

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 (See Note 7)	±10%
Output Current	see table
Output Power	40 watts, max.
Line Regulation (LL to HL at FL)	±0.2%
Load Regulation (See Note 8)	Single Output..... ±0.5%
(min. load to full load)	Dual Output ±1%
Load Cross Regulation (See Note 9)	Dual Output ±5%
Minimum Load (See Note 6)	see table
Ripple/Noise (See Note 4)	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 ⁹ 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 1</i>)	Bellcore TR-NWT-000332	1.105 x 10 ⁶ hrs
	MIL-STD-217F	1.511 x 10 ⁵ 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, EN60950-1
EMI (*See Note 12*) EN55022 Class A
ESD EN61000-4-2 Air ±8KV Perf. Criteria A
Contact ±6KV
Radiated Immunity EN61000-4-3 10 V/m Perf. Criteria A
Fast Transient (*See Note 13*) EN61000-4-4 ±2KV Perf. Criteria B
Surge (*See Note 13*) 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 ⁽⁴⁾ Ripple & Noise	Input Current		Efficiency ⁽⁴⁾	Max Capacitive Load ⁽⁵⁾
			Min. Load ⁽⁶⁾	Full Load		No Load ⁽³⁾	Full Load ⁽²⁾		
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

- 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).
- Maximum value at nominal input voltage and full load.
- Typical Value at nominal input voltage and no load.
- Typical Value at nominal input voltage and full load.
- Test by minimum Vin and constant resistive load.
- 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.
- 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.
- Load regulation for dual output: Minimum load to 100% load balanced on all outputs.
- Cross regulation for dual output: asymmetrical load 25% / 100% full load.
- 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).
- Heat sink is optional. Please call factory for ordering details.
- 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.
- 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.

DERATING CURVES & EFFICIENCY GRAPHS

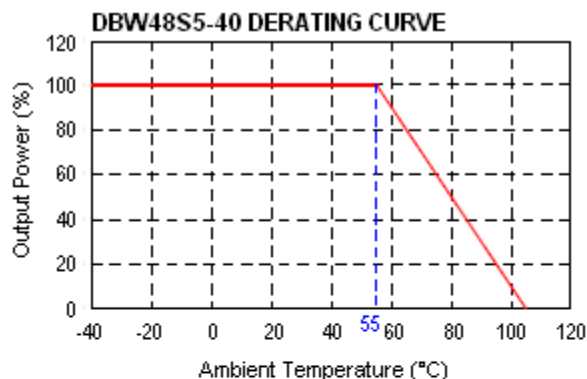
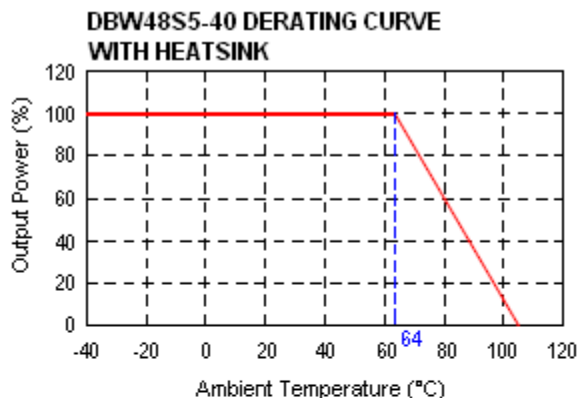
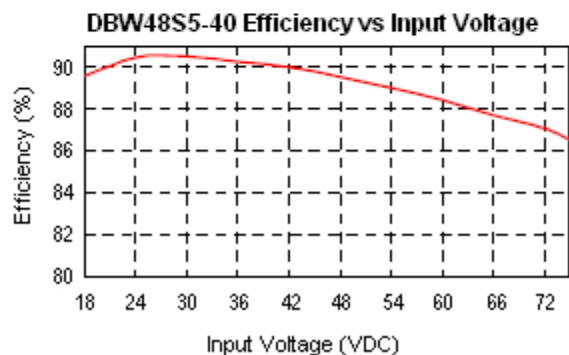
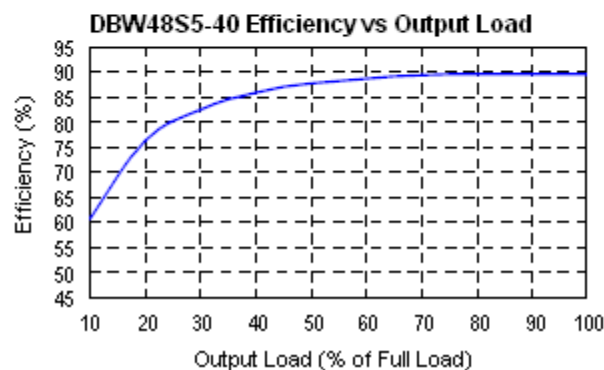
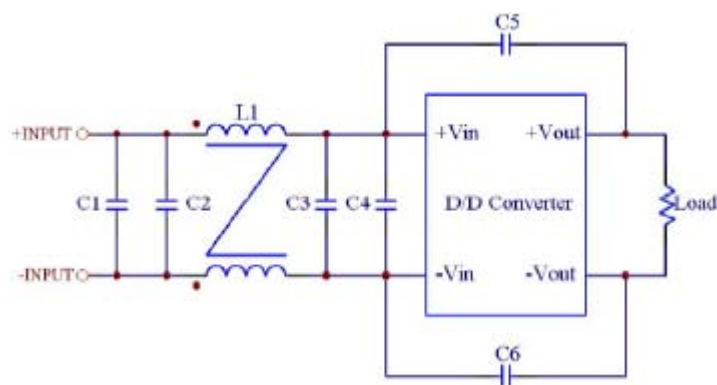


