### Selection Guide

<table>
<thead>
<tr>
<th>Certification</th>
<th>Part No.</th>
<th>Input Voltage (VDC)</th>
<th>Output</th>
<th>Full Load Efficiency (%)</th>
<th>Max. Capacitive Load (µF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nominal (Range)</td>
<td>Max.</td>
<td>Voltage (VDC)</td>
<td>Current (mA) Max./Min.</td>
</tr>
<tr>
<td>CE</td>
<td>URB2403S-10WR3</td>
<td>24 (9-36)</td>
<td>40</td>
<td>3.3</td>
<td>2400/0</td>
</tr>
<tr>
<td></td>
<td>URB2405S-10WR3</td>
<td></td>
<td></td>
<td>5</td>
<td>2000/0</td>
</tr>
<tr>
<td></td>
<td>URB2409S-10WR3</td>
<td></td>
<td></td>
<td>9</td>
<td>1111/0</td>
</tr>
<tr>
<td></td>
<td>URB2412S-10WR3</td>
<td></td>
<td></td>
<td>12</td>
<td>833/0</td>
</tr>
<tr>
<td></td>
<td>URB2415S-10WR3</td>
<td></td>
<td></td>
<td>15</td>
<td>667/0</td>
</tr>
<tr>
<td></td>
<td>URB2424S-10WR3</td>
<td></td>
<td></td>
<td>24</td>
<td>417/0</td>
</tr>
</tbody>
</table>

Notes: ① Exceeding the maximum input voltage may cause permanent damage; ② Efficiency is measured at nominal input voltage and rated output load.

### Input Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Operating Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Current (full load / no-load)</td>
<td>3.3VDC output</td>
<td>--</td>
<td>389/25</td>
<td>398/45</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>5VDC output</td>
<td>--</td>
<td>474/25</td>
<td>485/45</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>--</td>
<td>474/9</td>
<td>485/48</td>
<td>mA</td>
</tr>
<tr>
<td>Reflected Ripple Current</td>
<td>--</td>
<td>50</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Surge Voltage (1sec. max.)</td>
<td>-0.7</td>
<td>--</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start-up Voltage</td>
<td>--</td>
<td>--</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under-voltage Protection</td>
<td>5.5</td>
<td>6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Filter</td>
<td>Capacitance Filter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot Plug</td>
<td>Unavailable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ctrl*</td>
<td>Module on</td>
<td>Ctrl pin open or pulled high (3.5-12VDC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Module off</td>
<td>Ctrl pin pulled low to GND (0-1.2VDC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input current when off</td>
<td>--</td>
<td>6</td>
<td>10</td>
<td>mA</td>
</tr>
</tbody>
</table>

Note: * The Ctrl pin voltage is referenced to input GND.
### Output Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Operating Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Accuracy(^a)</td>
<td>5% -100% load</td>
<td>--</td>
<td>±1.5</td>
<td>±2</td>
<td>%</td>
</tr>
<tr>
<td>Linear Regulation(^b)</td>
<td>Input voltage variation from low to high at full load</td>
<td>--</td>
<td>±0.25</td>
<td>±0.5</td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation(^c)</td>
<td>5% -100% load</td>
<td>--</td>
<td>±0.5</td>
<td>±1</td>
<td>%</td>
</tr>
<tr>
<td>Transient Recovery Time</td>
<td>25% load step change, nominal input voltage</td>
<td>3.3V, 5V output</td>
<td>--</td>
<td>±5</td>
<td>±8</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>--</td>
<td>±3</td>
<td>±5</td>
<td>%</td>
</tr>
<tr>
<td>Transient Response Deviation</td>
<td>Full load</td>
<td>--</td>
<td>--</td>
<td>±0.03</td>
<td>%/℃</td>
</tr>
<tr>
<td>Ripple &amp; Noise(^d)</td>
<td>20MHz bandwidth, 5% -100% load</td>
<td>3.3V, 5V output</td>
<td>--</td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>--</td>
<td>75</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Over-current Protection</td>
<td>Input voltage range</td>
<td>110</td>
<td>160</td>
<td>230</td>
<td>%lo</td>
</tr>
<tr>
<td>Short-circuit Protection</td>
<td>Continuous, self-recovery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:  
\(^a\) Output voltage accuracy for 0%-5% load is ±3% max;  
\(^b\) Load regulation for 0%-100% load increases to ±3%;  
\(^c\) Ripple & noise for 0% - 5% load is ≤ 300mV. Ripple and noise are measured by Fig.2.

