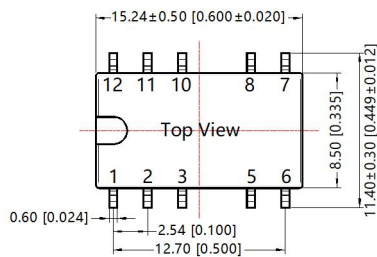
Fig. 4

Table 2: EMC recommended circuit value table

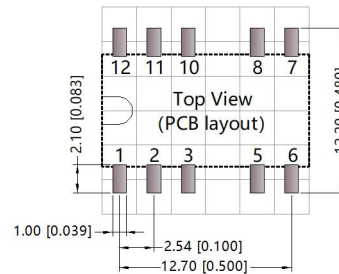
Emissions	C1/C2	4.7μF /50V
	C3/C4	Refer to the Cout in table 1
	LDM	6.8μH

3. For additional information, please refer to DC-DC converter application notes on [www.mornsun-power.com](http://www.mornsun-power.com)

Dimensions and Recommended Layout



THIRD ANGLE PROJECTION



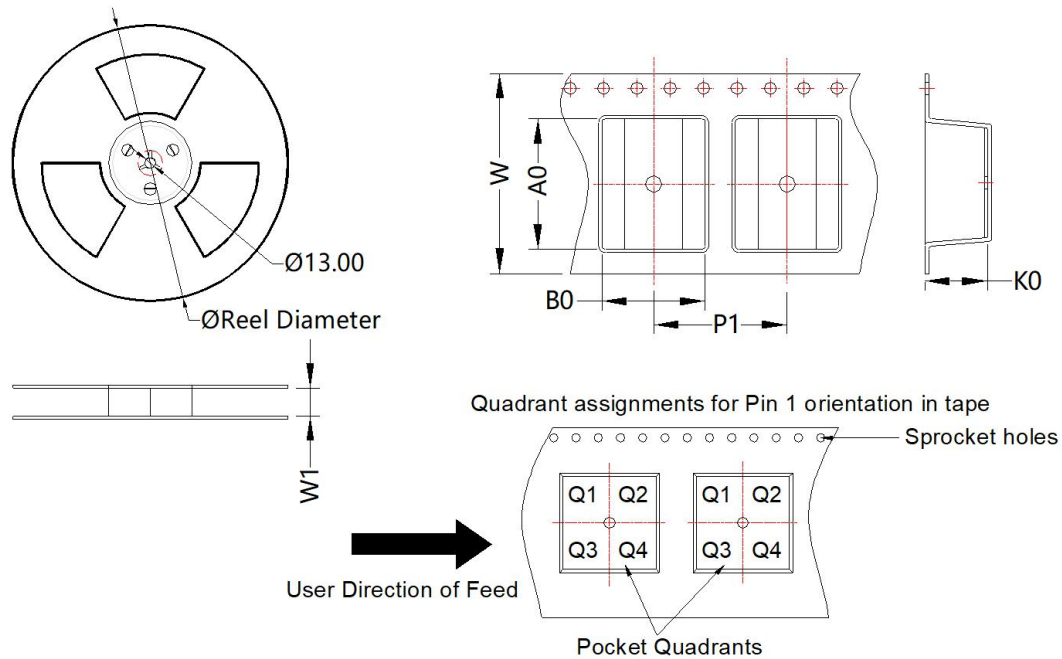
Note: Grid 2.54\*2.54mm

Pin	F_T-1WR3	E_T-1WR3
1	GND	GND
2	Vin	Vin
5	0V	0V
6	NC	-Vo
8	+Vo	+Vo
Other	NC	NC

NC: Pin to be isolated from circuitry

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

Tape and Reel Info



Device	Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
E_T-1WR3	SMD	10	500	330.0	24.5	15.64	12.4	7.45	16.0	24.0	Q1
F_T-1WR3	SMD	10	500	330.0	24.5	15.64	12.4	7.45	16.0	24.0	Q1

Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Tube Packaging bag number: 58210023, Roll Packaging bag number: 58210034;
- 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;
- The maximum capacitive load offered were tested at input voltage range and full load;
- 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;
- All index testing methods in this datasheet are based on our company corporate standards;
- We can provide product customization service, please contact our technicians directly for specific information;
- Products are related to laws and regulations: see "Features" and "EMC";
- 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](mailto:info@mornsun.cn) [www.mornsun-power.com](http://www.mornsun-power.com)