

## B\_(X)T-1W Series

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

multi-country patent protection

### FEATURES

- SMD Package Style
- Industry Standard Pinout
- No Heat sink Required
- 1KVDC Isolation
- High Power Density
- Internal SMD construction
- Temperature Range: -40°C to +85°C
- 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.

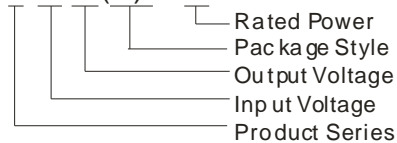
These products apply to:

- Where the voltage of the input power supply is fixed (voltage variation  $\leq \pm 10\%$ );
- Where isolation is necessary between input and output (isolation voltage  $\leq 1000\text{VDC}$ );
- 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.

### MODEL SELECTION

B0505(X)T-1W



### MORNSUN America LLC

43 Broad Street  
Hudson, MA 01749  
Tel: 978-567-9610  
Fax: 978-567-9601  
[Http://www.mornsunamerica.com](http://www.mornsunamerica.com)

### PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (% Typ.)	UL CE
	Voltage (VDC)		Voltage (VDC)	Current (mA)			
	Nominal	Range		Max	Min		
B0303(X)T-1W	3.3	3.0-3.6	3.3	303	30	73	UL
B0305(X)T-1W			5	200	20	74	UL
B0503(X)T-1W	5	4.5-5.5	3.3	303	30	72	
B0505(X)T-1W			5	200	20	77	UL, CE
B0509(X)T-1W			9	111	12	76	UL, CE
B0512(X)T-1W			12	84	9	79	UL, CE
B0515(X)T-1W			15	67	7	78	UL, CE
B1205(X)T-1W			12	10.8-13.2	5	200	20
B1209(X)T-1W	9	111			12	73	UL, CE
B1212(X)T-1W	12	84			9	73	UL, CE
B1215(X)T-1W	15	67			7	74	UL, CE
B2403(X)T-1W	24	21.6-26.4	3.3	300	30	69	
B2405(X)T-1W			5	200	20	70	
B2409(X)T-1W			9	110	11	72	
B2412(X)T-1W			12	83	8	75	
B2415(X)T-1W			15	67	7	76	
B2424(X)T-1W			24	42	4	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.

### ISOLATION 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

### OUTPUT SPECIFICATIONS

Item	Test Conditions	Min	Typ.	Max	Units
Output power		0.1		1	W
Line regulation	For Vin change of 1%(3.3V output)			±1.5	%
	For Vin change of 1%(Others output)			±1.2	
Load regulation	10% to 100% load (3.3V output)		15	20	%
	10% to 100% load (5V output)		12.8	15	
	10% to 100% load (9V output)		8.3	10	
	10% to 100% load (12V output)		6.8	10	
	10% to 100% load (15V output)		6.3	10	
	10% to 100% load (24V output)		5	10	
Output voltage accuracy	See tolerance envelope graph				
Temperature drift	100% full load			0.03	%/°C
Output ripple & Noise*	20MHz Bandwidth		50	100	mVp-p
Switching frequency	Full load, nominal input(5/12V)		100		KHz
	Full load, nominal input(24V)		500		

Note:

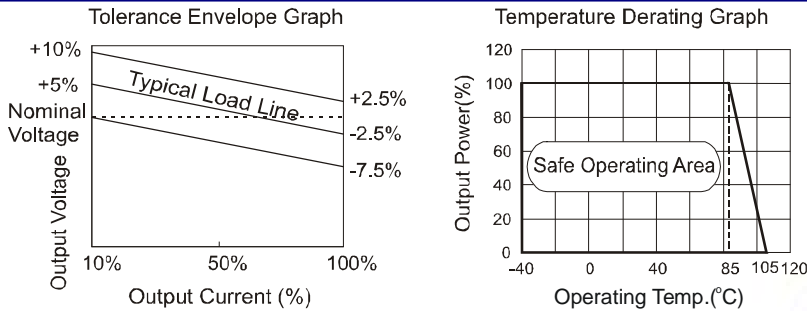
- All specifications measured at  $T_A=25^\circ\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- See below recommended circuits for more details.

