

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



**UL** **CE** **CB** Patent Protection **RoHS**

### FEATURES

- Continuous short-circuit protection
- Operating ambient temperature range: -40°C ~ +105°C
- Compact SMD package
- I/O isolation test voltage 1.5k VDC
- Internal surface mounted design
- No extra components required
- Industry standard pin-out
- IEC62368, UL60950, EN60950 approved

*B\_XT-1WR2 series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for*

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  $\leq 1500VDC$ );
3. Where the output voltage regulation and the ripple & noise of the output voltage is not strictly required;
4. Typical application: digit circuit condition; normal low-frequency artificial circuit condition; relay drive circuit condition, etc.

### Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load( $\mu$ F) Max.
		Nominal (Range)	Voltage (VDC)	Current(mA) Max./Min.		
CE	B0303XT-1WR2	3.3 (2.97-3.63)	3.3	303/30	65/69	220
UL/CE	B0305XT-1WR2		5	200/20	70/74	
--	B0309XT-1WR2		9	111/12	76/80	
CE	B0312XT-1WR2		12	84/9	76/80	
	B0315XT-1WR2		15	67/7	76/80	
	B0324XT-1WR2		24	42/4	76/80	
UL/CE	B0503XT-1WR2	5 (4.5-5.5)	3.3	303/30	68/72	
	B0505XT-1WR2		5	200/20	76/80	
	B0506XT-1WR2		6	167/17	76/80	
	B0509XT-1WR2		9	111/12	76/80	
	B0512XT-1WR2		12	84/9	76/80	
	B0515XT-1WR2		15	67/7	76/80	
	B0524XT-1WR2		24	42/4	76/80	
	CE		B1203XT-1WR2	12 (10.8-13.2)	3.3	
B1205XT-1WR2		5	200/20		76/80	
B1209XT-1WR2		9	111/12		76/80	
B1212XT-1WR2		12	84/9		76/80	
B1215XT-1WR2		15	67/7		76/80	
CE	B1224XT-1WR2	15 (13.5-16.5)	24	42/4	76/80	
	B1505XT-1WR2		5	200/20	76/80	
--	B1509XT-1WR2	9	111/12	76/80		
CE	B1515XT-1WR2	15	67/7	76/80		
UL/CE	B2403XT-1WR2	24 (21.6-26.4)	3.3	303/30	67/71	
	B2405XT-1WR2		5	200/20	76/80	
	UL/CE/CB		B2409XT-1WR2	9	111/12	76/80
	CE		B2412XT-1WR2	12	84/9	76/80
	UL/CE		B2415XT-1WR2	15	67/7	76/80
			B2424XT-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
	5V input	-0.7	--	9	
	12V input	-0.7	--	18	
	15V input	-0.7	--	21	
	24V input	-0.7	--	30	
Input Filter		Capacitance filters			
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: ±1%	3.3VDC output	--	--	±1.5	--
		Others	--	--	±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**	B03xxXT-1WR2/B24xxXT-1WR2/ B0524XT-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 B03xxXT-1WR2 series, B24xxXT-1WR2 series, and B0524XT-1WR2 model.						

### 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.	1500	--	--	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 ≥ 100°C (see Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C, nominal input, full load output	--	25	--	
Storage Humidity	Non-condensing	--	--	95	%RH
Reflow Soldering Temperature		Peak temp. ≤ 245°C, maximum duration time ≤ 60s over 217°C. For actual application, please refer to IPC/JEDEC J-STD-Q20D.1.			
Switching Frequency	Full load, nominal input voltage	--	100	--	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours

Mechanical Specifications

Case Material	Black epoxy resin; flame-retardant and 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

