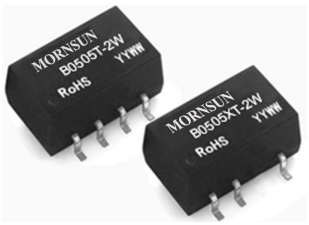
MORNSUN®

B_(X)T-2W Series

2W, FIXED INPUT, ISOLATED & UNREGULATED SINGLE OUTPUT DC-DC CONVERTER



Patent Protection RoHS

FEATURES

- Small Footprint
- SMD Package
- 1KVDC Isolation
- Operating Temperature Range: -40°C ~ +85°C
- Low Temperature Rise
- No External Component Required
- Industry Standard Pinout

PART NUMBER SYSTEM

B0505(X)T-2W

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

APPLICATIONS

The B_(X)T-2W Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

1) Input voltage variation ≤ ±10%;
2) 1KVDC 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) Max.	Output Current (mA) Min.	Input Current (mA)(typ.) @Max. Load	Input Current (mA)(typ.) @No Load	Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μF)	Efficiency (%, typ.) @Max. Load	Approval
B0503(X)T-2W	5 (4.5-5.5)	3.3	400	40	370	32	45	220	71	
B0505(X)T-2W		5	400	40	483	16			78	
B0509(X)T-2W		9	222	23	478				79	
B0512(X)T-2W		12	167	17	476				79	
B0515(X)T-2W		15	133	14	474				80	
B1205(X)T-2W	12 (10.8-13.2)	5	400	40	210	10	12		78	
B1212(X)T-2W		12	167	17	191				80	
B1215(X)T-2W		15	133	14	192				81	
B1224XT-2W		24	84	8	193				87	
B1515T-2W	15(13.5-16.5)	15	133	14	165	10	14		81	
B2405(X)T-2W	24 (21.6-26.4)	5	400	40	102	7	22		78	
B2412(X)T-2W		12	167	17	98				80	
B2415(X)T-2W		15	133	14	95				81	
B2424(X)T-2W		24	84	9	95				80	

Note: The B_XT-2W series have no 3,6,7 pin, For example B0505XT-2W.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input 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			

OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
Output Power			0.2	--	2	W
Output Voltage Accuracy			See tolerance envelope curve			
Line Regulation	For Vin change of ±1%		--	--	±1.2	%
Load Regulation	10% to 100% load	3.3VDC output	--	12	20	
		5VDC output	--	12.8	15	
		9VDC output	--	8.3	15	
		12VDC output	--	6.8	15	
		15VDC output	--	6.3	15	
		24VDC output	--	6.3	15	
Temperature Drift	100% load		--	--	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth		--	100	200	mVp-p
Short Circuit Protection**			--	--	1	s

Note: 1.*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.
2.**Supply voltage must be discontinued at the end of short circuit duration.

COMMON SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA		1000	--	--	VDC
Isolation Resistance	Test at 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input/Output,100KHz/1V	B2424(X)T-2W	--	100	--	pF
		Other Models	--	30	--	
Switching Frequency	Full load, nominal input		--	500	--	KHz
MTBF	MIL-HDBK-217F@25℃		3500	--	--	K hours
Case Material			Epoxy Resin (UL94-V0)			
Weight			--	1.41	--	g

ENVIRONMENTAL SPECIFICATIONS

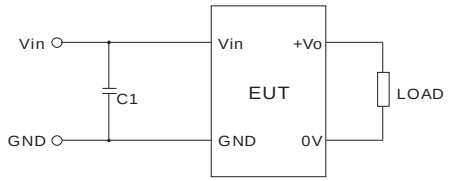
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85℃)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

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

EMC RECOMMENDED CIRCUIT

EMI Recommended External Circuit:

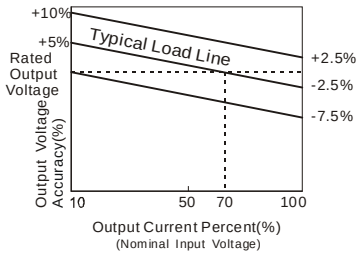


(Figure 1)

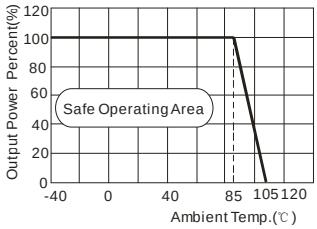
Recommended external circuit parameters:
①Vin： 5V/12V
C1：2.2μF/50V
②Vin：24V
C1：4.7μF/50V
Note: Product bare input of 3.3V、5V、12V already meet CLASS A, increase the capacitor margin increase.

