

MORNSUN®

URB_LD-15W Series 15W, WIDE INPUT, ISOLATED & REGULATED SINGLE OUTPUT DC-DC CONVERTER



RoHS

FEATURES

- Efficiency up to 85%
- 4:1 wide input voltage range
- 1.5kVDC input/output isolation
- Short circuit protection (automatic recovery)
- Operating temperature: -40°C ~ +85°C
- Internal SMD construction
- Metal shielding package
- Industry standard pinout
- MTBF>1,000,000 hours
- RoHS Compliance

PRODUCT PROGRAM

| Model | Input | | | Output | | Efficiency (% Typ.) | Capacitor Load ⁽³⁾ (max, µF) |
|---------------|---------------|-------|---------------------|---------------|-----------------------------|---------------------|---|
| | Voltage (VDC) | | | Voltage (VDC) | Current ⁽²⁾ (mA) | | |
| | Nominal | Range | Max. ⁽¹⁾ | | | | |
| URB2403LD-15W | 24 | 9-36 | 40 | 3.3 | 4000 | 80 | 10200 |
| URB2405LD-15W | | | | 5 | 3000 | 82 | 4020 |
| URB2412LD-15W | | | | 12 | 1250 | 85 | 1035 |
| URB2415LD-15W | | | | 15 | 1000 | 85 | 705 |
| URB4803LD-15W | 48 | 18-75 | 80 | 3.3 | 4000 | 81 | 10200 |
| URB4805LD-15W | | | | 5 | 3000 | 83 | 4020 |
| URB4812LD-15W | | | | 12 | 1250 | 85 | 1035 |
| URB4815LD-15W | | | | 15 | 1000 | 85 | 705 |

Note: Add suffix "H" for heatsink mounted, for example URB2405LD-15WH.

APPLICATION

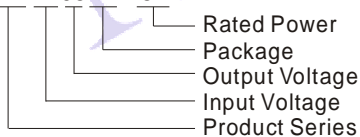
The URB_LD-15W series offer 15W of output, with 4:1 wide input voltage of 9-36VDC, 18-75VDC and features 1500VDC isolation, over current, over voltage and short-circuit protection, as well as six sided shielding. All models are particularly suited to industrial, tele-communications, test equipments power.

INPUT SPECIFICATIONS

| Item | Test conditions | Min. | Typ. | Max. | Units |
|---------------------|-----------------|-----------------------------|------|------|-------|
| Start-up voltage | 24 Vin models | -- | -- | 9 | VDC |
| | 48 Vin models | -- | -- | 18 | |
| Input filter | | LC | | | |
| Start-up time | | -- | 10 | -- | ms |
| Ctrl ⁽⁴⁾ | Models ON | 3.5 - 40VDC or open circuit | | | |
| | Models OFF | 0 - 1.2VDC | | | |

MODEL SELECTION

URB2405LD-15W



OUTPUT SPECIFICATIONS

| Item | Test conditions | Min. | Typ. | Max. | Units |
|--------------------------|--------------------------------|-----------------------------|--------|------|-------|
| Output power | See product program | 1.5 | -- | 15 | W |
| Output voltage accuracy | Refer to recommended circuit | -- | ±1 | ±3 | % |
| Load regulation | From 10% to 100% load | -- | ±0.5 | ±1 | |
| Line regulation | Input voltage from low to high | -- | ±0.2 | ±0.5 | |
| Ripple and noise | 20MHz Bandwidth | 55 | 75 | 150 | |
| Transient recovery time | 25%~50%~25% load or | -- | 200 | 500 | us |
| Transient peak deviation | 50%~75%~50% load step change | -- | ±2 | ±5 | % |
| Over current protection | Input voltage range | 120 | 130 | 150 | % |
| Over voltage protection | 3.3V output models | -- | 3.9 | -- | VDC |
| | 5V output models | -- | 6.2 | -- | |
| | 12V output models | -- | 15 | -- | |
| | 15V output models | -- | 18 | -- | |
| Output Short Circuit | Input voltage range | Hiccup, automatics recovery | | | |
| Trim | | -- | ±10%Vo | -- | VDC |
| Temperature drift (Vout) | Refer to recommended circuit | -- | ±0.02 | -- | %/°C |

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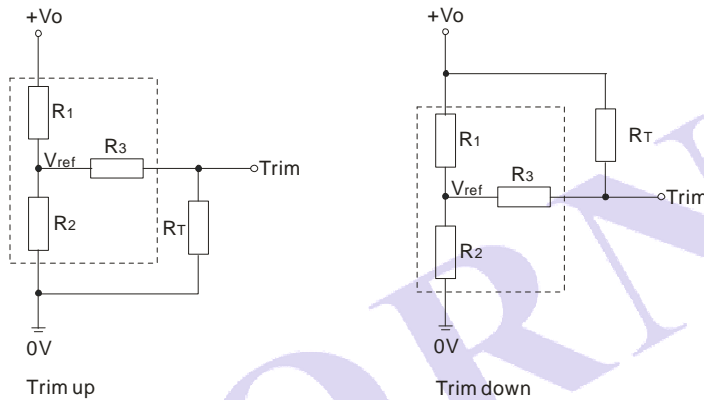
[Http://www.mornsun-power.com](http://www.mornsun-power.com)

