

MORNSUN®

B_XT-1WR2 Series

1W, FIXED INPUT, ISOLATED & UNREGULATED SINGLE OUTPUT

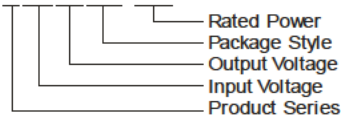


Continuous Short Circuit Protection

Patent Protection RoHS

PART NUMBER SYSTEM

B0505XT-1WR2



FEATURES

- Small Footprint
- SMD Package Style
- 1500VDC Isolation
- Operating Temperature Range: -40°C ~ +105°C
- Low Temperature rise
- Internal SMD construction
- No External Component Required
- Industry Standard Pinout

APPLICATIONS

The B_XT-1WR2 Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

- 1) Input voltage variation $\leq \pm 10\%$;
- 2) 1.5KVDC input and output isolation;
- 3) Regulated and low ripple noise is not required.

Such as: digital circuits, low frequency analog circuits, and IGBT power device driving circuits.

SELECTION GUIDE

Model Number	Input Voltage(VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(Typ.)		Reflected Ripple Current (mA, Typ.)	Max. Capacitive Load(μ F)	Efficiency (% , Typ.) @Max. Load	Approval
			Max.	Min.	@Max. Load	@No Load				
B0505XT-1WR2	5 (4.5-5.5)	5	200	20	250	20	15	220	80	
*B0509XT-1WR2		9	111	12	250					
B0512XT-1WR2		12	84	9	250					
B0515XT-1WR2		15	67	7	250					
B0524XT-1WR2		24	42	4	250					
B1205XT-1WR2	12 (10.8-13.2)	5	200	20	104	15	5	220	80	
*B1209XT-1WR2		9	111	12	104					
B1212XT-1WR2		12	84	9	103					
*B1215XT-1WR2		15	67	7	103					
*B1224XT-1WR2		24	42	4	103					
*B1505XT-1WR2	15 (13.5-16.5)	5	200	20	83	10	5	220	80	
*B1515XT-1WR2		15	67	7	82					
B2405XT-1WR2	24 (21.6-26.4)	5	200	20	52	7	5	220	80	
*B2409XT-1WR2		9	110	11	52					
*B2412XT-1WR2		12	83	8	51					
B2415XT-1WR2		15	67	7	51					
*B2424XT-1WR2		24	42	4	51					

Note: *Designing.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. 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			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit	
Output Power		0.1	--	1	W	
Output Voltage Accuracy		See tolerance envelope curve				
Line Regulation	For Vin change of $\pm 1\%$	--	--	± 1.2	%	
Load Regulation	10% to 100% load	5V output	--	12		15
		9V output	--	8		10
		12V output	--	7		10
		15V output	--	6		10
		24V output	--	5	10	
Temperature Drift	100% full load	--	--	± 0.03	$\%/^{\circ}\text{C}$	
Ripple & Noise*	20MHz Bandwidth	Output Voltage $\leq 12\text{V}$	--	30	--	mVp-p
		Output Voltage: 15V, 24V	--	60	--	
Short Circuit Protection		Continuous, automatic recovery				

Note: * Ripple and noise tested by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit	
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	1500	--	--	VDC	
Isolation Resistance	Test at 500VDC	1000	--	--	M Ω	
Isolation Capacitance	Input/Output, 100KHz/0.1V	B2424XT-1WR2	--	30	--	pF
		Others	--	20	--	
Switching Frequency	Full load, nominal input	--	100	300	KHz	
MTBF	MIL-HDBK-217F@25 $^{\circ}\text{C}$	3500	--	--	K hours	
Case Material		Epoxy Resin (UL94-V0)				
Weight		--	1.52	--	g	

ENVIRONMENTAL SPECIFICATIONS

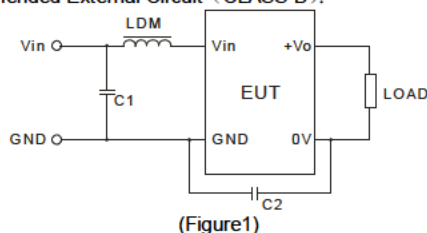
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 100 $^{\circ}\text{C}$)	-40	--	105	$^{\circ}\text{C}$
Storage Temperature		-55	--	125	
Temp. rise at full load	Ta=25 $^{\circ}\text{C}$	--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to Figure1)
EMS	ESD	IEC/EN61000-4-2 Contact $\pm 8\text{KV}$ perf. Criteria B

