DC/DC Converter

B_XT-2WR3(-TR) Series

MORNSUN®

2W isolated DC-DC converter
Fixed input voltage, unregulated single output

Continuous Short Circuit Protection

CE Report EN 62368-1 | UKCA Report BS EN 62368-1 | RoHS | Patent Protection

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 86%
- Compact SMD package
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out

B_XT-2WR3(-TR) 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.		
EN/BS EN	B0503XT-2WR3(-TR)	5 (4.5-5.5)	3.3	400/40	74/78	2400
	B0505XT-2WR3(-TR)		5	400/40	80/84	2400
	B05X7XT-2WR3(-TR)		7	286/29	80/84	1000
	B0509XT-2WR3(-TR)		9	222/22	81/85	1000
	B0512XT-2WR3(-TR)		12	167/17	81/85	560
	B0515XT-2WR3(-TR)		15	133/13	82/86	560
	B0524XT-2WR3(-TR)		24	83/8	82/86	220
EN/BS EN	B1205XT-2WR3	12 (10.8-13.2)	5	400/40	79/83	2400
EN	B1209XT-2WR3		9	222/22	79/83	1000
EN/BS EN	B1212XT-2WR3		12	167/17	80/84	560
	B1215XT-2WR3		15	133/13	80/84	560
	B1224XT-2WR3		24	83/8	81/85	220
EN	B1505XT-2WR3	15 (13.5-16.5)	5	400/40	79/83	2400
	B1515XT-2WR3		15	133/13	80/84	560
EN/BS EN	B2405XT-2WR3	24 (21.6-26.4)	5	400/40	77/83	2400
EN	B2409XT-2WR3		9	222/22	77/83	1000
EN/BS EN	B2412XT-2WR3		12	167/17	78/84	560
	B2415XT-2WR3		15	133/13	78/84	560
	B2424XT-2WR3		24	83/8	79/85	220

Note: * Product model suffix "-TR" indicates reel packaging.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	3.3VDC output	--	339/8	357/--	mA
		5VDC/7VDC output	--	477/8	500/--	
		9VDC/12VDC output	--	471/8	494/--	
		15VDC/24VDC output	--	466/8	488/--	
	12VDC input	5VDC/9VDC output	--	201/8	211/--	
		12VDC/15VDC output	--	199/8	209/--	
		24VDC output	--	196/8	206/--	
	15VDC input	5VDC output	--	161/8	169/--	
		15VDC output	--	159/8	167/--	
	24VDC input	5VDC/9VDC output	--	101/8	109/--	

Input Current (full load / no-load)	24VDC input	12VDC/15VDC output	--	100/8	107/--	mA
		24VDC output	--	98/8	106/--	
Reflected Ripple Current*	5VDC input		--	15	--	
	12/15/24VDC input		--	30	--	
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
	12VDC input		-0.7	--	18	
	15VDC input		-0.7	--	21	
	24VDC input		-0.7	--	30	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			
Note: *Reflected ripple current testing method please refer to *DC-DC Converter Application Note* 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%		3.3VDC output	--	--	±1.5	--
			Other output	--	--	±1.2	
Load Regulation	10%-100% load	5VDC input	3.3VDC output	--	10	20	%
			5VDC/7VDC output	--	9	15	
			9VDC output	--	8	10	
			12VDC/15VDC output	--	7	10	
			24VDC output	--	6	10	
		12/15/24VDC input	5VDC output	--	7	15	
			9VDC output		6	10	
			12VDC output	--	5	10	
			15VDC output	--	4	10	
			24VDC output	--	3	10	
Ripple & Noise*	20MHz bandwidth		5VDC input	--	75	200	mVp-p
			12/15/24VDC input	--	50	150	
Temperature Coefficient	Full load			--	±0.02	--	%/℃
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	See Fig. 2		-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃, nominal input voltage, full load		--	25	--	
Storage Humidity	Non-condensing		5	--	95	%RH
Reflow Soldering Temperature*			Peak temp. Tc≤245℃, maximum duration time≤60s over 217℃			
Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	5VDC input	--	220	--	kHz
		12/15/24VDC input	--	260	--	
MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1		Level 1			
Note: * See also IPC/JEDEC J-STD-020D.1.						

