

# DC/DC Converter

## B\_XT-1WR3G Series

MORNSUN®

1W isolated DC-DC converter

Fixed input voltage, unregulated single output



Continuous Short  
Circuit Protection

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 1.5k VDC
- Industry standard pin-out

B\_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.		
--	B0503XT-1WR3G	5 (4.5-5.5)	3.3	303/30	70/74	2400
	B0505XT-1WR3G		5	200/20	78/82	2400
	B0509XT-1WR3G		9	111/12	79/83	1000
	B0512XT-1WR3G		12	84/9	79/83	560
	B0515XT-1WR3G		15	67/7	79/83	560
	B0524XT-1WR3G		24	42/4	81/85	220

### Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	3.3VDC output	--	270/8	286/--	mA
		5VDC output	--	244/8	256/--	
		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.)	5VDC input		-0.7	--	9	VDC
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	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	

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Ripple & Noise*	20MHz bandwidth	Other outputs	--	30	75	mVp-p
		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.

## 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	For derating with temperature ≥100°C see Fig. 2		-40	--	105	°C
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25°C	3.3VDC output	--	25	--	
		Other outputs	--	15	--	
Storage Humidity	Non-condensing		--	--	95	%RH
Reflow Soldering Temperature*			Peak temp. ≤245°C, maximum duration time ≤60s over 217°C			
Switching Frequency	Full load, nominal input voltage		--	300	--	kHz
MTBF	MIL-HDBK-217F@25°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 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	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±4kV perf. Criteria B

Note: Refer to Fig. 4 for recommended circuit test

## Typical Characteristic Curves

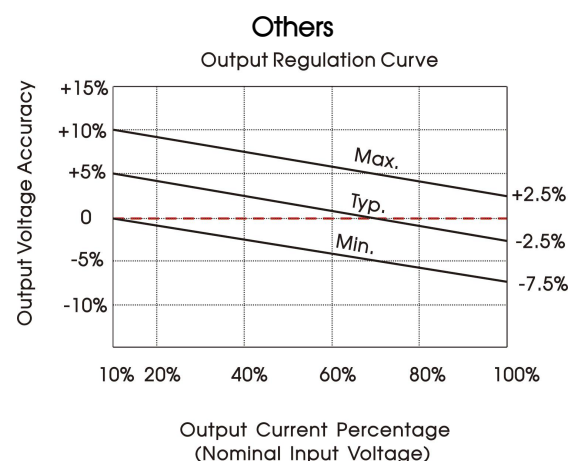
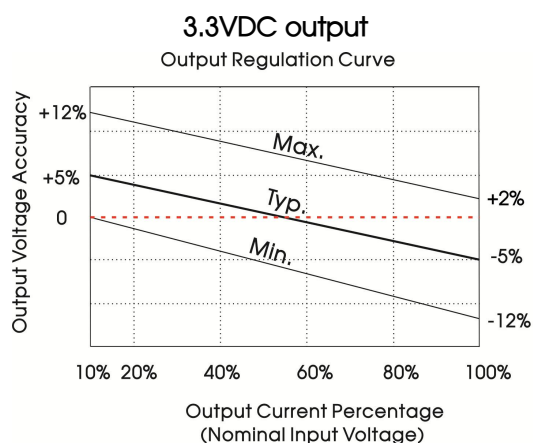


