

**FEATURES**

- High Efficiency up to 88%
- RoHS Directive Compliant
- Fixed Switching Frequency
- Six-Sided Continuous Shield
- Standard 2" x 2" x 0.4" Package
- Options: Negative Remote ON/OFF
- 4:1 Ultra Wide Input Voltage Range
- ISO9001 Certified Manufacturing Facilities
- UL60950-1, EN60950-1, and IEC60950-1 Licensed
- CE Mark Meets 2006/95/EC, 93/68/EEC, and 2004/108/EC

**APPLICATIONS**

- Telecom/Datacom
- Wireless Networks
- Measurement Equipment
- Industry Control Systems
- Semiconductor Equipment

**DESCRIPTION**

The DBW series of DC/DC converters offers 40 Watts of output power in a 2 x 2 x 0.4 inch package. The DBW series has a 4:1 ultra wide input range of 9-36VDC or 18-75VDC. This series also offers single and dual output models. Some features include 1600VDC isolation, positive or negative remote on/off, and six-sided shielding. All models are short circuit, over voltage, over load, and over temperature protected. Heatsinks are also available, please call factory for ordering details.

**SPECIFICATIONS: DBW Series**

*All specifications apply @ 25°C ambient unless otherwise noted*

**INPUT SPECIFICATIONS**

Input Voltage Range.....	24V nominal input .....	9 - 36VDC
	48V nominal input .....	18 - 75VDC
Input Filter.....		Pi Type
Input Surge Voltage (100ms max).....	24V input.....	50VDC
	48V input.....	100VDC
Input Reflected Ripple Current (nominal Vin and FL).....		20mA p-p
Start Up Time (nominal Vin and constant resistive load)		
Power Up.....		20ms, max.
Remote ON/OFF .....		20ms, max.
Start-Up Voltage.....	24V nominal input .....	9VDC
	48V nominal input .....	18VDC
Shutdown Voltage.....	24V nominal input .....	8VDC
	48V nominal input .....	16VDC
Remote ON/OFF ( <i>See Note 10</i> )		
Positive Logic .....	DC-DC ON .....	Open or 3V < Vr < 12V
	DC-DC OFF .....	Short or 0V < Vr < 1.2V
Negative Logic.....	DC-DC ON .....	Short or 0V < Vr < 1.2V
	DC-DC OFF .....	Open or 3V < Vr < 12V
Input Current of Remote Control Pin (nominal Vin).....		-0.5mA~+0.5mA
Remote Off State Input Current.....	24V nominal input.....	10mA
	48V nominal input.....	5mA

**OUTPUT SPECIFICATIONS**

Output Voltage .....	see table
Voltage Accuracy (nom Vin and full load).....	±1%
Voltage Adjustability ( <i>See Note 7</i> ).....	±10%
Output Current .....	see table
Output Power .....	40 watts, max.
Line Regulation (LL to HL at FL).....	±0.2%
Load Regulation ( <i>See Note 8</i> ).....	Single Output..... ±0.5% (min. load to full load) Dual Output..... ±1%
Load Cross Regulation ( <i>See Note 9</i> ).....	Dual Output..... ±5%
Minimum Load ( <i>See Note 6</i> ).....	see table
Ripple/Noise ( <i>See Note 4</i> ).....	see table
Transient Response Recovery Time.....	250µs (25% load step change)

**PROTECTION SPECIFICATIONS**

Over Voltage Protection .....	3.3V Output .....	3.9V
(Zener diode clamp)	5V Output .....	6.2V
	12V Output .....	15V
	15V Output .....	18V
	±12V Output .....	±15V
	±15V Output .....	±18V

Over Load Protection (% of FL at nominal input).....	150%, max.
Short Circuit Protection .....	Hiccup, automatic recovery
Over Temperature Protection .....	110°C, typ.

**GENERAL SPECIFICATIONS**

Efficiency .....	see table
Switching Frequency .....	300KHz, typ.
Isolation Voltage	
Input to Output .....	1600VDC, min.
Input to Case .....	1600VDC, min.
Output to Case .....	1600VDC, min.
Case Grounding.....	connect case to -Vin with decoupling Y cap
Isolation Resistance .....	10 <sup>9</sup> Ω, min.
Isolation Capacitance .....	2500pF, max.

