

FEATURES

- High Efficiency up to 90%
- Fixed Switching Frequency
- Six-Sided Continuous Shield
- 2:1 Wide Input Voltage Range
- 40 Watts Maximum Output power
- Standard 2.02" x 2.02" x 0.4" Package
- International Safety Standard Approval
- Single, Dual, Dual Positive (Total Output Current 8A), and Triple Outputs Available



UL E155800
TUV
CB
CE MARK



SPECIFICATIONS: DB Series

All specifications apply @ 25°C ambient unless otherwise noted

INPUT SPECIFICATIONS

Input Voltage Range	12V nominal input	9-18VDC
	24V nominal input	18-36VDC
	48V nominal input	36-75VDC
Under Voltage Lockout		
12V nominal input.....	DC-DC ON	9VDC
	DC-DC OFF	8VDC
24V nominal input.....	DC-DC ON	17.8VDC
	DC-DC OFF	16VDC
48V nominal input.....	DC-DC ON	36VDC
	DC-DC OFF	34VDC
Input Filter		L-C Type
Input Voltage Variation.....	dv/dt	5V/ms max
	(Complies with ETS300 132 part 4.4)	
Input Surge Voltage (100ms max)	12V input	36VDC
	24V input	50VDC
	48V input	100VDC
Input Reflected Ripple Current (See Note 6)		40mA _{p-p}
	(nominal Vin and full load)	
Start Up Time (nominal Vin and constant resistive load)		
Power Up.....		25ms typ.
Remote ON/OFF		25ms typ.
Remote ON/OFF (See Note 7)		
DC-DC ON	Open or 3.5V < Vr < 12V	
DC-DC OFF	Short or 0V < Vr < 1.2V	
Remote Off Input Current (nominal Vin)		2.5mA

OUTPUT SPECIFICATIONS

Output Voltage		see table
Voltage Accuracy (nom Vin and full load).....	Single & Dual.....	±1%
	Triple (main)	±1%
	(auxiliary)	±5%
Voltage Adjustability (See Note 1)		±10%
	(Single & Dual Outputs only-not including Dual positive & triple)	
Output Current		see table
Output Power		40 watts max.
Line Regulation (LL to HL at FL).....	Single & Dual.....	±0.5%
	Triple (main)	±1%
	Triple (auxiliary)	±5%
Load Regulation (See Note 3)	Single.....	±0.5%
	Dual	±1%
	Triple (main)	±2%
	(auxiliary)	±5%
Load Cross Regulation (See Note 4)	Triple (main)	±1%
	Dual/Triple (auxiliary).....	±5%

OUTPUT SPECIFICATIONS (CONTINUED)

Minimum Load (See Note 2).....	Single & Dual Positive.....	0%
	Dual & Triple	10% of FL
Ripple/Noise (See Note 5).....		see table
	(20MHz -Measured with a 104pF/50V MLCC)	
Transient Response Recovery Time		250us
	(25% load step change)	

PROTECTION SPECIFICATIONS

Over Voltage Protection	1.5V Output.....	3.9V
	(Zener diode clamp)	
	1.8V Output.....	3.9V
	2.5V Output.....	3.9V
	3.3V Output.....	3.9V
	5V Output.....	6.2V
	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		115°C typ.

GENERAL SPECIFICATIONS

Efficiency		see table
Switching Frequency (See Note 8).....		300KHz typ.
Isolation Voltage (Input to Output).....		1600VDC min.
Isolation Voltage (Input/Output to Case)		1600VDC min.
Isolation Resistance		10 ⁹ ohms min.
Isolation Capacitance		1000pF max.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature		-40°C to +85°C (with derating)
Storage Temperature		-55°C ~ +105°C
Maximum Case Temperature		+100°C
Relative Humidity.....		5% to 95% RH
Temperature Coefficient		±0.02% / °C max.
Thermal Impedance (See Note 10)		
Natural Convection		9.2°C / Watt
Heat-Sink with 20LFM		7.6°C/Watt
Heat-Sink with 500LFM		2.8°C/Watt
Thermal Shock		MIL-STD-810D
Vibration		10~55Hz, 10G, 30 minutes along X, Y, and Z
MTBF (See Note 9)		1.398 x 10 ⁶ hrs

SPECIFICATIONS (CONTINUED)

All specifications apply @ 25°C ambient unless otherwise noted

PHYSICAL SPECIFICATIONS

Weight.....	60g (2.11 oz)
Dimensions	2.02 x 2.02 x 0.40 inches (51.3 x 51.3 x 10.2 mm)
Case Material.....	Nickel-coated copper
Base Material.....	Non-conductive black FR4
Potting material.....	Epoxy (UL94-V0)
Shielding	six – sided

