

# B1000RW Series

## 10W, Wide Input Range Single & Dual Output DC/DC Converters



### Electrical Specifications

#### Key Features:

- 10W Output Power
- 2:1 Input Range
- 1,500 VDC Isolation
- Meets EN55022 Class A
- Compact DIP Package
- LOW COST!

#### Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Start Voltage	12 VDC Input	8.0	8.5	9.0	VDC
	24 VDC Input	15.0	17.0	18.0	
	48 VDC Input	30.0	33.0	36.0	
Input Filter	$\pi$ (Pi) Filter (Complies with EN55022 Class "A")				
Reverse Polarity Input Current				2.0	A
Short Circuit Input Power				3,500	4,500 mW

#### Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±0.5	±1.0	%
Output Voltage Balance	Dual Output , Balanced Loads		±0.5	±2.0	%
Line Regulation	Vin = Min to Max		±0.1	±0.3	%
Load Regulation	Iout = 10% to 100%		±0.1	±0.5	%
Ripple & Noise (20 MHz) (Note 2)		50	75	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 (Note 3)	25% Load Step Change		150	300	µSec
Transient Response Deviation			±2.0	±4.0	%
Temperature Coefficient			±0.01	±0.02	%/°C
Output Short Circuit	Continuous				

#### 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		150	pF
Switching Frequency		260	300	340	kHz

#### Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+71	°C
Operating Temperature Range	Case	-40		+90	°C
Storage Temperature Range		-40		+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	1.13 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)	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
Internal Power Dissipation	All Models			5,000	mW

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



## Model Selection Guide - B1000RW Series

Model Number	Input				Output			Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)		
	Voltage (VDC)		Current (mA)		Reflected Ripple Current (mA, Typ)	Voltage (VDC)	Current (mA, Max)				
	Nominal	Range	Full-Load	No-Load							
B1001RW	12	9.0 - 18.0	917	30	50	3.3	2,400.0	120.0	72		
B1002RW	12	9.0 - 18.0	1,082	30	50	5.0	2,000.0	100.0	77		
B1003RW	12	9.0 - 18.0	1,038	30	50	12.0	830.0	42.0	80		
B1004RW	12	9.0 - 18.0	1,047	30	50	15.0	670.0	34.0	80		
B1005RW	12	9.0 - 18.0	1,027	30	50	24.0	416.0	21.0	81		
B1006RW	12	9.0 - 18.0	1,068	30	50	$\pm 5.0$	$\pm 1,000.0$	$\pm 50.0$	78		
B1007RW	12	9.0 - 18.0	1,027	30	50	$\pm 12.0$	$\pm 416.0$	$\pm 21.0$	81		
B1008RW	12	9.0 - 18.0	1,041	30	50	$\pm 15.0$	$\pm 333.0$	$\pm 17.0$	80		
B1011RW	24	18.0 - 36.0	434	20	25	3.3	2,400.0	120.0	76		
B1012RW	24	18.0 - 36.0	534	20	25	5.0	2,000.0	100.0	78		
B1013RW	24	18.0 - 36.0	506	20	25	12.0	830.0	42.0	82		
B1014RW	24	18.0 - 36.0	511	20	25	15.0	670.0	34.0	82		
B1015RW	24	18.0 - 36.0	501	20	25	24.0	416.0	21.0	83		
B1016RW	24	18.0 - 36.0	521	20	25	$\pm 5.0$	$\pm 1,000.0$	$\pm 50.0$	80		
B1017RW	24	18.0 - 36.0	507	20	25	$\pm 12.0$	$\pm 416.0$	$\pm 21.0$	82		
B1018RW	24	18.0 - 36.0	507	20	25	$\pm 15.0$	$\pm 333.0$	$\pm 17.0$	82		
B1021RW	48	36.0 - 75.0	217	10	12	3.3	2,400.0	120.0	76		
B1022RW	48	36.0 - 75.0	260	10	12	5.0	2,000.0	100.0	80		
B1023RW	48	36.0 - 75.0	253	10	12	12.0	830.0	42.0	82		
B1024RW	48	36.0 - 75.0	252	10	12	15.0	670.0	34.0	83		
B1025RW	48	36.0 - 75.0	251	10	12	24.0	416.0	21.0	83		
B1026RW	48	36.0 - 75.0	257	10	12	$\pm 5.0$	$\pm 1,000.0$	$\pm 50.0$	81		
B1027RW	48	36.0 - 75.0	251	10	12	$\pm 12.0$	$\pm 416.0$	$\pm 21.0$	83		
B1028RW	48	36.0 - 75.0	251	10	12	$\pm 15.0$	$\pm 333.0$	$\pm 17.0$	83		
									750		

