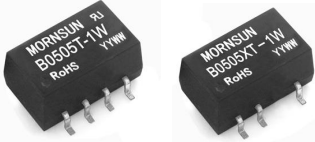


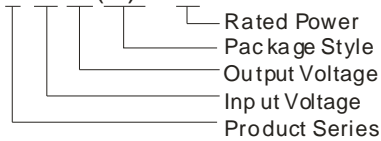
B_(X)T-1W Series

**1W, FIXED INPUT, ISOLATED & UNREGULATED
SINGLE OUTPUT DC-DC CONVERTER
ULTRAMINIATURE SMD PACKAGE**



Patent Protection RoHS **MODEL SELECTION**

B0505(X)T-1W



FEATURES

- Small Footprint
- SMD Package Style
- 1KVDC Isolation
- Temperature Range: -40°C ~ +85°C
- Industry Standard Pinout
- No Heatsink Required
- High Power Density
- Internal SMD construction
- No External Component Required
- RoHS Compliance

APPLICATIONS

The B_(X)T-1W series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board. These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation $\leq \pm 10\%$);
- 2) Where isolation is necessary between input and output (isolation voltage $\leq 1000\text{VDC}$);
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.

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

PRODUCT PROGRAM

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(μF)	Efficiency (% , typ.) @Max. Load	Approval
			Max.	Min.	@Max. Load	@No Load				
B0303(X)T-1W	3.3 (3.0-3.6)	3.3	303	30	418	45	25	33	73	UL
B0305(X)T-1W		5	200	20	390				74	UL
B0309(X)T-1W		9	111	12	408				70	
B0312(X)T-1W		12	84	9	367				78	
B0315(X)T-1W		15	67	7	390				76	
B0324(X)T-1W		24	42	4	364				78	
B0503(X)T-1W	5 (4.5-5.5)	3.3	303	30	265	36	16	33	72	
B0505(X)T-1W		5	200	20	256				77	UL CE
B0506(X)T-1W		6	167	17	269				69	
B0507(X)T-1W		7.2	139	14	252				75	
B0509(X)T-1W		9	111	12	252				76	UL CE
B0512(X)T-1W		12	84	9	245				79	UL CE
B0515(X)T-1W		15	67	7	256				78	UL CE
B0524(X)T-1W		24	42	4	234				79	
B1203(X)T-1W	12 (10.8-13.2)	3.3	303	30	110	22	12	33	71	
B1205(X)T-1W		5	200	20	115				69	UL CE
B1209(X)T-1W		9	111	12	110				73	UL CE
B1212(X)T-1W		12	84	9	109				73	UL CE
B1215(X)T-1W		15	67	7	110				74	UL CE
B1224(X)T-1W		24	42	4	95				79	
B1505(X)T-1W	15 (13.5-16.5)	5	200	20	101	12	10	33	62	
B1515(X)T-1W		15	67	7	80				76	
B2403(X)T-1W	24 (21.6-26.4)	3.3	300	30	57	9	11	33	69	
B2405(X)T-1W		5	200	20	58				70	
B2409(X)T-1W		9	110	11	53				72	
B2412(X)T-1W		12	83	8	52				75	
B2415(X)T-1W		15	67	7	51				76	
B2424(X)T-1W		24	42	4	50				77	

Note: 1. The B_XT-1W series have no 3,6,7 pin, For example B0505XT-1W.

2. B_XT-1W series: UL-60950-1 pending.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Input Surge Voltage (1 sec. max.)	3.3VDC Input Models	-0.7	--	5	VDC
	5VDC Input Models	-0.7	--	9	
	12VDC Input Models	-0.7	--	18	
	15VDC Input Models	-0.7	--	21	
	24VDC Input Models	-0.7	--	30	
Reverse Polarity Input Current*		--	--	0.4	A
Internal Power Dissipation*		--	--	0.4	W
Input Filter		C Filter			

Note: *If the product reverse did not seek to limit current or work does not limit the maximum power, may result in injury or permanent damage, testing is not recommended.

