

DC/DC Converter

F_XT-1WR2 Series

MORNSUN®

1W isolated DC-DC converter

Fixed input voltage, unregulated single output



Report

EN 62368-1

Patent Protection

RoHS



Continuous Short
Circuit Protection



FEATURES

- Continuous short-circuit protection
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 80%
- SMD package
- I/O isolation test voltage 3k VDC
- Low ripple & noise
- Industry standard pin-out

F_XT-1WR2 series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: Pre-stage interference isolation, ground interference cancellation, pure digital circuits, voltage isolation conversion, general low-frequency analog circuits, relay drive circuits, etc.

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.		
EN	F0303XT-1WR2	3.3 (2.97-3.63)	3.3	303/30	65/69	220
	F0305XT-1WR2		5	200/20	70/74	
	F0312XT-1WR2		12	84/9	72/76	
	F0503XT-1WR2	5 (4.5-5.5)	3.3	303/30	68/72	
	F0505XT-1WR2		5	200/20	76/80	
	F0506XT-1WR2		6	167/17	76/80	
	F0509XT-1WR2		9	111/12	76/80	
	F0512XT-1WR2		12	84/9	76/80	
	F0515XT-1WR2		15	67/7	76/80	
	F0524XT-1WR2		24	42/4	76/80	
	F1203XT-1WR2	12 (10.8-13.2)	3.3	303/30	68/72	
	F1205XT-1WR2		5	200/20	74/78	
	F1209XT-1WR2		9	111/12	76/80	
	F1212XT-1WR2		12	84/9	76/80	
	F1215XT-1WR2		15	67/7	76/80	
	F1224XT-1WR2		24	42/4	76/80	
	F1515XT-1WR2	15 (13.5-16.5)	15	67/7	76/80	
	F2405XT-1WR2	24 (21.6-26.4)	5	200/20	76/80	
	F2409XT-1WR2		9	111/12	76/80	
	F2415XT-1WR2		15	67/7	76/80	
	F2424XT-1WR2		24	42/4	76/80	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V input	--	404/25	--/70	mA
	5V input	--	250/20	--/60	
	12V input	--	104/15	--/50	
	15V input	--	82/10	--/35	
	24V input	--	52/7	--/30	
Reflected Ripple Current		--	15	--	mA
Surge Voltage (1sec. max.)	3.3V input	-0.7	--	5	VDC

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Surge Voltage (1sec. max.)	5V input	-0.7	--	9	VDC
	12V input	-0.7	--	18	
	15V input	-0.7	--	21	
	24V input	-0.7	--	30	
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curve(Fig. 1)			
Linear Regulation	Input voltage change: $\pm 1\%$	3.3VDC output	--	--	± 1.5	--
		Other outputs	--	--	± 1.2	
Load Regulation	10%-100% load	3.3VDC output	--	18	--	%
		5VDC output	--	12	--	
		6VDC output	--	10	--	
		9VDC output	--	8	--	
		12VDC output	--	7	--	
		15VDC output	--	6	--	
		24VDC output	--	5	--	
Ripple & Noise*	20MHz bandwidth		--	60	150	mVp-p
Temperature Coefficient	Full load		--	--	± 0.03	%/°C
Short-circuit Protection**	F03xxXT-1WR2/F24xxXT-1WR2/F0524XT-1WR2		--	--	1	s
	Others		Continuous, self-recovery			

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

** Supply voltage must be discontinued at the end of short circuit duration for F03xxXT-1WR2 series, F24xxXT-1WR2 series, and F0524XT-1WR2 model.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	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 100°C, (see Fig. 2)	-40	--	105	°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
Reflow Soldering Temperature	Peak temp. $\leq 245^{\circ}\text{C}$, maximum duration time $\leq 60\text{s}$ over 217°C . For actual application, please refer to IPC/JEDEC J-STD-020D.1.				
Switching Frequency	Full load, nominal input voltage	--	100	--	kHz
MTBF	MIL-HDFK-217F@25°C	3500	--	--	k hours

Mechanical Specifications

Case Material	Black epoxy resin; flame-retardant heat- resistant (UL94 V-0)
Dimensions	12.70 x 11.20 x 7.25 mm
Weight	1.6g(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 ±8kV perf. Criteria B

