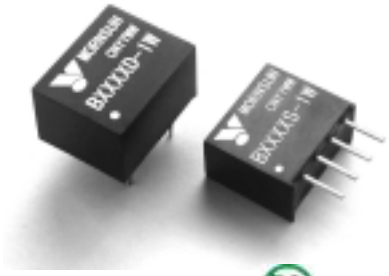
MORNSUN
mini power professional

B_S-1W / B_D-1W Series



FIXED INPUT ISOLATED & UNREGULATED 1W OUTPUT SINGLE OUTPUT MINIATURE SIP/DIP PACKAGE

RoHS

multi-country patent protection

FEATURES

- Efficiency up to 81%
- Small Footprint
- Miniature SIP/DIP Package
- Single Output Voltage
- 1KVDC Isolation
- Temperature Range: -40°C~+85°C
- Industry Standard Pinout
- UL94-V0 Package
- No Heat sink Required
- No External Component Required
- PCB Mounting
- RoHS Compliance

APPLICATIONS

The B_S(D)-1W Series are specially designed for applications where a single power supply is 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 =1000VDC);
3) Where the regulation of the output voltage and the output ripple and noise are not demanding.

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

These products don't apply to:

1) Where the input supply voltage is varied (variation≥ ±10%), otherwise our company's WRA series is recommended;
2) Where the isolation voltage between input and output is required to be>1000VDC, otherwise our company's F_S(D) Series of products are recommended;
3) Circuits in which the output voltage regulation is demanding, otherwise our company's IF Series or WRF Series are recommended;
4) The output load's actual power consumption is less than 0.25W, otherwise our company's B_S(D)-0.25W Series are recommended.

MODEL SELECTION

B0505S-1W

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

PRODUCT PROGRAM

Part Number	Input Voltage (VDC) Nominal	Input Voltage (VDC) Range	Output Voltage (VDC)	Output Current (mA) Max	Output Current (mA) Min	Efficiency (%, Typ)	Package Style
B0303S/D-1W	3.3	3.0~3.6	3.3	300	30	72	SIP/DIP
B0305S/D-1W	3.3	3.0~3.6	5	200	20	73	SIP/DIP
B0503S/D-1W	5	4.5~5.5	3.3	300	30	74	SIP/DIP
B0505S/D-1W	5	4.5~5.5	5	200	20	78	SIP/DIP
B0509S/D-1W	5	4.5~5.5	9	111	12	79	SIP/DIP
B0512S/D-1W	5	4.5~5.5	12	83	9	80	SIP/DIP
B0515S/D-1W	5	4.5~5.5	15	67	7	78	SIP/DIP
B1203S/D-1W	12	10.8~13.2	3.3	300	30	75	SIP/DIP
B1205S/D-1W	12	10.8~13.2	5	200	20	78	SIP/DIP
B1209S/D-1W	12	10.8~13.2	9	111	12	80	SIP/DIP
B1212S/D-1W	12	10.8~13.2	12	83	9	81	SIP/DIP
B1215S/D-1W	12	10.8~13.2	15	67	7	79	SIP/DIP
B2403S/D-1W	24	21.6~26.4	3.3	300	30	76	SIP/DIP
B2405S/D-1W	24	21.6~26.4	5	200	20	79	SIP/DIP
B2409S/D-1W	24	21.6~26.4	9	111	12	80	SIP/DIP
B2412S/D-1W	24	21.6~26.4	12	83	9	81	SIP/DIP
B2415S/D-1W	24	21.6~26.4	15	67	7	79	SIP/DIP
B2424S/D-1W	24	21.6~26.4	24	42	4	80	SIP/DIP

COMMON SPECIFICATION

Short circuit protection	1 second
Temperature rise at full load	25°C MAX, 15°C TYP
Cooling	Free air convection
Operation temperature range	-40°C~+85°C
Storage temperature range	-55°C ~+125°C
Lead temperature*	300°C (1.5mm from case for 10 seconds)
Storage humidity range	≤ 95%
Case material	Plastic (UL94-V0)
MTBF	>3,500,000 hours

ISOLATION SPECIFICATIONS

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute	1000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

OUTPUT SPECIFICATIONS

Item	Test condition	Min	Typ	Max	Units
Output power		0.1		1	W
Line regulation	For Vin change of 1%			1.2	%
Load regulation	10% to 100% full load			15	%
Output voltage accuracy	See tolerance envelope graph				
Temperature drift	100% full load			0.03	%/°C
Output ripple	20MHz Bandwidth		50	75	mVp-p
Switching frequency	Full load, nominal input		100		KHz

Note:
1.All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2.See below recommended circuits for more details.