SAFETY & EMC (See Note 11)

Approvals and Standards	IEC60950-1, UL60950-1, EN60950-1
Conducted Emissions.....	EN55022 Class A
Radiated Emissions.....	EN55022 Class A
ESD	EN61000-4-2..... Perf. Criteria B
Radiated Immunity.....	EN61000-4-3..... Perf. Criteria A
Fast Transient.....	EN61000-4-4..... Perf. Criteria B
Surge.....	EN61000-4-5..... Perf. Criteria B
Conducted Immunity.....	EN61000-4-6..... Perf. Criteria A

Due to advances in technology, specifications subject to change without notice

OUTPUT VOLTAGE / CURRENT RATING CHART

Model Number	Input Range	Output Voltage	Output Current	Output Ripple & Noise	Input Current ⁽¹³⁾	Efficiency ⁽¹⁴⁾	Max Capacitive Load ⁽¹⁵⁾
DB12S1.5-12	12VDC (9 – 18 VDC)	1.5 VDC	8000mA	50mVp-p	1250mA	84%	45000µF
DB12S1.8-14		1.8 VDC	8000mA	50mVp-p	1538mA	82%	37700µF
DB12S2.5-20		2.5 VDC	8000mA	50mVp-p	2083mA	84%	27000µF
DB12S3.3-26		3.3 VDC	8000mA	50mVp-p	2683mA	86%	21000µF
DB12S5-40		5 VDC	8000mA	50mVp-p	4065mA	86%	13600µF
DB12S12-40		12 VDC	3333mA	75mVp-p	4065mA	86%	2360µF
DB12S15-40		15 VDC	2666mA	75mVp-p	4015mA	87%	1510µF
DB12D12-40		±12 VDC	±1800mA	120mVp-p	4444mA	85%	±1200µF
DB12D15-40		±15 VDC	±1400mA	150mVp-p	4321mA	85%	±750µF
DB12D3.3-5-33		3.3 / 5 VDC	4A / 4A (total 8A) ⁽¹²⁾	100mVp-p	3416mA	85%	11000 / 6800µF
DB12T3.3-12-31		3.3 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	3063mA	84%	13000 / ±330µF
DB12T3.3-15-31		3.3 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	3000mA	84%	13000 / ±110µF
DB12T5-12-40		5 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	4024mA	86%	6800 / ±330µF
DB12T5-15-40		5 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	3963mA	86%	6800 / ±110µF
DB24S1.5-12		24VDC (18 – 36 VDC)	1.5 VDC	8000mA	50mVp-p	649mA	81%
DB24S1.8-14	1.8 VDC		8000mA	50mVp-p	759mA	83%	37700µF
DB24S2.5-20	2.5 VDC		8000mA	50mVp-p	1016mA	86%	27000µF
DB24S3.3-26	3.3 VDC		8000mA	50mVp-p	1325mA	87%	21000µF
DB24S5-40	5 VDC		8000mA	50mVp-p	1961mA	89%	13600µF
DB24S12-40	12 VDC		3333mA	75mVp-p	2048mA	88%	2360µF
DB24S15-40	15 VDC		2666mA	75mVp-p	1985mA	89%	1510µF
DB24D12-40	±12 VDC		±1800mA	120mVp-p	2169mA	87%	±1200µF
DB24D15-40	±15 VDC		±1400mA	150mVp-p	2108mA	87%	±750µF
DB24D3.3-5-33	3.3 / 5 VDC		4A / 4A (total 8A) ⁽¹²⁾	100mVp-p	1689mA	86%	11000 / 6800µF
DB24T3.3-12-31	3.3 / ±12 VDC		6000mA / ±400mA	50 / 75mVp-p	1512mA	85%	13000 / ±330µF
DB24T3.3-15-31	3.3 / ±15 VDC		6000mA / ±300mA	50 / 75mVp-p	1481mA	85%	13000 / ±110µF
DB24T5-12-40	5 / ±12 VDC		6000mA / ±400mA	50 / 75mVp-p	1989mA	87%	6800 / ±330µF
DB24T5-15-40	5 / ±15 VDC		6000mA / ±300mA	50 / 75mVp-p	1958mA	87%	6800 / ±110µF
DB48S1.5-12	48VDC (36 – 75 VDC)		1.5 VDC	8000mA	50mVp-p	321mA	82%
DB48S1.8-14		1.8 VDC	8000mA	50mVp-p	375mA	84%	37700µF
DB48S2.5-20		2.5 VDC	8000mA	50mVp-p	508mA	86%	27000µF
DB48S3.3-26		3.3 VDC	8000mA	50mVp-p	655mA	88%	21000µF
DB48S5-40		5 VDC	8000mA	50mVp-p	969mA	90%	13600µF
DB48S12-40		12 VDC	3333mA	75mVp-p	1000mA	89%	2360µF
DB48S15-40		15 VDC	2666mA	75mVp-p	992mA	89%	1510µF
DB48D12-40		±12 VDC	±1800mA	120mVp-p	1084mA	87%	±1200µF
DB48D15-40		±15 VDC	±1400mA	150mVp-p	1054mA	87%	±750µF
DB48D3.3-5-33		3.3 / 5 VDC	4A / 4A (total 8A) ⁽¹²⁾	100mVp-p	823mA	88%	11000 / 6800µF
DB48T3.3-12-31		3.3 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	747mA	86%	13000 / ±330µF
DB48T3.3-15-31		3.3 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	732mA	86%	13000 / ±110µF
DB48T5-12-40		5 / ±12 VDC	6000mA / ±400mA	50 / 75mVp-p	982mA	88%	6800 / ±330µF
DB48T5-15-40		5 / ±15 VDC	6000mA / ±300mA	50 / 75mVp-p	967mA	88%	6800 / ±110µF