Mechanical Specifications

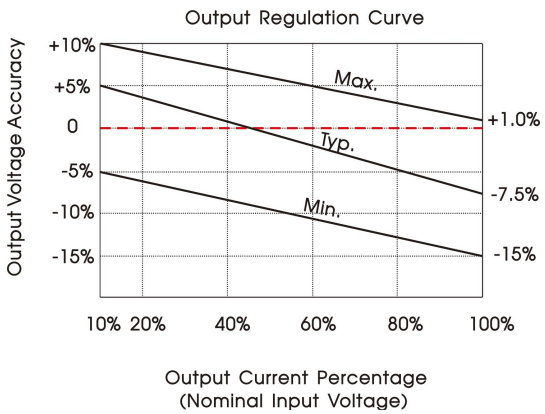
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	13.20 x 11.40 x 7.25 mm
Weight	1.4g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

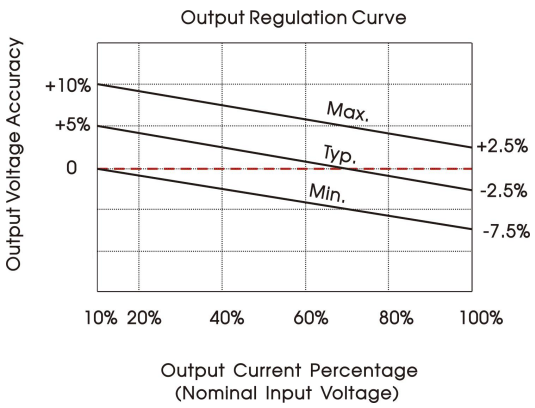
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV	perf. Criteria B
Note: Refer to Fig. 4 for recommended circuit test.				

Typical Characteristic Curves

5VDC input 3.3VDC output



5VDC input other output



Other input

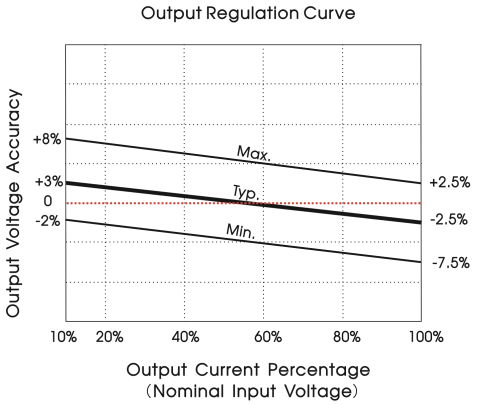
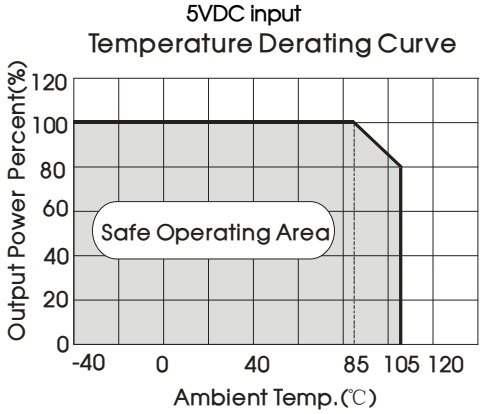