**ENVIRONMENTAL SPECIFICATIONS**

Operating Ambient Temperature .....	-40°C to +50°C (without derating) +50°C to +105°C (with derating)
Storage Temperature .....	-55°C ~ +125°C
Maximum Case Temperature .....	+105°C
Relative Humidity .....	5% to 95% RH
Temperature Coefficient .....	±0.02% / °C, max.
Thermal Impedance ( <i>See Note 11</i> )	
Without Heat-Sink .....	9.2°C / Watt
With Heat-Sink .....	7.6°C / Watt
Thermal Shock .....	MIL-STD-810F
Vibration .....	MIL-STD-810F
MTBF ( <i>See Note 11</i> ) .....	Bellcore TR-NWT-000332..... 1.105 x 10 <sup>6</sup> hrs MIL-STD-217F..... 1.511 x 10 <sup>5</sup> hrs

**SPECIFICATIONS (CONTINUED)***All specifications apply @ 25°C ambient unless otherwise noted***PHYSICAL SPECIFICATIONS**

Weight.....	2.11oz (60g)
Dimensions .....	2.00 x 2.00 x 0.40 inches (50.8 x 50.8 x 10.2 mm)
Case Material.....	Nickel-coated copper
Base Material.....	FR4 PCB
Potting material.....	Epoxy (UL94-V0)
Shielding.....	six – sided

**SAFETY & EMC**

Approvals and Standards .....	IEC60950-1, UL60950-1 (See Note 14), EN60950-1
EMI ( <i>See Note 12</i> ) .....	EN55022.....Class A
ESD .....	EN61000-4-2.....Air ±8KV Contact ±6KV
Radiated Immunity .....	EN61000-4-3 .....10 V/m Perf. Criteria A
Fast Transient ( <i>See Note 13</i> ) .....	EN61000-4-4 ..... ±2KV Perf. Criteria B
Surge ( <i>See Note 13</i> ) .....	EN61000-4-5 .....±1KV Perf. Criteria A
Conducted Immunity .....	EN61000-4-6 .....10 Vrms Perf. Criteria A

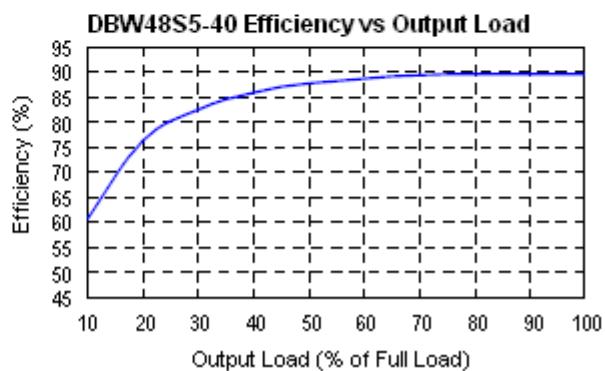
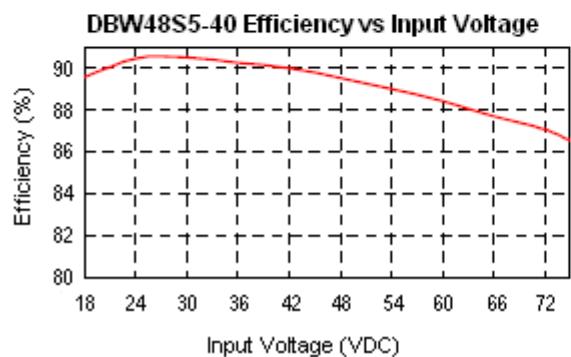
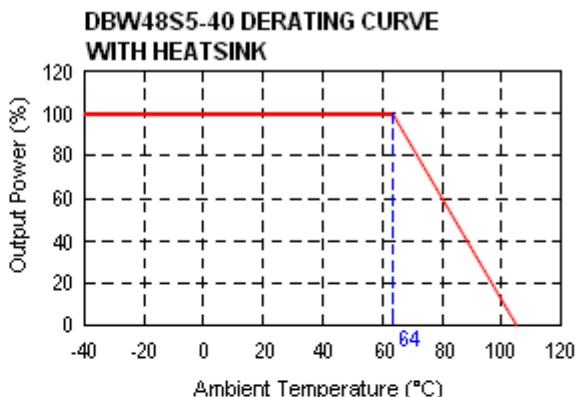
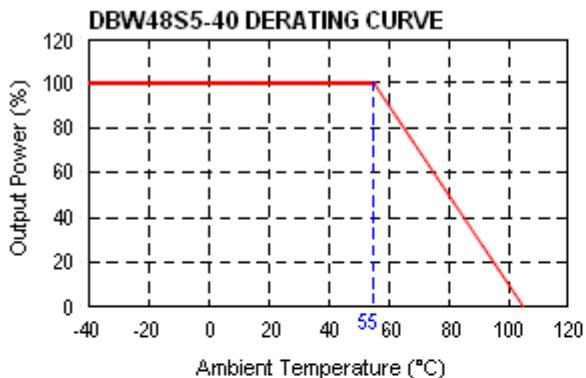
*Due to advances in technology, specifications subject to change without notice***MODEL SELECTION CHART**

