B2000ERU Series

Ultra-Wide Input 20W Single & Dual Output DC/DC Converters



Key Features:

- 20W Output Power
- 4:1 Input Voltage Range
- 1,500 VDC Isolation
- Compact 1 x 2 Inch Case
- Single & Dual Outputs
- Remote ON/OFF
- Industry Standard Pin-Out



RoHS

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 Voltage Range	24 VDC Input	9.0	24	36.0	VDC
	48 VDC Input	18.0	48	75.0	
Under Voltage Lockout, 24 VDC Input	Unit Off	8.0			VDC
	Unit On			9.0	
Under Voltage Lockout, 48 VDC Input	Unit Off	16.0			VDC
	Unit On			17.8	
Input Filter	π (Pi) Filter				
Start-Up Time			10		mS

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±1.0	±3.0	%
Output Voltage Balance	Dual Output , Balanced Loads		±0.5		%
Line Regulation	Vin = Min to Max		±0.2	±0.5	%
Load Regulation	Iout = 10% to 100%		±0.5	±1.0	%
Cross Regulation	See Note 1			±5.0	%
Noise (20 MHz)	See Note 2		75	100	mV P - P
Ripple (20 MHz)	See Note 2		40	50	mV P - P
Output Power Protection		120		150	%
Transient Recovery Time, See Note 4	25% Load Step Change		200	500	µSec
Transient Response Deviation			±3.0	±5.0	%
Temperature Coefficient			±0.02		%/°C
Output Short Circuit , See Note 5	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		2,000		pF
Switching Frequency			400		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
Storage Temperature Range		-55		+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 0.44 Inches (50.8 x 25.4 x 11.2 mm)
Case Material	Metal with Non-Conductive Base
Weight	1.41 Oz (40g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1,000			kHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	24 VDC Input	-0.7		40.0	VDC
	48 VDC Input	-0.7		80.0	
Lead Temperature	1.5 mm From Case For 10 Sec			300.0	°C

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

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Model Selection Guide

Model Number	Input				Output			Over Voltage Protection (VDC Typ)	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							
B2001ERU	24	9.0 - 36.0	1,004	25	3.3	5,000	500.0	3.9	83	18,700	2,500
B2002ERU	24	9.0 - 36.0	968	25	5.0	4,000	400.0	6.2	86	9,600	2,500
B2003ERU	24	9.0 - 36.0	958	25	12.0	1,667	167.0	15.0	87	1,600	2,500
B2004ERU	24	9.0 - 36.0	947	25	15.0	1,333	134.0	18.0	88	1,000	2,500
B2005ERU	24	9.0 - 36.0	947	25	24.0	834	84.0	28.0	88	500	2,500
B2006ERU	24	9.0 - 36.0	992	25	±5.0	±2,000	±200.0	±6.2	84	±4,800	2,500
B2007ERU	24	9.0 - 36.0	958	25	±12.0	±833	±84.5	±15.0	87	±800	2,500
B2008ERU	24	9.0 - 36.0	958	25	±15.0	±667	±67.0	±18.0	87	±500	2,500
B2011ERU	48	18.0 - 75.0	502	15	3.3	5,000	500.0	3.9	83	18,700	1,250
B2012ERU	48	18.0 - 75.0	479	15	5.0	4,000	400.0	6.2	87	9,600	1,250
B2013ERU	48	18.0 - 75.0	473	15	12.0	1,667	167.0	15.0	88	1,600	1,250
B2014ERU	48	18.0 - 75.0	473	15	15.0	1,333	134.0	18.0	88	1,000	1,250
B2015ERU	48	18.0 - 75.0	473	25	24.0	834	84.0	28.0	88	500	2,500
B2016ERU	48	18.0 - 75.0	490	15	±5.0	±2,000	±200.0	±6.2	85	±4,800	1,250
B2017ERU	48	18.0 - 75.0	479	15	±12.0	±833	±84.5	±15.0	87	±800	1,250
B2018ERU	48	18.0 - 75.0	473	15	±15.0	±667	±67.0	±18.0	88	±500	1,250

