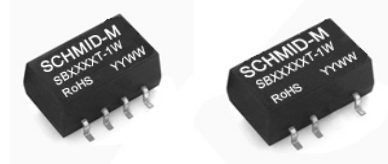




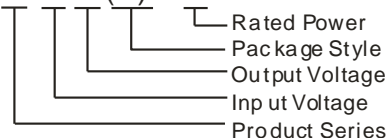
SB_(X)T-1W Series

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



PART NUMBER SYSTEM

SB0505(X)T-1W



FEATURES

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

APPLICATIONS

The SB_(X)T-1W 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) 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)		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				
SB0303(X)T-1W	3.3 (3.0-3.6)	3.3	303	30	418	45	25	33	73	UL
SB0305(X)T-1W		5	200	20	390				74	UL
SB0309(X)T-1W		9	111	12	408				70	
SB0312(X)T-1W		12	84	9	367				78	
SB0315(X)T-1W		15	67	7	390				76	
SB0324(X)T-1W		24	42	4	364				78	
SB0503(X)T-1W	5 (4.5-5.5)	3.3	303	30	265	36	16	33	72	
SB0505(X)T-1W		5	200	20	256				77	UL CE
SB0506(X)T-1W		6	167	17	269				69	
SB0507T-1W		7.2	139	14	252				75	
SB0509(X)T-1W		9	111	12	252				76	UL CE
SB0512(X)T-1W		12	84	9	245				79	UL CE
SB0515(X)T-1W		15	67	7	256				78	UL CE
SB0524(X)T-1W		24	42	4	234				79	
SB1203(X)T-1W		12 (10.8-13.2)	3.3	303	30				110	22
SB1205(X)T-1W	5		200	20	115	69	UL CE			
SB1209(X)T-1W	9		111	12	110	73	UL CE			
SB1212(X)T-1W	12		84	9	109	73	UL CE			
SB1215(X)T-1W	15		67	7	110	74	UL CE			
SB1224(X)T-1W	24		42	4	95	79				
SB1505(X)T-1W	15 (13.5-16.5)	5	200	20	101	12	10	33	62	
SB1515(X)T-1W		15	67	7	80				76	
SB2403(X)T-1W	24 (21.6-26.4)	3.3	300	30	57	9	11	33	69	
SB2405(X)T-1W		5	200	20	58				70	
SB2409(X)T-1W		9	110	11	53				72	
SB2412(X)T-1W		12	83	8	52				75	
SB2415(X)T-1W		15	67	7	51				76	
SB2424(X)T-1W		24	42	4	50				77	

Note: 1. The SB_XT-1W series have no 3,6,7 pin, For example SB0505XT-1W.

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

INPUT SPECIFICATIONS					
Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	3.3VDC input	-0.7	--	5	VDC
	5VDC input	-0.7	--	9	
	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 $\pm 1\%$	3.3VDC output	--	--	± 1.5	%
		Others	--	--	± 1.2	
Load Regulation	10% to 100% load	3.3VDC output	--	15	20	
		5,6,7VDC output	--	12.8	15	
		9VDC output	--	8.3	10	
		12VDC output	--	6.8	10	
		15VDC output	--	6.3	10	
24VDC output	--	5	10			
Temperature Drift	100% load	--	--	± 0.03	$\%/^{\circ}\text{C}$	
Ripple & Noise*	20MHz Bandwidth	--	50	75	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.