### Notes:

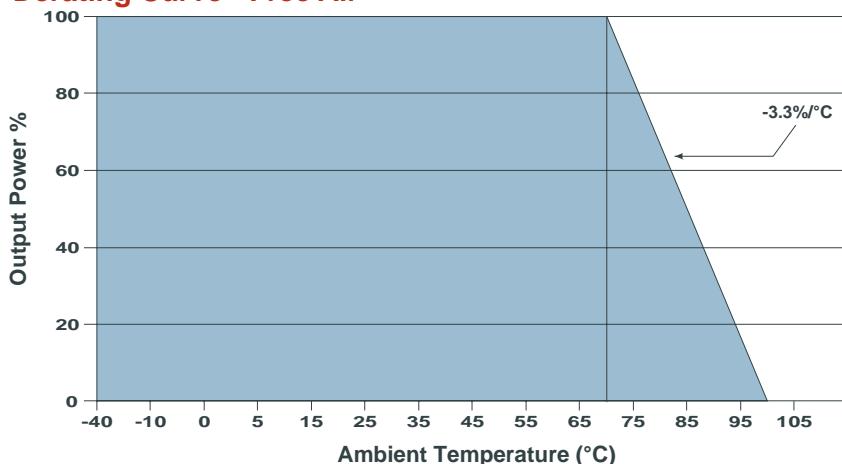
1. Exceeding the absolute maximum ratings of the unit could cause damage. These are not continuous operating ratings.
2. When measuring output ripple, it is recommended that an external 0.47  $\mu$ F ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each 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. Operation at no-load will not damage these units. However, they may not meet all specifications.
5. 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.
6. 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.

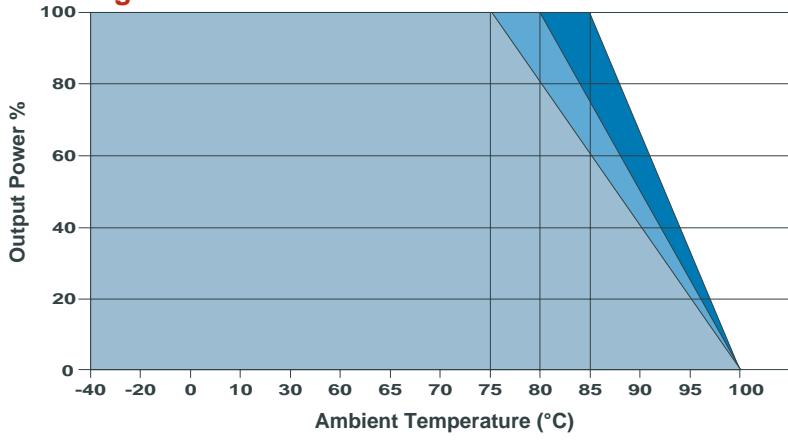
In this case, it is recommended that a low Equivalent Series Resistance (ESR <1.0 $\Omega$  at 100 kHz) capacitor be mounted close to the converter. For 12 VDC input models a 15.0  $\mu$ F should be used; and for 24 & 48 VDC input units a 4.7  $\mu$ F.

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.

