B4000RW Series

Compact, 1 x 2 Inch 40W, 2:1 Input Range DC/DC Converters

Key Features:

- 40W Output Power
- 2:1 Input Voltage Range
- 1,500 VDC Isolation
- Very High Efficiency
- Compact 1 x 2 Inch Case
- Single & Dual Outputs
- Optional 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 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	π (Pi) Filter (See Note on Page 2)				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±1.0	%
Output Voltage Balance	Dual Output , Balanced Loads			±2.0	%
Line Regulation	Vin = Min to Max			±0.5	%
Load Regulation, See Note 1	Single Output Models			±0.5	%
	Dual Output Models			±1.0	
Ripple & Noise, See Note 2	3.3 & 5.0 Vout Models		100		mV P - P
	12 & 15 Vout Models		150		mV P - P
	Dual Output Models		150		mV P - P
Output Power Protection				150	%
Transient Recovery Time, See Note 3	25% Load Step Change		250		µSec
Transient Response Deviation			±2.0		%
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 Test Voltage	Flash Tested For 1 Sec	1,650			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V			1,500	pF
Switching Frequency			320		kHz

Remote On/Off (See Note 4)

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	EN55022 Class "A"				

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	1.06 Oz (30g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	328			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 Selection Guide

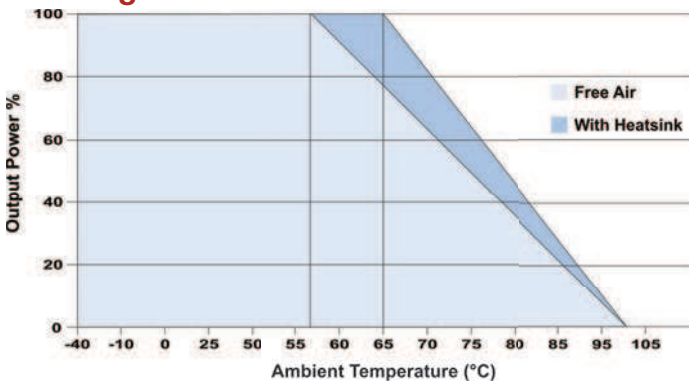
Model Number	Input				Reflected Ripple Current (mA, Typ)	Output			Over Voltage Protection (VDC)	Efficiency (%, Typ)	Capacitive Load (µF Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)			Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load								
B4001RW	12	9.0 - 18.0	2,472	120	50	3.3	8,000.0	0.0	3.9	89	21,000	8,000
B4002RW	12	9.0 - 18.0	3,745	160	50	5.0	8,000.0	0.0	6.2	89	13,600	8,000
B4003RW	12	9.0 - 18.0	3,745	160	50	12.0	3,333.0	0.0	15.0	89	2,360	8,000
B4004RW	12	9.0 - 18.0	3,703	150	50	15.0	2,666.0	0.0	18.0	90	1,510	8,000
B4005RW	12	9.0 - 18.0	3,786	70	50	±12.0	±1,666.0	±145.0	±15.0	88	±1,200	8,000
B4006RW	12	9.0 - 18.0	3,787	60	50	±15.0	±1,333.0	±110.0	±18.0	88	±750	8,000
B4011RW	24	18.0 - 36.0	1,222	75	30	3.3	8,000.0	0.0	3.9	90	21,000	4,000
B4012RW	24	18.0 - 36.0	1,832	50	30	5.0	8,000.0	0.0	6.2	91	13,600	4,000
B4013RW	24	18.0 - 36.0	1,831	85	30	12.0	3,333.0	0.0	15.0	91	2,360	4,000
B4014RW	24	18.0 - 36.0	1,831	75	30	15.0	2,666.0	0.0	18.0	91	1,510	4,000
B4015RW	24	18.0 - 36.0	1,872	50	30	±12.0	±1,666.0	±145.0	±15.0	89	±1,200	4,000
B4016RW	24	18.0 - 36.0	1,872	45	30	±15.0	±1,333.0	±110.0	±18.0	89	±750	4,000
B4021RW	48	36.0 - 75.0	611	40	20	3.3	8,000.0	0.0	3.9	90	21,000	2,000
B4022RW	48	36.0 - 75.0	916	50	20	5.0	8,000.0	0.0	6.2	91	13,600	2,000
B4023RW	48	36.0 - 75.0	906	50	20	12.0	3,333.0	0.0	15.0	92	2,360	2,000
B4024RW	48	36.0 - 75.0	906	50	20	15.0	2,666.0	0.0	18.0	92	1,510	2,000
B4025RW	48	36.0 - 75.0	936	65	20	±12.0	±1,666.0	±145.0	±15.0	89	±1,200	2,000
B4026RW	48	36.0 - 75.0	936	65	20	±15.0	±1,333.0	±110.0	±18.0	89	±750	2,000

