

# B1500RU Series



## Ultra-Wide Input 15W Single & Dual Output DC/DC Converters

### Key Features:

- 15W Output Power
- 4:1 Input Voltage Range
- 1,500 VDC Isolation
- Compact 1 x 2 Inch Case
- Single & Dual Outputs
- Optional Remote ON/OFF
- Industry Standard Pin-Out



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### Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

#### Input

| Parameter                      | Conditions    | Min. | Typ. | Max.  | Units |
|--------------------------------|---------------|------|------|-------|-------|
| Input Start Voltage            | 24 VDC Input  | 8.0  | 8.5  | 9.0   | VDC   |
|                                | 48 VDC Input  | 15.0 | 17.0 | 18.0  |       |
| Input Filter, See Note 1       | π (Pi) Filter |      |      |       |       |
| Reverse Polarity Input Current |               |      |      | 1.0   | A     |
| Short Circuit Input Power      |               |      |      | 3,500 | mW    |

#### Output

| Parameter                           | Conditions                     | Min. | Typ.  | Max.  | Units    |
|-------------------------------------|--------------------------------|------|-------|-------|----------|
| Output Voltage Accuracy             |                                |      | ±1.0  | ±2.0  | %        |
| Output Voltage Balance              | Dual Output, Balanced Loads    |      | ±0.5  | ±2.0  | %        |
| Line Regulation                     | V <sub>in</sub> = Min to Max   |      | ±0.1  | ±0.5  | %        |
| Load Regulation                     | I <sub>out</sub> = 10% to 100% |      | ±0.5  | ±1.0  | %        |
| Ripple & Noise (20 MHz)             | See Note 2                     |      | 55    | 80    | mV P - P |
| Ripple & Noise (20 MHz)             | Over Line, Load & Temp.        |      |       | 100   | mV P - P |
| Ripple & Noise (20 MHz)             |                                |      |       | 15    | mV rms   |
| Output Power Protection             |                                | 120  |       |       | %        |
| Transient Recovery Time, See Note 3 | 25% Load Step Change           |      | 300   | 500   | μSec     |
| Transient Response Deviation        |                                |      | ±2.0  | ±4.0  | %        |
| Temperature Coefficient             |                                |      | ±0.01 | ±0.02 | %/°C     |
| Output Short Circuit                | Continuous (Autorecovery)      |      |       |       |          |

#### General

| Parameter              | Conditions             | Min.  | Typ.  | Max.  | Units |
|------------------------|------------------------|-------|-------|-------|-------|
| Isolation Voltage      | 60 Seconds             | 1,500 |       |       | VDC   |
| Isolation Test Voltage | Flash Tested For 1 Sec | 1,650 |       |       | VDC   |
| Isolation Resistance   | 500 VDC                | 1,000 |       |       | MΩ    |
| Isolation Capacitance  | 100 kHz, 1V            |       | 1,200 | 1,500 | pF    |
| Switching Frequency    |                        | 290   | 330   | 400   | kHz   |

#### Remote On/Off See Note 4

| Parameter             | Conditions | Min.                                 | Typ. | Max. | Units |
|-----------------------|------------|--------------------------------------|------|------|-------|
| Supply On             |            | 2.5                                  |      | 5.5  | VDC   |
| Supply Off            |            | -0.7                                 |      | 0.8  | VDC   |
| Standby Input Current |            |                                      |      | 10   | mA    |
| Control Common        |            | Referenced to Negative Input (pin 2) |      |      |       |

#### Environmental

| Parameter                   | Conditions                                 | Min. | Typ. | Max. | Units |
|-----------------------------|--|------|------|------|-------|
| Operating Temperature Range | Ambient                                    | -40  | +25  | +60  | °C    |
| Operating Temperature Range | Case                                       |      |      | +100 | °C    |
| Storage Temperature Range   |  | -50  |      | +125 | °C    |
| Cooling                     | Free Air Convection (See Curves on Page 2) |      |      |      |       |
| Humidity                    | RH, Non-condensing                         |      |      | 95   | %     |
| RFI                         | Six-Side Shielded Metal Case               |      |      |      |       |

#### Physical

|               |   |  |  |  |  |
|---------------|---|--|--|--|--|
| Case Size     | 2.0 x 1.0 x 0.40 Inches (50.8 x 25.4 x 10.2 mm) |  |  |  |  |
| Case Material | Metal with Non-Conductive Base                  |  |  |  |  |
| Weight        | 1.13 Oz (32g)                                   |  |  |  |  |

#### Reliability Specifications

| Parameter | Conditions                      | Min. | Typ. | Max. | Units  |
|-----------|---------------------------------|------|------|------|--------|
| MTBF      | MIL HDBK 217F, 25°C, Gnd Benign | 700  |      |      | kHours |

#### Absolute Maximum Ratings

| Parameter                   | Conditions                  | Min. | Typ. | Max.  | Units |
|-----------------------------|-----------------------------|------|------|-------|-------|
| Input Voltage Surge (1 Sec) | 24 VDC Input                | -0.7 |      | 50.0  | VDC   |
|                             | 48 VDC Input                | -0.7 |      | 100.0 |       |
| Lead Temperature            | 1.5 mm From Case For 10 Sec |      |      | 260.0 | °C    |
| Internal Power Dissipation  | All Models                  |      |      | 5,000 | mW    |

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.