Model Number	Input Range	Output Voltage	Output Current		Output <sup>(4)</sup> Ripple & Noise	Input Current		Efficiency <sup>(4)</sup>	Max Capacitive Load <sup>(5)</sup>
			Min. Load <sup>(6)</sup>	Full Load		No Load <sup>(3)</sup>	Full Load <sup>(2)</sup>		
DBW24S3.3-33	24VDC (9 – 36 VDC)	3.3 VDC	0mA	10,000mA	50mVp-p	80mA	1677mA	86%	25,750µF
DBW24S5-40		5 VDC	0mA	8000mA	50mVp-p	100mA	2008mA	87%	13,600µF
DBW24S12-40		12 VDC	50mA	3333mA	75mVp-p	50mA	2008mA	87%	2360µF
DBW24S15-40		15 VDC	50mA	2666mA	75mVp-p	50mA	2008mA	87%	1510µF
DBW24D12-40		±12 VDC	±65mA	±1667mA	120mVp-p	60mA	2032mA	86%	±1200µF
DBW24D15-40		±15 VDC	±50mA	±1333mA	150mVp-p	70mA	2032mA	86%	±750µF
DBW48S3.3-33	48VDC (18 – 75 VDC)	3.3 VDC	0mA	10,000mA	50mVp-p	60mA	838mA	86%	25,750µF
DBW48S5-40		5 VDC	0mA	8000mA	50mVp-p	65mA	992mA	88%	13,600µF
DBW48S12-40		12 VDC	50mA	3333mA	75mVp-p	30mA	1004mA	87%	2360µF
DBW48S15-40		15 VDC	50mA	2666mA	75mVp-p	30mA	1004mA	87%	1510µF
DBW48D12-40		±12 VDC	±65mA	±1667mA	120mVp-p	30mA	1016mA	86%	±1200µF
DBW48D15-40		±15 VDC	±60mA	±1333mA	150mVp-p	30mA	1016mA	86%	±750µF

**NOTES**

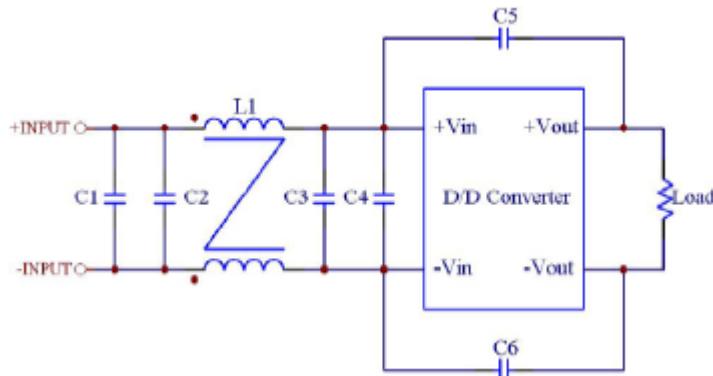
1. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C.  
MIL-STD-217F Notice2 @ Ta=25°C, Full Load (Ground, Benign, controlled environment).
2. Maximum value at nominal input voltage and full load.
3. Typical Value at nominal input voltage and no load.
4. Typical Value at nominal input voltage and full load.
5. Test by minimum Vin and constant resistive load.
6. The output requires a minimum loading on the output to maintain specified regulations. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
7. For single output models: maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used the +SENSE should be connected to the +OUTPUT and the -SENSE should be connected to the -OUTPUT.
8. Load regulation for dual output: Minimum load to 100% load balanced on all outputs.
9. Cross regulation for dual output: asymmetrical load 25% / 100% full load.
10. The ON/OFF control function: There are positive (standard) and negative logic (option). The pin voltage is referenced to negative input. To order negative logic ON/OFF control add the suffix "R" to the part number (Ex: DBW48S5-40R).
11. Heat sink is optional. Please call factory for ordering details.
12. The DBW series can meet EN55022 Class A with an external capacitor in parallel with the input pins.  
Recommended: 24Vin: N/A.  
48Vin: 2.2µF/100V \* 2 PCS 1812 MLCC.
13. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor suggested is Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.
14. This product is Listed to applicable standards and requirements by UL.