COMMON SPECIFICATIONS

| Item | Test conditions | Min. | Typ. | Max. | Units |
|-----------------------|---------------------------------|---------------------|------|------|---------|
| Operating temperature | | -40 | -- | 85 | °C |
| Storage temperature | | -55 | -- | 125 | |
| Storage humidity | | 5 | -- | 95 | |
| Cooling | | Free Air Convection | | | |
| Maximum Case temp. | On working temperature | -- | -- | 105 | °C |
| Lead temperature | 1.5mm from case for 10 seconds | -- | -- | 300 | |
| Isolation voltage | Tested for 1 minute and 1mA max | 1500 | -- | -- | VDC |
| Isolation resistance | Test at 500VDC | 1000 | -- | -- | MΩ |
| Isolation capacitance | 100kHz /0.1V | -- | 1000 | -- | pF |
| Switching frequency | Nominal, full load | -- | 300 | -- | kHz |
| MTBF | M1L-HDBK-217F | 1000 | -- | -- | k hours |
| Case material | | Aluminum Alloy | | | |
| Weight | | -- | 28 | -- | g |

TRIM APPLICATION & TRIM RESISTANCE

Application circuit for TRIM (Part in broken line is the interior of models)



Formula for resistance of Trim

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2$$

Note: Value for R1, R2, R3, and Vref refer to the following table.

R_T : Resistance of Trim

a: User-defined parameter, no actual meanings.

V_o' : The trim up/down voltage

| Resistance \ V_o | V_o | | | |
|--------------------|----------|--------|---------|---------|
| | 3.3(VDC) | 5(VDC) | 12(VDC) | 15(VDC) |
| R1(KΩ) | 4.80 | 2.88 | 10.97 | 14.50 |
| R2(KΩ) | 2.86 | 2.86 | 2.86 | 2.86 |
| R3(KΩ) | 15 | 10 | 17.8 | 17.8 |
| Vref(V) | 1.24 | 2.5 | 2.5 | 2.5 |

RECOMMENDED CIRCUIT

1) Recommended circuit



(Fig.1)

In order to obtain better performance for the DC/DC models. It's recommended that use input and output filters as Fig.1 shown.

2) Recommended capacitance

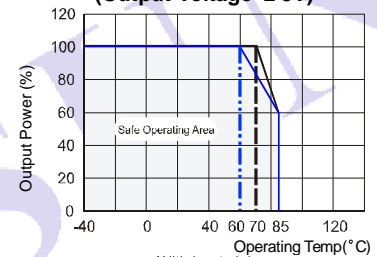
| Output voltage \ Capacitance | C_{out} | $C_{in}(24V, 48V \text{ input})$ |
|------------------------------|-----------|----------------------------------|
| 3.3V, 5V | 470μF | 100μF |
| 12V, 15V | 220μF | |

3) No parallel connection or plug and play

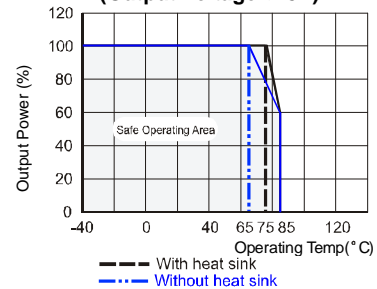
DERATING & EFFICIENCY CURVE

1) Temperature derating curve

(Output Voltage ≤ 5V)



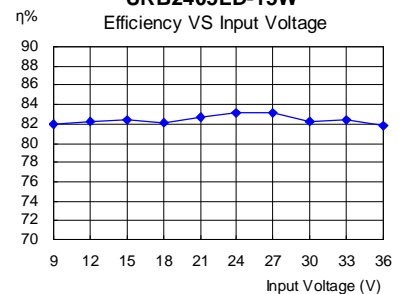
(Output Voltage > 5V)



2) Efficiency VS nput voltage (Rated load)

URB2405LD-15W

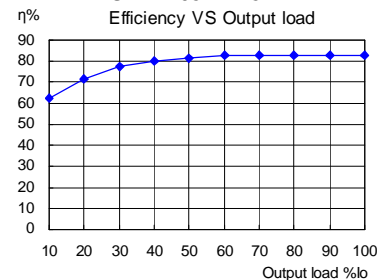
Efficiency VS Input Voltage



3) Efficiency VS output Load (Nominal input)

