

# B5000RW Series



## Compact, 1 x 2 Inch 50W, 2:1 Input Range DC/DC Converters

### Key Features:

- 50W Output Power
- 2:1 Input Voltage Range
- 1,500 VDC Isolation
- Very High Efficiency
- Compact 1 x 2 Inch Case
- Twelve Standard Models
- Remote ON/OFF Control
- Industry Standard Pin-Out



### 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      | 12 VDC Input  |      |      | 9.0  | VDC   |
|                          | 24 VDC Input  |      |      | 18.0 |       |
|                          | 48 VDC Input  |      |      | 36.0 |       |
| Input Shutdown Voltage   | 12 VDC Input  |      | 8.3  |      | VDC   |
|                          | 24 VDC Input  |      | 16.5 |      |       |
|                          | 48 VDC Input  |      | 33.0 |      |       |
| Input Filter, See Note 1 | π (Pi) Filter |      |      |      |       |

| Output Parameter                    | Conditions                        | Min. | Typ. | Max.  | Units    |
|-------------------------------------|-----------------------------------|------|------|-------|----------|
| Output Voltage Accuracy             |                                   |      |      | ±1.0  | %        |
| Line Regulation                     | V <sub>IN</sub> = Min to Max      |      |      | ±0.5  | %        |
| Load Regulation                     | See Note 2                        |      |      | ±0.5  | %        |
| Ripple & Noise, See Note 3          | 3.3 & 5.0 V <sub>OUT</sub> Models |      | 100  |       | mV P - P |
|                                     | 12 & 15 V <sub>OUT</sub> Models   |      | 150  |       | mV P - P |
| Output Power Protection             |                                   | 115  | 130  |       | %        |
| Transient Recovery Time, See Note 4 | 25% Load Step Change              |      | 250  |       | μSec     |
| Transient Response Deviation        |                                   |      | ±5.0 |       | %        |
| Temperature Coefficient             |                                   |      |      | ±0.02 | %/°C     |
| Output Short Circuit                | Continuous (Autorecovery)         |      |      |       |          |

### General

| Parameter             | Conditions  | Min.  | Typ. | Max.  | Units |
|-----------------------|-------------|-------|------|-------|-------|
| Isolation Voltage     | 60 Seconds  | 1,500 |      |       | VDC   |
| Isolation Resistance  | 500 VDC     | 1,000 |      |       | MΩ    |
| Isolation Capacitance | 100 kHz, 1V |       |      | 2,200 | pF    |
| Switching Frequency   |             |       | 320  |       | kHz   |

### Remote On/Off See Note 5

| Parameter             | Conditions                           | Min. | Typ. | Max. | Units |
|-----------------------|--------------------------------------|------|------|------|-------|
| Supply On             |                                      | 3.5  |      | 12.0 | VDC   |
| Supply Off            |                                      | 0.0  |      | 1.2  | VDC   |
| Standby Input Current |                                      |      | 2.5  |      | mA    |
| Control Common        | Referenced to Negative Input (pin 2) |      |      |      |       |

### Environmental

| Parameter                   | Conditions                   | Min. | Typ. | Max. | Units |
|-----------------------------|------------------------------|------|------|------|-------|
| Operating Temperature Range | Ambient                      | -40  | +25  | +58  | °C    |
| Operating Temperature Range | Case                         |      |      | +105 | °C    |
| Storage Temperature Range   |                              | -50  |      | +125 | °C    |
| Cooling                     | Free Air Convection          |      |      |      |       |
| Humidity                    | RH, Non-condensing           |      |      | 95   | %     |
| RFI                         | Six-Side Shielded Metal Case |      |      |      |       |
| Conducted EMI, See Note 1   | EN55022 Class "A"            |      |      |      |       |

### Physical

|               |   |  |  |  |  |
|---------------|---|--|--|--|--|
| Case Size     | 2.0 x 1.0 x 0.43 Inches (50.8 x 25.4 x 11.0 mm) |  |  |  |  |
| Case Material | Metal with Non-Conductive Base                  |  |  |  |  |
| Weight        | 1.06 Oz (30g)                                   |  |  |  |  |

### Reliability Specifications

| Parameter | Conditions                      | Min. | Typ. | Max. | Units  |
|-----------|---------------------------------|------|------|------|--------|
| MTBF      | MIL HDBK 217F, 25°C, Gnd Benign | 227  |      |      | kHours |

