MORNSUN®

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

Continuous Short Circuit Protection

c UL us CE CB Patent Protection RoHS

3 years Warranty

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out
- IEC62368, UL62368, EN62368 approved

B_XT-1WR3 series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: 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.		
UL/CE/CB	B1205XT-1WR3	12 (10.8-13.2)	5	200/20	78/82	2400
	B1209XT-1WR3		9	111/12	79/83	1000
	B1212XT-1WR3		12	84/9	79/83	560
	B1215XT-1WR3		15	67/7	79/83	560
	B1224XT-1WR3		24	42/4	81/85	220
--	B1505XT-1WR3	15 (13.5-16.5)	5	200/20	78/82	2400
	B1509XT-1WR3		9	111/12	78/82	1000
UL/CE/CB	B1515XT-1WR3		15	67/7	79/83	560
	B2405XT-1WR3	24 (21.6-26.4)	5	200/20	74/80	2400
	B2409XT-1WR3		9	111/12	74/80	1000
	B2412XT-1WR3		12	84/9	74/80	560
	B2415XT-1WR3		15	67/7	74/80	560
	B2424XT-1WR3		24	42/4	74/80	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12VDC input	5VDC output	--	102/8	107/--	mA
		9VDC/12VDC/15VDC output	--	101/8	106/--	
		24VDC output	--	99/8	103/--	
	15VDC input	5VDC/9VDC output	--	82/8	86/--	
		15VDC output	--	81/8	85/--	
	24VDC input	5VDC output	--	53/8	57/--	
		9VDC/12VDC/15VDC output	--	51/8	55/--	
		24VDC output	--	53/8	57/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage(1sec. max.)	12VDC input		-0.7	--	18	VDC
	15VDC input		-0.7	--	21	
	24VDC input		-0.7	--	30	
Input Filter			Capacitance filter			

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Hot Plug		Unavailable
Note: * Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.		

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%		--	--	1.2	--
Load Regulation	10%-100% load	5VDC output	--	5	15	%
		9VDC output	--	3	10	
		12VDC output	--	3	10	
		15VDC output	--	3	10	
		24VDC output	--	2	10	
Ripple & Noise*	20MHz bandwidth	5VDC/9VDC/12VDC/15V DC output	---	30	75	mVp-p
		24VDC output	---	50	100	
Temperature Coefficient	Full load		--	±0.02	--	%/℃
Short-Circuit Protection			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.						

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℃, (see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25℃	--	25	--	
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature*		Peak temp.≤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	--	260	--	kHz
MTBF	MIL-HDBK-217F@25℃	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 ±6kV perf. Criteria B
Note: Refer to Fig.4 for recommended circuit test.		

