

## WR-U SERIES

Single and dual output



- **30 Watts output power**
- **UL approved (48V input models)**
- **2:1 input range**
- **Efficiency to 86%**
- **Isolated outputs**

The WR-U series DC/DC converters accept a wide input voltage range of 9 to 18VDC, 18 to 36VDC, and 36 to 72VDC. A 100kHz switching regulator produces operating efficiencies as high as 86% with output loads as light as 25% of full load. These 30 Watt models provide for remote sensing, input/output isolation of 500VDC minimum, and short circuit protection. The WRU Series incorporates six sided continuous EMI/RFI shielding. The "U" package measures 2.56 x 4.56 x 0.83 inches and is PCB mountable. Other pertinent specifications include: overvoltage protection on all outputs, operating temperature range of -25°C to 71°C with no derating required and all models are free-air convection cooled.

[ 2 YEAR WARRANTY ]

## SPECIFICATION

All specifications are typical at nominal input, full load at 25°C unless otherwise stated

| OUTPUT SPECIFICATIONS      |   |   |
|----------------------------|---|---|
| Voltage accuracy           |   | ±1.0%                                       |
| Voltage adjustability      | Singles   | ±10%, max.                                  |
| Remote sense               | Singles   | Yes   |
| Line regulation            | LL-HL, all outputs                                | ±0.2%, max.                                 |
| Load regulation            | FL-NL<br>FL-0.25%FL                               | ±5.0%, max.<br>±1.0%, max.                  |
| Voltage balance            | Duals   | ±2.0%                                       |
| Ripple and noise           | 5Hz to 20MHz                                      | 75mV pk-pk<br>10mV rms, max.                |
| Transient response         | 25% step load change                              | ±1.0% error band<br>500µs rec.              |
| Temperature coefficient    |   | ±0.02%/°C, max.                             |
| Overvoltage protection     | Single +5V output<br>Single +12 and +15V<br>Duals | 6.8V ±10%<br>18.0V ±10%<br>No               |
| Short circuit protection   |   | Continuous<br>automatic recovery            |
| INPUT SPECIFICATIONS       |   |   |
| Input voltage range        | 12VDC<br>24VDC<br>48VDC                           | 9 to 18VDC<br>18 to 36VDC<br>36 to 72VDC    |
| No load input current      | 12VDC<br>24VDC<br>48VDC                           | 30mA<br>25mA<br>20mA                        |
| Input filter<br>See Note 7 | Single outputs<br>Dual outputs                    | Pi filter<br>Low ESR cap                    |
| Reverse voltage protection |   | Internal shunt diode<br>(Use external fuse) |

| INPUT SPECIFICATIONS CONTINUED  |  |  |
|---------------------------------|--|--|
| Remote ON/OFF                   |  |  |
| Logic compatibility             |  | CMOS or open collector TTL   |
| E <sub>c</sub> -ON              |  | +5.5VDC min. or open-circuit   |
| E <sub>c</sub> -OFF             |  | max. 1.8VDC  |
| Shutdown idle current           |  | 5mA  |
| Input resistance                |  | 0VDC < E <sub>in</sub> < 9VDC; 100kΩ   |
| Control common                  |  | Referenced to input minus  |
| GENERAL SPECIFICATIONS          |  |  |
| Efficiency                      | Typical  | 75% to 86%   |
| Isolation voltage<br>See Note 5 | Input/Output<br>Input/Case   | 500VDC<br>250VDC   |
| Switching frequency             | Fixed  | 100kHz   |
| Approvals and standards         | Safety   | UL1950   |
| Case material                   |  | Black coated copper with<br>non-conductive base  |
| Material flammability           |  | UL94V-0  |
| Weight                          |  | 390g (13.77oz)   |
| MTBF                            | See Note 6   | 840,000 hours  |
| ENVIRONMENTAL SPECIFICATIONS    |  |  |
| Thermal performance             | Operating ambient<br>Non-operating amb.<br>Case, temp. rise<br>Derating<br>Cooling | -25°C to +71°C<br>-55°C to +105°C<br>+30°C at FL max.<br>None required<br>Free-air convection cooled |
| Relative humidity               | Non-condensing   | 5% to 95% RH   |
| Altitude                        | Operating<br>Non operating   | 10,000 feet max.<br>40,000 feet max.   |
| Vibration, Pressure             | 5Hz to 500Hz   | 2.5G rms (approx.)   |