### Absolute Maximum Ratings

| Parameter                   | Conditions                  | Min. | Typ. | Max.  | Units |
|-----------------------------|-----------------------------|------|------|-------|-------|
| Input Voltage Surge (1 Sec) | 12 VDC Input                | -0.7 |      | 25.0  | VDC   |
|                             | 24 VDC Input                | -0.7 |      | 50.0  |       |
|                             | 48 VDC Input                | -0.7 |      | 100.0 |       |
| Lead Temperature            | 1.5 mm From Case For 10 Sec |      |      | 260.0 | °C    |

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

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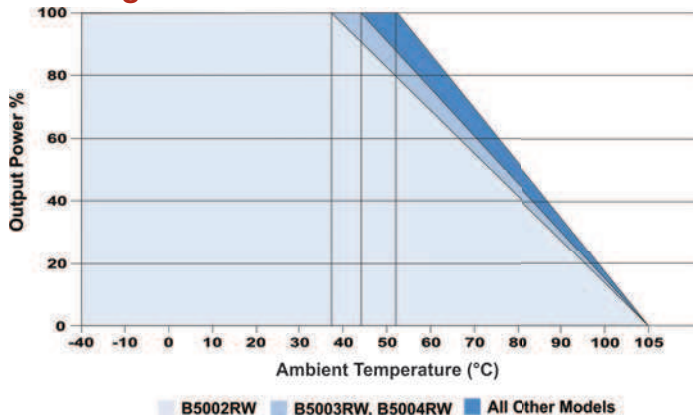
| Model Number | Input         |             |              |         | Reflected Ripple Current (mA, Typ) | Output        |                   |                   | Over Voltage Protection (VDC) | Efficiency (% Typ) | Capacitive Load (µF Max) | Fuse Rating Slow-Blow (mA) |
|--------------|---------------|-------------|--------------|---------|------------------------------------|---------------|-------------------|-------------------|-------------------------------|--------------------|--------------------------|----------------------------|
|              | Voltage (VDC) |             | Current (mA) |         |                                    | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) |                               |                    |                          |                            |
|              | Nominal       | Range       | Full-Load    | No-Load |                                    |               |                   |                   |                               |                    |                          |                            |
| B5001RW      | 12            | 9.0 - 18.0  | 3,090        | 85      | 50                                 | 3.3           | 10,000            | 0.0               | 3.9                           | 89                 | 25,757                   | 10,000                     |
| B5002RW      | 12            | 9.0 - 18.0  | 4,630        | 110     | 50                                 | 5.0           | 10,000            | 0.0               | 6.2                           | 90                 | 17,000                   | 10,000                     |
| B5003RW      | 12            | 9.0 - 18.0  | 4,579        | 160     | 50                                 | 12.0          | 4,167             | 0.0               | 15.0                          | 91                 | 2,950                    | 10,000                     |
| B5004RW      | 12            | 9.0 - 18.0  | 4,579        | 160     | 50                                 | 15.0          | 3,333             | 0.0               | 18.0                          | 91                 | 1,887                    | 10,000                     |
| B5011RW      | 24            | 18.0 - 36.0 | 1,545        | 50      | 40                                 | 3.3           | 10,000            | 0.0               | 3.9                           | 89                 | 25,757                   | 5,000                      |
| B5012RW      | 24            | 18.0 - 36.0 | 2,264        | 70      | 40                                 | 5.0           | 10,000            | 0.0               | 6.2                           | 92                 | 17,000                   | 5,000                      |
| B5013RW      | 24            | 18.0 - 36.0 | 2,264        | 85      | 40                                 | 12.0          | 4,167             | 0.0               | 15.0                          | 92                 | 2,950                    | 5,000                      |
| B5014RW      | 24            | 18.0 - 36.0 | 2,264        | 85      | 40                                 | 15.0          | 3,333             | 0.0               | 18.0                          | 92                 | 1,887                    | 5,000                      |
| B5021RW      | 48            | 36.0 - 75.0 | 772          | 35      | 30                                 | 3.3           | 10,000            | 0.0               | 3.9                           | 89                 | 25,757                   | 2,500                      |
| B5022RW      | 48            | 36.0 - 75.0 | 1,132        | 45      | 30                                 | 5.0           | 10,000            | 0.0               | 6.2                           | 92                 | 17,000                   | 2,500                      |
| B5023RW      | 48            | 36.0 - 75.0 | 1,132        | 50      | 30                                 | 12.0          | 4,167             | 0.0               | 15.0                          | 92                 | 2,950                    | 2,500                      |
| B5024RW      | 48            | 36.0 - 75.0 | 1,132        | 50      | 30                                 | 15.0          | 3,333             | 0.0               | 18.0                          | 92                 | 1,887                    | 2,500                      |

For heatsink option, add suffix "H" to model number (i.e. B5003RW-H)