Fig. 1

5VDC input



Other input

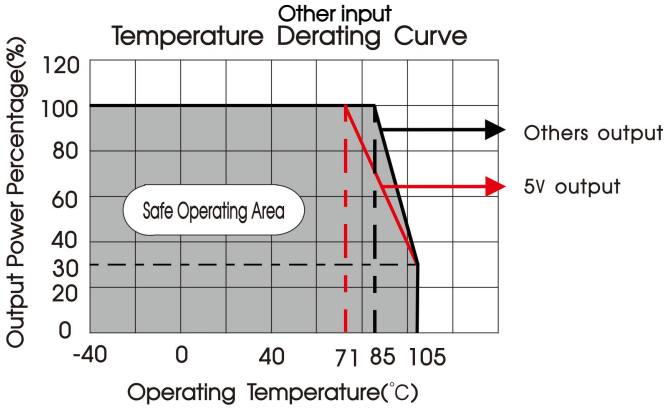
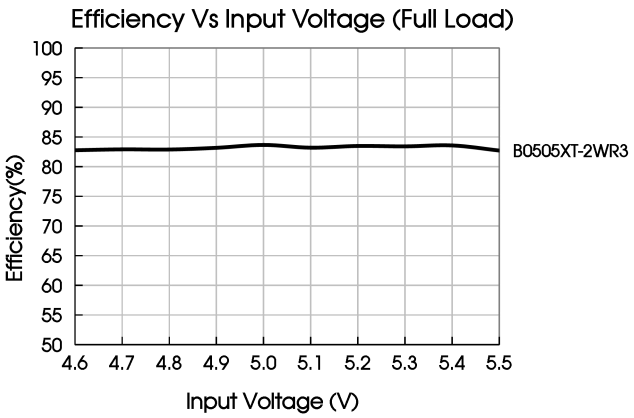
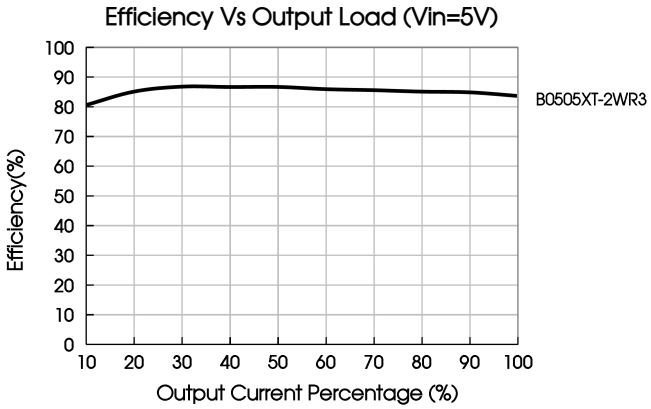
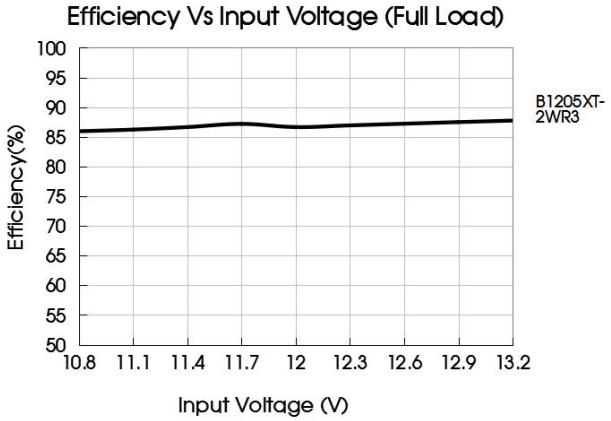
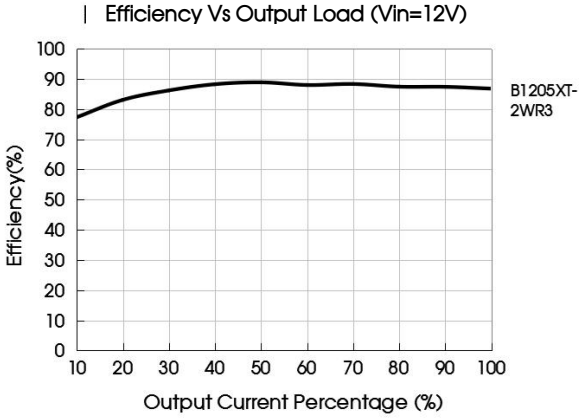


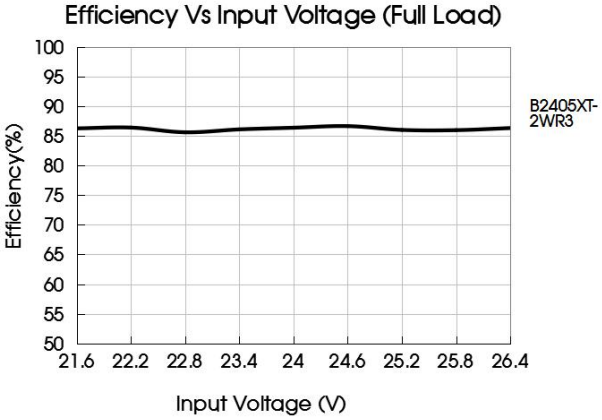
Fig. 2

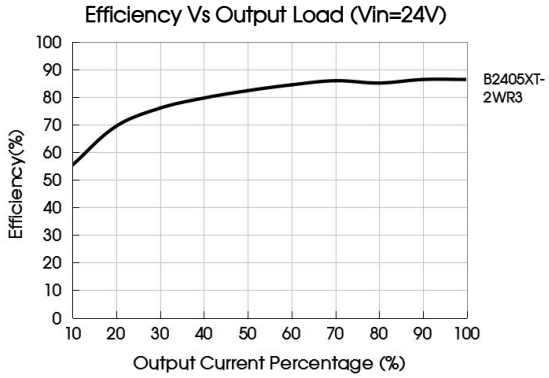












Design Reference

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/10V
12VDC	2.2μF/25V	7/9VDC	2.2μF/25V
15VDC	1μF/25V	12VDC	2.2μF/25V
24VDC	1μF/50V	15VDC	1μF/25V
--	--	24VDC	0.47μF/50V