Typical Characteristic Curves

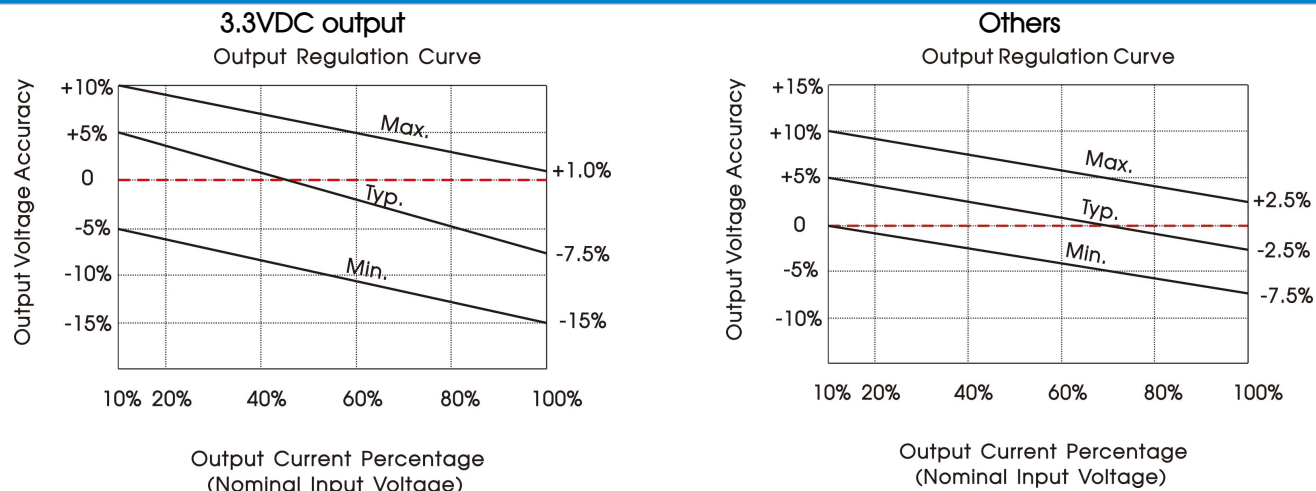


Fig. 1

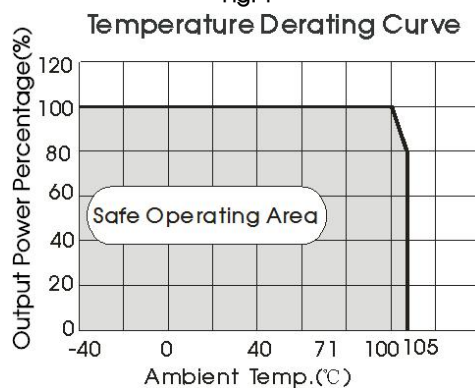
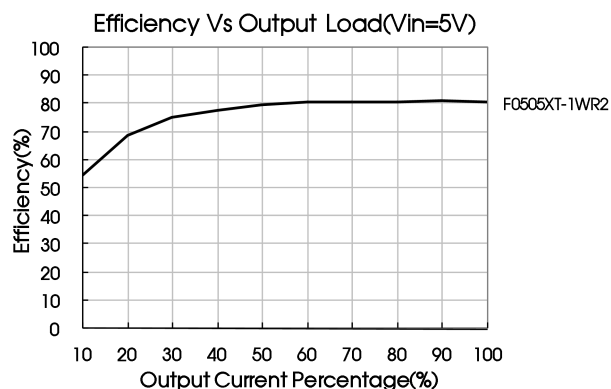
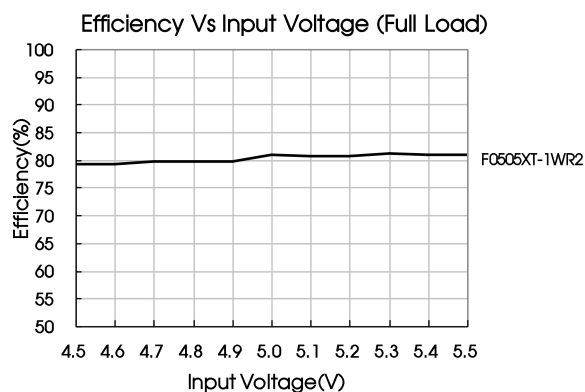
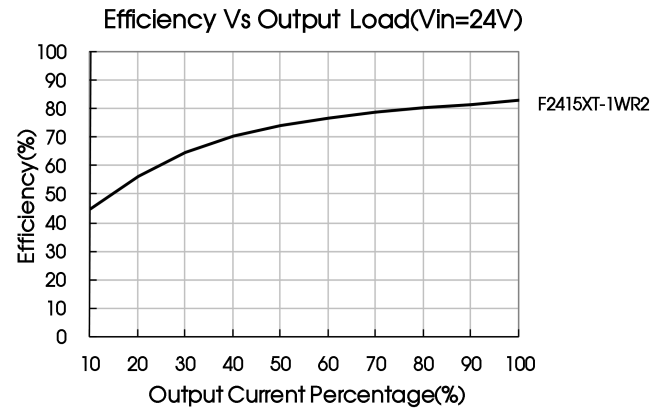
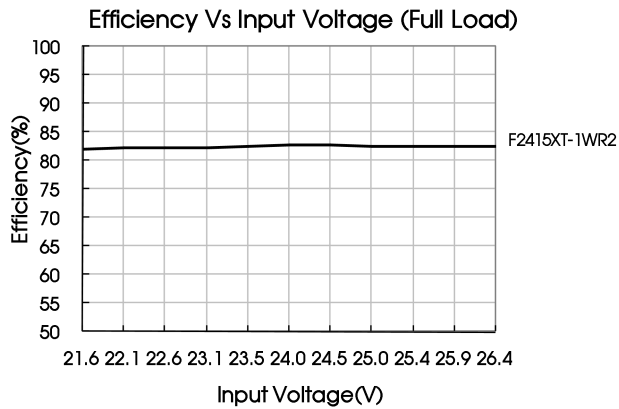


