



## 2S12B\_10RP series

2W - Single Output DC-DC Converter - Isolated & Regulated

### DC-DC Converter 2 Watt

- ⊕ SIPI2 package type
- ⊕ Operating temperature range: -40°C to +85°C
- ⊕ Short circuit protection (SCP)
- ⊕ 10,000VDC isolation voltage
- ⊕ Up to 90% efficiency
- ⊕ Low ripple & noise (50 mVp-p)

Introducing our new and innovative 2S12B\_10RP series, designed for reliable isolated power conversion in a compact SIPI2 package. The series operates across a wide temperature range from -40 °C to +85 °C, making it suitable for a broad range of industrial and embedded applications. With a high isolation voltage of 10,000 VDC, integrated short-circuit protection (SCP), and efficiency of up to 90%, the 2S12B\_10RP series delivers robust performance and dependable operation even in electrically demanding environments. Low output ripple and noise of typically 50 mVp-p ensure stable and clean power for sensitive downstream components. The 2S12B\_10RP series combines safety, efficiency, and compact design, offering a reliable solution where high isolation and long-term stability are essential.



| Common specifications     |   |
|---------------------------|---|
| Short circuit protection  | Output with self-recovery overload short circuit protection |
| Effectiveness             | 60% to 80%  |
| Operation temperature     | -40°C ~+85°C (with derating)                                |
| Storage temperature       | -55°C ~+125°C   |
| Lower the fixed value     | See temperature characteristic curve                        |
| Temperature               | ≤ 90 %, uncompressed  |
| On-off level              | 60kHz (typ.)  |
| Input filter              | Ceramic capacitors  |
| External filter capacitor | Suggest Co ≤4.7uF   |
| Case Material             | Non-conductive flame retardant black plastic                |
| Package Dimensions        | 33.0 x 10.5 x 15.5 mm                                       |
| Weight                    | Approx. 8g  |
| Cooling Method            | Natural air cooling   |

| Input specifications |                |     |       |     |       |
|----------------------|----------------|-----|-------|-----|-------|
| Item                 | Test condition | Min | Typ   | Max | Units |
| Voltage range        | Nominal value  |     | +/-10 |     | %     |

The following data are measured at TA = 25° C, nominal input voltage, and rated output current except for special instructions.

| Isolation specifications |                |                 |     |     |       |
|--------------------------|----------------|-----------------|-----|-----|-------|
| Item                     | Test condition | Min             | Typ | Max | Units |
| Rated voltage            | About 8000VAC  | 10000           |     |     | VDC   |
| Leakage current          |                |                 | 1   |     | mA    |
| Isolation resistance     |                | 10 <sup>9</sup> |     |     | Ohm   |
| Isolation capacitance    |                |                 | 60  |     | pF    |

| Output specifications                           |                                |     |              |       |       |
|---|--------------------------------|-----|--------------|-------|-------|
| Item  | Test condition                 | Min | Typ          | Max   | Units |
| Output voltage accuracy                         | load variation range 0-100%    |     | ±2           |       | %     |
| Linear regulation (input voltage variation ±1%) | 3.3VDC output<br>Others output |     | ±1.0<br>±0.5 |       | %     |
| Load regulation                                 | No load to full load           |     | ±0.5         | ±1.0  | %     |
| Ripple & noise                                  | 20MHz bandwidth                |     |              | 50    | mVp-p |
| Temperature drift coefficient                   | Full load                      |     |              | ±0.02 | %/°C  |

**Example:**  
**2S12B\_2405S10RP**  
**2 = 2Watt; S12 = SIPI2; B = Series; 24 = 24Vin; 05 = 5Vout; S = Single Output;**  
**10 = 10,000VDC isolation; R = Regulated Output; P = Short circuit protection.**

- As shown in figure 1: According to the product isolation voltage specification and set the rated high voltage value, please pay attention to personal safety when testing, beware of electric shock. Test conditions: room temperature TA = 25 ° C, humidity <75%
- The pressure test operator must wear rubber-insulated gloves and a rubber insulation pad under the seat to prevent high-voltage electric shock.
- The pressure tester instrument must be grounded reliably and should not be tested in high temperature, humid and dusty environments.
- The pressure tester must ensure that the high voltage output is "0" and "reset" when connecting the measured object.
- Do not touch the test object, test line or high voltage output when the instrument is in the startup state or before the test high voltage is released.
- The product pressure test test method as shown in figure 1: shorting the input and output pins respectively, and adding isolation voltage between the input and output terminals (DC or AC peak, according to the isolation voltage given by the product), test 1 minute.
- According to the standard of pressure test, the withstand voltage value is gradually increased from 0, and it is adjusted to the set maximum and maintained at the highest withstand voltage for one minute.
- The Pressure test itself is a destructive test. The fewer times you should do the better, if the customer needs to test multiple times, the general requirements are: the first time according to the value of the specification, the next time should be correspondingly reduced test the voltage, otherwise the product will be damaged during multiple tests.