PRODUCT TYPICAL CURVE

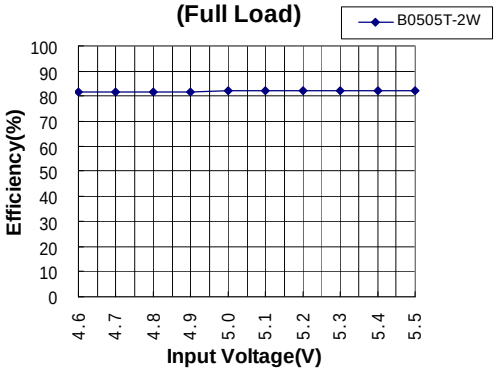
Tolerance Envelope Curve



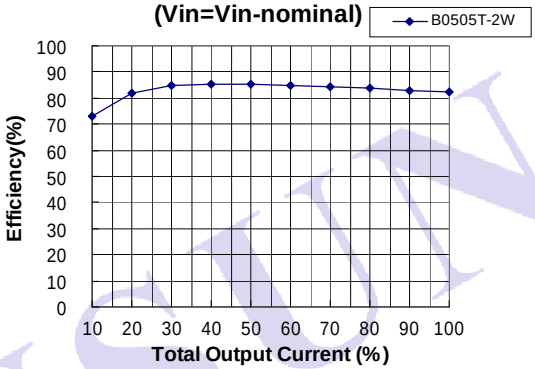
Temperature Derating Curve



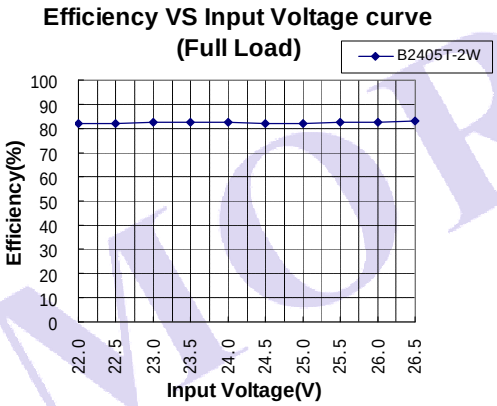
Efficiency VS Input Voltage curve (Full Load)



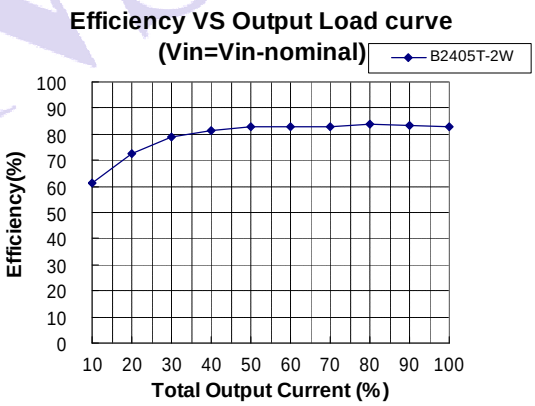
Efficiency VS Output Load curve (Vin=Vin-nominal)



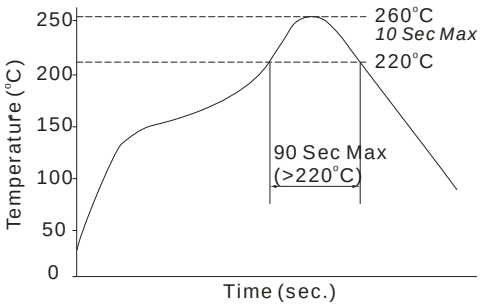
Efficiency VS Input Voltage curve (Full Load)



Efficiency VS Output Load curve (Vin=Vin-nominal)