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| Model Number | Input         |             |              |         | Reflected Ripple Current (mA, Typ) | Output        |                   |                   | Efficiency (% Typ) | Capacitive Load (µF Max) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|------------------------------------|---------------|-------------------|-------------------|--------------------|--------------------------|----------------------------|
|              | Voltage (VDC) |             | Current (mA) |         |                                    | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) |                    |                          |                            |
|              | Nominal       | Range       | Full-Load    | No-Load |                                    |               |                   |                   |                    |                          |                            |
| B1501RU      | 24            | 9.0 - 36.0  | 528          | 25      | 40                                 | 3.3           | 3,000             | 300.0             | 78                 | 470                      | 2,500                      |
| B1502RU      | 24            | 9.0 - 36.0  | 762          | 25      | 40                                 | 5.0           | 3,000             | 300.0             | 82                 | 470                      | 2,500                      |
| B1503RU      | 24            | 9.0 - 36.0  | 735          | 25      | 40                                 | 12.0          | 1,250             | 125.0             | 85                 | 470                      | 2,500                      |
| B1504RU      | 24            | 9.0 - 36.0  | 726          | 25      | 40                                 | 15.0          | 1,000             | 100.0             | 86                 | 470                      | 2,500                      |
| B1505RU      | 24            | 9.0 - 36.0  | 753          | 25      | 40                                 | ±5.0          | ±1,500            | ±150.0            | 81                 | ±220                     | 2,500                      |
| B1506RU      | 24            | 9.0 - 36.0  | 735          | 25      | 40                                 | ±12.0         | ±625              | ±62.5             | 85                 | ±220                     | 2,500                      |
| B1507RU      | 24            | 9.0 - 36.0  | 726          | 25      | 40                                 | ±15.0         | ±500              | ±50.0             | 86                 | ±220                     | 2,500                      |
| B1511RU      | 48            | 18.0 - 75.0 | 264          | 15      | 30                                 | 3.3           | 3,000             | 300.0             | 78                 | 470                      | 1,250                      |
| B1512RU      | 48            | 18.0 - 75.0 | 381          | 15      | 30                                 | 5.0           | 3,000             | 300.0             | 82                 | 470                      | 1,250                      |
| B1513RU      | 48            | 18.0 - 75.0 | 368          | 15      | 30                                 | 12.0          | 1,250             | 125.0             | 85                 | 470                      | 1,250                      |
| B1514RU      | 48            | 18.0 - 75.0 | 363          | 15      | 30                                 | 15.0          | 1,000             | 100.0             | 86                 | 470                      | 1,250                      |
| B1515RU      | 48            | 18.0 - 75.0 | 376          | 15      | 30                                 | ±5.0          | ±1,500            | ±150.0            | 81                 | ±220                     | 1,250                      |
| B1516RU      | 48            | 18.0 - 75.0 | 368          | 15      | 30                                 | ±12.0         | ±625              | ±62.5             | 85                 | ±220                     | 1,250                      |
| B1517RU      | 48            | 18.0 - 75.0 | 363          | 15      | 30                                 | ±15.0         | ±500              | ±50.0             | 86                 | ±220                     | 1,250                      |

For Class "A" filter option, add suffix "F" to model number (i.e. B1503RU-F)

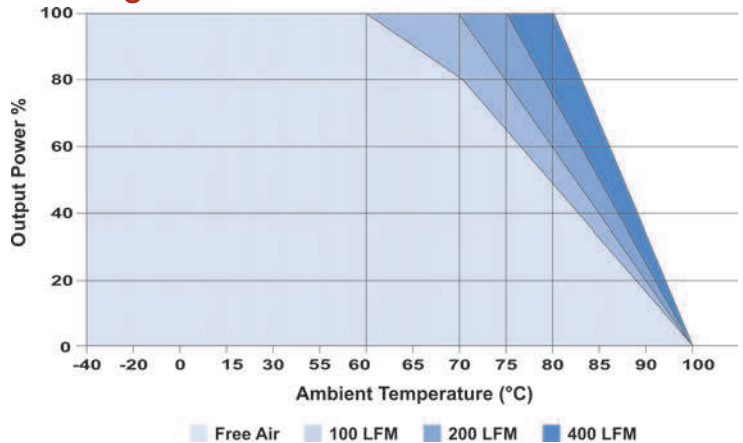
For heatsink option, add suffix "H" to model number (i.e. B1503RU-H)

