

FEATURES

- ◆ RoHS compliant
- ◆ Efficiency up to 85%
- ◆ SIP Package
- ◆ Wide temperature performance at full 2 Watt load, -40°C to 85 °C
- ◆ UL 94V-0 package material
- ◆ No heatsink required
- ◆ Low ripple and good EMC features
- ◆ Industry standard pinout
- ◆ Power sharing on output
- ◆ 1KVDC isolation
- ◆ Continuous Short Circuit Protection
- ◆ Internal SMD construction
- ◆ No external components required
- ◆ Good dynamic feature

MODEL SELECTION

D^①05^②05^③05^④X^⑤N^⑥S^⑦-2W^⑧

- ① Product Series
- ② Input Voltage
- ③ Output Voltage1
- ④ Output Voltage2
- ⑤ Fixed Input
- ⑥ Negation output
- ⑦ SIP Package
- ⑧ Rated Power

APPLICATIONS

The D-XNS-2W series are specially designed for applications where a group of polar power supplies are 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 $\leq \pm 10\%$);
- 2) where isolation is necessary between input and output (isolation voltage $\leq 1000\text{VDC}$);
- 3) where the regulation of the output voltage and the output ripple noise are not demanded.

Such as: purely digital circuits, ordinary low frequency analog circuits, and 1GBT power device driving circuits.



SELECTION GUIDE

| Order code | Input | | Output | | | Efficiency (% Typ) | Switching Frequency (KHz Typ) |
|---------------|---------------|-----------|---------------|---------|-----|--------------------|-------------------------------|
| | Voltage (VDC) | | Voltage (VDC) | Current | | | |
| | Nominal | Range | | Max | Min | | |
| D050505XNS-2W | 5 | 4.5-5.5 | 5 | 200 | 20 | 80 | 84 |
| D050909XNS-2W | 5 | 4.5-5.5 | 9 | 111 | 12 | 82 | 81 |
| D051212XNS-2W | 5 | 4.5-5.5 | 12 | 83 | 9 | 82 | 82 |
| D051515XNS-2W | 5 | 4.5-5.5 | 15 | 67 | 7 | 83 | 83 |
| D120505XNS-2W | 12 | 10.8-13.2 | 5 | 200 | 20 | 80 | 180 |
| D120909XNS-2W | 12 | 10.8-13.2 | 9 | 111 | 12 | 83 | 150 |
| D121212XNS-2W | 12 | 10.8-13.2 | 12 | 83 | 9 | 85 | 84 |
| D121515XNS-2W | 12 | 10.8-13.2 | 15 | 67 | 7 | 83 | 83 |
| D240505XNS-2W | 24 | 21.6-26.4 | 5 | 200 | 20 | 81 | 82 |
| D240909XNS-2W | 24 | 21.6-26.4 | 9 | 111 | 12 | 82 | 83 |
| D241212XNS-2W | 24 | 21.6-26.4 | 12 | 83 | 9 | 84 | 83 |
| D241515XNS-2W | 24 | 21.6-26.4 | 15 | 67 | 7 | 84 | 80 |

ISOLATION SPECIFICATIONS

| Parameter | Test conditions | Min. | Typ. | Max | Unit |
|------------------------|---|------|------|-----|------|
| Isolation test voltage | Flash tested for 1 minute and 1mA max(Vin/Vout) | 1000 | | | VDC |
| | Flash tested for 1 minute and 1mA max(V01/V02) | 1000 | | | VDC |
| Isolation resistance | Test at Viso=500VDC(Vin/Vout) | 1000 | | | MΩ |
| | Test at Viso=500VDC(V01/V02) | 1000 | | | MΩ |
| Isolation capacitance | (Vin/Vout) | | 90 | | PF |
| | (V01/V02) | | 90 | | PF |

OUTPUT SPECIFICATIONS

| Parameter | Test conditions | Min | Typ. | Max | Unit |
|-------------------------|-----------------------------------|------------------------------|------|-----------|--------|
| Output power | | | | 2 | W |
| Line regulation | For Vin change of $\pm 1\%$ | | | ± 1.2 | % |
| Load regulation | 10% to 100% full load(5V output) | | 12.8 | 15 | |
| | 10% to 100% full load(9V output) | | 8.3 | 10 | |
| | 10% to 100% full load(12V output) | | 6.8 | 10 | |
| | 10% to 100% full load(15V output) | | 6.3 | 10 | |
| Output voltage accuracy | | See tolerance envelope graph | | | |
| Temperature drift | 100% full load | | 0.03 | | %/°C |
| Output Ripple&Noise* | 20MHz Bandwidth | | 100 | 150 | MV p-p |
| Switching frequency | Full load, nominal input | | 70 | | Khz |

