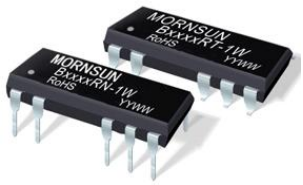
MORNSUN®

B_RN-1W & B_RT-1W Series

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



RoHS

FEATURES

- Small Footprint, Ultra-thin package
- 1.5KVDC Isolation
- Temperature Range: -40°C ~ +85°C
- No Heatsink Required
- High Power Density
- No External Component Required
- Industry Standard Pinout
- Compatible with DCP01 Series
- Short Circuit Protection
- RoHS Compliance

APPLICATIONS

The B_RN-1W&B_RT-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 ≤ ±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤1500VDC);
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.

MODEL SELECTION

B0505RN-1W

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

PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (%, Typ.)	Package Style
	Voltage (VDC)		Voltage (VDC)	Current (mA)			
	Nominal	Range		Max.	Min.		
B0505RN-1W	5	4.5-5.5	5	200	20	74	DIP
B0509RN-1W *			9	111	12	78	DIP
B0512RN-1W			12	83	9	77	DIP
B0515RN-1W *			15	67	7	76	DIP
B0505RT-1W			5	200	20	74	SMD
B0509RT-1W *			9	111	12	78	SMD
B0512RT-1W			12	83	9	77	SMD
B0515RT-1W			15	67	7	76	SMD
B1205RN-1W	12	10.8-13.2	5	200	20	73	DIP
B1209RN-1W *			9	111	12	74	DIP
B1212RN-1W *			12	83	9	76	DIP
B1215RN-1W *			15	67	7	75	DIP
B1205RT-1W			5	200	20	73	SMD
B1209RT-1W *			9	111	12	74	SMD
B1212RT-1W *			12	83	9	76	SMD
B1215RT-1W *			15	67	7	75	SMD

* Designing.

COMMON SPECIFICATIONS

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			300	
Short circuit protection		Continuous, auto-recovery			
Cooling		Free air convection			
Package material		Epoxy Resin(UL94-V0)			
MTBF		3500			k hours
Weight			1.4		g

ISOLATION SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance			25		pF

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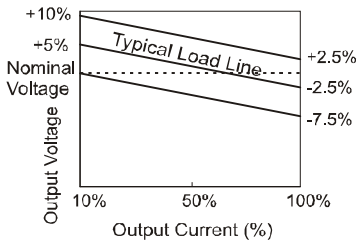
OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Units
Output power			0.1		1	W
Line regulation	For Vin change of ±1%				±1.2	%
Load regulation	10% to 100% load	(5V output)		12.8	15	
		(9V output)		8.3	15	
		(12V output)		6.8	15	
		(15V output)		6.3	15	
Output voltage accuracy			See tolerance envelope graph			
Temperature drift	Nominal input,100% full load				±0.03	%/°C
Ripple & Noise*	20MHz bandwidth nominal input	50% load		20		mVp-p
		100% load		50	75	
Switching frequency	Full load, nominal input			100		kHz

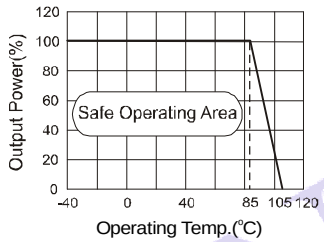
*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

TYPICAL CHARACTERISTICS

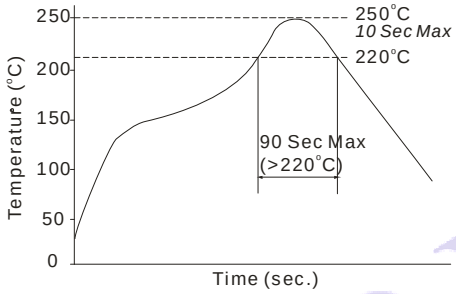
Tolerance Envelope Graph



Temperature Derating Graph

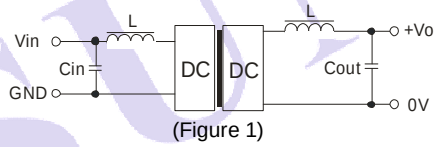


RECOMMENDED REFLOW SOLDERING PROFILE

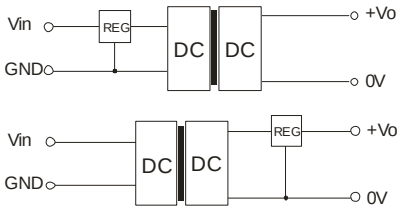


Remark: The curve applies only to the hot air reflow soldering

RECOMMENDED CIRCUIT



(Figure 1)



（Figure2）

EXTERNAL CAPACITOR TABLE (TABLE 1)

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

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

APPLICATION NOTE

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) 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).

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).

3) 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).