## DERATING CURVES & EFFICIENCY GRAPHS



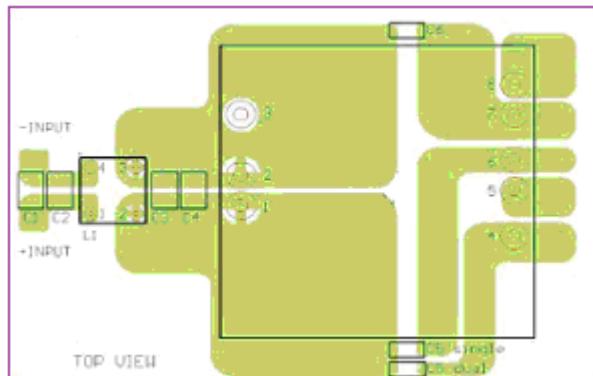
**Figure 1**

## **Recommended Filter for EN55022 Class B Compliance**



**Figure 2**

## Recommended EN55022 Class B Filter Circuit Layout

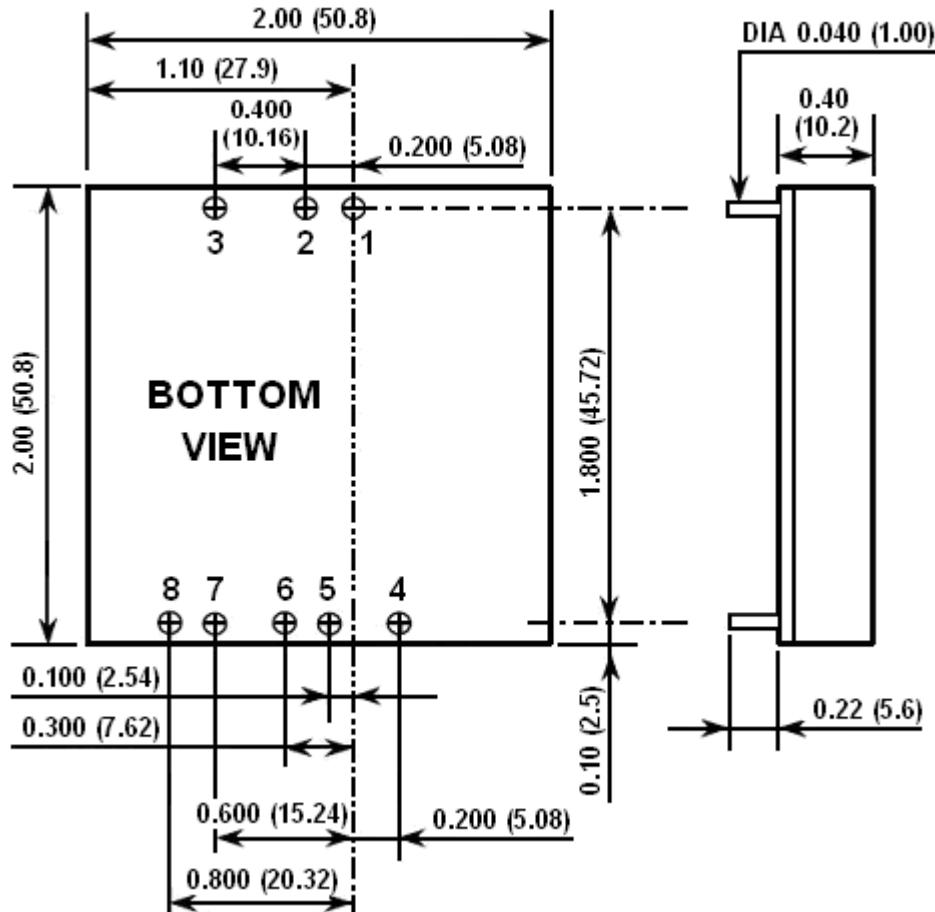


The components used in the above figure are as follows:

	C1	C2	C3	C4	C5 & C6	L1
DBW24Sxx-xx	4.7µF/50V 1812MLCC	N/A	4.7µF/50V 1812MLCC	N/A	1000pF/2KV MLCC	450µH Common Choke PMT-048
DBW48Sxx-xx	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	2.2µF/100V 1812 MLCC	1000pF/2KV MLCC	830µH Common Choke PMT-053

**MECHANICAL DRAWING**

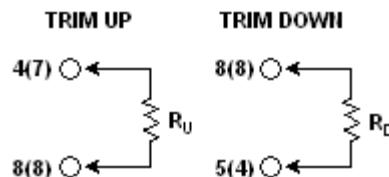
Unit: inches (mm)

**Notes**

1. Tolerance:  $X.XX \pm 0.02$  ( $X.X \pm 0.5$ )  
 $X.XXX \pm 0.01$  ( $X.XX \pm 0.25$ )
2. Pin pitch tolerance:  $\pm 0.01$  (0.25)
3. Pin dimension tolerance:  $\pm 0.004$  (0.1)

**EXTERNAL OUTPUT TRIMMING**

Output can be externally trimmed by using the method shown below.  
( ) for Dual output trim





**Wall Industries, Inc.**

Rev D

DBW Series  
Single and Dual Outputs  
40 Watt DC/DC Converter  
4:1 Ultra Wide Input Voltage Range

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## COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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