### General Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Operating Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation</td>
<td>Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.</td>
<td>1500</td>
<td>--</td>
<td>--</td>
<td>VDC</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>Input-output resistance at 500VDC</td>
<td>1000</td>
<td>--</td>
<td>--</td>
<td>MΩ</td>
</tr>
<tr>
<td>Isolation Capacitance</td>
<td>Input-output capacitance at 100kHz/0.1V</td>
<td>--</td>
<td>1000</td>
<td>--</td>
<td>pF</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>See Fig. 1</td>
<td>-40</td>
<td>--</td>
<td>+85</td>
<td>℃</td>
</tr>
<tr>
<td>Storage Humidity</td>
<td>Non-condensing</td>
<td>5</td>
<td>--</td>
<td>95</td>
<td>%RH</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65</td>
<td>--</td>
<td>--</td>
<td>+125</td>
<td>℃</td>
</tr>
<tr>
<td>Pin Soldering Resistance</td>
<td>Soldering spot is 1.5mm away from case for 10 seconds</td>
<td>--</td>
<td>--</td>
<td>+300</td>
<td>℃</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>10-150Hz, 0.75mm, 5G, 90min. along X, Y and Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching Frequency (^*)</td>
<td>PWM mode</td>
<td>--</td>
<td>500</td>
<td>--</td>
<td>kHz</td>
</tr>
<tr>
<td>MTBF</td>
<td>MIL-HDBK-217F@25°C</td>
<td>1000</td>
<td>--</td>
<td>--</td>
<td>K hours</td>
</tr>
</tbody>
</table>

Note: \(^*\) Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

### Mechanical Specifications

- **Case Material**: Black plastic; flame-retardant and heat-resistant (UL94 V-0)
- **Dimensions**: 22.00 x 9.50 x 12.00 mm
- **Weight**: 5.5g (Typ.)
- **Cooling method**: Free air convection(20LFM)

### Electromagnetic compatibility (EMC)

#### Emissions

- **CE**: CISPR32/EN55032 CLASS B (see Fig.4-② for recommended circuit)
- **RE**: CISPR32/EN55032 CLASS B (see Fig.4-② for recommended circuit)

#### Immunity

- **ESD**: IEC/EN61000-4-2 Contact ±6KV perf. Criteria B
- **RS**: IEC/EN61000-4-3 10V/m perf. Criteria A
- **EFT**: IEC/EN61000-4-4 ±2KV (see Fig.4-④ for recommended circuit) perf. Criteria B
- **Surge**: IEC/EN61000-4-5 line to line ±2KV (see Fig.4-① for recommended circuit) perf. Criteria B
- **CS**: IEC/EN61000-4-6 3 Vt/m.s perf. Criteria A
DC/DC Converter
URB_S-10WR3 Series

Typical Characteristic Curves

Temperature Derating Curve

Efficiency Vs Input Voltage (Full Load)

Efficiency Vs Output Load (Vin=24V)

Efficiency Vs Input Voltage (Full Load)

Efficiency Vs Output Load (Vin=24V)
1. Ripple & Noise

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Please keep the wire of probe to copper as short as possible.

2. Typical application

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the max. capacitive load value of the product.

3. EMC compliance circuit

Fig. 3


cardboard

Fig. 4

Notes: For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test.

4. The products do not support parallel connection of their output.

5. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

<table>
<thead>
<tr>
<th>Model</th>
<th>Vin:24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE</td>
<td>Choose according to actual input current</td>
</tr>
<tr>
<td>C0, C4</td>
<td>330µF/50V</td>
</tr>
<tr>
<td>C1, C2</td>
<td>10µF/50V</td>
</tr>
<tr>
<td>C3</td>
<td>22µF/50V</td>
</tr>
<tr>
<td>LCM1</td>
<td>1.4-1.7mH (TN150P-RH12.7<em>12.7</em>7.9)</td>
</tr>
<tr>
<td>CY1, CY2</td>
<td>1nF/2000VDC</td>
</tr>
</tbody>
</table>
Dimensions and Recommended Layout

**Front View**
- Dimensions: 12.00 [0.472] x 4.10 [0.161] x 0.70 [0.028]

**Bottom View**
- Dimensions: 22.00 [0.866] x 9.50 [0.374] x 2.70 [0.106]
- Pin-Out:
<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Vin</td>
</tr>
<tr>
<td>3</td>
<td>Ctrl</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>+Vo</td>
</tr>
<tr>
<td>7</td>
<td>0V</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
</tr>
</tbody>
</table>

Note: Grid 2.54*2.54mm

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

---

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210004;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations; see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China
Tel: 86-20-38601850  Fax: 86-20-38601272  E-mail: info@mornsun.cn  www.mornsun-power.com