# 30 Watt Wide input DC/DC converters

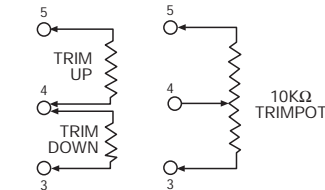
| INPUT VOLTAGE (1) | OUTPUT VOLTAGE | OUTPUT CURRENT | INPUT CURRENT (2) | TYPICAL EFFICIENCY | REGULATION |          | MODEL NUMBER  |
|-------------------|----------------|----------------|-------------------|--------------------|------------|----------|---------------|
|                   |                |                |                   |                    | LINE (3)   | LOAD (4) |               |
| 9-18VDC           | 5VDC           | 5.0A           | 2.8A              | 75%                | ±0.2%      | ±1.0%    | WR12S05/5000U |
| 9-18VDC           | 12VDC          | 2.5A           | 3.2A              | 78%                | ±0.2%      | ±1.0%    | WR12S12/2500U |
| 9-18VDC           | 15VDC          | 2.0A           | 3.2A              | 78%                | ±0.2%      | ±1.0%    | WR12S15/2000U |
| 18-36VDC          | 5VDC           | 5.0A           | 1.35A             | 77%                | ±0.2%      | ±1.0%    | WR24S05/5000U |
| 18-36VDC          | 12VDC          | 2.5A           | 1.55A             | 80%                | ±0.2%      | ±1.0%    | WR24S12/2500U |
| 18-36VDC          | 15VDC          | 2.0A           | 1.55A             | 80%                | ±0.2%      | ±1.0%    | WR24S15/2000U |
| 36-72VDC          | 5VDC           | 5.0A           | 0.68A             | 77%                | ±0.2%      | ±1.0%    | WR48S05/5000U |
| 36-72VDC          | 12VDC          | 2.5A           | 0.78A             | 80%                | ±0.2%      | ±1.0%    | WR48S12/2500U |
| 36-72VDC          | 15VDC          | 2.0A           | 0.78A             | 80%                | ±0.2%      | ±1.0%    | WR48S15/2000U |
| 9-18VDC           | ±12VDC         | ±1.25A         | 3.05A             | 82%                | ±0.2%      | ±1.0%    | WR12D12/1250U |
| 9-18VDC           | ±15VDC         | ±1.0A          | 3.05A             | 82%                | ±0.2%      | ±1.0%    | WR12D15/1000U |
| 18-36VDC          | ±12VDC         | ±1.25A         | 1.5A              | 84%                | ±0.2%      | ±1.0%    | WR24D12/1250U |
| 18-36VDC          | ±15VDC         | ±1.0A          | 1.5A              | 84%                | ±0.2%      | ±1.0%    | WR24D15/1000U |
| 36-72VDC          | ±12VDC         | ±1.25A         | 0.73A             | 86%                | ±0.2%      | ±1.0%    | WR48D12/1250U |
| 36-72VDC          | ±15VDC         | ±1.0A          | 0.73A             | 86%                | ±0.2%      | ±1.0%    | WR48D15/1000U |

## Notes

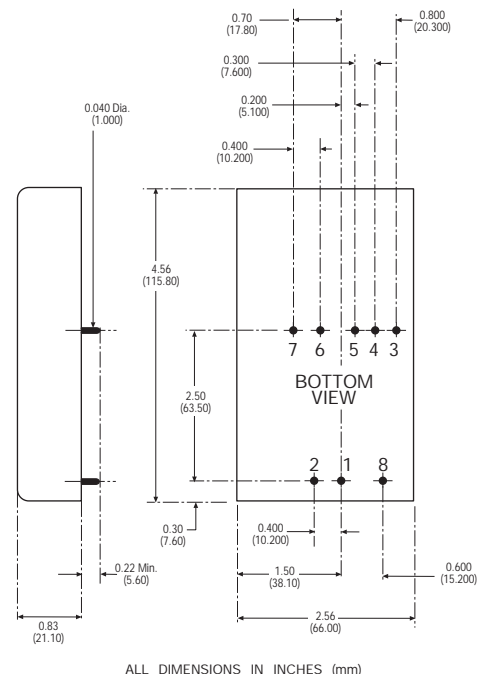
- Nominal input 12, 24 and 48VDC.
- Maximum at full load.
- Measured from high line to low line.
- Measured from full load to 0.25% full load.
- In many cases, the isolation specification may be upgraded. Consult factory for details.
- MTBF figures are based on actual product performance. Consult factory for details.
- Fixed frequency design provides for easier input filtering and better noise performance.
- Standard specifications are conservative and can be optimised for specific applications. In particular, converter start-up at lower than specified temperature, wider input voltage range and output voltage adjustment are all relatively simple modifications to the standard product. Consult factory for details.

## EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by ±10% using either method shown below.



| PIN CONNECTIONS |                       |             |
|-----------------|-----------------------|-------------|
| PIN NUMBER      | SINGLE OUTPUT         | DUAL OUTPUT |
| 1               | + Input               | + Input     |
| 2               | - Input               | - Input     |
| 3               | + Sense/Trim Down     | + Output    |
| 4               | Trim                  | Common      |
| 5               | - Sense/Trim Up       | - Output    |
| 6               | + Output              | No Pin      |
| 7               | - Output              | No Pin      |
| 8               | Remote On/Off Control |             |



## International Safety Standard Approvals



UL1950 File Numbers E136005 and E131987

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