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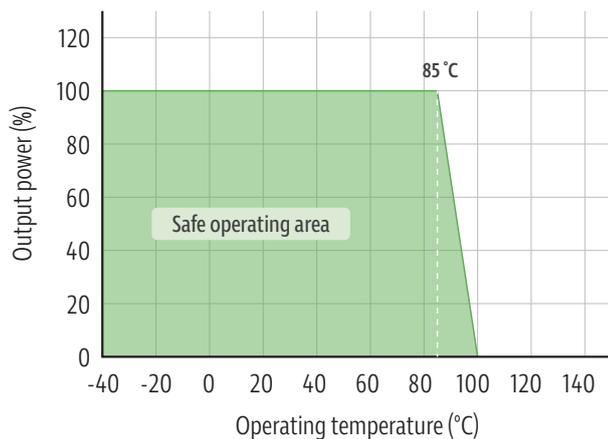
### Product Selection Guide

| Approval | Part number     | Input Voltage Vin (VDC) | Input Current No load (mA) | Input Current Full load (mA) | Output Voltage Vout (VDC) | Output Current max. (mA) | Full load efficiency typ. (%) |
|----------|-----------------|-------------------------|----------------------------|------------------------------|---------------------------|--------------------------|-------------------------------|
|          | 2S12B_0505S10RP | 5                       | 55                         | 580                          | 5                         | 400                      | 68                            |
|          | 2S12B_0512S10RP | 5                       | 35                         | 445                          | 12                        | 167                      | 89                            |
|          | 2S12B_0515S10RP | 5                       | 40                         | 495                          | 12                        | 167                      | 80                            |
|          | 2S12B_1205S10RP | 12                      | 30                         | 250                          | 5                         | 400                      | 66                            |
|          | 2S12B_1209S10RP | 12                      | 28                         | 216                          | 9                         | 222                      | 77                            |
|          | 2S12B_1212S10RP | 12                      | 25                         | 198                          | 12                        | 167                      | 84                            |
|          | 2S12B_1215S10RP | 12                      | 27                         | 215                          | 15                        | 133                      | 77                            |
|          | 2S12B_2405S10RP | 24                      | 8                          | 119                          | 5                         | 400                      | 69                            |
|          | 2S12B_2409S10RP | 24                      | 8                          | 103                          | 9                         | 222                      | 80                            |
|          | 2S12B_2412S10RP | 24                      | 10                         | 100                          | 12                        | 167                      | 83                            |
|          | 2S12B_2415S10RP | 24                      | 9                          | 105                          | 15                        | 134                      | 79                            |

Note: The output efficiency of the output voltage value adjustable product is calculated according to the actual value.

### Typical characteristics

#### Temperature derating graph

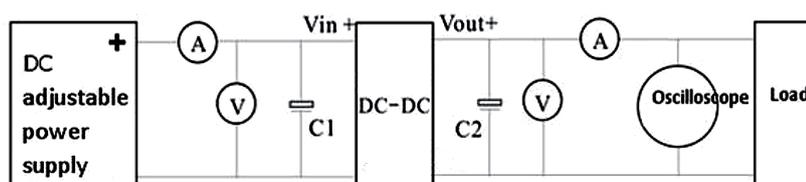


### Typical circuit design and application

Product main specification detection ways of DC-DC Converter

Use standard Kelvin four-terminal input and rated load test (as picture show)

Test conditions: room temperature  $T_A = 25^\circ\text{C}$ , temperature: <75% nominal input and rated load

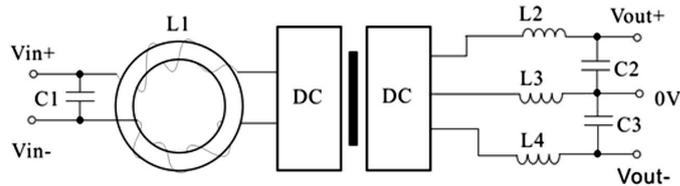


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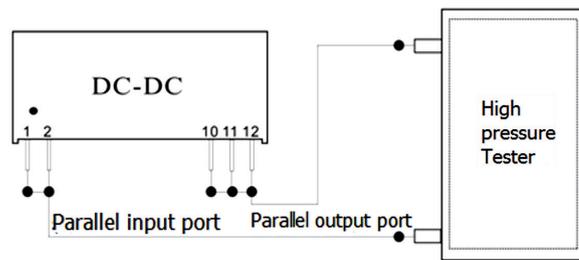
### Reference method for reducing noise common-mode interference in DC-DC Converter use

The de-dc converter supply generates common mode and differential mode noise when operating at the switching frequency. The method of reducing the ripple and noise is to add a passive LC or RC (large loss) filter network to the input and output terminals. The self-resonant frequency of L is much higher than the switching frequency of the module. The current value allowed to pass is also preferably chosen to be more than twice the maximum input current of the module, and the internal resistance is smaller to reduce the DC loss.

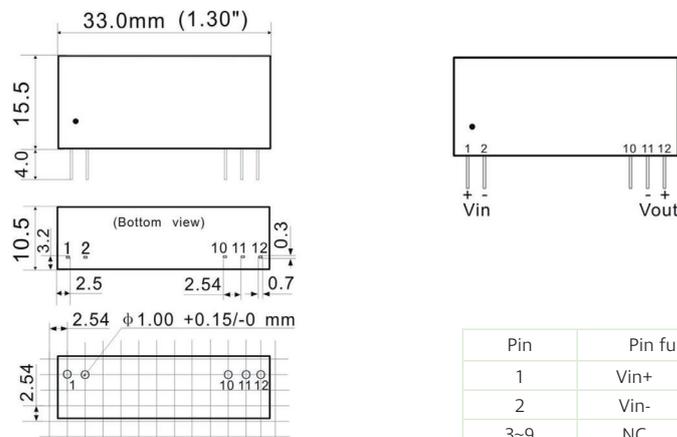
For fixed frequency modules, the filter network parameters can be calculated. Generally, the differential mode noise is very small. Only the external L1 (common mode turbulence map) needs to be input, which can meet the requirements (as the picture show).



DC-DC Converter isolation withstands voltage detection method.



## Mechanical dimensions



| Pin | Pin function description |                 |
|-----|--------------------------|-----------------|
| 1   | Vin+                     | Input positive  |
| 2   | Vin-                     | Input negative  |
| 3-9 | NC                       | No pins         |
| 10  | NC                       | No function     |
| 11  | Vout-                    | Output negative |
| 12  | Vout+                    | Output positive |