4) Overload Protection

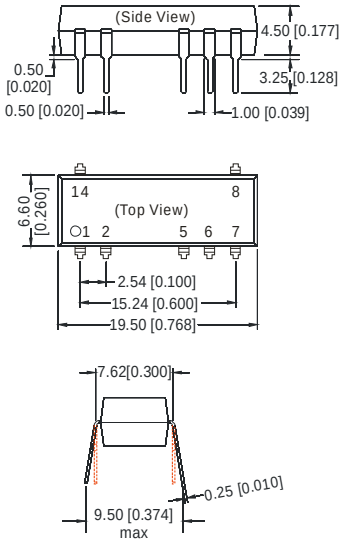
Under normal operating conditions, the output circuit of these products has no protection against over load. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

5) No parallel connection or plug and play

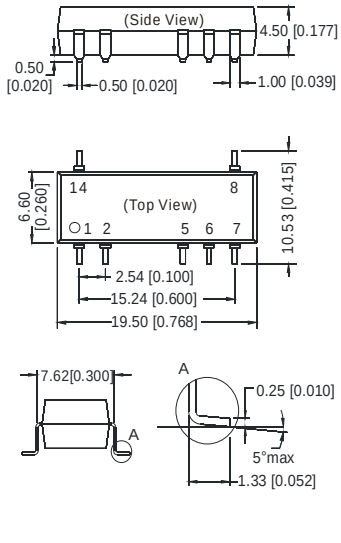
OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS

B_RN-1W Series



B_RT-1W Series



FOOTPRINT DETAILS	
Pin	Function
1	Vin
2	GND
5	0V
6	+Vo
Others	NC

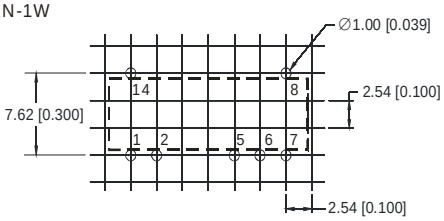
NC:No connection

FOOTPRINT DETAILS	
Pin	Function
1	Vin
2	GND
5	0V
6	+Vo
Others	NC

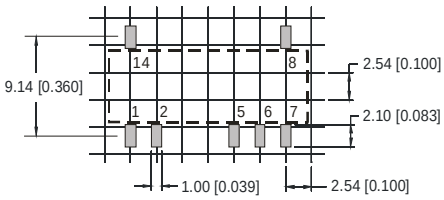
Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT

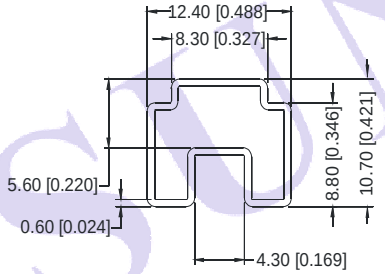
B_RN-1W



B_RT-1W



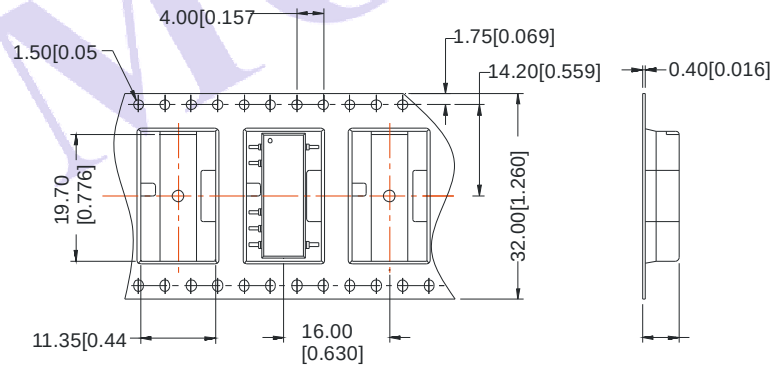
TUBE OUTLINE DIMENSIONS

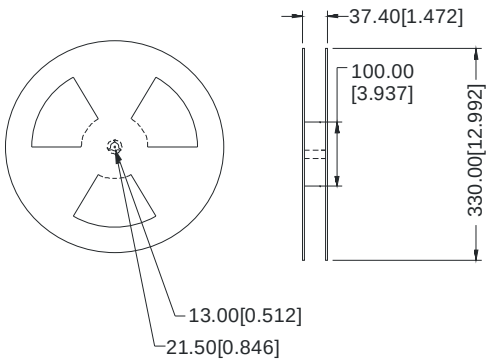


Note:
Unit: mm[inch]
General tolerances: ±0.50mm [±0.020inch]
L=530mm[20.866inch] Devices per tube quantity : 26pcs
L=220mm[8.661inch] Devices per tube quantity: 10pcs

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

TAPING REEL DIMENSIONS





Note:
Unit: mm[inch]
General Tolerances:±0.5mm [±0.02inch]

Per reel of packing quantity:500PCS
Inner package carton dimensions: L*W*H=365*350*105mm
Outer package carton dimensions: L*W*H=390*360*245mm

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. Only typical models listed, other models may be different, please contact our technical person for more details.
4. In this datasheet, all the test methods of indications are based on corporate standards.