

6W, FIXED INPUT ISOLATED & REGULATED TWIN OUTPUT DIP24 DC-DC CONVERTER



FEATURES

- ◆ Fixed input voltage range
- ◆ Twin output
- ◆ Operating temperature: -40°C to + 85°C
- ◆ UL94-V0 package
- ◆ No external component required
- ◆ Industry standard pin out
- ◆ Short circuit protection(automatic recovery)
- ◆ Five-sided metal shielding
- ◆ MTBF>1,000,000 hours
- ◆ No heat sink required
- ◆ RoHS Compliance

MODEL SELECTION

6MD^①12^②05^③05^④X^⑤D^⑥

- ① Product Series
- ② Input Voltage
- ③ 1st Output Voltage
- ④ 2nd Output Voltage
- ⑤ Fixed Input Range
- ⑥ DIP24 Package Style

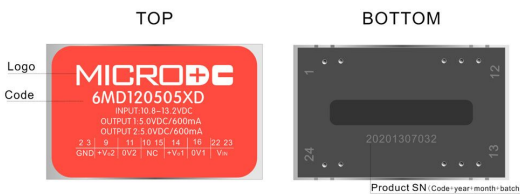
APPLICATIONS

The 6MD-XD series are specially designed for applications where a wide range input voltage 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 range;
- 2) Where isolation is necessary between input and output (Isolation Voltage≤1500VDC);
- 3) Where isolation is necessary between Vout1 and Vout2 (Isolation Voltage≤1000VDC);
- 4) Where the regulation of the output voltage and the output ripple noise are demanded.

PRODUCT ID DESCRIPTION



PRODUCT PROGRAM

| Part Number | Input | | | No-load Current (mA, Typ) | Output | | | Efficiency (% Typ) |
|-------------|--------------|-----------|------|---------------------------|---------------|-------------|-------|--------------------|
| | Voltage(VDC) | | | | Voltage (VDC) | Current(MA) | | |
| | Nomina | Range | Max* | | | Max | Min. | |
| 6MD120505XD | 12 | 10.8-13.2 | 15 | 25 | 5/5 | 600/600 | 60/60 | 76 |
| 6MD120707XD | 12 | 10.8-13.2 | 15 | 25 | 7.2/7.2 | 417/417 | 42/42 | 79 |
| 6MD120909XD | 12 | 10.8-13.2 | 15 | 25 | 9/9 | 333/333 | 33/33 | 78 |
| 6MD121212XD | 12 | 10.8-13.2 | 15 | 25 | 12/12 | 250/250 | 25/25 | 80 |
| 6MD121515XD | 12 | 10.8-13.2 | 15 | 25 | 15/15 | 200/200 | 20/20 | 81 |
| 6MD122424XD | 12 | 10.8-13.2 | 15 | 25 | 24/24 | 125/125 | 13/13 | 82 |
| 6MD240505XD | 24 | 21.6-26.4 | 30 | 15 | 5/5 | 600/600 | 60/60 | 76 |
| 6MD240512XD | 24 | 21.6-26.4 | 30 | 15 | 5/12 | 600/250 | 60/25 | 77 |
| 6MD241212XD | 24 | 21.6-26.4 | 30 | 15 | 12/12 | 250/250 | 25/25 | 80 |
| 6MD241515XD | 24 | 21.6-26.4 | 30 | 15 | 15/15 | 200/200 | 20/20 | 79 |
| 6MD242405XD | 24 | 21.6-26.4 | 30 | 15 | 24/05 | 125/600 | 13/60 | 81 |
| 6MD242424XD | 24 | 21.6-26.4 | 30 | 15 | 24/24 | 125/125 | 13/13 | 81 |
| 6MD480505XD | 48 | 43.2-52.5 | 60 | 10 | 5/5 | 600/600 | 60/60 | 76 |
| 6MD480512XD | 48 | 43.2-52.5 | 60 | 10 | 5/12 | 600/250 | 60/25 | 78 |
| 6MD480909XD | 48 | 43.2-52.5 | 60 | 10 | 9/9 | 333/333 | 33/33 | 78 |
| 6MD481212XD | 48 | 43.2-52.5 | 60 | 10 | 12/12 | 250/250 | 25/25 | 80 |
| 6MD481515XD | 48 | 43.2-52.5 | 60 | 10 | 15/15 | 200/200 | 20/20 | 81 |
| 6MD482424XD | 48 | 43.2-52.5 | 60 | 10 | 24/24 | 125/125 | 13/13 | 82 |

*Input voltage can't exceed this value, or will cause the permanent damage.

COMMON SPECIFICATIONS

| Item | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------|--------------------------------|------|------|------|---------|
| Storage humidity | | | | 95 | % |
| Operating temperature | | -40 | | 85 | °C |
| Storage Temperature | | -55 | | 125 | |
| Temp. rise at full load | | | 15 | | |
| Lead temperature | 1.5mm from case for 10 seconds | | | 300 | |
| Cooling | Free Air Convection | | | | |
| Case Material | Plastic (UL94-V0) | | | | |
| Short circuit protection | Continuous, Automatic Recovery | | | | |
| MTBF | | 1000 | | | K hours |
| Weight | | | 15 | | g |

ISOLATION SPECIFICATIONS

| Item | Test Conditions | Min. | Typ. | Max. | Units |
|-----------------------|---------------------------------|------|------|------|-------|
| Isolation voltage | Tested for 1 minute and 1mA max | 1500 | | | VDC |
| Isolation resistance | Test at 500VDC | 1000 | | | MΩ |
| Isolation capacitance | Input/Output, 100KHz/1V | | 100 | | pF |

OUTPUT SPECIFICATIONS

| Item | Test Conditions | Min. | Typ. | Max. | Units |
|------------------------------|--------------------------------|------|------|-------|-------|
| Output power | Refer to product program | 0.6 | | 6 | W |
| Main output voltage accuracy | Refer to recommended circuit | | ±1 | ±3 | % |
| Vice-output voltage accuracy | Refer to recommended circuit | | ±3 | ±5 | |
| Load regulation | From 10% to 100% load | | ±0.5 | ±1* | |
| Line regulation | Input voltage from low to high | | ±0.2 | ±0.5 | |
| Temperature drift (Vout) | Refer to recommended circuit | | | ±0.03 | %/°C |
| Ripple** | 20MHz Bandwidth | | 20 | 50 | mVp-p |
| Noise** | 20MHz Bandwidth | | 75 | 150 | |
| Switching frequency | 100% load, input voltage range | | 300 | | KHz |

*Dual output models unbalanced load: ±5%.