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

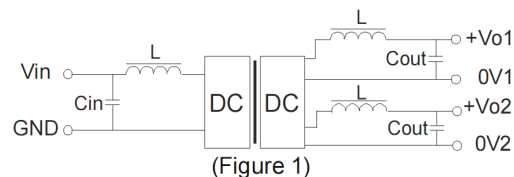
COMMON SPECIFICATIONS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---------------------------|--------------------------------|------|------|------|-------|
| Storage humidity range | | | | 95 | % |
| Operating temperature | | -40 | | 85 | °C |
| Storage temperature | | -55 | | 125 | |
| Lead temperature | 1.5mm from case for 10 seconds | | 300 | | |
| Temp.rise at full load | | | 15 | 25 | |
| Cooling | Free air convection | | | | |
| Case material | Plastic(UL94-V0) | | | | |
| Short circuit protection* | Continuous | | | | |
| MTBF | | 3500 | | 1 | s |
| Weight | | | 2.8 | | g |

*Supply voltage must be discontinued at the end of short circuit duration.

Filtering

To get the input/output 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).



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 (Table 1).

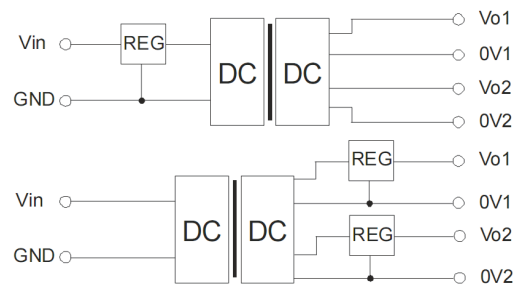
EXTERNAL CAPACITOR TABLE (TABLE 1)

| Vin (VDC) | Cin (μF) | Vout (VDC) | Cout (μF) |
|-----------|----------|------------|-----------|
| 5 | 47 | 5 | 4.7 |
| 12 | 2.2 | 9 | 2.2 |
| 24 | 1.0 | 12 | 1.0 |
| -- | -- | 15 | 0.47 |

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

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 (Figure 2).



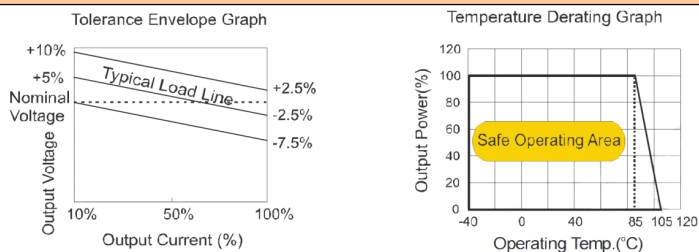
(Figure 2)

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

No parallel connection or plug and play.

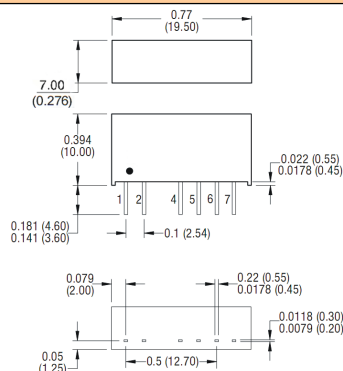
TYPICAL CHARACTERISTICS

Temperature Derating Graph



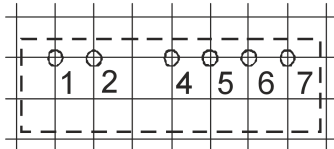
OUTLINE DIMENSIONS & PIN CONNECTIONS

SIZE Graph



RECOMMENDED FOOTPRINT

Top view, grid: 2.54mm (0.1inch)
diameter: 1.00mm (0.039inch)



FOOTPRINT DETAILS

| Pin | Function |
|-----|----------|
| 1 | VIN |
| 2 | GND |
| 4 | 0V1 |
| 5 | +V01 |
| 6 | 0V2 |
| 7 | +V02 |

Note:
Unit:mm(inch)
Pin section:0.50*0.3mm(0.020*0.012inch)
Pin section tolerances: 0.10mm(0.004inch)
General tolerances: ±0.25mm(±0.010inch)

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!**

RoHS COMPLIANT INFORMATION

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300° C for 10 seconds.
The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.

REACH COMPLIANT INFORMATION

This series has proven that this product does not contain harmful chemicals, it also has harmful chemical substances through the registration, inspection and approval.