Fig. 1

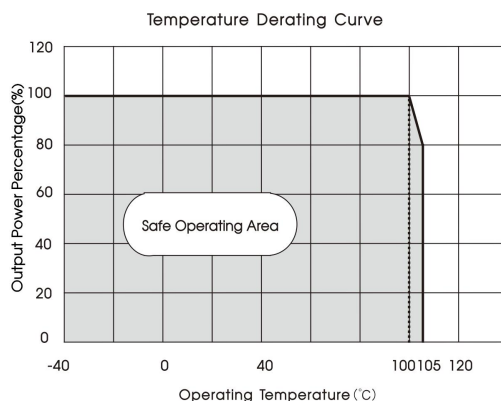
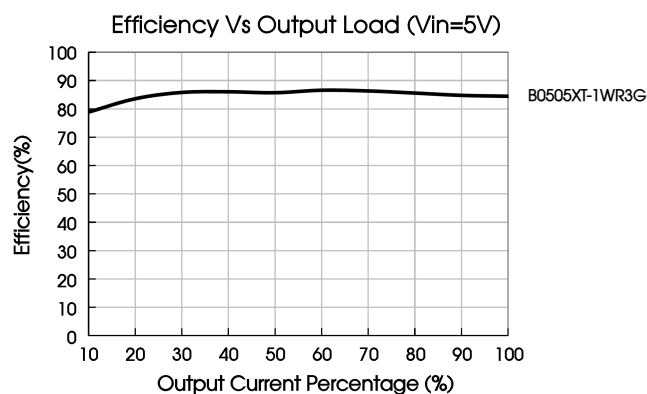
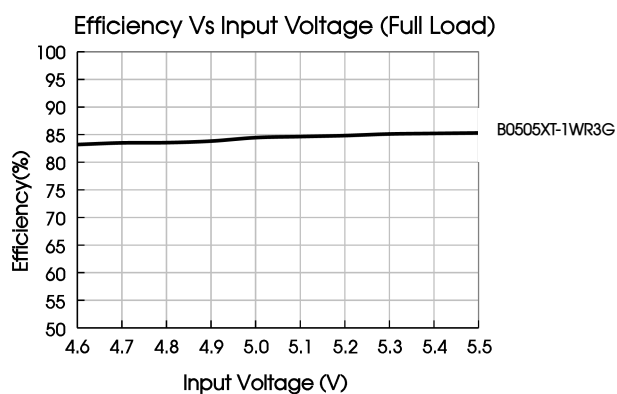


Fig. 2



## 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
5VDC	4.7μF/16V	3.3/5VDC	10μF/16V
		9VDC	4.7μF/16V
		12VDC	2.2μF/25V
		15VDC	1μF/25V
		24VDC	0.47μF/50V

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

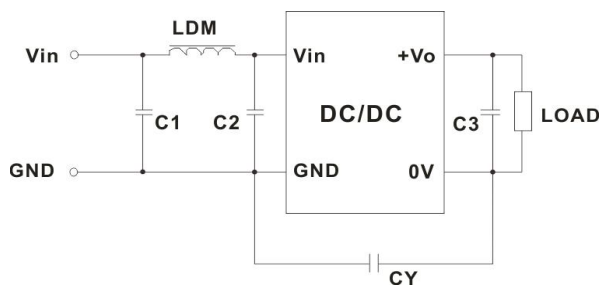


Fig. 4

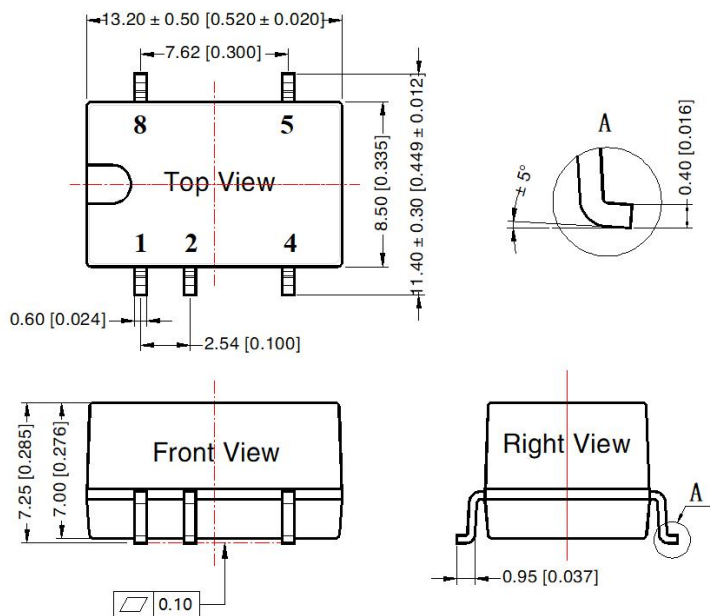
Table 2: Recommended EMC filter values

Input voltage 5VDC	Output voltage		3.3/5/9VDC	12/15/24VDC
	Emissions	C1/C2	4.7 $\mu$ F /25V	4.7 $\mu$ F /25V
		CY	100pF /2kVDC	1nF /2kVDC
		C3	Refer to the Cout in table 1	
		LDM	6.8 $\mu$ H	6.8 $\mu$ H