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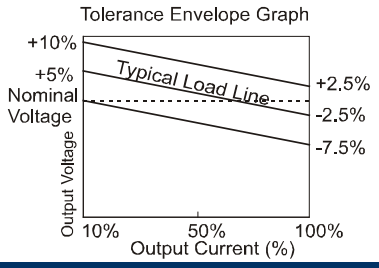
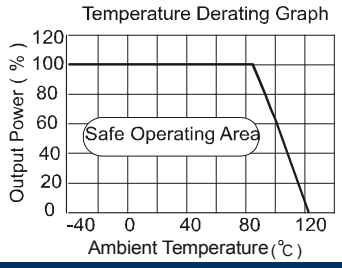
TYPICAL CHARECTERISTICS

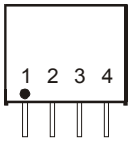




FOOTPRINT DETAILS

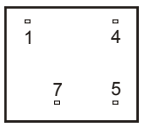
Pin	Function
1	GND
2	Vin
3	0V
4	+V

BXXXXS-Series



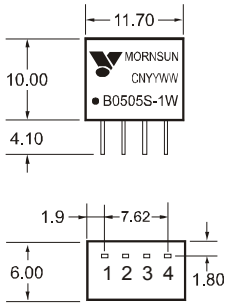
Pin	Function
1	GND
4	Vin
5	+V
7	0V

BXXXXD-Series



OUTLINE DIMENSIONS& RECOMMENDED FOOTPRINT

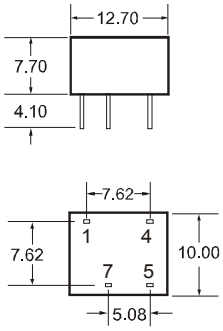
BXXXXS-1W Package



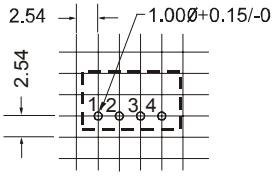
Side View

Bottom View

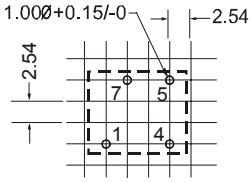
BXXXXD-1W Package



BXXXXS-1W Footprint



BXXXXD-1W Footprint



Note: All Pins on a 2.54mm pitch; All Pin diameters are 0.50 mm; all dimensions in mm.

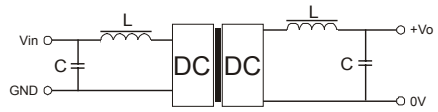
APPLICATION NOTE

Filtering

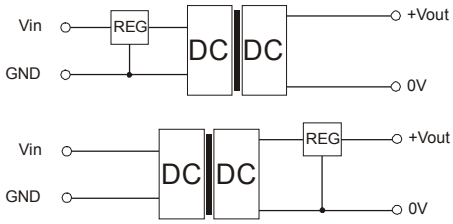
In some circuits which are sensitive to noise and ripple, a filtering capacitor may be added to the DC/DC output end and input end to reduce the noise and ripple. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees the external capacitor table. To get an extremely low ripple, an “LC” filtering network may be connected to the input and output ends of the DC/DC converter, which may produce a more significant filtering effect. 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 (see figure 1).

Requirement On Output Load

To ensure this module can operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, 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, or use our company’s products with a lower rated output power (B_S(D) -0.25W Series).



<Figure 1>



<Figure 2>

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.

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 (see Figure 2).

External Capacitor Table

V_{in}	External capacitor	V_{out}	External capacitor
3.3VDC	4.7uF	3.3VDC	10uF
5VDC	4.7uF	5VDC	10uF
12VDC	2.2uF	9VDC	4.7uF
24VDC	1uF	12VDC	2.2uF
--	--	15VDC	1uF

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