NOTES

- For single output: Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Vsense should be connected to its corresponding +OUTPUT and likewise the -Vsense should be connected to its corresponding -OUTPUT.
- Dual and triple outputs require a minimum 10% loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specifications.
- Load regulation for triple output:
Main output (V1): 10% to 100% with 10% to 100% balanced on auxiliaries.
Auxiliary outputs (V2 and V3): 10% to 100% balanced on all outputs.
- Cross regulation for dual output: asymmetrical load 25% / 100% FL
Cross regulation for triple output:
Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%.
Auxiliary outputs (V2 and V3): main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25% auxiliary 25%, other auxiliary 25% to 100%.
- The models of DBXXD3.3-5-33 are specified with 1μF ceramic output capacitors.
- Please add an external filter at converter input terminals when measuring input reflected ripple, as in Figure 1.
L: Simulated source impedance of 12μH. C: Nippon chemi-con KMF series, 220μF/100V
- The ON/OFF control pin voltage is referenced to the negative input.
- Switching frequency for dual outputs: master (5Vo) 300KHz slave (3.3Vo) 500KHz
- BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment).
- Heat sink is optional. Please call factory for ordering details.
- An external filter capacitor is required for EMC testing. The capacitor should be capable of handling 1A ripple current for 12V/24V/48V models. We suggest: Nippon chemi-con KMF series, 220μF/100V, ESR 90mΩ.
- Any condition of dual output (3.3V / 5V) rated lout current, not to exceed 8A of total output current.
- Maximum value at nominal input voltage and full load.
- Typical value at nominal input voltage and full load.
- Test at minimum Vin and constant resistive load.