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](http://www.mornsun-power.com)

## Dimensions and Recommended Layout



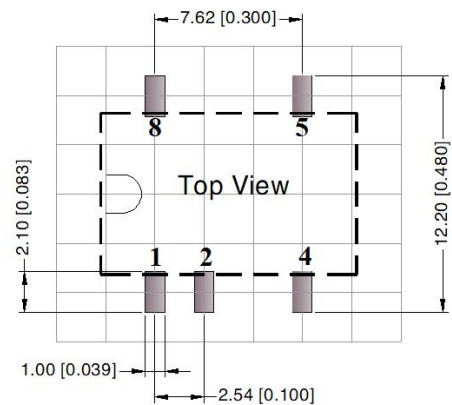
Note:

Unit: mm[inch]

Pin section tolerances:  $\pm 0.10$  [ $\pm 0.004$ ]

General tolerances:  $\pm 0.25$  [ $\pm 0.010$ ]

THIRD ANGLE PROJECTION

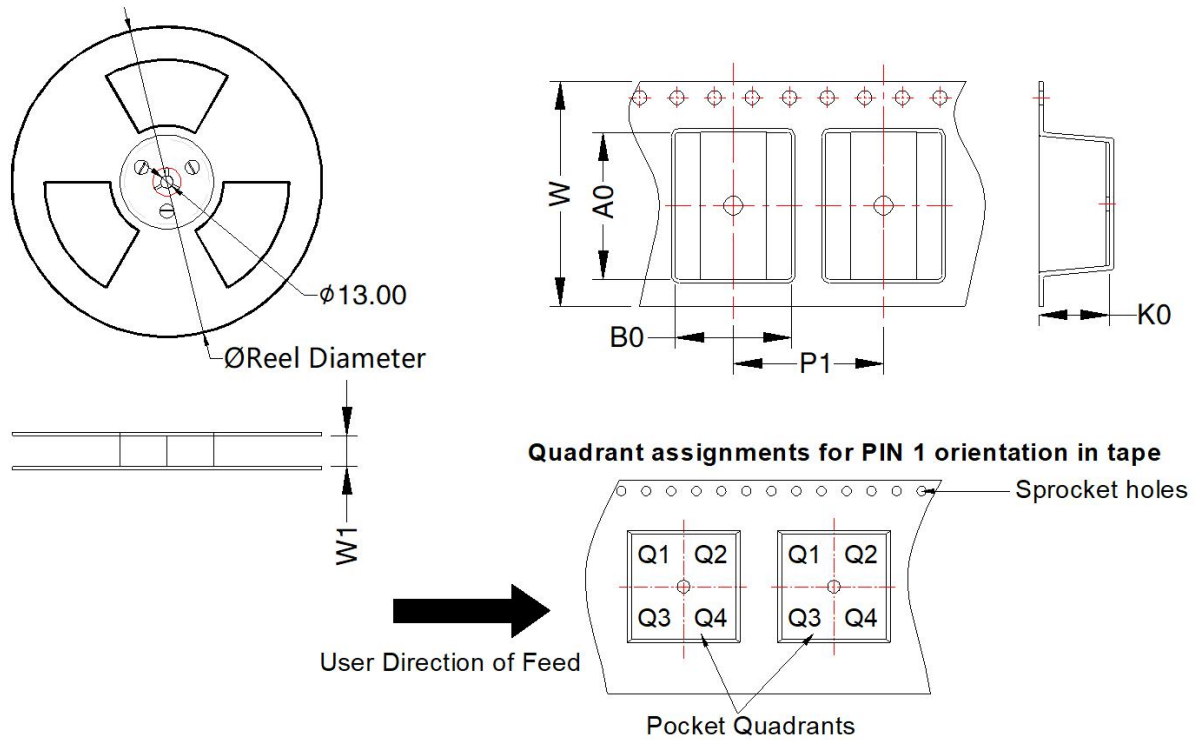


Note: Grid 2.54\*2.54mm

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
B05_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](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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