2. EMC compliance circuit

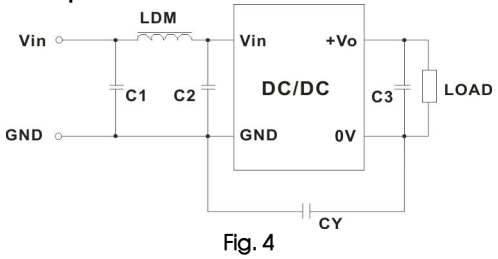


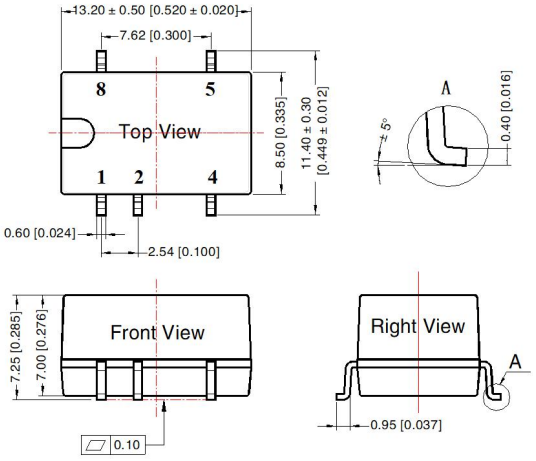
Fig. 4

Input Voltage		5VDC input	12/15/24VDC input
Emissions	C1, C2	4.7μF /16V	4.7μF /50V
	C3	Refer to the Cout in Fig. 3	
	CY	270pF /2kV	
	LDM	6.8μH	

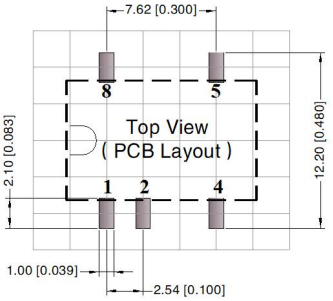
3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



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

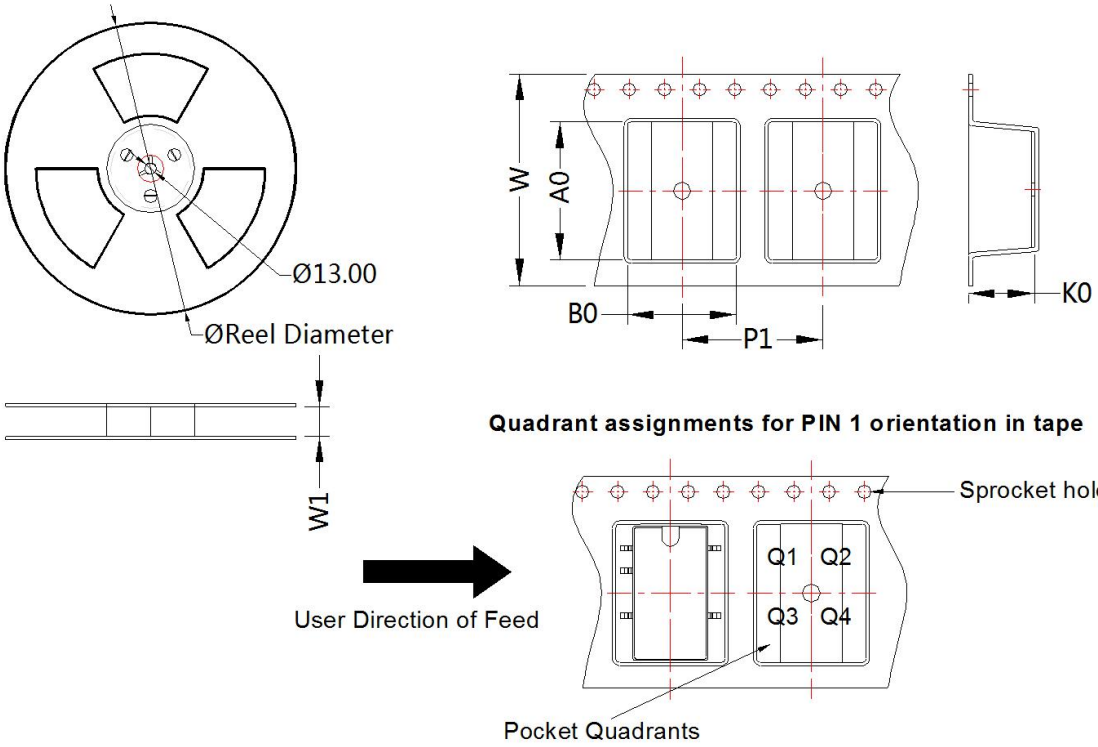


Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
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
B_XT-2WR3	SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number: 58210024, Roll Packaging bag number: 58200054;
2. 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;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. 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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