For heatsink option, add suffix "H" to model number (i.e. **B4003RW-H**)

Notes:

1. Load regulation is specified for a load change of minimum load to full load.
2. 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.
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 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.
5. 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.
6. Operation at no-load will not damage these units. However, they may not meet all specifications.
7. 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 V_{OUT} 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 V_{OUT} trim pin. The trim pin may be left floating if it is not used. Contact the factroy for more information.
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



Meeting EN55022 "A"

The **B4000RW** series can meet EN55022 Class A with the addition of three external capacitors connected as shown at left. Recommended component values are given in the table below. Capacitor C_1 is an 1812 MLCC and capacitors C2 & C3 are 1808 MLCC.

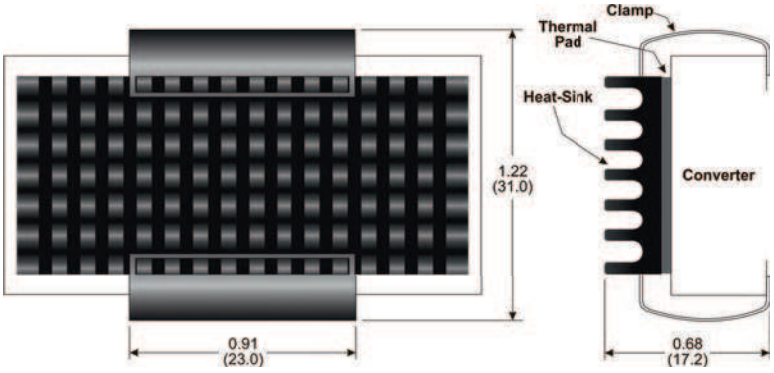
Input	C_1	C_2 & C_3
12 VDC	10 µF/25V	1,000 pF/2kV
24 VDC	4.7 µF/50V	1,000 pF/2kV
48 VDC	2.2 µF/100V	1,000 pF/2kV

Pin Connections

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	ON/OFF	ON/OFF

Pin	Single	Dual
4	+Vout	+Vout
5	-Vout	Comm.
6	Trim	-Vout

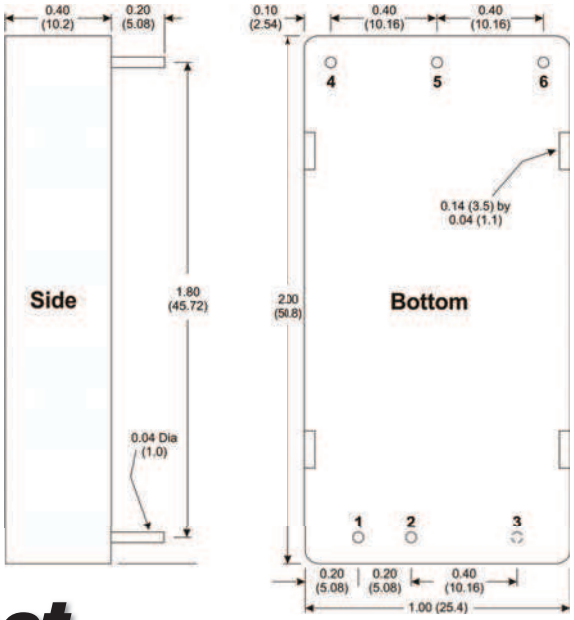
Heatsink Dimensions (Optional)



Heatsink Notes:

- The heatsink is black anodized aluminum.
- Heatsink weight is 0.07 Oz (2.0g)

Mechanical Dimensions



Mechanical Notes:

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

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