MORNSUN®

# URB_MP-12W Series

***12W, WIDE INPUT, ISOLATED & REGULATED SINGLE OUTPUT DC-DC CONVERTER***


**Patent Protected RoHS**

## FEATURES

- ●Efficiency up to 88%
- ● Wide (4:1) Input Range
- ● 12W Rated Power Output
- ● Operating Temperature: -40°C to+85°C
- ● 1.5KVDC Input/Output Isolation
- ●Over Voltage Protection,Output Short Circuit Protection
- ● Remote ON/OFF
- ● Five-sided Metal Shielding Package
- ● DIP24 Package(Industry Standard Pinout)

## PART NUMBER SYSTEM

URB2403MP-12W

- Rated Power
- Package Style
- Output Voltage
- Input Voltage
- Product Series

## APPLICATION

The URB_MP-12W Series are particularly suited to data transfer equipments, battery operated equipments, tele-communication equipments, distributed power system, mix analog/digital system, remote control system, industrial robot system and other wide input voltage application fields.

## SELECTION GUIDE

| Model | Input Voltage(VDC) | | Output Voltage (VDC) | Output Current (mA) | | Input Current (mA)(Typ.) | Max. Capacitive Load(μF) | Efficiency (%, Typ.) @Max. Load |
|---|---|---|---|---|---|---|---|---|
| | Nominal (Range) | Max.** | | Max. | Min. | @No Load | | |
| URB2403MP-12W | 24 (9-36) | 40 | 3.3 | 3500 | 350 | 55 | 3000 | 84 |
| URB2405MP-12W | | | 5 | 2400 | 240 | 55 | 2000 | 86 |
| URB2412MP-12W | | | 12 | 1000 | 100 | 25 | 400 | 86 |
| URB2415MP-12W | | | 15 | 800 | 80 | 25 | 220 | 86 |
| URB4803MP-12W | 48 (18-75) | 80 | 3.3 | 3500 | 350 | 20 | 3000 | 84 |
| URB4805MP-12W | | | 5 | 2400 | 240 | 20 | 2000 | 86 |
| URB4812MP-12W | | | 12 | 1000 | 100 | 10 | 400 | 87 |
| URB4815MP-12W | | | 15 | 800 | 80 | 10 | 220 | 87 |

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

## INPUT SPECIFICATIONS

| Item | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Start-up time | Input voltage range refer to output load | | -- | 500 | -- | ms |
| Input Surge Voltage (1sec. max.) | Nominal input(24V) | DC-DC Module ON | -- | 8.8 | 9 | VDC |
| | | DC-DC Module OFF | -- | 8.3 | 8.5 | |
| | Nominal input(48V) | DC-DC Module ON | -- | 17 | 17.5 | |
| | | DC-DC Module OFF | -- | 16.5 | 17 | |
| Ctrl* | DC-DC Module ON | | 3 | -- | 40 | |
| | | | Or open circuit | | | |
| | DC-DC Module OFF | | 0 | -- | 1.2 | VDC |

## OUTPUT SPECIFICATIONS

| Item | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Output Power | See product program | 1.2 | -- | 12 | W |
| Ripple& Noise | 20MHz Bandwidth | -- | -- | 85 | mV |
| Switching Frequency | | 350 | 400 | 450 | KHz |
| Output Voltage Accuracy | Input voltage range refer to output load | -- | ±1 | ±3 | % |
| Voltage regulation | Input voltage from low to high | -- | ±0.2 | ±0.5 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Load Regulation | Nominal input,10% to 100% load | | -- | ±0.5 | ±1.5 | |
| Temperature Drift(Vout) | 25°C environment temperature | | -- | 0.02 | -- | %/℃ |
| Over voltage protection | Output voltage (VDC) | 3.3 | -- | 4.3 | -- | VDC |
| | | 5 | -- | 6 | -- | |
| | | 12 | -- | 13 | -- | |
| | | 15 | -- | 16 | -- | |
| Short circuit protection | -- | | Continuous | | | |