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Typical Performance Curves

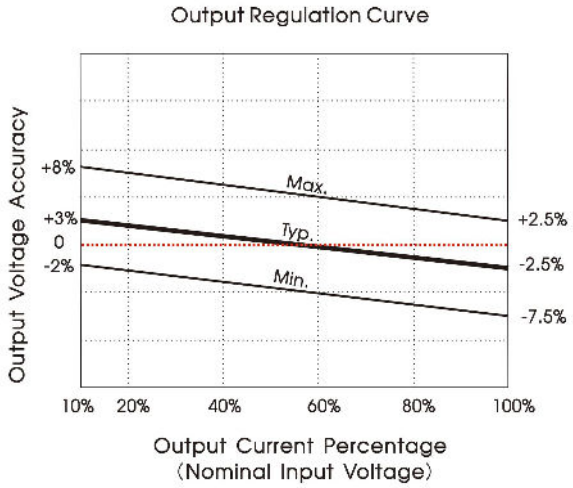


Fig. 1

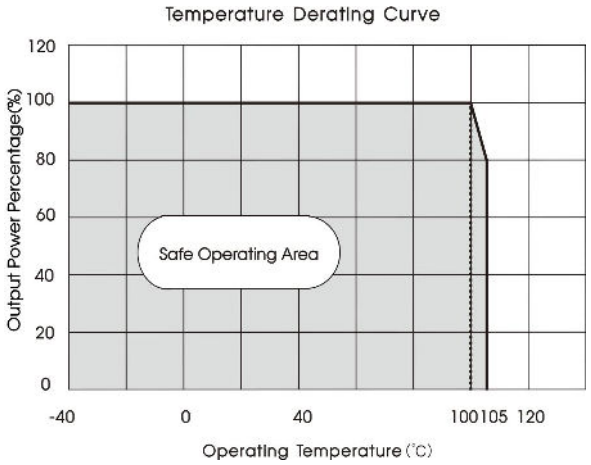
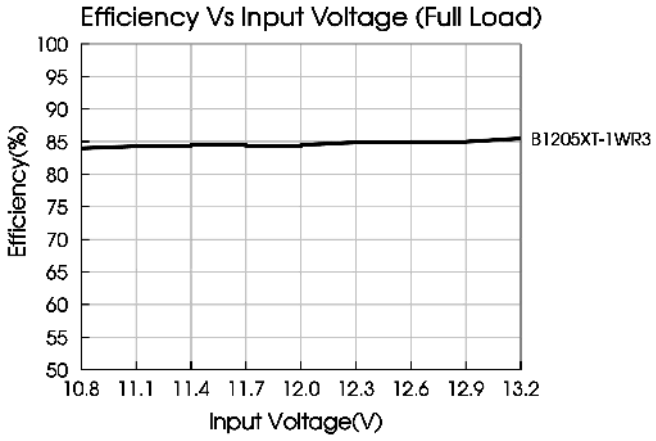
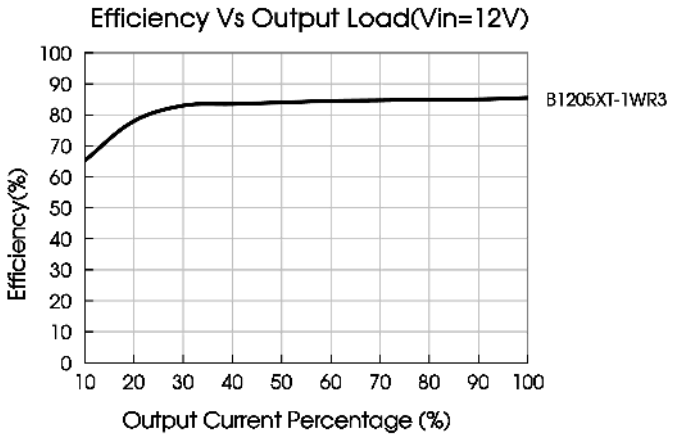
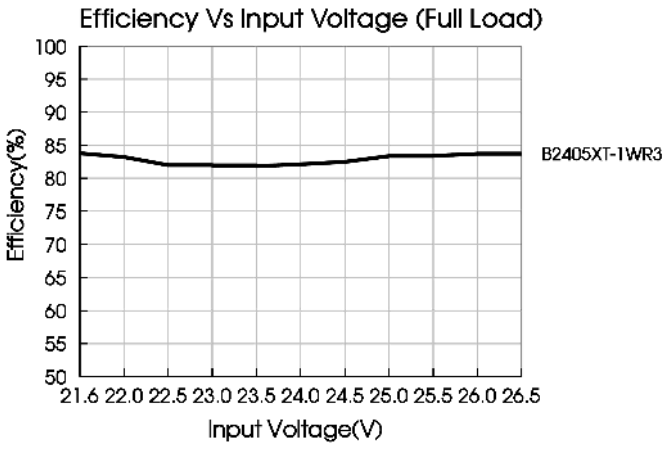
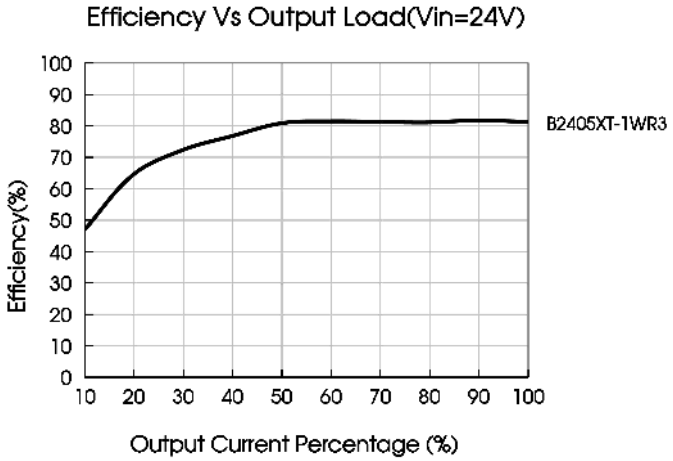


Fig. 2









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.

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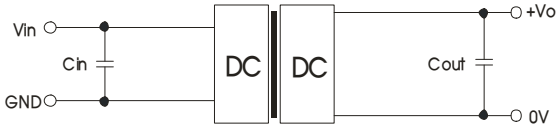


Fig.3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
12VDC	2.2μF/25V	5VDC	10μF/16V
15VDC	2.2μF/25V	9VDC	2.2μF/16V
24VDC	1μF/50V	12VDC	2.2μF/25V
--	--	15VDC	1μF/25V
--	--	24VDC	1μF/50V