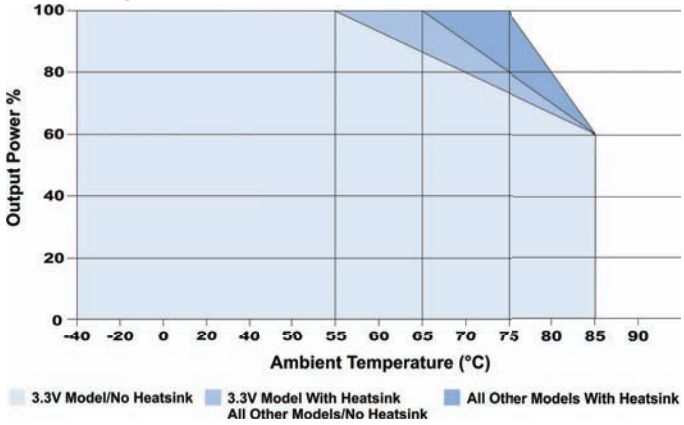
For heatsink option, add suffix "H" to model number (i.e. **B2003ERW-H**)

Notes:

1. Measured with Output 1 at 55% of load while varying output 2 from 10% to 100% load.
2. When measuring output ripple, it's 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 outputs units.
3. These converters are specified for operation without external components. However, in some applications the addition of input/output capacitors will enhance stability and reduce output ripple. Recommended capacitor values are given in the table at right.
4. Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
5. Short circuit protection is provided by a "hiccup" mode circuit.
6. These units should not be operated at no-load. A minimum 10% load is recommended for each output.
7. 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.

Vin (VDC)	Input Capacitor	Vout (VDC)	Output Capacitor
24	100 µF	3.3	470 µF
		5	470 µF
48	100 µF	12	220 µF
		15	220 µF
		24	100 µF
		±5	±470 µF
		±12	±100 µF
		±15	±100 µF

Derating Curve



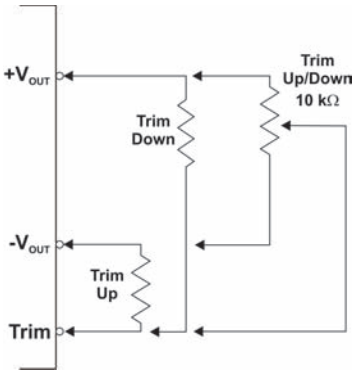
Remote ON/OFF

Parameter	Min	Max	Units
Supply On	3.5	12.0 or Open	VDC
Supply Off	Grnd	1.2	VDC
Control Common	Referenced to Gnd		

Remote ON/OFF Notes:

1. Standby input current is 2 mA max.

External Trim

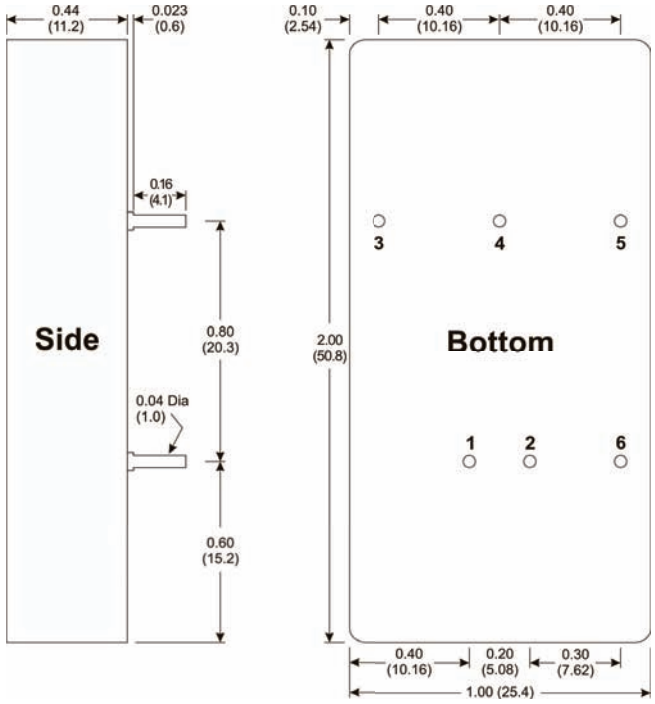


A simple external circuit may be used to adjust the converter output (single output models only). To adjust the output DOWN, connect a 5%, 3W resistor between the plus output pin and the Vout trim pin. To adjust the output UP, connect a 5%, 3W resistor between the minus utput pin and the Vout trim pin.

For 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 range is ±10%.

Mechanical Dimensions



Pin Connections

Pin	Single	Dual	Pin	Single	Dual
1	+Vin	+Vin	4	Trim	Comm.
2	-Vin	-Vin	5	-Vout	-Vout
3	+Vout	+Vout	6	ON/OFF	ON/OFF

Mechanical Notes:

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

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