

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



Patent Protection **RoHS**

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage 3k VDC
- Industry standard pin-out

F_XT-1WR3G 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.

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.		
—	F0303XT-1WR3G	3.3 (2.97-3.63)	3.3	303/30	73/77	2400
	F0305XT-1WR3G		5	200/20	78/82	2400
	F0309XT-1WR3G		9	111/12	80/84	1000
	F0312XT-1WR3G		12	84/9	80/84	560
	F0315XT-1WR3G		15	67/7	80/84	560
	F0324XT-1WR3G		24	42/4	80/84	220
	F0503XT-1WR3G	5 (4.5-5.5)	3.3	303/30	70/74	2400
	F0505XT-1WR3G		5	200/20	78/82	2400
	F0506XT-1WR3G		6	167/17	76/80	2400
	F0509XT-1WR3G		9	111/12	79/83	1000
	F0512XT-1WR3G		12	84/9	79/83	560
	F0515XT-1WR3G		15	67/7	79/83	560
	F0524XT-1WR3G		24	42/4	81/85	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	394/12	416/--	mA
		5VDC output	--	370/12	389/--	
		9VDC/12VDC/15VDC/24VDC output	--	361/12	379/--	
	5VDC input	3.3VDC output	--	270/8	286/--	
		5VDC output	--	244/8	256/--	
		6VDC output		250/12	263/--	
		9VDC/12VDC output	--	241/12	254/--	
		15VDC output	--	241/18	254/--	
	24VDC output	--	236/18	247/--		
Reflected Ripple Current*			--	15	--	mA
Surge Voltage (1sec. max.)	3.3VDC input		-0.7	--	5	VDC
	5VDC input		-0.7	--	9	
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: ±1%	3.3VDC output		--	--	1.5	--
		Other outputs		--	--	1.2	
Load Regulation	10%-100% load	3.3VD C input	3.3VDC output	--	15	20	%
			5VDC output	--	10	15	
			9VDC/12VDC/15VDC output	--	8	15	
			24VDC output	--	6	15	
			3.3VDC output	--	15	20	
		5VDC input	5VDC/6VDC output	--	10	15	
			9VDC output	--	8	10	
			12VDC output	--	7	10	
			15VDC output	--	6	10	
			24VDC output	--	5	10	
Ripple & Noise*	20MHz bandwidth	3.3VDC input		--	50	100	mVp-p
		5VDC input	Other outputs	--	30	75	
			24VDC output	---	50	100	
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.							

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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	--	--	M Ω
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V			--	20	--	pF
Operating Temperature	3.3VDC input	For derating with temperature $\geq 85^{\circ}\text{C}$ see Fig. 2		-40	--	105	$^{\circ}\text{C}$
	5VDC input	For derating with temperature $\geq 100^{\circ}\text{C}$ see Fig. 2					
Storage Temperature				-55	--	125	
Case Temperature Rise	Ta=25 $^{\circ}\text{C}$	3.3VDC input		--	25	--	
		5VDC input	3.3VDC output	--	25	--	
			Other outputs	--	15	--	
Storage Humidity	Non-condensing			--	--	95	%RH
Reflow Soldering Temperature*				Peak temp. $\leq 245^{\circ}\text{C}$, maximum duration time $\leq 60\text{s}$ over 217°C			
Vibration	3.3VDC input			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	3.3VDC input		--	220	--	kHz
		5VDC input		--	300	--	
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.							

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Mechanical Specifications

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

Electromagnetic Compatibility (EMC)

Emissions		CE	CISPR32/EN55032	CLASS B	
		RE	CISPR32/EN55032	CLASS B	
Immunity	3.3VDC input	ESD	IEC/EN61000-4-2	Air $\pm 8\text{kV}$, Contact $\pm 6\text{kV}$	perf. Criteria B
	5VDC input	ESD	IEC/EN61000-4-2	Air $\pm 8\text{kV}$, Contact $\pm 4\text{kV}$	perf. Criteria B