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units	
Output Power		0.1	--	1	W	
Output Voltage Accuracy		See tolerance envelope graph				
Line Regulation	For Vin change of ±1%	3.3V output	--	--	±1.5	%
		Others	--	--	±1.2	
Load Regulation	10% to 100% load	3.3V output	--	15	20	
		5,6,7V output	--	12.8	15	
		9V output	--	8.3	10	
		12V output	--	6.8	10	
		15V output	--	6.3	10	
24V output	--	5	10			
Temperature Drift	100% full load	--	--	±0.03	%/°C	
Ripple & Noise*	20MHz Bandwidth	--	50	75	mVp-p	
Short Circuit Protection**		--	--	1	s	

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

**Supply voltage must be discontinued at the end of short circuit duration.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	Tested for 1 minute and 1mA max	1000	--	--	VDC	
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ	
Isolation Capacitance	Input/Output, 100KHz/1V	B2424(X)T-1W	--	50	--	pF
		Others	--	30	--	
Switching Frequency	Full load, nominal input	5V/12V	--	100	--	KHz
		24V	--	500	--	
		Others	--	100	500	
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours	
Case Material		Epoxy Resin (UL94-V0)				
Weight		--	1.41	--	g	

ENVIRONMENTAL SPECIFICATIONS

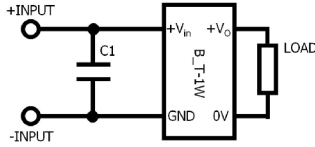
Item	Test Conditions	Min.	Typ.	Max.	Units
Storage Humidity		--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure1)
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

EMI RECOMMENDED CIRCUIT

EMI Recommended External Circuit (CLASS A):



(Figure1)

Recommended external circuit parameters:

Vin: 3.3V/5V/12V/15V

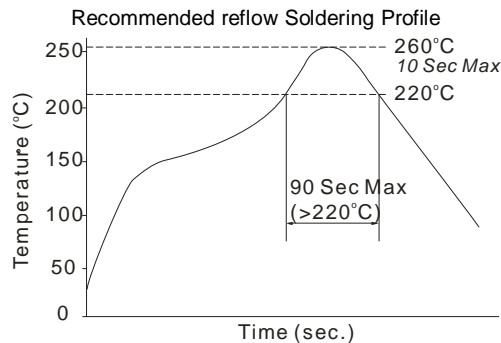
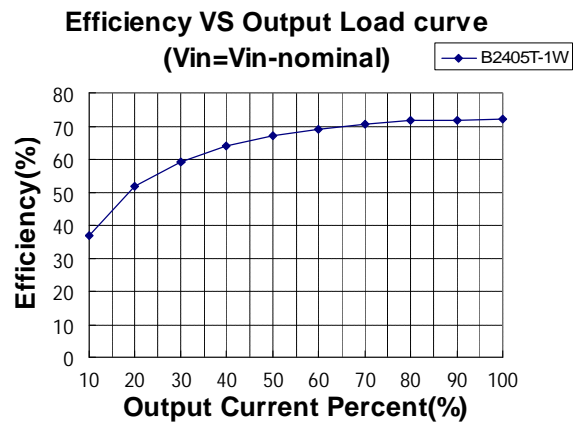
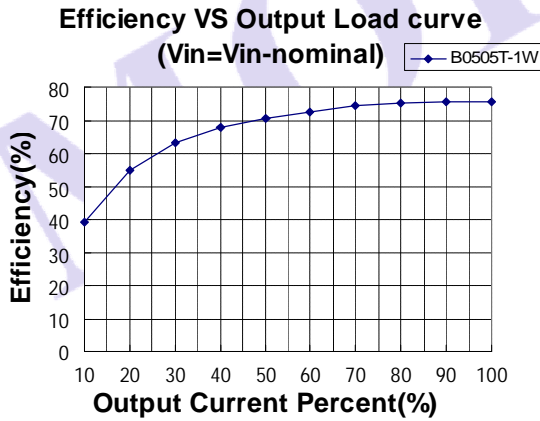
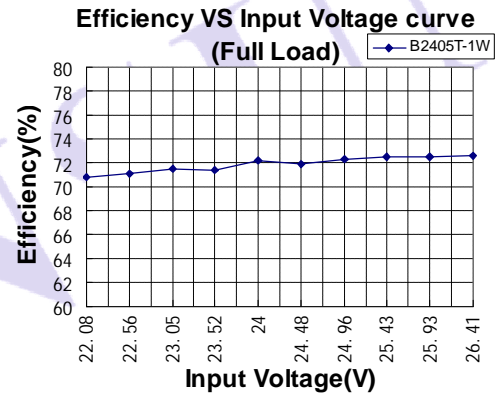
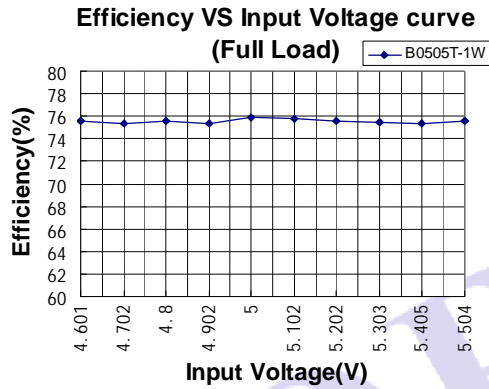
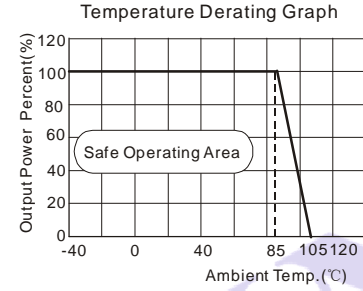
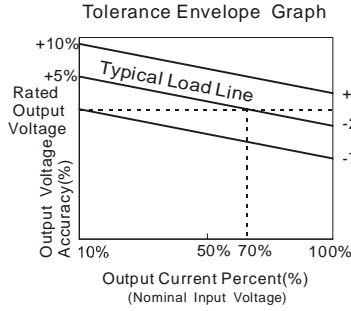
C1: 2.2 μ F/50V 1210