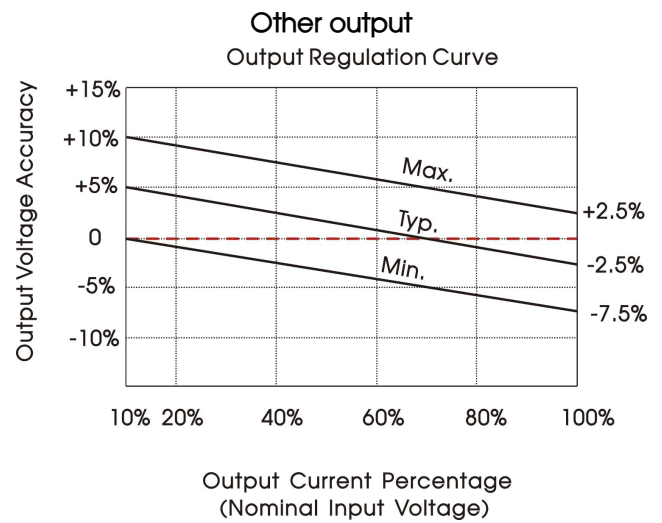
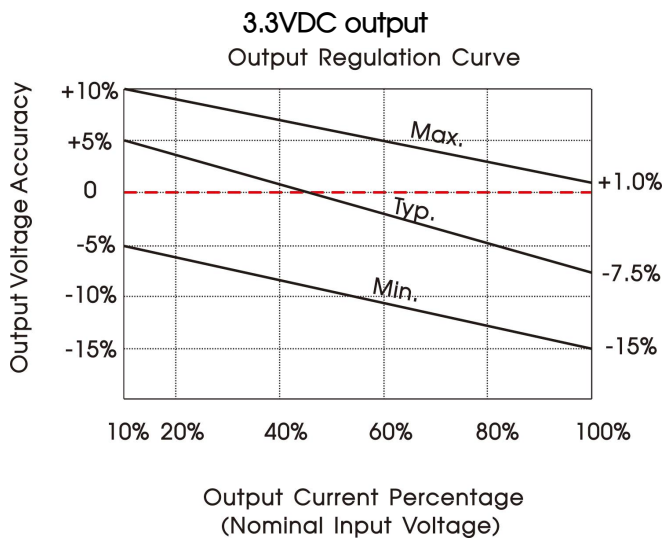


Fig. 1

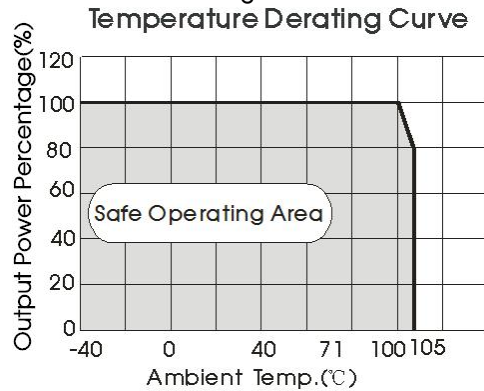
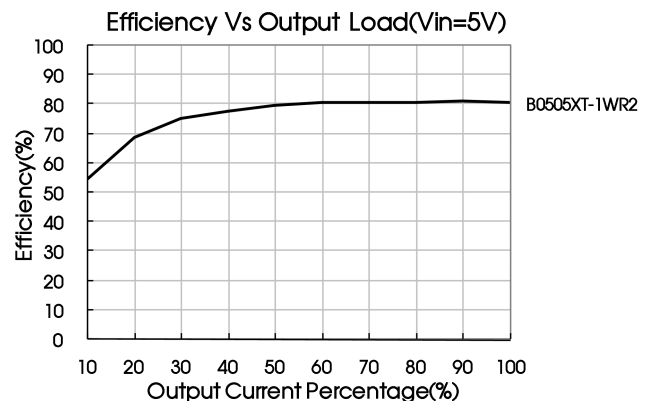
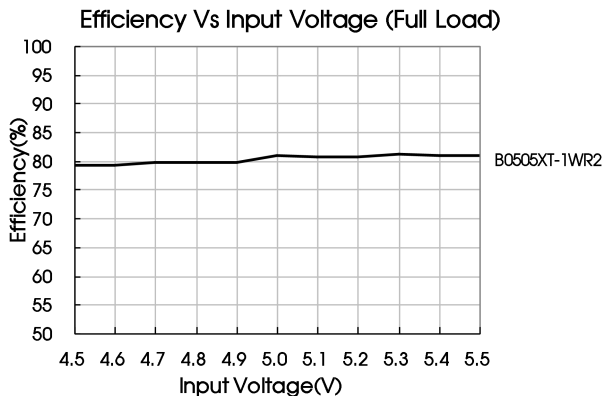
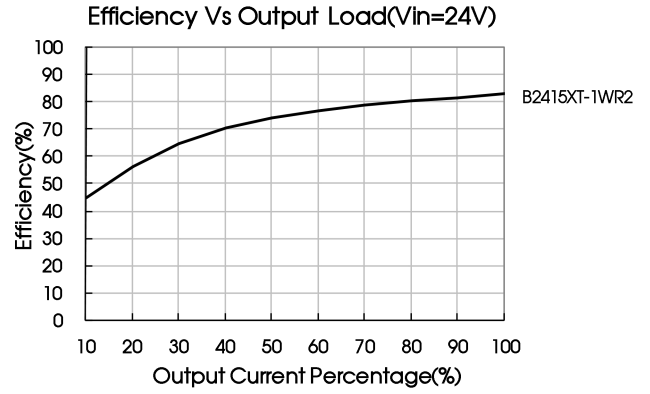
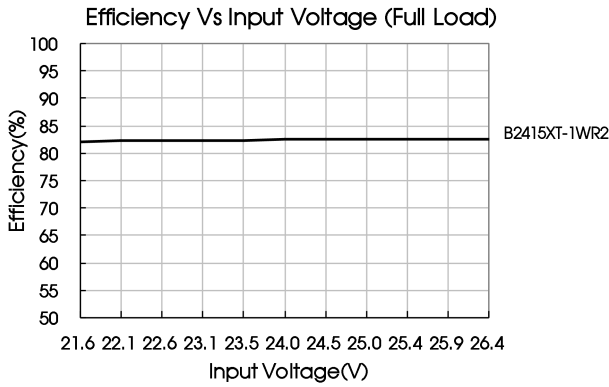