Note: Refer to Fig. 4 for recommended circuit test

Typical Characteristic Curves

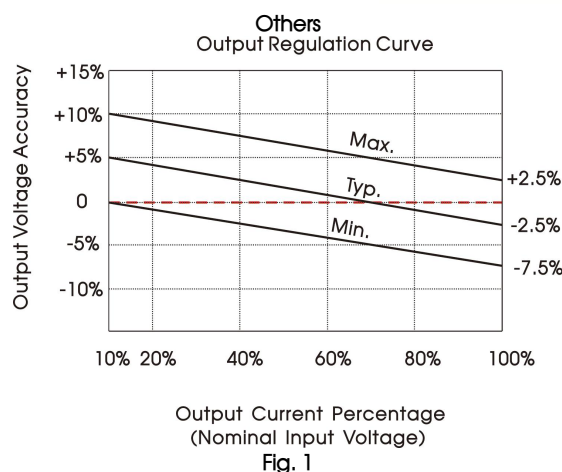
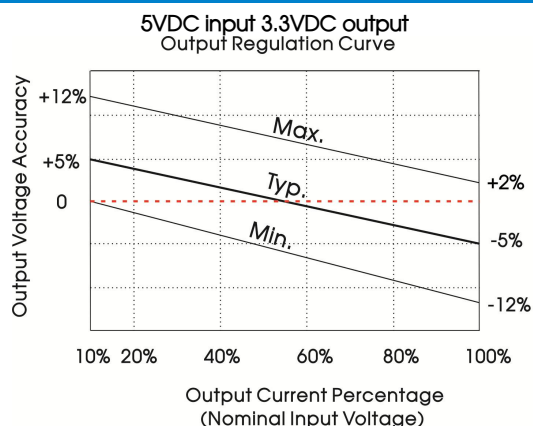
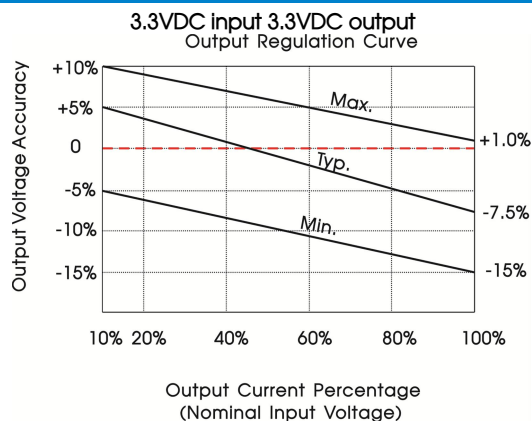


Fig. 1

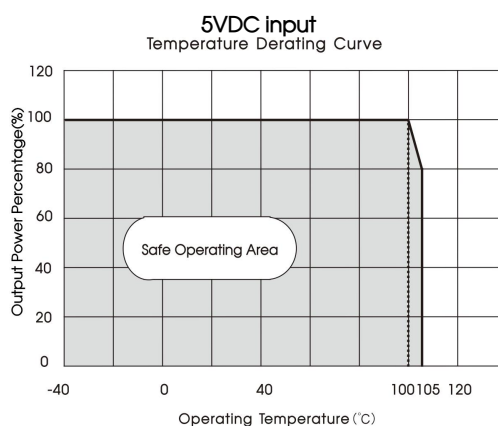
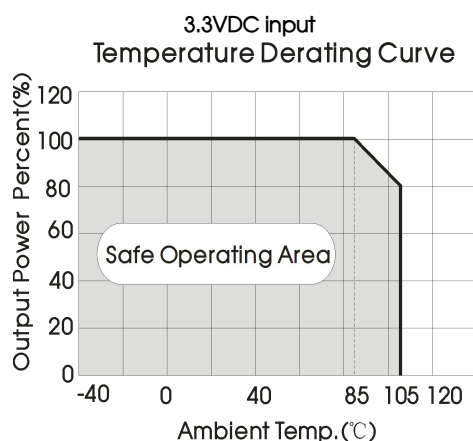
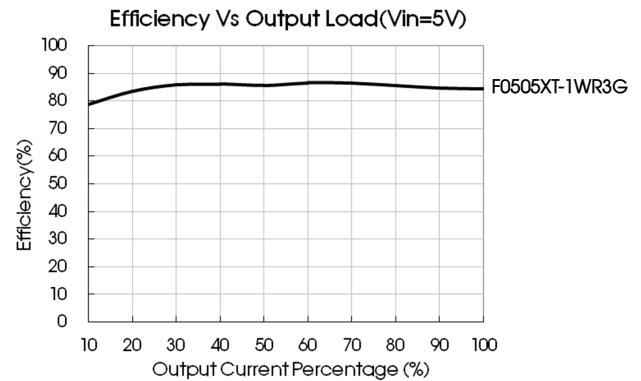
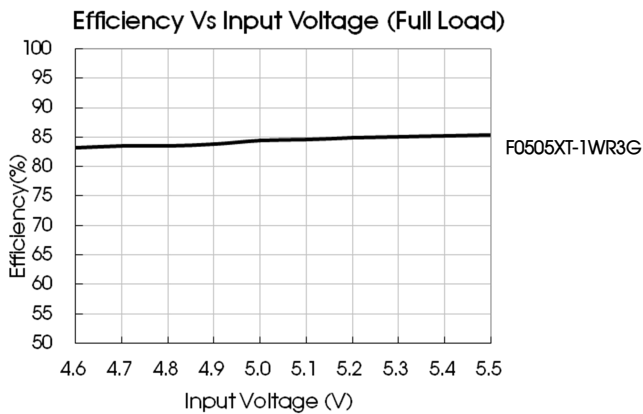
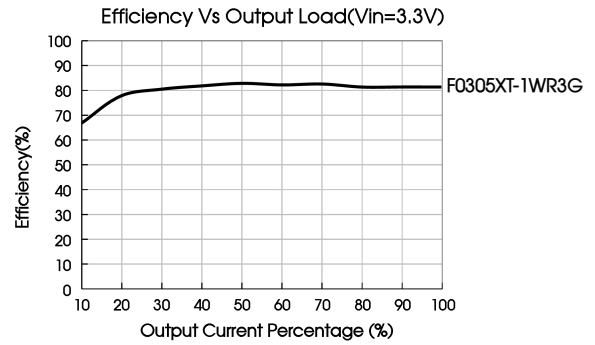
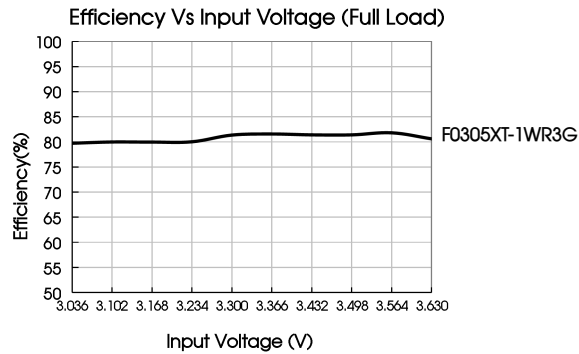