Vin: 24V

C1: 4.7 μ F/50V 1210

Remarks: Product bare input of 3.3V、5V、12V can be tested by the CLASS A, increase the capacitor margin increase.

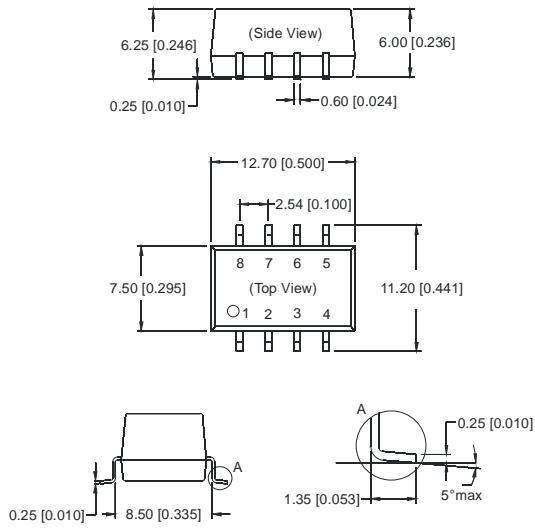
PRODUCT TYPICAL CURVE



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

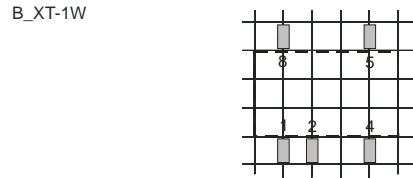
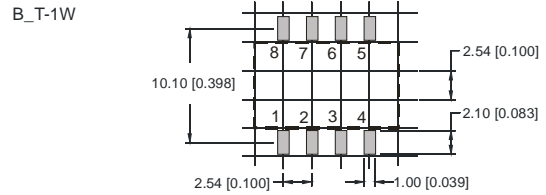
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS