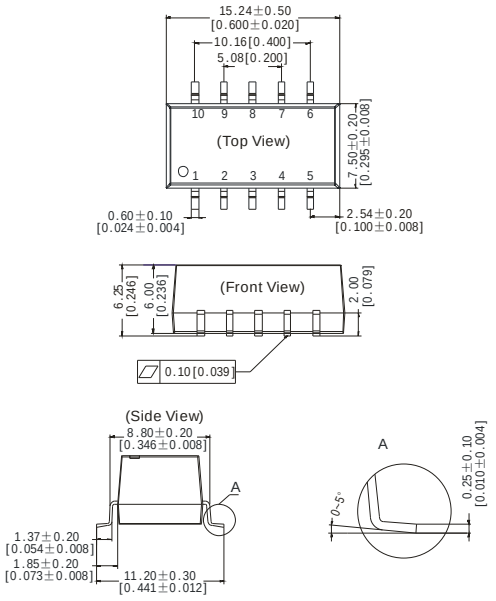
Recommended reflow Soldering Profile



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

OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

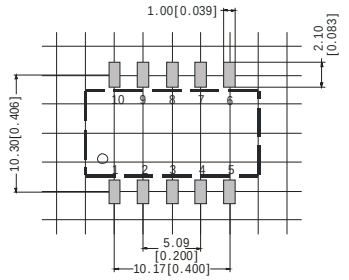
MECHANICAL DIMENSIONS



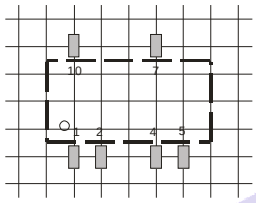
Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10mm[± 0.004inch]
General tolerances: ± 0.25mm[± 0.010inch]

RECOMMENDED FOOTPRINT

A_T-1W



A_XT-1W

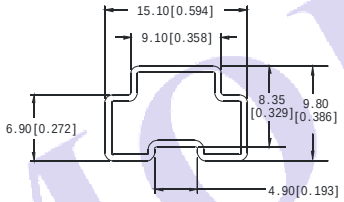


Note:grid 2.54*2.54mm

FOOTPRINT DETAILS		
Pin	Function(T)	Function(XT)
1	GND	GND
2	Vin	Vin
4	0V	0V
7	+Vo	+Vo
5,10	NC	NC
3,6,8,9	NC	No Pin

NC:No Connection

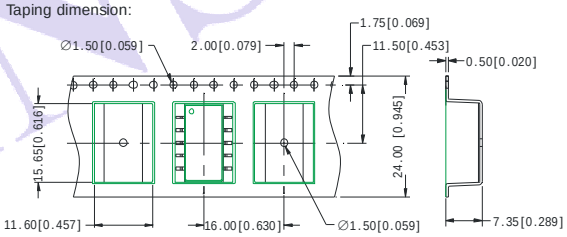
TUBE OUTLINE DIMENSIONS



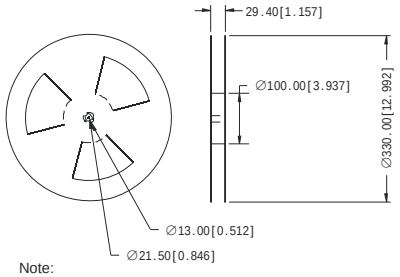
Note:
Unit: mm[inch]
General tolerances: ± 0.5mm[± 0.020inch]
L=530mm[20.866inch] Devices per tube quantity: 33pcs
L=220mm[8.661inch] Devices per tube quantity: 12pcs
Short tube inner package dimensions: L*W*H= 255*170*80mm
Short tube outer package dimensions(with six inner package boxes):
L*W*H= 375*280*270mm
Long tube inner package dimensions: L*W*H= 580*200*100mm
Long tube outer package dimensions(with two inner package boxes):
L*W*H= 600*215*220mm
Long tube outer package dimensions(with three inner package boxes):
L*W*H= 600*215*325mm

REEL PACKING OUTLINE DIMENSIONS

Taping dimension:



Taping reel dimension:

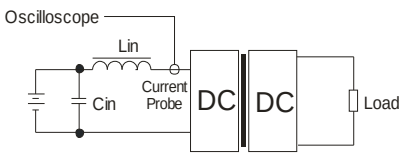


Note:
Unit: mm[inch]
General tolerances: ± 0.5mm[± 0.020inch]
Devices per reel quantity: 500pcs

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

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, or use our company's products with a lower rated output power.

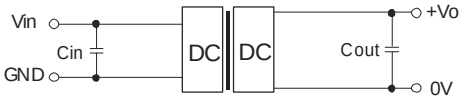
2) Overload Protection

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

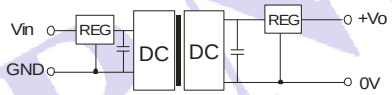
EXTERNAL CAPACITO2 TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Vout (VDC)	Cout (μF)
5	4.7	5	10
12	2.2	12	2.2
15	1	15	1
24	0.47	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 date in the datasheet are measured according to nominal input voltage, rated output load, TA=25℃, humidity<75%, unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. The performance in the datasheet is just fit for the part number in the selection guide, and may be different from the customer-designed product, you can get more details from MORNSUN FAE.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

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