### Derating Curve - Free Air



### Derating Curves - Forced Air

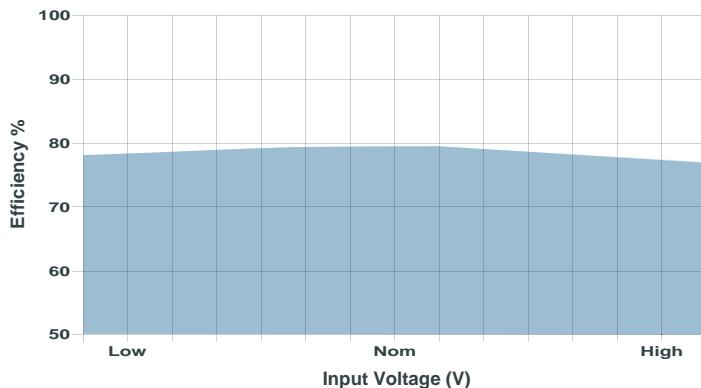


# B1000RW Series

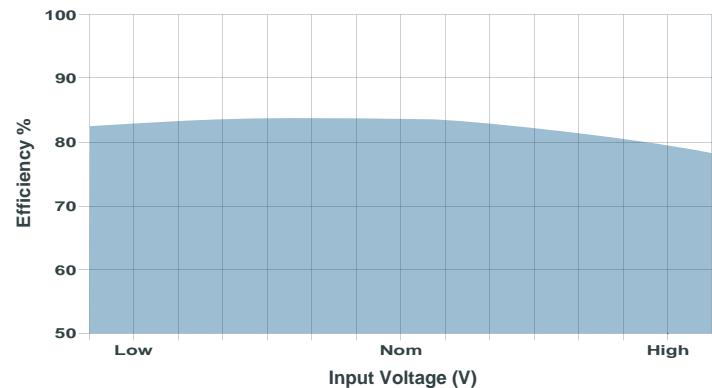


10W, High Performance, Wide Input DC/DC Converters

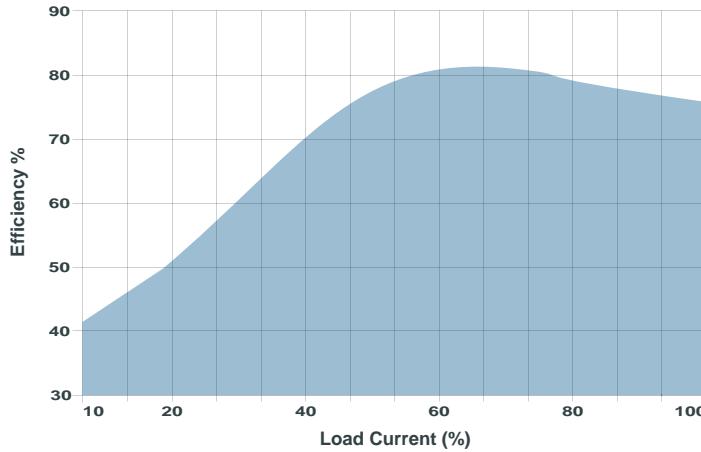
**Efficiency vs Input Voltage (Single Output Models)**



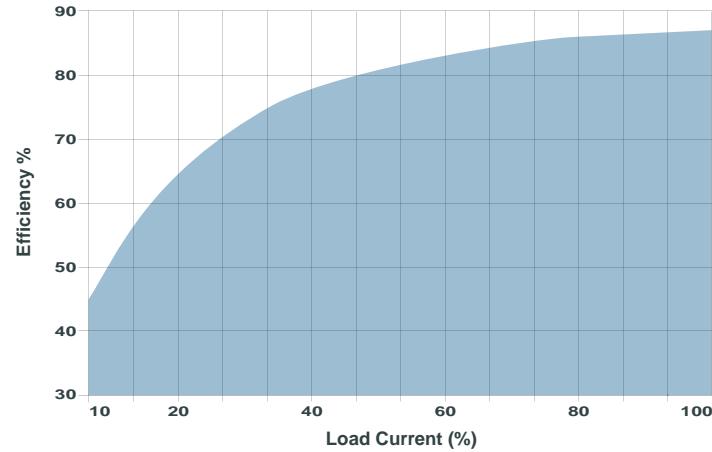
**Efficiency vs Input Voltage (Dual Output Models)**



**Efficiency vs Output Load (Single Output Models)**



**Efficiency vs Output Load (Dual Output Models)**



## Thermal Measurement

Position of air velocity probe and thermocouple

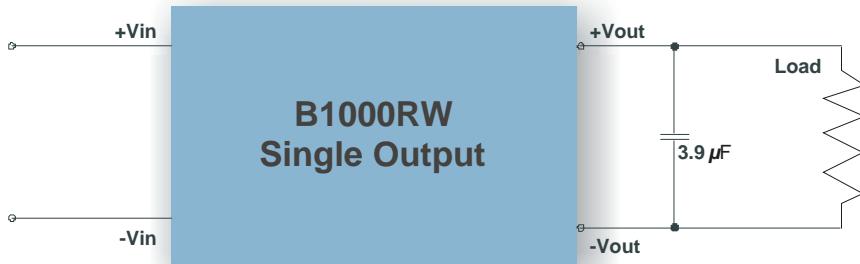


A number of factors affect the thermal performance of the converter, including mounting orientation, component spacing, airflow over the unit, etc. To avoid exceeding the maximum rated temperature of internal components, the case temperature of the converter must be kept below 90°C.