## COMMON SPECIFICATION

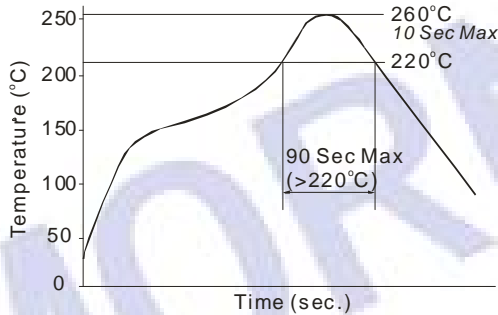
Item	Test Conditions	Min	Typ	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			15	25	
Lead temperature	1.5mm from case for 10 seconds			260	
Cooling		Free air convection			
Package material		Epoxy Resin(UL94V-0)			
Short circuit protection*				1	s
MTBF		3500			K Hours
Weight				1.41	g

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

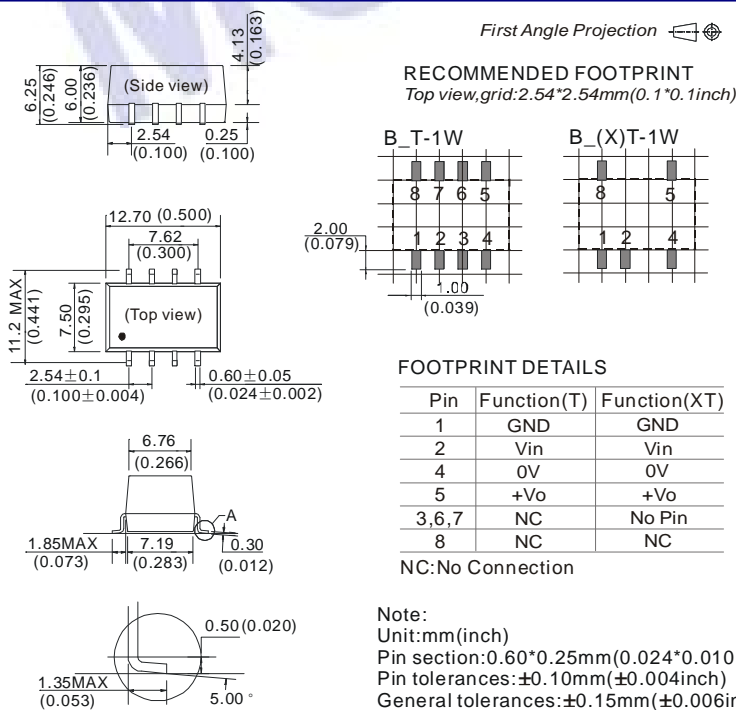
## TYPICAL CHARACTERISTICS



## RECOMMENDED REFLOW SOLDERING PROFILE



## OUTLINE DIMENSIONS & FOOTPRINT DETAILS



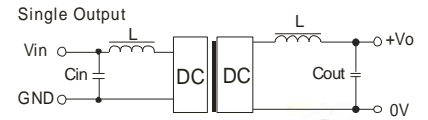
## APPLICATION NOTE

### Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is **not less than 10%** of the full load, and that **this product should never be operated under no 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.

### Recommended testing circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output 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 greatest capacitance of its filter capacitor sees (Table 1).

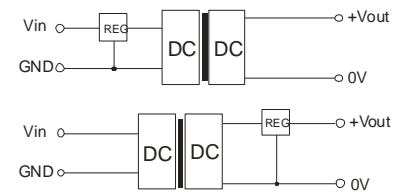
EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (uF)	Vout (VDC)	Cout (uF)
3.3/5	4.7	3.3/5	10
12	2.2	9	4.7
24	0.47	12	2.2
-	-	15	1
-	-	24	0.47

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

### Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure2).



(Figure2)

### Overload Protection

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

**No parallel connection or plug and play.**