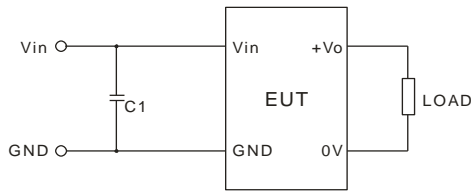
COMMON SPECIFICATIONS						
Item	Test Conditions	Min.	Typ.	Max.	Unit	
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	1000	--	--	VDC	
Isolation Resistance	Test at 500VDC	1000	--	--	M Ω	
Isolation Capacitance	Input/Output, 100KHz/1V	B2424(X)T-1W	--	50	--	pF
		Others	--	30	--	
Switching Frequency	Full load, nominal input	5V/12V	--	100	--	KHz
		24V	--	500	--	
		Others	--	100	500	
MTBF	MIL-HDBK-217F @25 $^{\circ}\text{C}$	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 $^{\circ}\text{C}$)	-40	--	85	$^{\circ}\text{C}$
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 $\pm 8\text{KV}$ perf. Criteria B

EMI RECOMMENDED CIRCUIT

EMI Recommended External Circuit:



(Figure1)

Recommended external circuit parameters:

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

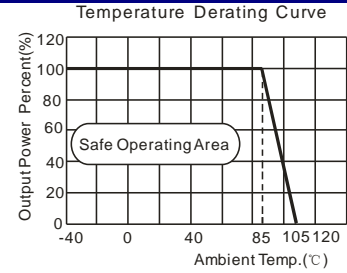
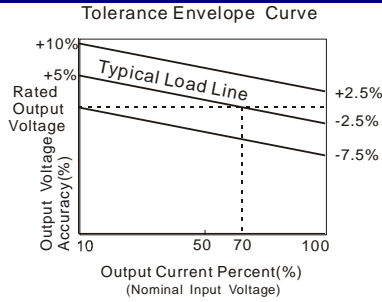
C1: 2.2 μ F/50V

Vin: 24V

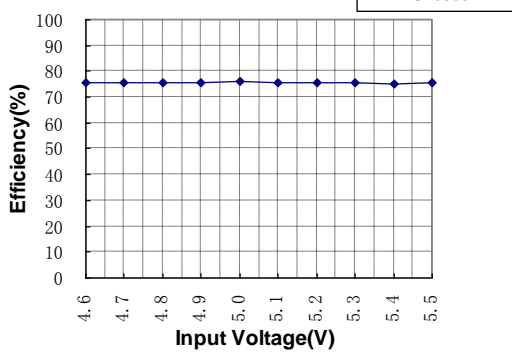
C1: 4.7 μ F/50V

Note: Product bare input of 3.3V、5V、12V already meet CLASS A, increase the capacitor margin increase.

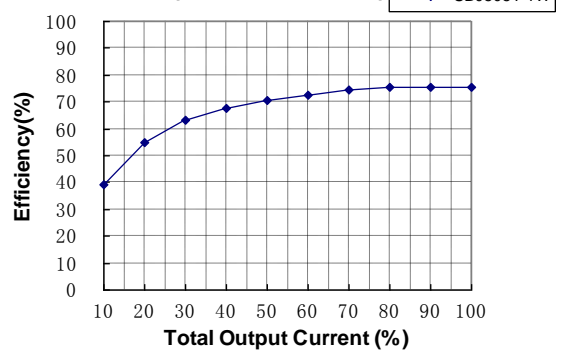
PRODUCT TYPICAL CURVE



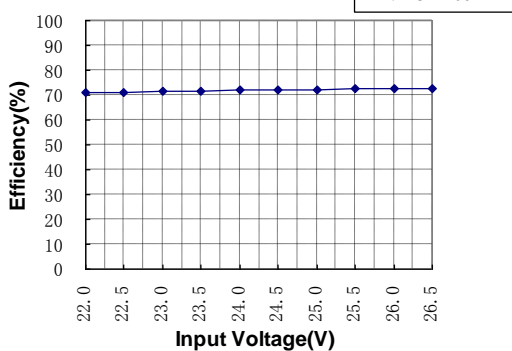
Efficiency VS Input Voltage curve (Full Load)