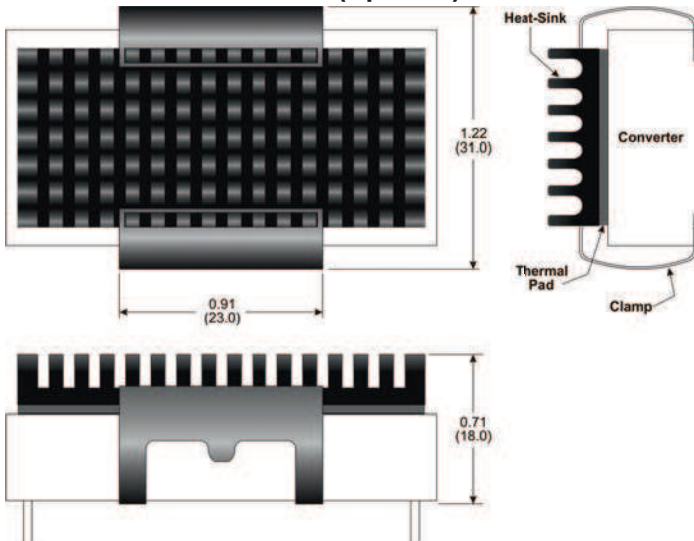
Notes:

- The B500RW series can meet EN55022 Class A with the addition of a capacitor connected in parallel with the input pins. It is recommended that a low ESR (ESR <1.0Ω at 100 kHz) capacitor be mounted close to the converter. For 12V input units, a 22.0 µF/25V is recommended; for 24V inputs a 3.3 µF/50V; and for 48V units a 2.2 µF/100V.
- Load regulation is specified for a load change of minimum load to full load.
- When measuring output ripple, it is recommended that external 1.0 µF & 10 µF capacitors be placed in parallel from the +Vout pin to the -Vout pin.
- Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
- The maximum control current at the on/off pin (pin 3) during a logic high is 5 µA. The maximum control current to the on/off pin at logic low is -100 µA. If the on/off pin is left open, the unit operates. If grounded, the unit will shut off.
- 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.
- Operation at no-load will not damage these units. However, they may not meet all specifications.
- An external resistor may be used to adjust the converter output by ±10%. To adjust the output UP, connect a 5%, 3W resistor between the minus output pin and the Vout trim pin. To adjust the output DOWN, connect a 5%, 3W resistor between the plus output pin and the Vout trim pin. For continuous UP/Down trimming capability, connect a 10 kW potentiometer between the plus and minus outputs with the wiper arm connected to the Vout trim pin. The trim pin may be left floating if it is not used. Contact the factory for more information.
- 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



Heatsink Dimensions (Optional)



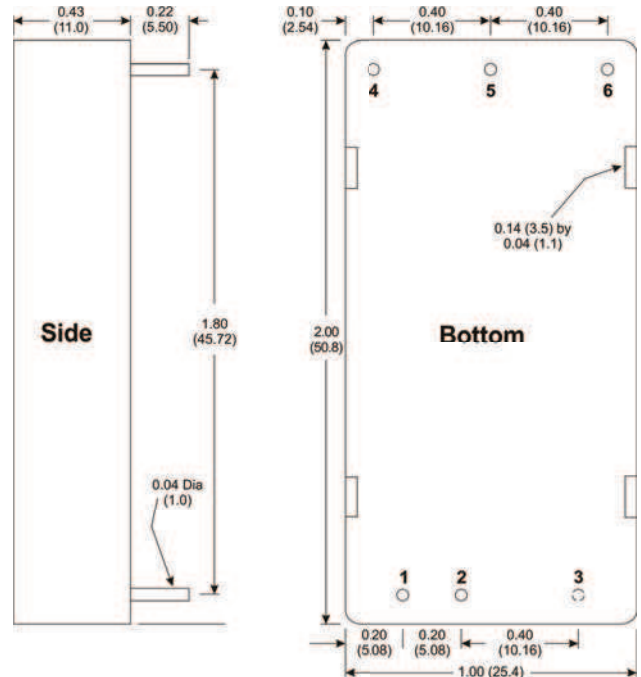
Heatsink Notes:

- Use of the heatsink will extend the units operating temperature range by approximately 10°C.
- The heatsink is black anodized aluminum.
- Heatsink weight is 0.32 Oz (9.0g)

Pin Connections

| Pin | Function | Pin | Function |
|-----|----------|-----|----------|
| 1   | +Vin     | 4   | +Vout    |
| 2   | -Vin     | 5   | -Vout    |
| 3   | ON/OFF   | 6   | Trim     |

Mechanical Dimensions



Mechanical Notes:

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



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