EMI RECOMMENDED CIRCUIT

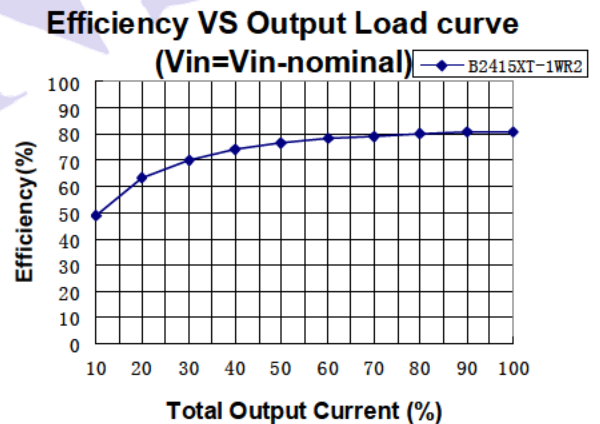
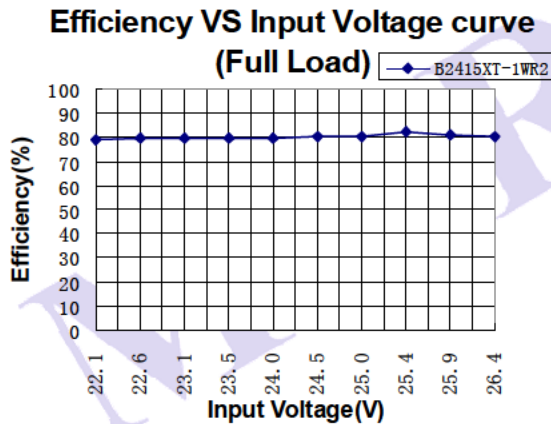
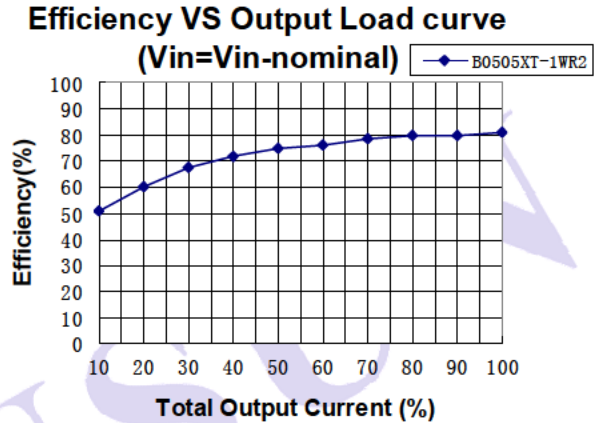
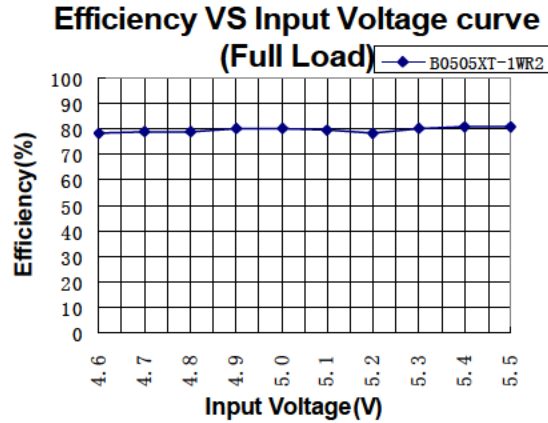
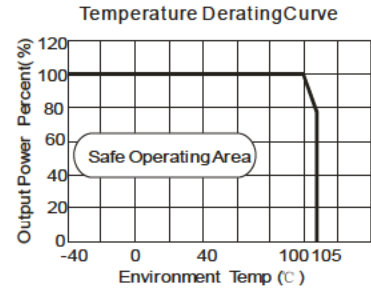
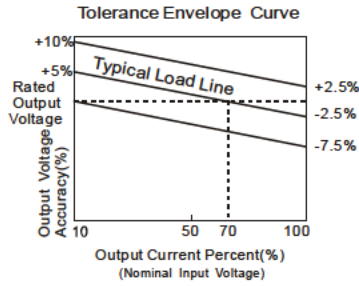
EMI Recommended External Circuit (CLASS B):