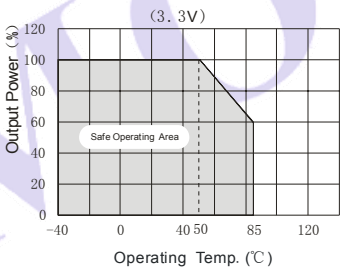
## COMMON SPECIFICATIONS

| Item | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Isolation voltage | Input/Output | Tested for 1 minute and 1 mA max | 1500 | -- | -- | VDC |
| | Input, Output and case | | 1500 | -- | -- | |
| Isolation resistance | Input/Output | Tested at 500VDC | 1000 | -- | -- | MΩ |
| | Input, Output and case | | 1000 | -- | -- | |
| Isolation Capacitance | 100KHz/0.1V | | -- | -- | 1100 | pF |
| Storage humidity | -- | | -- | -- | 95 | % |
| Operating temperature | With derating at 55°C,refer to Temperature Derating Graph | | -40 | -- | 85 | ℃ |
| Storage temperature | -- | | -55 | -- | 125 | |
| Lead temperature | 1.5mm from case for 10 seconds | | -- | -- | 300 | |
| MTBF | MIL-HDBK-217F(25°C) | | 1000 | -- | -- | K hours |
| Weight | -- | | -- | 13 | -- | g |
| Case material | -- | | Aluminum Alloy | | | |

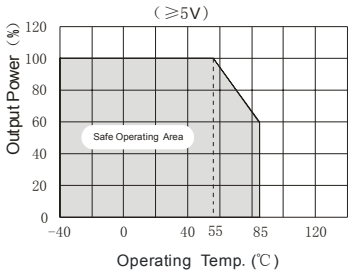
Note:
1. All specifications measured at $T_A$=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. When product begins to work, temperature may rise slowly until stabilize. It's normal that output voltage derating and efficiency reduce about 2 percent during this process.
3. Only typical model listed. If you need other model of this series (same power and package), please confirm input and output voltage, then phone us.
4. No parallel connection or plug and play.
5. The CTRL pin voltage is referenced to GND.
6. If product has no use for CTRL pin, it's name will change, add "X" in front of "MP" to distinguish.
7.Product pressure to play, it will be vacated Ctrl pin.

## PRODUCT TYPICAL PERFORMANCE CURVE

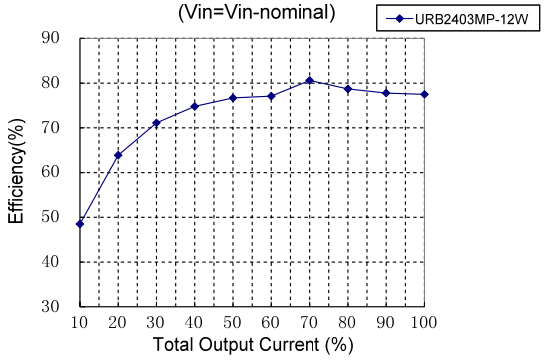
Temperature Derating Graph
(3.3V)



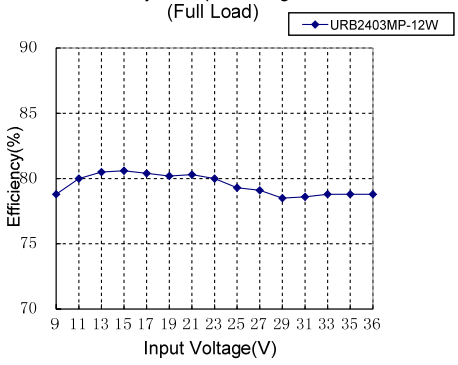

Temperature Derating Graph
(≥5V)