Fig. 2



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	Cin	Vo	Cout
3.3VDC	4.7μF/16V	3.3VDC/5VDC/6VDC	10μF/16V
5VDC	4.7μF/16V	9VDC	4.7μF/16V
--	--	12VDC	2.2μF/25V
--	--	15VDC	1μF/25V
--	--	24VDC	0.47μF/50V

2. EMC (CLASS B) compliance circuit

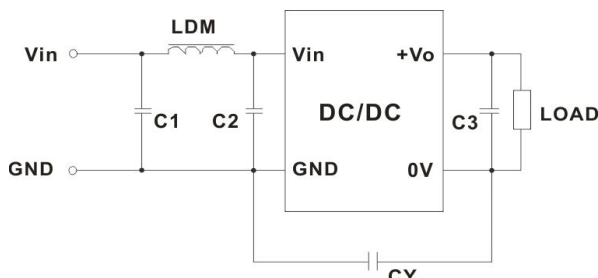


Fig. 4

Table 2: Recommended EMC filter values

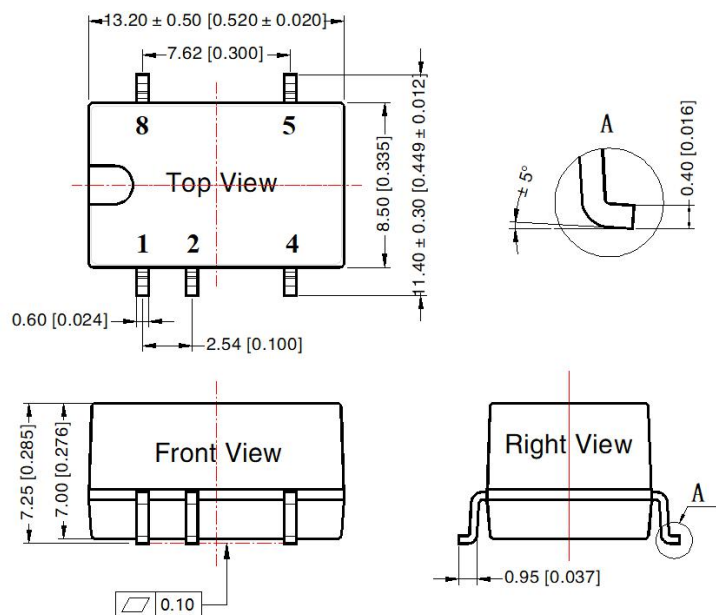
Input voltage		3.3VDC Input		5VDC Input	
Output voltage		--		3.3/5/6/9VDC	12/15/24VDC
Emissions	C1/C2	4.7μF/16V		4.7μF/25V	4.7μF/25V
	CY	270pF/4kVDC		100pF/4kVDC	1nF/4kVDC
	C3	Refer to the Cout in table 1			
	LDM	6.8μH		6.8μH	6.8μH