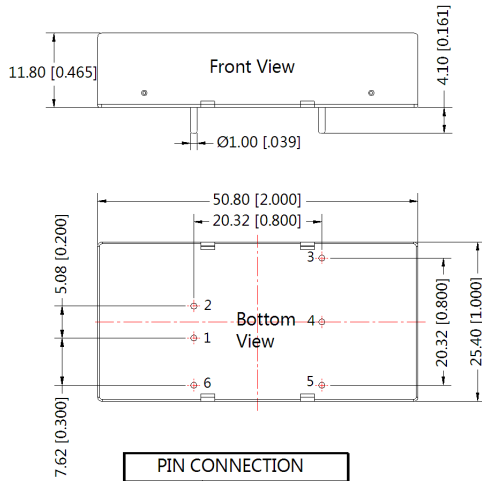
URB2405LD-15W

Efficiency VS Output load



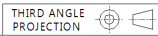
OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS

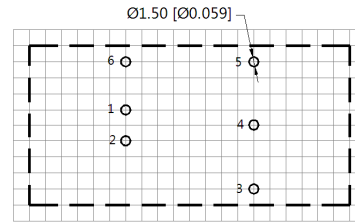


| PIN CONNECTION | |
|----------------|--------|
| Pin | Single |
| 1 | GND |
| 2 | Vin |
| 3 | +Vo |
| 4 | Trim |
| 5 | 0V |
| 6 | Ctrl |

Note:
 Unit :mm[inch]
 Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
 Pin height tolerances : $\pm 0.50[\pm 0.020]$
 General tolerances: $\pm 0.30[\pm 0.012]$

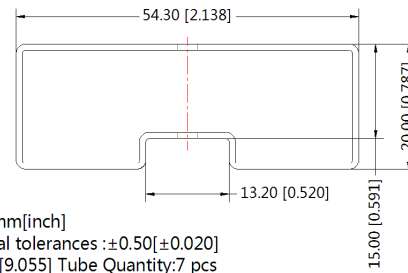


RECOMMENDED FOOTPRINT DETAILS



Note : Grid 2.54*2.54mm

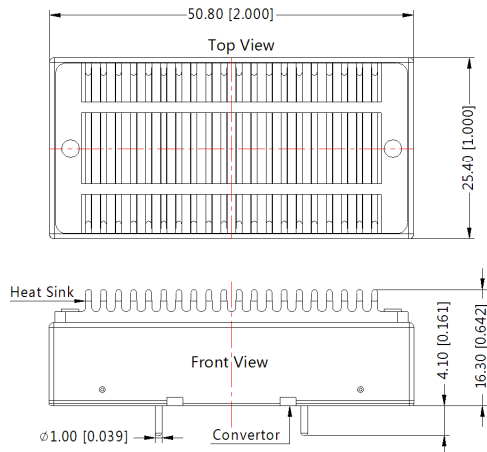
TUBE PACKAGING DIMENSIONS (WITHOUT HEATSINK)



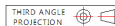
Note:
 Unit :mm[inch]
 General tolerances : $\pm 0.50[\pm 0.020]$
 L=230[9.055] Tube Quantity:7 pcs
 Inner carton(S): L*W*H=255*170*80
 Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)

HEATSINK ASSEMBLY & PACKAGE DIAGRAM(WITH HEATSINK)

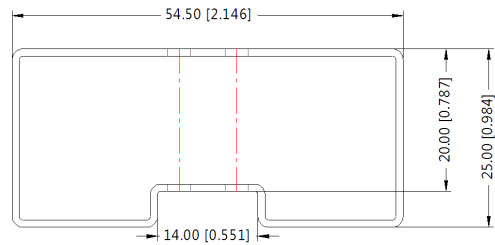
MECHANICAL DIMENSIONS(WITH HEATSINK)



Note:
 Unit :mm[inch]
 General tolerances: $\pm 0.30[\pm 0.012]$
 If use heatsinks,make sure there is enough space for a special size in ther above graph



TUBE PACKAGING DIMENSIONS (WITH HEATSINK)



Note:
 Unit :mm[inch]
 General tolerances : $\pm 0.50[\pm 0.020]$
 L=220[8.661] Tube Quantity: 7pcs
 Inner carton(S): L*W*H=255*170*80
 Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)

NOTE

1. Input voltage can't exceed this value, or will cause the permanent damage.
2. Minimum operating current is 10% of rated current, if less than 10% rated current, output ripple may increase rapidly, the amplitude $\leq 1V$.
3. Capacitor MAX load tested at nominal input voltage, full load and constant resistive load.
4. The CTRL control pin voltage is referenced to GND.
5. Only typical model listed. Non-standard models will be different from the above, please contact us for more details.
6. All specifications are measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
7. In this datasheet, all the test methods of indications are based on corporate standards.