The derating curves given in this datasheet have been derived using a converter operating at full load and nominal input. Temperature measurements have been made as shown above.

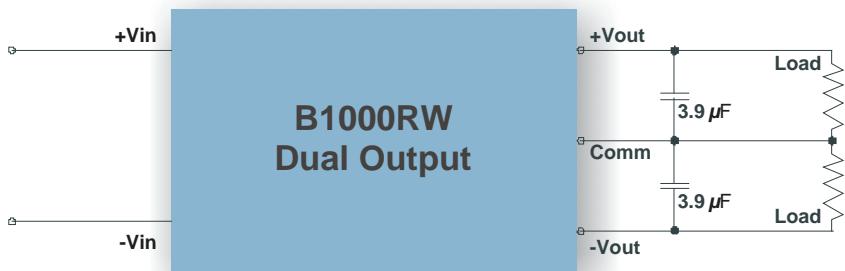


## Output Noise



When using this series in a noise sensitive application, it is recommended that an external capacitor be connected as shown in the drawing at left.

For the **B1000RW**, a low ESR 3.9 μF capacitor connected as close as possible to the load is recommended.



## Capacitive Load

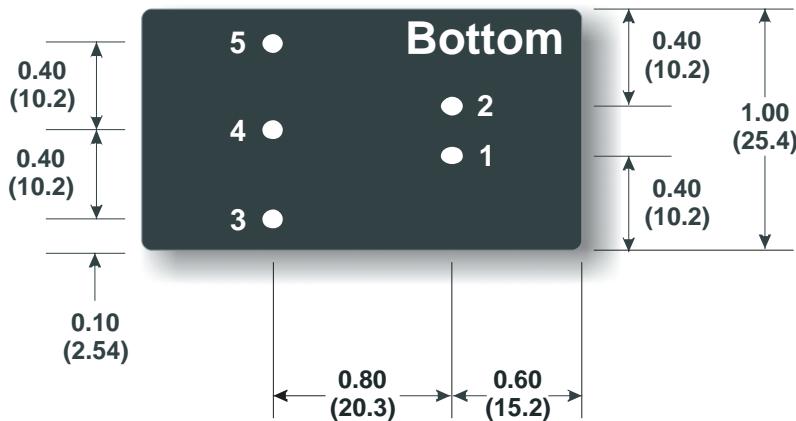
Models (Vout)	3.3V	5V	12V	15V	24V	±5V	±12V	±15V	Units
Max. Capacitive Load	2,200	2,200	2,200	2,200	2,200	±470	±470	±470	μF

Having excessive capacitive load in a power supply application may cause start up problems. If the specified capacitive load is exceeded, the converter may go into current limit on start-up.

### Notes:

1. For dual output units, capacitive load is specified for each output.

## Mechanical Dimensions

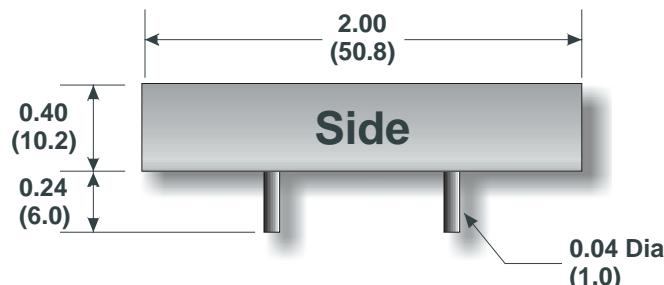


## Pin Connections

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No Pin	Common
5	-Vout	-Vout

### Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.01 (±0.25)
- Leads are gold plated for improved solderability.



## Flammability

The B1000RW converter is encapsulated in a low thermal resistance molding compound that has excellent resistance/electrical characteristics over a wide temperature range or in high humidity environments.

The encapsulant and unit case are both rated to UL 94V-0 flammability specifications.