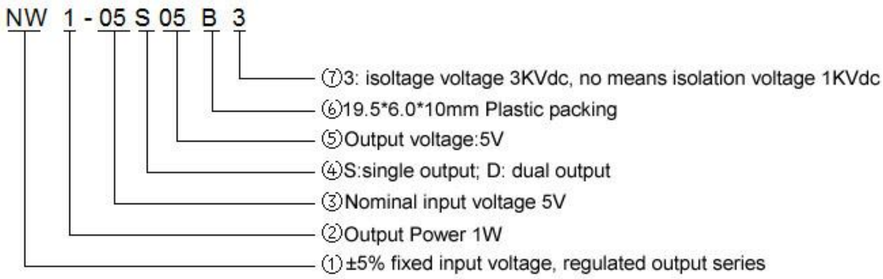
## Typical Features

- ◆Fixed input voltage, isolated & regulated output, 1W
- ◆Transfer efficiency up to 73%
- ◆Compact SIP package
- ◆No external component required
- ◆Isolation voltage: 1000VDC
- ◆Operating temperature range:-40℃～+85℃
- ◆Plastic case, meet UL94 V-0 standard


**Test Condition:** Unless otherwise specified, data in the datasheet should be tested under the conditions of inputting nominal voltage, pure resistance rated load and Ta=25℃.

**Product Named Method:**




## Input Specifications

| Item | Operating Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Input Surge Voltage (1sec. max.) | 5Vdc Input | -0.7 | -- | 9 | Vdc |
| | 12Vdc Input | -0.7 | -- | 18 | |
| | 15Vdc Input | -0.7 | -- | 21 | |
| | 24Vdc Input | -0.7 | -- | 30 | |
| Input Filter | | Filter capacitor | | | |

## Output Specifications

| Item | Operating Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output Power | | | 0.1 | -- | 1 | W |
| Output Voltage Accuracy | Nominal input, full load | | -- | ±2 | ±3 | % |
| Load Regulation | Nominal input, 10%-100% load | 3.3V output | -- | -- | 1.2 | |
| | | Other output | | | 1.0 | |
| Line Regulation | Input voltage change:±5%, full load | 3.3V output | -- | -- | ±0.3 | |
| | | Other output | -- | -- | ±0.25 | |
| Ripple & Noise* | Nominal input, full load, 20MHz bandwidth | | -- | 75 | 100 | mVp-p |
| Temperature Coefficient | 100% load | | -- | -- | ±0.03 | %/°C |
| Output Short Circuit Protection | | | no | | | |

* Note: Ripple and Noise are measured by twisted pair method.

## General Specifications

| Item | Condition | Value |
|---|---|---|
| Switching Frequency | typical | 100KHz (Typ.) |
| Operating Temperature | Refer to temperature derating curve | -40℃ ~ +85℃ |

| | | |
|---|---|---|
| Storage Temperature | | -55℃ ~ +125℃ |
| Casing Temperature Rise | Within temperature derating curve | 25℃(Typ.) |
| Storage Humidity | Non-condensing | 5%~95% |
| Casing Material | | Black flame-retardant heat-resistant plastic(UL94 V-0) |
| Weight | | 2.4g (Typ.) |
| Isolation Voltage | Test 1 minute, leakage current＜0.5mA | 1000VDC |
| Isolation Capacitor | Input/output ,100KHz/0.1V | 20 (Typ.) |
| MTBF | MIL-HDBK-217F@25℃ | $35X10^5$Hrs |