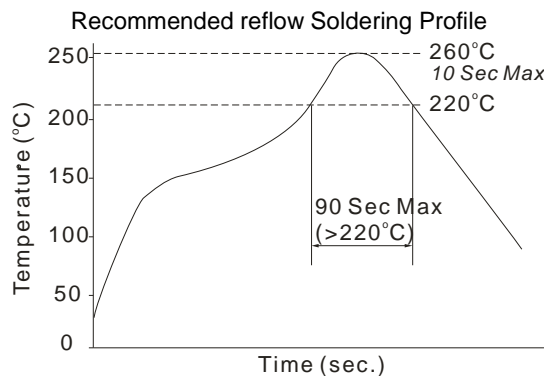
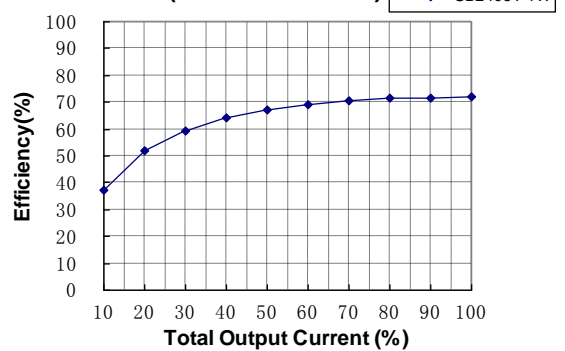
Efficiency VS Output Load curve (Vin=Vin-nominal)



Efficiency VS Input Voltage curve (Full Load)