Figure 1

Recommended Filter for EN55022 Class B Compliance

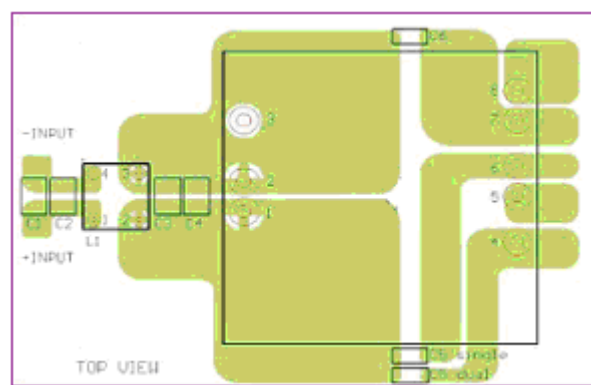


The components used in the above figure are as follows:

	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

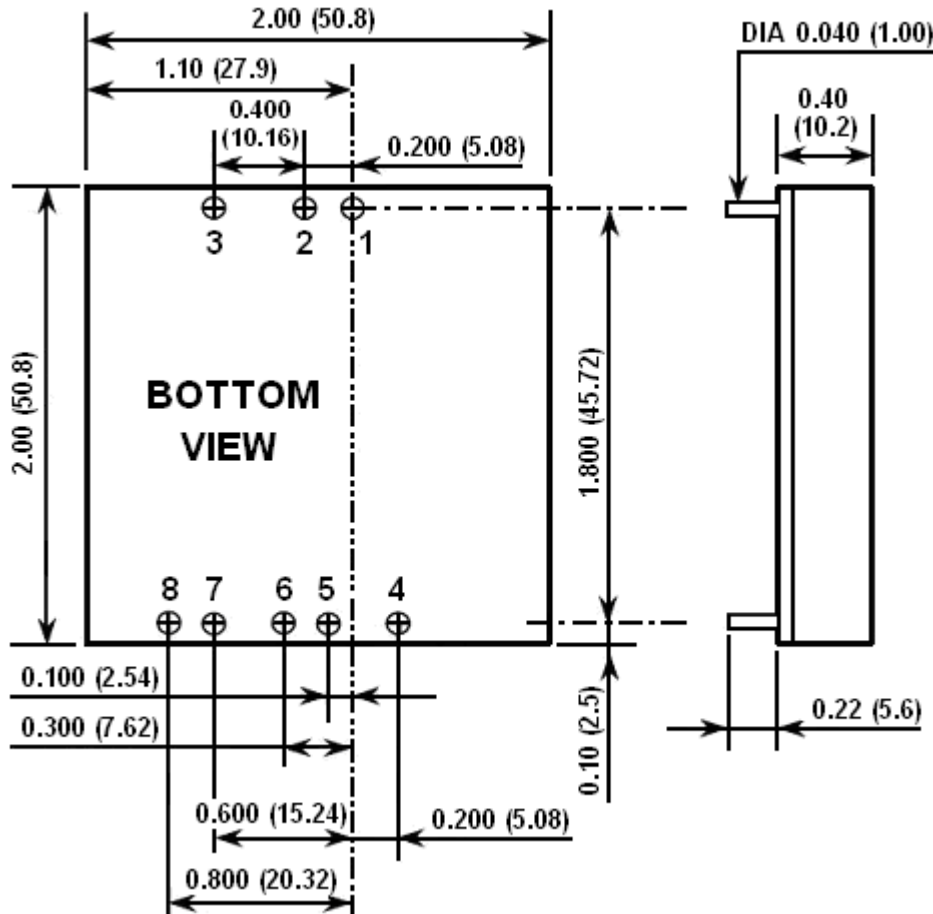
Figure 2

Recommended EN55022 Class B Filter Circuit Layout



MECHANICAL DRAWING

Unit: inches (mm)



PIN CONNECTION		
PIN	SINGLE	DUAL
1	+Input	+Input
2	-Input	-Input
3	CTRL	CTRL
4	-Sense	+Output
5	+Sense	COM
6	+Output	COM
7	-Output	-Output
8	Trim	Trim

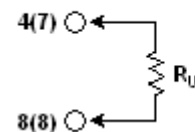
Notes

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: ± 0.01 (0.25)
3. Pin dimension tolerance: ± 0.004 (0.1)

EXTERNAL OUTPUT TRIMMING

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

TRIM UP



TRIM DOWN