Fig. 2





## 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.

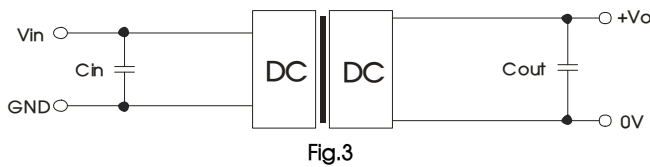


Fig.3

Table 1: Recommended capacitive load value table

Vin(VDC)	Cin(μF)	Vo (VDC)	Cout(μF)
3.3	4.7	3.3	10
5	4.7	5/6	10
12	2.2	9	4.7
15	2.2	12	2.2
24	1	15	1
--	--	24	0.47

### 2. EMC (CLASS B) compliance circuit

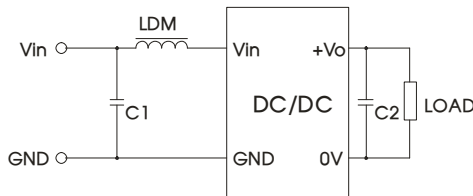


Fig. 4

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

### 3. Minimum output load requirement

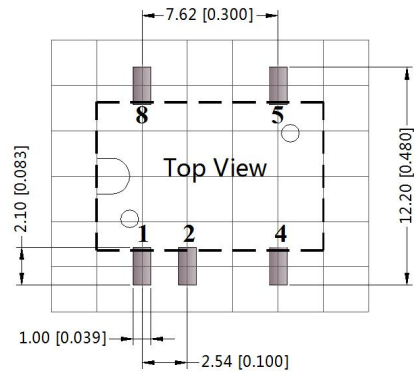
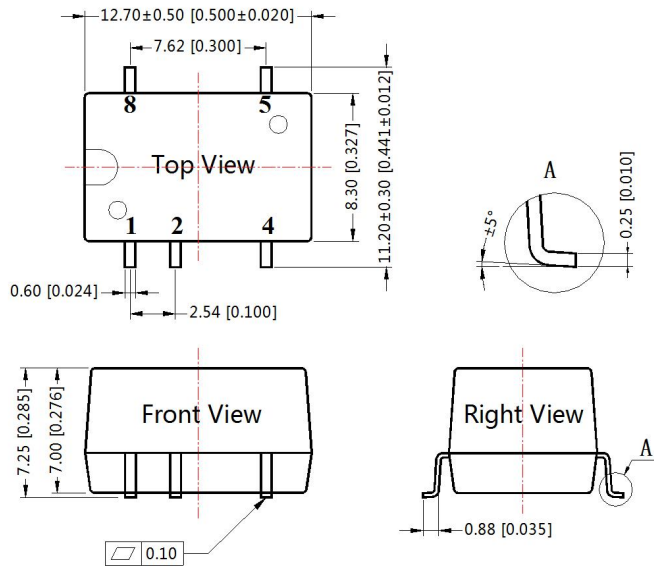
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side ( The sum of the efficient power and resistor consumption power is not less than 10%).

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

NC: Pin to be isolated from circuitry

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

Notes:

- For additional information on Product Packaging please refer to [www.mornsun-power.com](http://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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