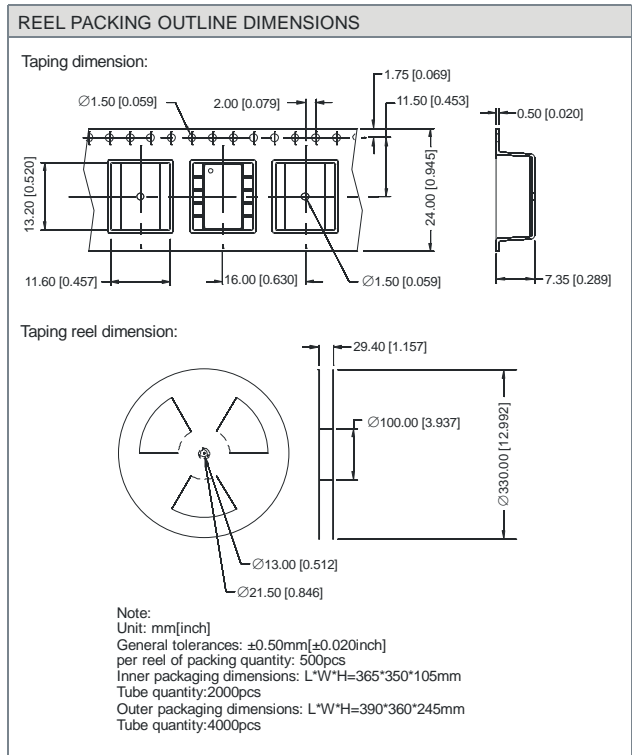
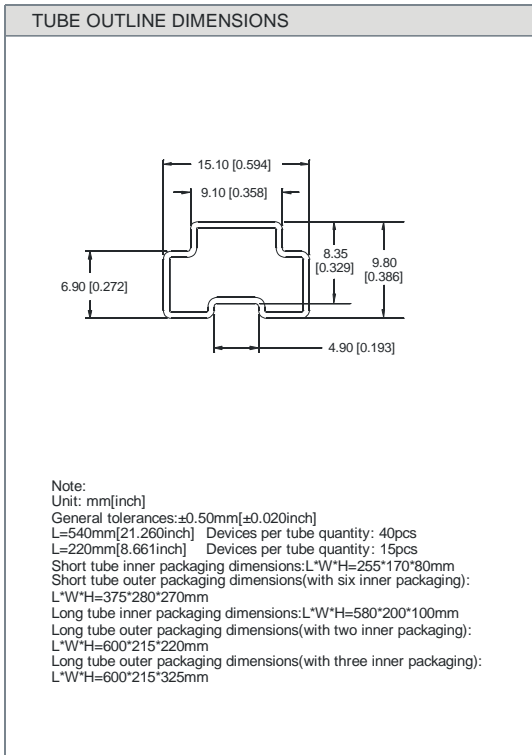
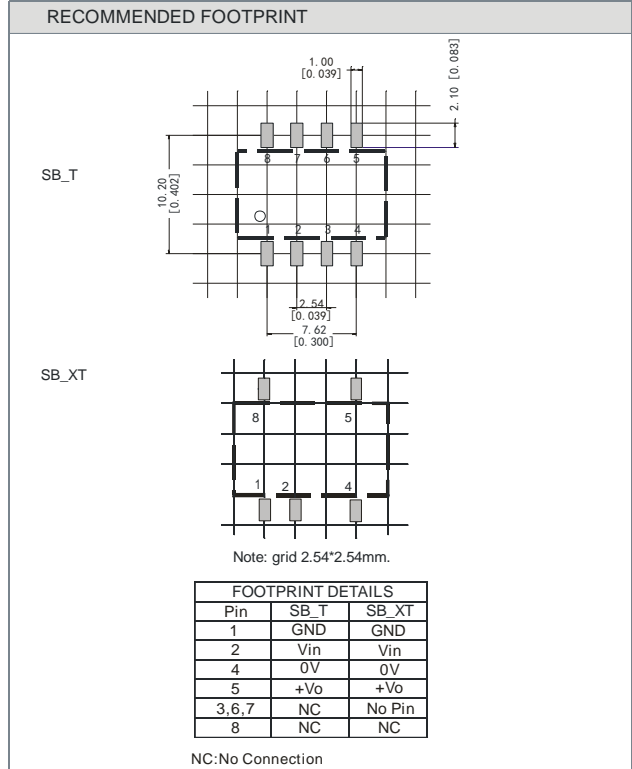
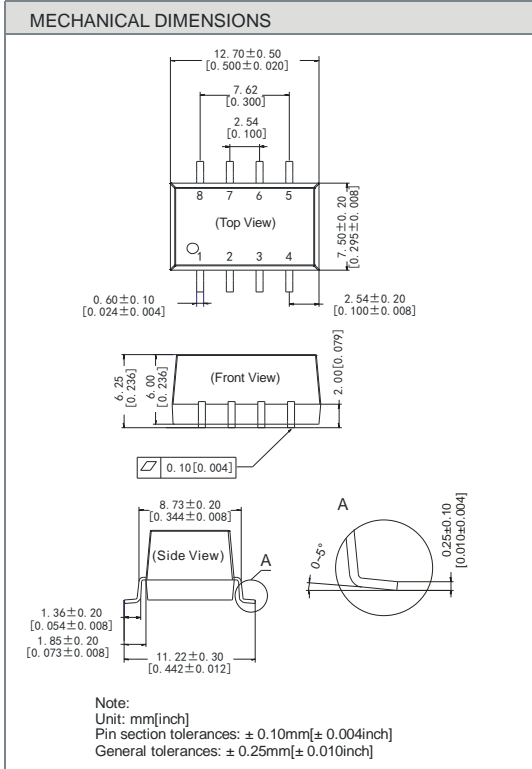


Efficiency VS Output Load curve (Vin=Vin-nominal)



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

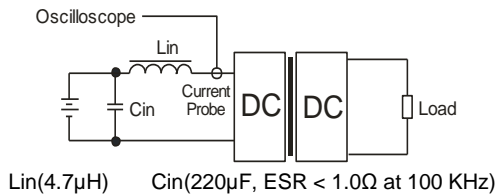
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



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

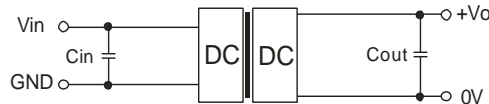
2) Overload Protection

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

3) Recommended circuit

If you want to further decrease the input/output ripple, a 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) 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°C, 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 SCHMID-M'S FAE.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.