For Remote Control option, add suffix "R" to model number (i.e. B1503RU-R)

**Notes:**

1. An internal filter that complies with EN55022 Class "A" is available. Add a suffix "-F" to the model number
2. When measuring output ripple, it is recommended that an external 4.7 µF ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units.
3. Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
4. The maximum control current at the on/off pin (pin 6) during a logic high is 50 µA. The maximum control current to the on/off pin at logic low (-0.7V to 0.8V) is 1 mA. If the on/off pin is left open, the unit operates. If it is grounded, the unit will shut off.
5. Operation at no-load will not damage these units. However, they may not meet all specifications.
6. Dual output units may be connected to provide a 10 VDC, 24 VDC or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.
7. The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter.  
In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up.  
In this case, it is recommended that a low Equivalent Series Resistance (ESR <1.0Ω at 100 kHz) capacitor be mounted close to the converter. A 10.0 µF is recommended.
8. It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

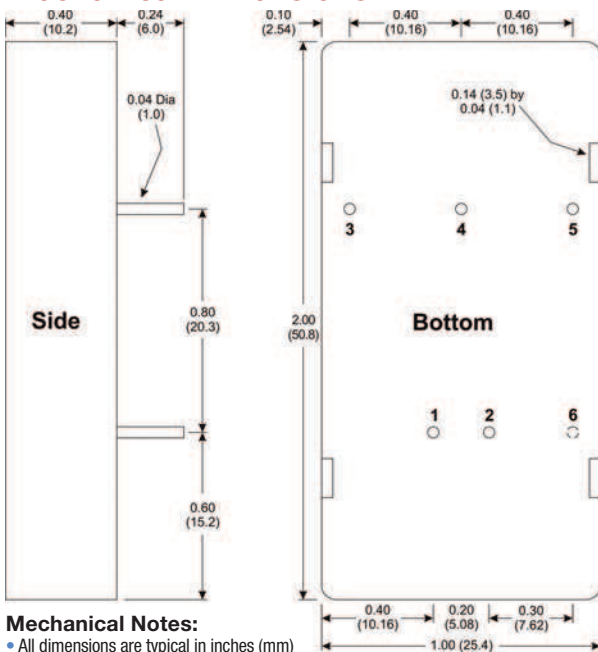
**Derating Curve**



**Pin Connections**

| Pin | Single | Dual  | Pin | Single | Dual   |
|-----|--------|-------|-----|--------|--------|
| 1   | +Vin   | +Vin  | 4   | No Pin | Comm.  |
| 2   | -Vin   | -Vin  | 5   | -Vout  | -Vout  |
| 3   | +Vout  | +Vout | 6   | ON/OFF | ON/OFF |

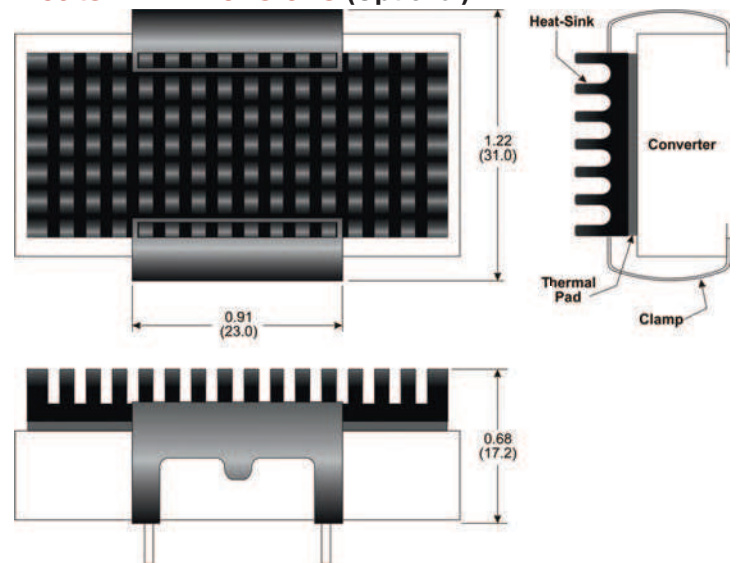
**Mechanical Dimensions**



**Mechanical Notes:**

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.01 (±0.25)

**Heatsink Dimensions (Optional)**



**Heatsink Notes:**

- Use of the heatsink will extend the units operating temperature range by approximately 10°C.
- The heatsink is black anodized aluminum.



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