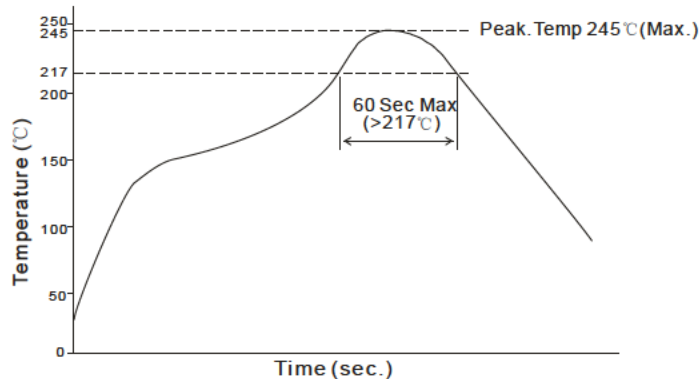
Recommended external circuit parameters:

Vin: 5V/12V
 C1: 4.7 $\mu\text{F}/50\text{V}$
 LDM: 6.8 μH
 Vin: 15V/24V
 C1: 4.7 $\mu\text{F}/50\text{V}$
 LDM: 6.8 μH
 C2: 470pF/2KV

PRODUCT TYPICAL CURVE

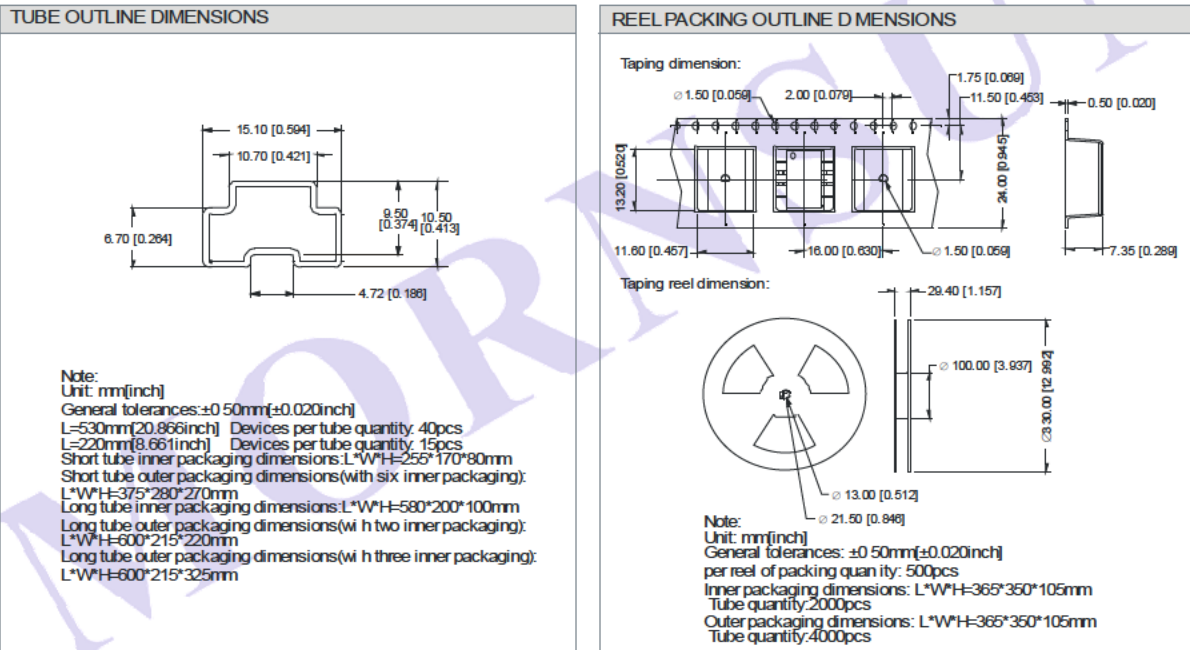
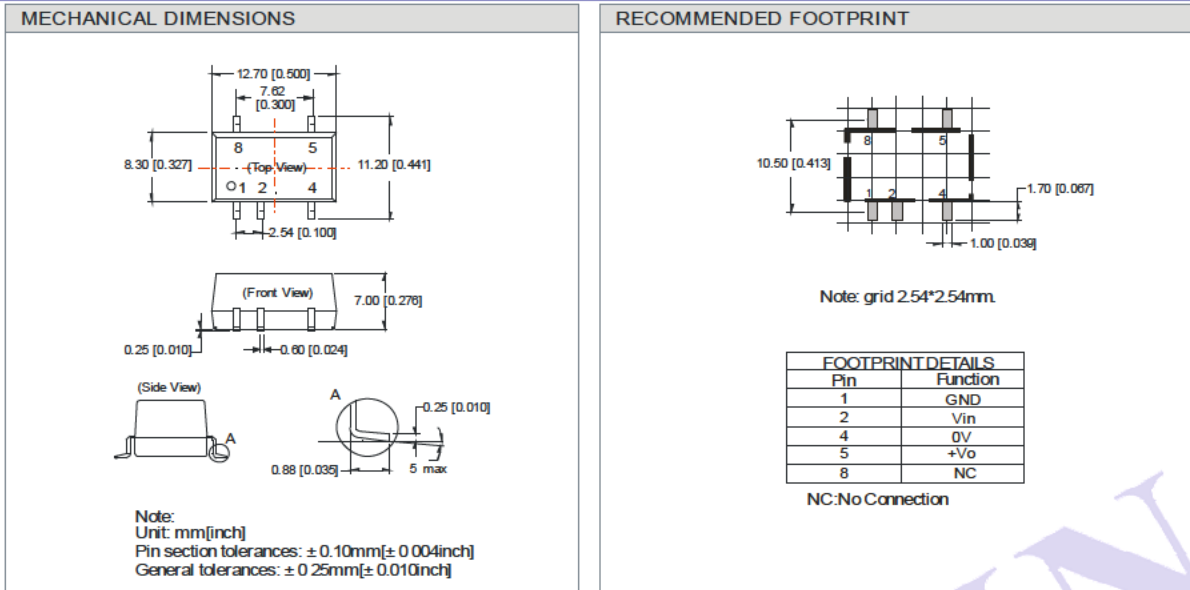