Fig. 2





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.

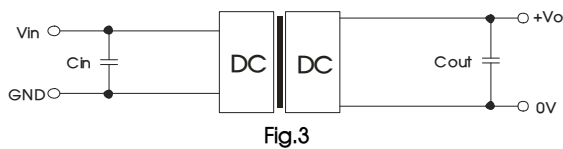


Fig.3

Recommended capacitive load value table (Table 1)

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

2. EMC (CLASS B) compliance circuit

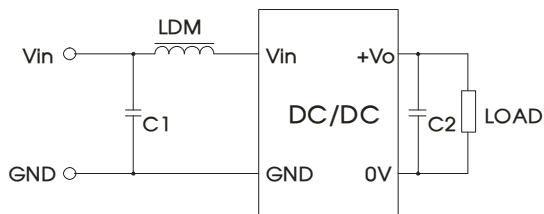


Fig. 4

Input voltage		3.3/5/12/15/24VDC
Emissions	C1	4.7μF /50V
	C2	Refer to the Cout in Fig.3
	LDM	6.8μH


3. Output load requirements

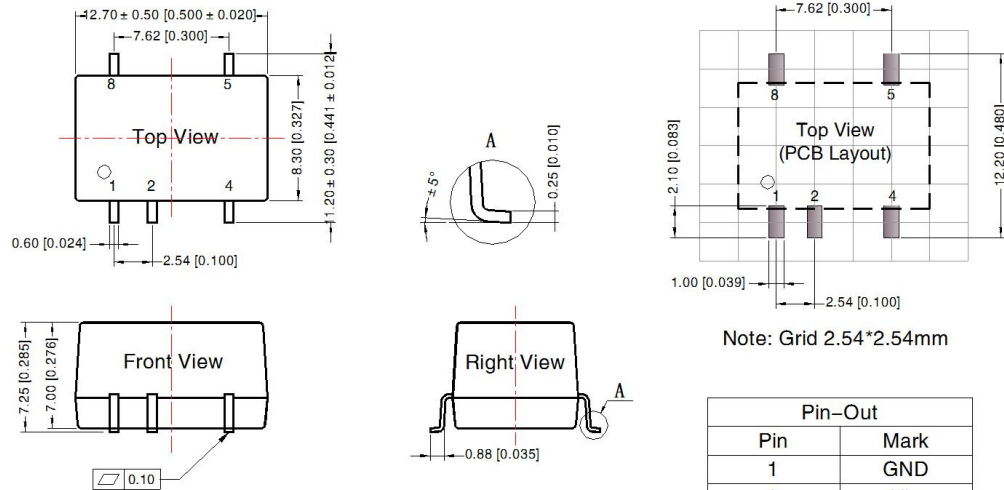
For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained 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:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10 [\pm 0.004]$
General tolerances: $\pm 0.25 [\pm 0.010]$

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

NC: Pin to be isolated from circuitry

Notes:

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