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

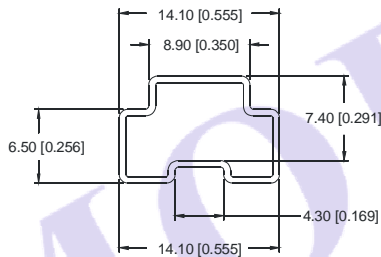
RECOMMENDED FOOTPRINT



Pin	B_T-1W	B_XT-1W
1	GND	GND
2	Vin	Vin
4	0V	0V
5	+Vo	+Vo
3,6,7	NC	No Pin
8	NC	NC

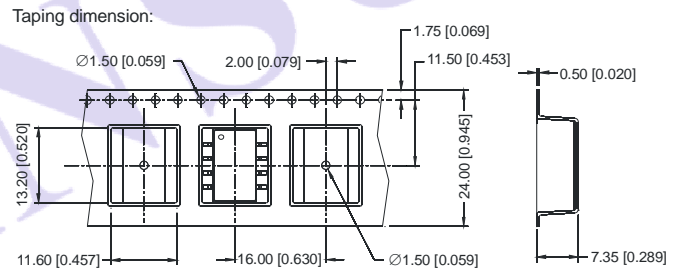
NC: No Connection

TUBE OUTLINE DIMENSIONS

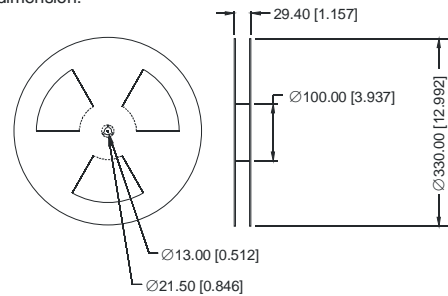


Note:
Unit: mm[inch]
General tolerances: $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$
L=540mm[21.260inch] Devices per tube quantity: 40pcs
L=220mm[8.661inch] Devices per tube quantity: 15pcs
Short tube inner packaging dimensions: L*W*H=255*170*80mm
Short tube outer packaging dimensions(with six inner packaging):
L*W*H=375*280*270mm
Long tube inner packaging dimensions: L*W*H=580*200*100mm
Long tube outer packaging dimensions(with two inner packaging):
L*W*H=600*215*220mm
Long tube outer packaging dimensions(with three inner packaging):
L*W*H=600*215*325mm

REEL PACKING OUTLINE DIMENSIONS



Taping reel dimension:

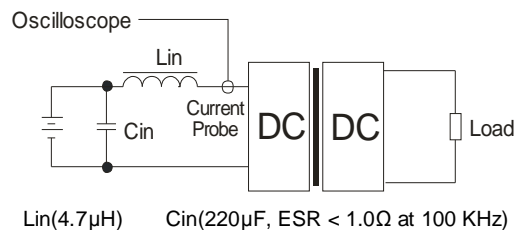


Note:
Unit: mm[inch]
General tolerances: $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$
per reel of packing quantity: 500pcs
Inner packaging dimensions: L*W*H=365*350*105mm
Tube quantity: 2000pcs
Outer packaging dimensions: L*W*H=390*360*245mm
Tube quantity: 4000pcs

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

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



DESIGN & APPLY 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, or use our company's products with a lower rated output power (B_(X)T-W2 series).

2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

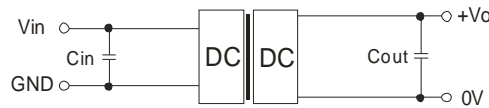
Input Fuse Selection Guide

3.3VDC Input Models	500mA slow-Blow Type	15VDC Input Models	100mA slow-Blow Type
5VDC Input Models	500mA slow-Blow Type	24VDC Input Models	100mA slow-Blow Type
12VDC Input Models	200mA slow-Blow Type		

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)	Single Vout (VDC)	Cout (μF)
3.3/5	4.7	3.3/5/6	10
12	2.2	7.2/9	4.7
15	2.2	12	2.2
24	0.47	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) No parallel connection or plug and play

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.
5. Our company offer custom products.
6. Specifications subject to change without notice.

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