Recommended reflow soldering profile refer to IPC/JEDEC J-STD-020D standard, our products recommend reflow soldering profile as follows:



Note: The curve applies only to the hot air reflow soldering

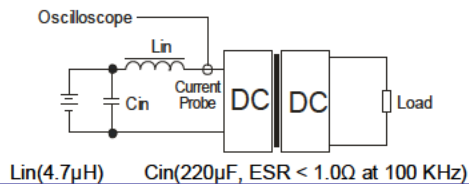
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} and Capacitor C_{in} to simulate source impedance.



DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full load**. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

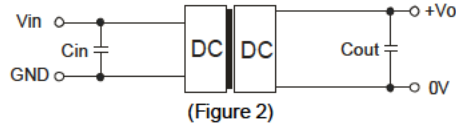
2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to add a circuit breaker to the circuit.

3) Recommended circuit

If you want to further decrease the input/output ripple, an capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 2).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).



(Figure 2)

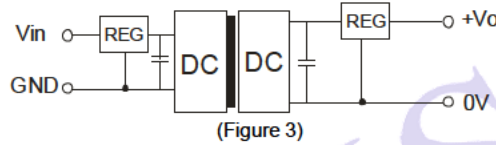
EXTERNAL CAPACITOR TABLE (Table 1)

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

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

4) Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear regulator and an capacitor filtering network with overheat protection that is connected to the input or output end in series (Figure 3), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current to reasonable selection.



(Figure 3)

5) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. All characteristics are for listed model only, non-standard models may perform differently, please contact our technical person for more detail.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

MORNSUN Science & Technology Co.,Ltd.

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou,P.R.China.

Tel: 86-20-28203030

Fax:86-20-38601272

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