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

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

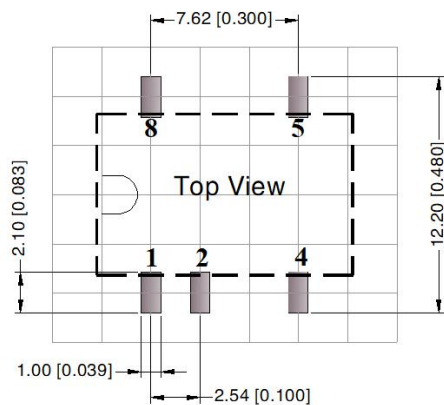
www.mornsun-power.com

Dimensions and Recommended Layout



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

THIRD ANGLE PROJECTION

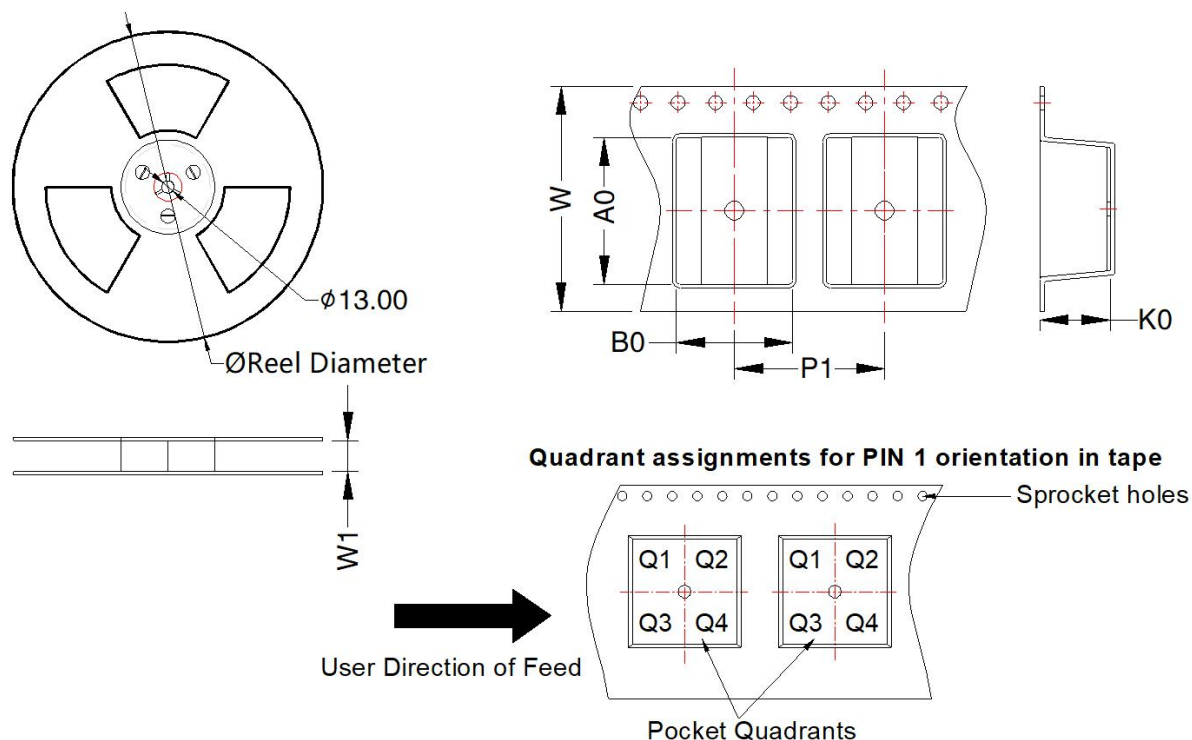


Note: Grid 2.54*2.54mm

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

NC: Pin to be isolated from circuitry

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
F_XT-1WR3G	SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1

Notes:

- For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number: 58210024, Roll Packaging bag number: 58200054;
- 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.

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