

# MORNSUN®

## IB\_S-2W Series

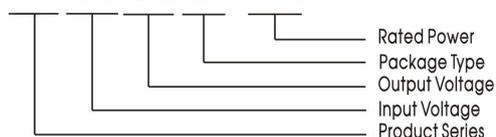
2W Isolated DC-DC converter with Fixed Input Voltage and Regulated Single Output



CE Patent Protection RoHS

### MODEL SELECTION

## IB0505S-2W



### FEATURES

- Compact size
- SIP package
- I/O isolation test voltage 1k VDC
- Operating ambient temperature range -40°C to +85°C
- Excellent thermal characteristic
- Internal surface mounted design
- Industry standard pin-out
- No external component required
- RoHS Compliant
- EN60950 Approval

### APPLICATIONS

The IB\_S-2W Series are specially designed for applications where power supply are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) The voltage of the input power supply is within a range of  $\pm 5\%$  max;
- 2) Input to output isolation of up to 1000VDC is required;
- 3) Applications requiring tight line and load regulation and/or low ripple and noise.

### MODEL SELECTION

| Certification | Model      | Input Voltage (VDC) |             | Output Voltage (VDC) | Output Current (mA) |      | Input Current typical (mA) |         | Full Load Efficiency (%) |      |
|---------------|------------|---------------------|-------------|----------------------|---------------------|------|----------------------------|---------|--------------------------|------|
|               |            | Nominal             | Range       |                      | Max.                | Min. | Full Load                  | No Load | Min.                     | Typ. |
| CE            | IB0505S-2W | 5                   | 4.75-5.25   | 5                    | 400                 | 40   | 580                        | 25      | 65                       | 69   |
|               | IB0512S-2W |                     |             | 12                   | 150                 | 15   | 507                        |         | 67                       | 71   |
|               | IB1205S-2W | 12                  | 11.4-12.6   | 5                    | 400                 | 40   | 238                        | 20      | 66                       | 70   |
|               | IB1212S-2W |                     |             | 12                   | 167                 | 16   | 228                        |         | 73                       | 77   |
|               | IB1215S-2W |                     |             | 15                   | 133                 | 13   | 231                        |         | 68                       | 72   |
|               | IB1505S-2W | 15                  | 14.25-15.75 | 5                    | 400                 | 40   | 190                        | 15      | 66                       | 70   |
|               | IB2405S-2W | 24                  | 22.8-25.2   | 5                    | 400                 | 40   | 119                        | 8       | 66                       | 70   |

### OUTPUT SPECIFICATIONS

| Item                    | Test condition               | Min.       | Typ.    | Max.       | Unit      |      |
|-------------------------|------------------------------|------------|---------|------------|-----------|------|
| Linear regulation       | Vin change nominal $\pm 1\%$ | IB1212S-2W | --      | --         | $\pm 1$   | %    |
|                         |                              | Others     | --      | --         | $\pm 0.5$ |      |
| Load regulation         | 10% to 100% load step        | --         | $\pm 1$ | $\pm 2$    |           |      |
| voltage accuracy        | 100% load                    | --         | --      | $\pm 3$    | mVp-p     |      |
| Temperature Coefficient | 100% load                    | --         | --      | $\pm 0.03$ |           | %/°C |
| Ripple*                 | 20MHz Bandwidth              | --         | 20      | 30         | mVp-p     |      |
| Noise*                  | 20MHz Bandwidth              | --         | 50      | 150        |           |      |

Note\*: The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

### ENVIRONMENTAL SPECIFICATION

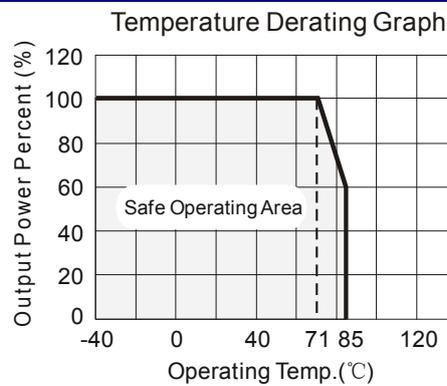
| Item                   | Test Conditions | Min. | Typ. | Max. | Unit |
|------------------------|-----------------|------|------|------|------|
| Storage humidity range | Non condensing  | --   | --   | 95   | %RH  |
| Operating temperature  |                 | -40  | --   | 85   | °C   |
| Storage temperature    |                 | -55  | --   | 125  |      |

|                                      |  |  |     |     |         |
|--------------------------------------|--|--|-----|-----|---------|
| Case Temperature Rise                | Ta=25°C  | --   | 40  | --  | °C      |
| Pin Soldering Resistance Temperature | Soldering spot is 1.5mm from case for 10 seconds | --   | --  | 300 |         |
| Cooling Method                       |  | Free air convection  |     |     |         |
| Case material                        |  | Black plastic; flame-retardant and heat-resistant (UL94 V-0) |     |     |         |
| Short-circuit protection             |  | Continuous   |     |     |         |
| Switching Frequency                  | 100% load, nominal input                         | --   | 100 | 300 | KHz     |
| MTBF                                 | MIL-HDBK-217F@25°C                               | 3500   | --  | --  | K hours |
| Weight                               |  | --   | 2.4 | --  | g       |