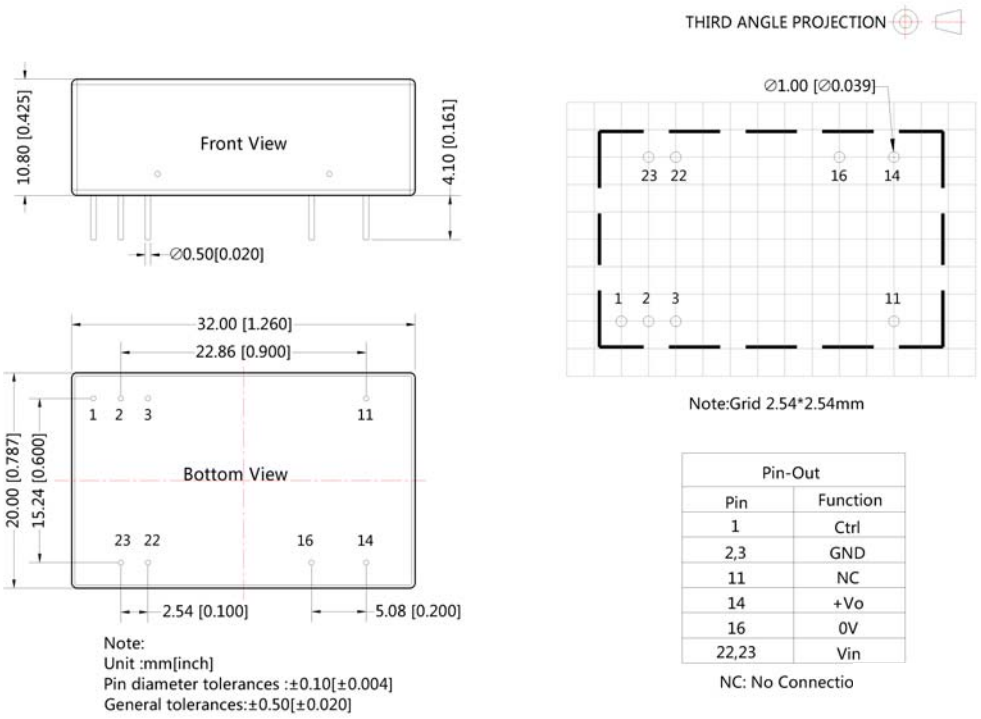

Efficiency VS Output Load curve
(Vin=Vin-nominal)




Efficiency VS Input Voltage curve
(Full Load)



## OUTLINE DIMENSIONS & PIN CONNECTIONS




| Pin-Out | |
|---|---|
| Pin | Function |
| 1 | Ctrl |
| 2,3 | GND |
| 11 | NC |
| 14 | +Vo |
| 16 | 0V |
| 22,23 | Vin |

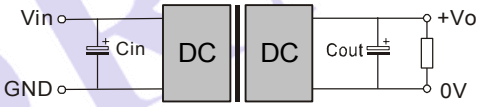
NC: No Connectio

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]

## APPLICATION NOTE

**1.Recommended Circuit**

All the URB_MP-12W Series have been tested according to the following recommended testing circuit before leaving factory. If you want to further decrease the input ripple, Cin is recommended to use 100uF. If ripple and noise are required, you can increase capacitance of Cout properly However, the capacitance should not be higher than Max capacitance. (see Figure 1).




(Figure 1)

**2.Recommended capacitance** (Table 1)

| Output Voltage \ Capacitance | | Cout | Cin |
|---|---|---|---|
| Single | 3.3V,5V | 220μF | 100μF |
| | 12V,15V | 100μF | |

Note:
1. Min. load shouldn't be less than 10%, otherwise ripple maybe increased dramatically, If the product operates under min. load, it may not be guaranteed to meet all specifications listed. Operation under minimum load will not damage the converter.
2. Max. Capacitive Load is tested at input voltage range and full load.
3. All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more details.
6. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

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