## Typical Product List

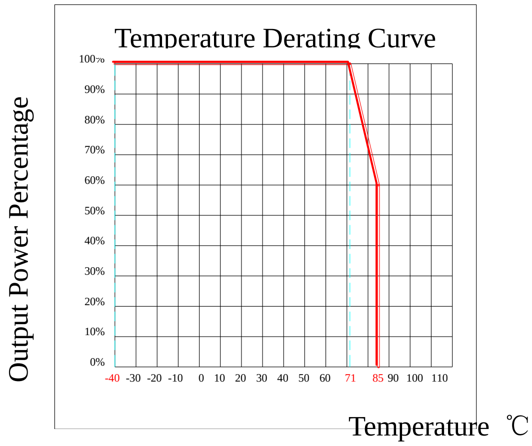
| Part No. | Input Voltage Range(VDC) | | Output Voltage/Current (Vo/Io) | | Input Current(mA) Nominal Voltage | | Max. Capacitive Load | Ripple & Noise (Max.) | Efficiency (%) |
|---|---|---|---|---|---|---|---|---|---|
| | Nominal | Range | Voltage (V) | Current (mA) | Full load Typ. | No load Typ. | uF | mVp-p | Typ. |
| **Single Output:** | | | | | | | | | |
| NW1-3V3S3V3B | 3.3 | 3.135 - 3.465 | 3.3 | 300 | 522 | 60 | 22 | 100 | 58 |
| NW1-3V3S05B | | | 5 | 200 | 489 | | 22 | | 62 |
| NW1-3V3S09B | | | 9 | 110 | 473 | | 10 | | 64 |
| NW1-3V3S12B | | | 12 | 83 | 473 | | 10 | | 64 |
| NW1-3V3S15B | | | 15 | 67 | 466 | | 10 | | 65 |
| NW1-3V3S24B | | | 24 | 42 | 481 | | 4.7 | | 63 |
| NW1-05S3V3B | 5 | 4.75 - 5.25 | 3.3 | 300 | 333 | 40 | 22 | | 60 |
| NW1-05S05B | | | 5 | 200 | 286 | | 22 | | 70 |
| NW1-05S09B | | | 9 | 110 | 286 | | 10 | | 70 |
| NW1-05S12B | | | 12 | 83 | 286 | | 10 | | 70 |
| NW1-05S15B | | | 15 | 67 | 286 | | 10 | | 70 |
| NW1-05S24B | | | 24 | 42 | 286 | 45 | 4.7 | | 70 |
| NW1-09S3V3B | 9 | 8.55 - 9.45 | 3.3 | 300 | 185 | 22 | 22 | | 60 |
| NW1-09S05B | | | 5 | 200 | 168 | | 22 | | 66 |
| NW1-09S09B | | | 9 | 110 | 161 | | 10 | | 69 |
| NW1-09S12B | | | 12 | 83 | 161 | | 10 | | 69 |
| NW1-09S15B | | | 15 | 67 | 156 | | 10 | | 71 |
| NW1-09S24B | | | 24 | 42 | 159 | 25 | 4.7 | | 70 |
| NW1-12S3V3B | 12 | 11.4 - 12.6 | 3.3 | 300 | 137 | 17 | 22 | | 61 |
| NW1-12S05B | | | 5 | 200 | 119 | | 22 | | 70 |
| NW1-12S09B | | | 9 | 110 | 117 | | 10 | | 71 |
| NW1-12S12B | | | 12 | 83 | 119 | | 10 | | 70 |
| NW1-12S15B | | | 15 | 67 | 114 | | 10 | | 73 |
| NW1-12S24B | | | 24 | 42 | 124 | 22 | 4.7 | | 67 |
| NW1-15S3V3B | 15 | 14.25 - 15.75 | 3.3 | 300 | 109 | 13 | 22 | | 61 |
| NW1-15S05B | | | 5 | 200 | 97 | | 22 | | 69 |
| NW1-15S09B | | | 9 | 110 | 95 | | 10 | | 70 |
| NW1-15S12B | | | 12 | 83 | 95 | | 10 | | 70 |
| NW1-15S15B | | | 15 | 67 | 97 | | 10 | | 69 |
| NW1-15S24B | | | 24 | 42 | 97 | 15 | 4.7 | | 69 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NW1-24S3V3B | 24 | 22.8 - 25.2 | 3.3 | 300 | 69 | 11 | 22 | | 60 |
| NW1-24S05B | | | 5 | 200 | 62 | | 22 | | 67 |
| NW1-24S09B | | | 9 | 110 | 62 | | 10 | | 67 |
| NW1-24S12B | | | 12 | 83 | 60 | | 10 | | 69 |
| NW1-24S15B | 24 | 22.8-25.2 | 15 | 67 | 60 | 11 | 10 | 100 | 69 |
| NW1-24S24B | | | 24 | 42 | 62 | 12 | 4.7 | | 67 |

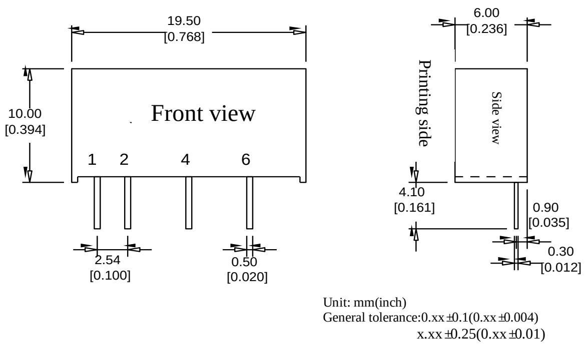
Note: 1."*" is model under developing;

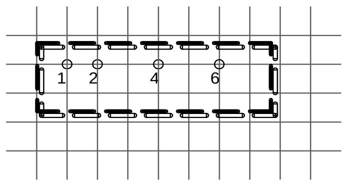
2. To ensure the module work efficiently and reliably, during the operation, the min. output load should be no less than 10% of the rated load. If the actual power is too low, please parallel a resister to the output terminal, with a recommenced resistance which is 10% of the rated power.