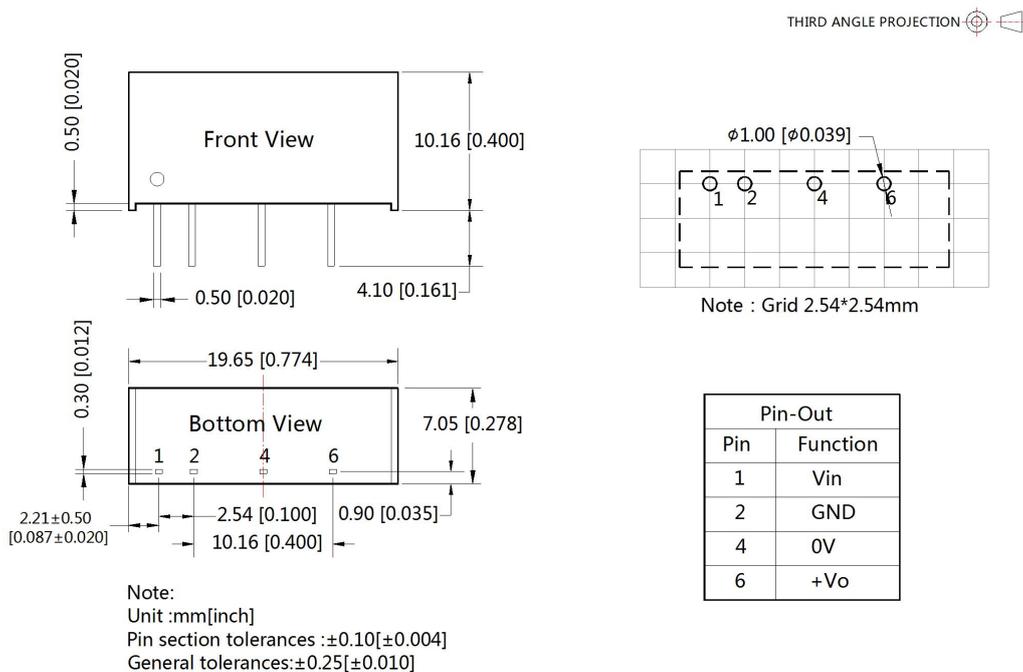
## ISOLATION

| Item                  | Test condition   | Min. | Typ. | Max. | Unit |
|-----------------------|--|------|------|------|------|
| Isolation             | Input-output Electric Strength Test for 1minute with a leakage current of 1mA max. | 1000 | --   | --   | VDC  |
| Insulation Resistance | Input-output resistance at 500VDC  | 1000 | --   | --   | MΩ   |
| Isolation Capacitance | Input-output capacitance 100KHz/0.1V   | --   | 60   | --   | pF   |

## TYPICAL CHARACTERISTICS CURVES



## MECHANICAL DIMENSIONS & PIN ALLOCATION



## APPLICATION NOTE

### 1) Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be below 10% of the rated output load. If the total required output power is less than 10%, a parallel bleeding resistor is required, ensuring that the sum of the power consumption is always maintained at 10% minimum.

### 2) Recommended circuit for Ripple Reduction

Input and/or output ripple can be further reduced by connecting "LC" filters to the input and/or output terminals of the DC-DC converter as shown in Figure 1.

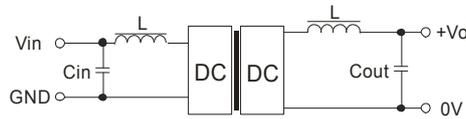


Figure 1

Note: To avoid mutual interference/oscillation the inductance and the frequency of the "LC" filter network should be staggered with the DC-DC converters frequency. Also, the capacitance of the output filter capacitor must be properly selected. If the capacitor value that is too high, the converter may not be able to properly start up. To ensure safe and reliable operation, the specified filter capacitor value in Table 1 must not be exceeded.

TABLE 1: RECOMMENDED EXTERNAL CAPACITOR VALUES

| Vin (VDC) | Cin ( $\mu$ F) | Vout (VDC) | Cout ( $\mu$ F) |
|-----------|----------------|------------|-----------------|
| 5         | 4.7            | 5          | 4.7             |
| 12        | 2.2            | 12         | 2.2             |
| 15        | 1              | 15         | 1               |
| 24        | 0.47           | --         | --              |

It is not recommended to use external capacitors for applications where the actual output power is less than 0.5W

### 3) Overload Protection

This family of DC-DC converter products does not incorporate any protection against overcurrent and/or short circuit. The best approach for protection the device is to add a self-recovery fuse or a circuit breaker in series to the input.

### 4) Input Over-voltage Protection Circuit

For input overvoltage protection, simply use a linear voltage regulator with overtemperature protection in front of the DC-DC converter as shown in Figure 2.

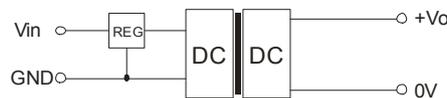


Figure 2

5) The total output power of the device has to be reduced to 60% or less of the rated output power at ambient temperatures above 71° C.

6) These products are not hot-swappable and do not support parallel connection of their outputs. We recommended the use of a converter with higher output power capability to cover applications with higher power requirements.

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our Company's corporate standards;
4. Non-standard models may have slightly different characteristics than the standard models listed. For details, please contact technical support;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

## MORNSUN Science & Technology Co.,Ltd.

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou, P.R.China.

Tel: 86-20-38601850

Fax: 86-20-38601272

E-mail: sales@mornsun.cn

www.mornsun-power.com