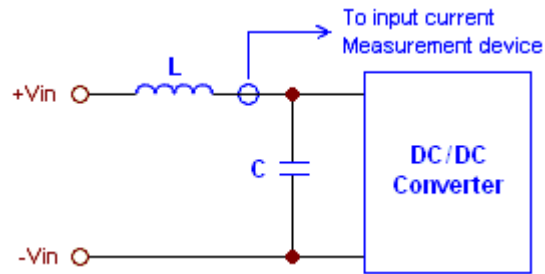
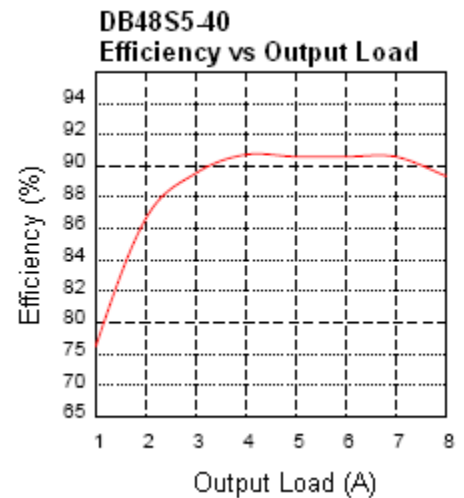
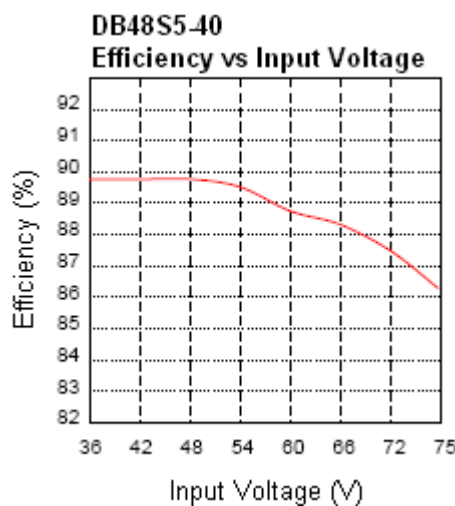
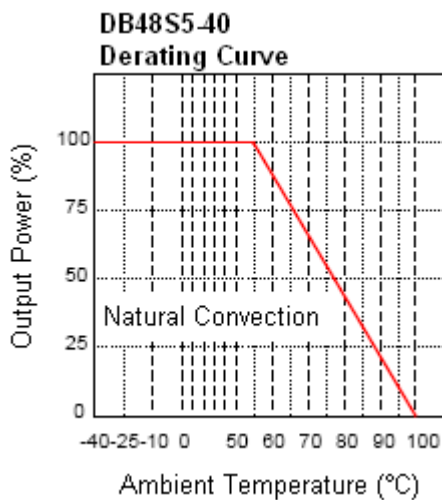
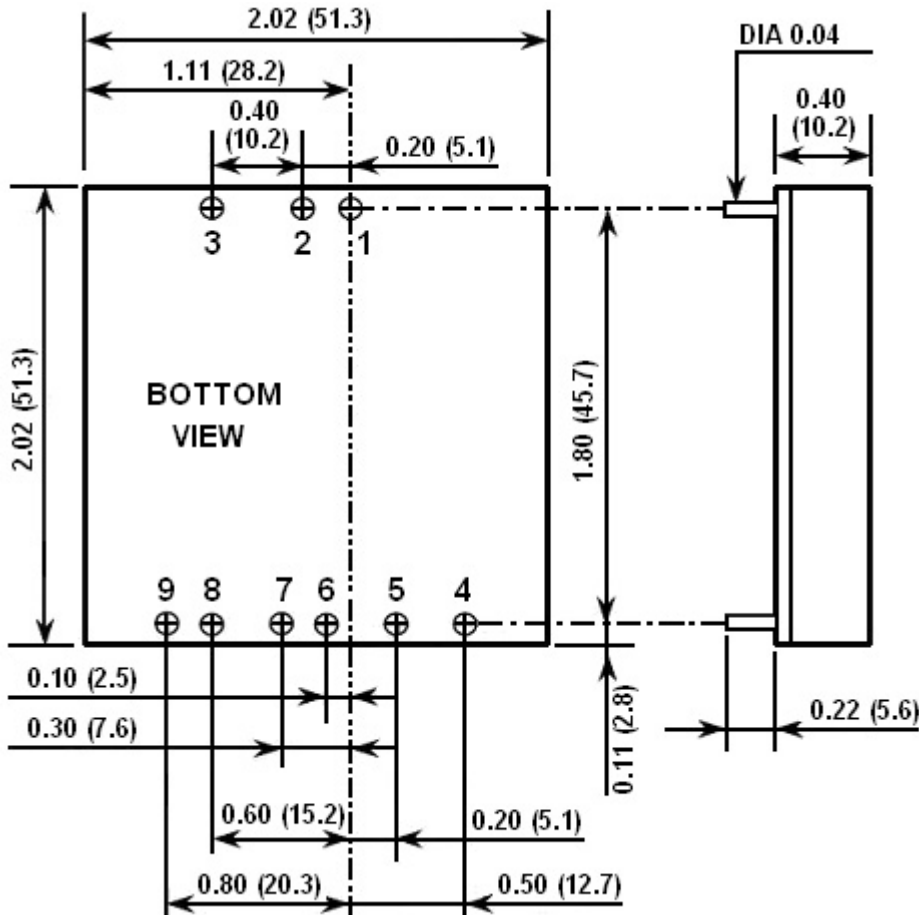


Figure 1

DERATING CURVES & EFFICIENCY GRAPHS



MECHANICAL DRAWING



- All dimensions in inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.014 (0.35)

PIN CONNECTION				
PIN	SINGLE	DUAL	DUAL POSITIVE	TRIPLE
1	+Input	+Input	+Input	+Input
2	-Input	-Input	-Input	-Input
3	CTRL	CTRL	CTRL	CTRL
4	NC	No Pin	3.3V	+AUX
5	-Sense (Note 1)	+Output	3.3V RTN (Com)	Com
6	+Sense (Note 1)	Com	NC	-AUX
7	+Output	Com	NC	+Output
8	-Output	-Output	5V	-Output (Com)
9	Trim	Trim	5V RTN (Com)	NC