## Temperature Curve



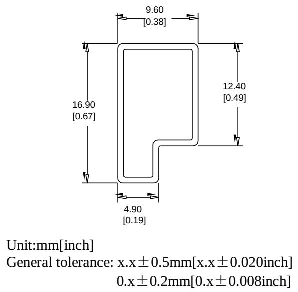

## Packing Dimension, Pin Function, Recommended PCB layout




Printed board vertical view

Lattic spacing:2.54mm(0.1inch)




Packing Dimension Recommended PCB layout Packing

| Pin Function | Single(S) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| | | +Vin | GND | -- | -Vo | -- | +Vo |

Note: If the definition of pin is not in accordance with the model selection manual, please refer to the label on actual item.

## Packing Dimension

| Packing Code | L x W x H | |
|---|---|---|
| B | 19.50× 6.00 × 10.00mm | 0.768 × 0.236 × 0.394inch |

## Design and Application Circuit Reference

**1. Output load request**

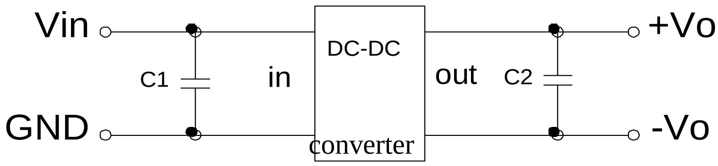
a. To ensure the module work efficiently and reliably, the min. output load should be no less than 10% of the nominal load; If the actual output power is indeed low, please connect a resister to the output terminal in parallel, with a recommenced resistance which is 10% of the rated power.

b. The maximum capacitive load is tested under nominal input full load, and it cannot exceed the maximum capacitive load of output  when using, otherwise it will make it difficult to startup and damage the product.

**2. Recommended Circuit**

In order to ensure the ripple and noise of input and output reduced, a filter capacitor net can be connected to the input and output terminals, application circuit see Photo 1. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.(but for actual output power of application circuit less than 0.5W, recommend not to connect external capacitor)

Photo 1




Recommended capacitive load value(Table1)

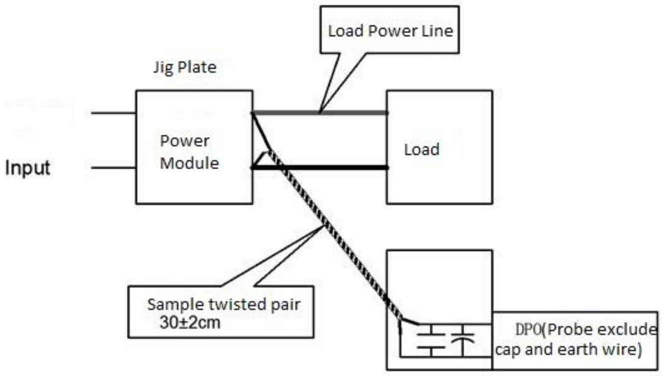
| Vin (Vdc) | C1 (μF) | Vout (Vdc) | C2 (μF) |
|---|---|---|---|
| 3.3/5 | 4.7 | 3.3/5 | 10 |
| 12 | 2.2 | 9 | 4.7 |
| 15 | 1 | 12 | 2.2 |
| 24 | 1 | 15 | 1 |
| -- | -- | 24 | 0.47 |

**3.Ripple& Noise Test(20MHZ bandwidth)**

Twisted Pair Test Method:

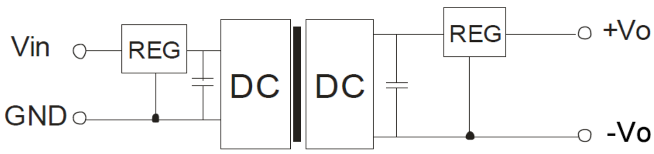
a.12# twisted pair to connect, Oscilloscope bandwidth set as 20MHz, 100M bandwidth probe, terminated with 0.1uF polypropylene capacitor and 47uF high frequency low resistance electrolytic capacitor in parallel, oscilloscope set as Sample pattern.

b. Input terminal connect to power supply, output terminal connect to electronic load through jig plate, Use 30cm±2 cm sampling line, Power line selected from corresponding diameter wire with insulation according to the flow of output current.




**4.Output over voltage protection circuit**

The simplest device to protect output over voltage and over current is, to cascade a linear regulator with overheat protection at input or output side, and connect a filter capacitor net(see picture below), filter capacitance recommended value see Table 1, linear regulator is chosen according to the actual operating voltage and current needed.




Note:1.This product cannot be used in parallel, and do not support hot-plug;

2. If the product is operated below the required minimum load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;

3. All index testing methods in this datasheet are based on our Company's corporate standards;

4. Specifications are subject to change without prior notice.