2. EMC compliance circuit

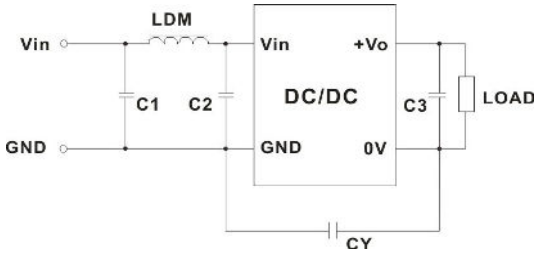


Fig.4

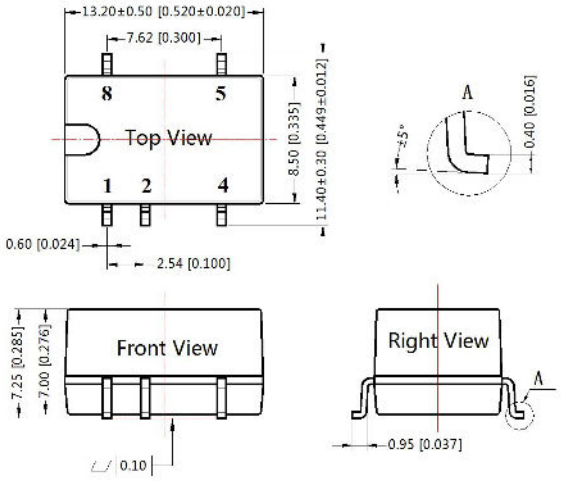
Table 2: EMC recommended circuit value table

EMI	C1	4.7μF /50V
	C2	4.7μF /50V
	CY	270pF/2kV
	C3	Refer to the Cout in table 1
	LDM	6.8μH

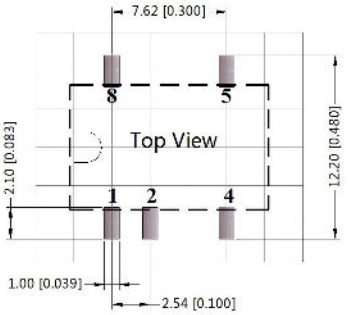
3. For additional information, please refer to DC-DC converter application notes on www.mornsun-power.com

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

NC: Pin to be isolated from circuitry

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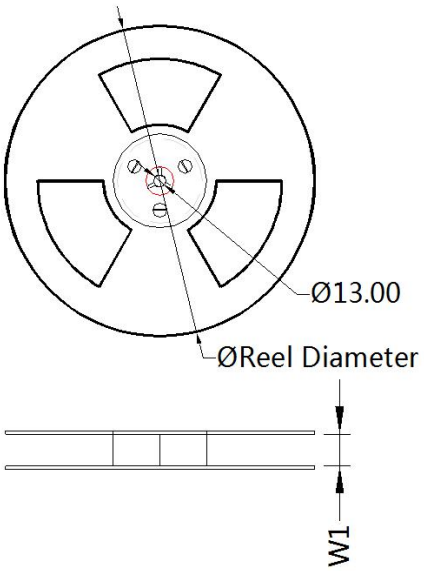
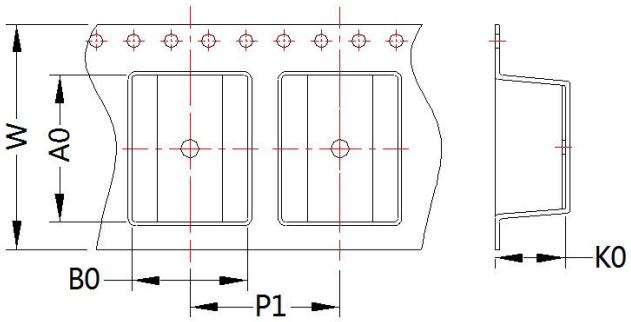
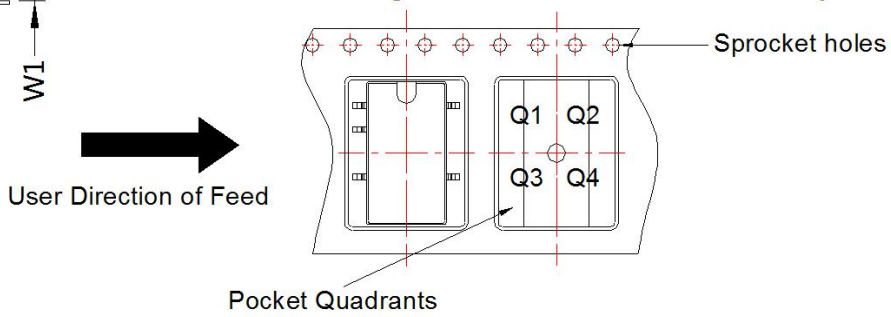
Tape and Reel Info





Quadrant assignments for PIN 1 orientation in tape



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-1WR3	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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