# **MORNSUN®**

## **IB S-2W Series**

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



## **RoHS**

## **FEATURES**

Small Footprint SIP Package 1KVDC Isolation

Temperature Range: -40°C to +85°C No External Component Required Internal SMD construction Continuous Short Circuit Protection

Industry Standard Pinout RoHS Compliance

## **APPLICATIONS**

The IB\_S-2W Series are specially designed for applications where a single power supply is highly 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 ≤±5%);
- Where isolation is necessary between input and output (isolation voltage ≤1000VDC);
- Where the regulation of the output voltage and the output ripple and noise are demanded.

|                |               |             |                |     | COLIS   |                     |           |
|----------------|---------------|-------------|----------------|-----|---------|---------------------|-----------|
| PRODUCT        | PROGR         | AM          |                |     |         |                     |           |
| _              | I             | nput        | Output         |     |         |                     | Switching |
| Part<br>Number | Voltage (VDC) |             | Voltage Curren |     | nt (mA) | Efficiency (%, Typ) | frequenc  |
|                | Nominal       | Range       | (VDC)          | Max | Min     | (70, 170)           | (KHz)     |
| IB0505S-2W     | 5             | 4.75-5.25   | 5              | 400 | 40      | 70                  | 333       |
| IB1205S-2W     | 12            | 11.40-12.60 | 5              | 400 | 40      | 71                  | 58        |
| IB1505S-2W*    | 15            | 14.25-15.75 | 5              | 400 | 40      | 71                  | <u> </u>  |
| IB2405S-2W     | 24            | 22.8-25.2   | 5              | 400 | 40      | 71                  | 66        |
|                |               |             |                |     | 4       |                     |           |
|                |               |             |                | _   |         |                     |           |
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|                |               |             |                |     |         |                     |           |
|                |               |             |                |     |         |                     |           |
| Designing.     |               |             |                |     |         |                     |           |

| ISOLATION SPECIFICATIONS |                                 |      |     |     |       |
|--------------------------|---------------------------------|------|-----|-----|-------|
| Item                     | Test condition                  | Min  | Тур | Max | Units |
| Isolation voltage        | Tested for 1 minute and 1mA max | 1000 |     |     | VDC   |
| Isolation resistance     | Test at 500VDC                  | 1000 |     |     | МΩ    |
| Isolation capacitance    |                                 |      | 100 |     | pF    |

## MODEL SELECTION



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| Test condition       |   |   |  |   |
|----------------------|---|---|--|---|
|                      | Min   | Тур   | Max  | Units   |
|                      | 0.2   |   | 2  | W   |
| For Vin change of 5% |   |   | ±0.5   |   |
| 10% to 100% load     |   |   | ±1.5   | %   |
| 100% full load       |   |   | ±3   |   |
| 100% full load       |   |   | 0.03   | %/°C  |
| 20MHz Bandwidth      |   | 20  | 30   | m\/n n  |
| 20MHz Bandwidth      |   | 50  | 150  | mVp-p   |
|                      | 10% to 100% load<br>100% full load<br>100% full load<br>20MHz Bandwidth | For Vin change of 5%  10% to 100% load  100% full load  100% full load  20MHz Bandwidth | For Vin change of 5%  10% to 100% load  100% full load  100% full load  20MHz Bandwidth  20  20MHz Bandwidth  50 | For Vin change of 5% ±0.5  10% to 100% load ±1.5  100% full load ±3  100% full load 0.03  20MHz Bandwidth 20 30 |

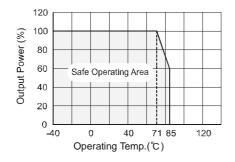
\*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

#### Note

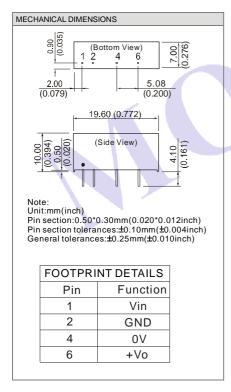
- All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
- See below recommended circuits for more details.
- 3. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.

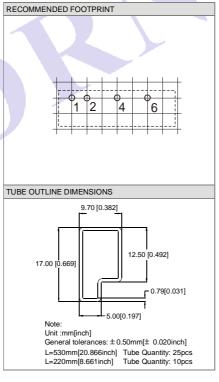
| OUTPUT SPECIFICATIONS    |                                |                     |     |     |         |
|--------------------------|--------------------------------|---------------------|-----|-----|---------|
| Item                     | Test Conditions                | Min                 | Тур | Max | Units   |
| Storage humidity         |                                |                     |     | 95  | %       |
| Operating temperature    |                                | -40                 |     | 85  |         |
| Storage temperature      |                                | -55                 |     | 125 | °C      |
| Temp. rise at full load  |                                |                     | 40  | 58  |         |
| Lead temperature         | 1.5mm from case for 10 seconds |                     |     | 300 |         |
| Short circuit protection |                                | Continuous          |     |     |         |
| Cooling                  |                                | Free air convection |     |     |         |
| Case material            |                                | Plastic(UL94-V0)    |     |     |         |
| MTBF                     |                                | 3500                |     |     | K hours |
| Weight                   |                                |                     | 2.8 |     | g       |

## **TYPICAL TEMPERATURE CURVE**



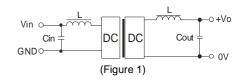
## **OUTLINE DIMENSION & PIN CONNECTIONS**





#### Recommended 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).

### **EXTERNAL CAPACITOR TABLE (Table 1)**

|   | Vin<br>(VDC) | Cin<br>(uF) | Vout<br>(VDC) | Cout<br>(uF) |
|---|--------------|-------------|---------------|--------------|
|   | 5            | 4.7         | 5             | 4.7          |
| - | 12           | 2.2         | -             | -            |
|   | 15           | 1           | -             | -            |
|   | 24           | 0.47        | -             | -            |

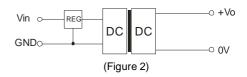
It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

### **Overload Protection**

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

### Input Over-voltage Protection Circuit

The simplest device for input over-voltage protection is a linear voltage regulator with overheat protection that is connected to the input end in series (Figure 2).



When the environment temperature is higher than 71°C, the product output power should be less then 60% of the rated power.

No parallel connection or plug and play.

## **APPLICATION NOTE**

## 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.