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

APPLICATION NOTE

1) Requirement On Output Load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load no less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.

2) Recommended Circuit

All the MD-XD Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load (see Figure 1).

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high, or may cause start-up problem. If you want to use the products in high EMI, please choose our metal packaged products. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees

(Table 1). General:

Cin: 5V,12V 100μF
 24V&48V 22μF/10μF
 Cout: 10μF/100mA

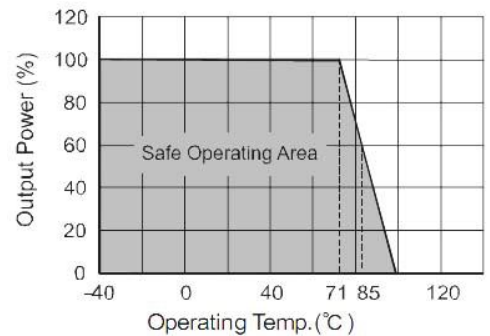
3) Input Current

While using unstable power source, please ensure the output voltage and ripple voltage do not exceed indexes of the converter. The preceding power source must be able to provide for converter sufficient starting current I_p (Figure 2).

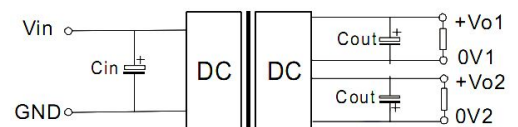
General: $I_p \leq 1.4 \cdot I_{in-max}$

4) No parallel connection or plug and play

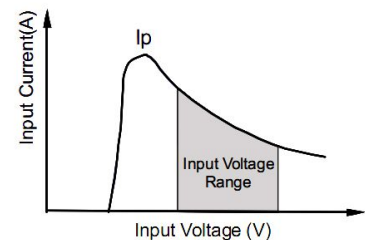
TYPICAL CHARACTERISTICS



RECOMMENDED CIRCUIT



(Figure 1)



(Figure 2)

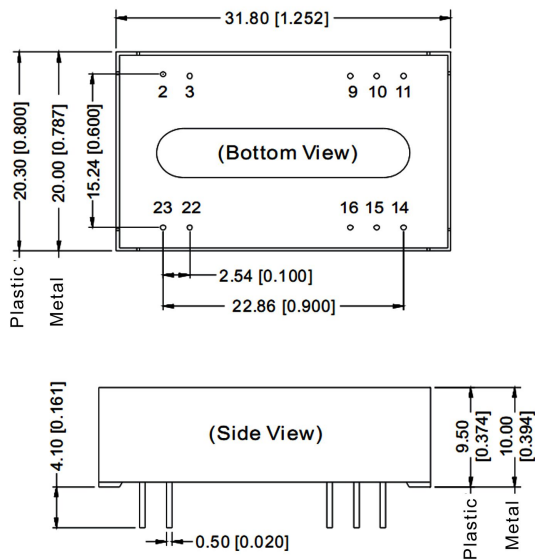
EXTERNAL CAPACITOR TABLE (TABLE 1)

Output External Capacitor Table (Table 1)

| Vout(VDC) | Cout(μF) |
|-----------|----------|
| 5 | 680 |
| 9 | 470 |
| 12 | 330 |
| 15 | 220 |
| 24 | 100 |

OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS

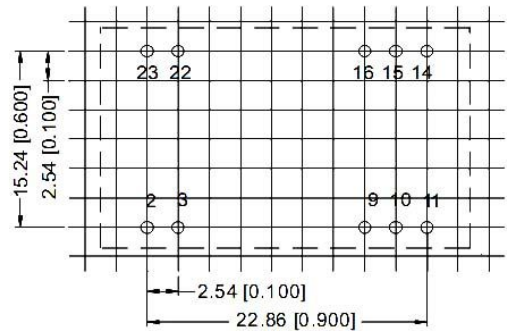


Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

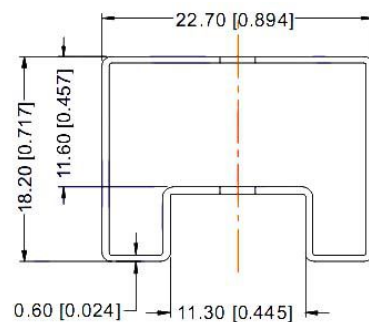
| FOOTPRINT DETAILS | |
|-------------------|----------|
| Pin | Function |
| 2,3 | GND |
| 9 | +Vo2 |
| 10,15 | NC |
| 11 | 0V2 |
| 14 | +Vo1 |
| 16 | 0V1 |
| 22,23 | Vin |

NC: No connection

RECOMMENDED FOOTPRINT(TOP VIEW)



TUBE OUTLINE DIMENSIONS



Note:
Unit :mm[inch]
General tolerances:± 0.50mm[± 0.020inch]
L=530mm[20.866inch] Tube Quantity: 15pcs
L=220mm[8.661inch] Tube Quantity: 6pcs

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.