



Wall Industries, Inc.

DB Series
2:1 Input Voltage Range
40 Watt DC/DC Converter
Single, Dual, and Triple Outputs

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 |



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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.

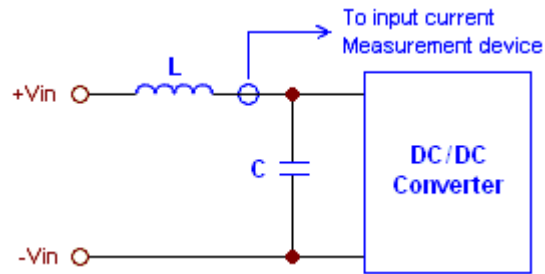
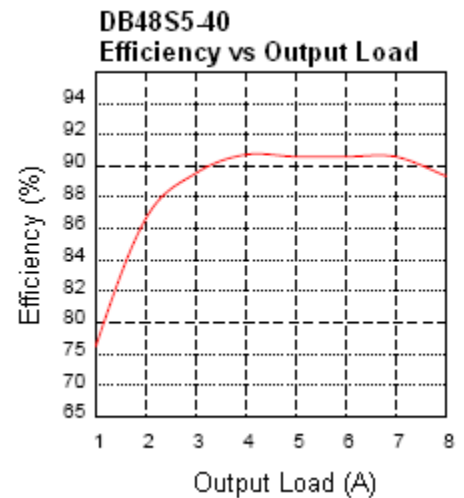
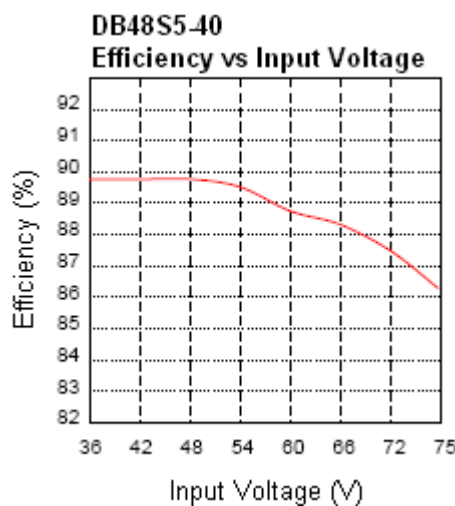
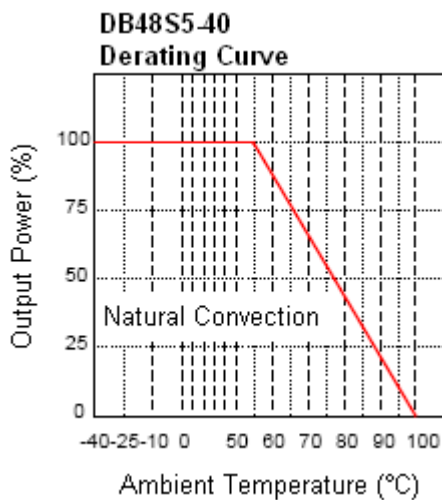
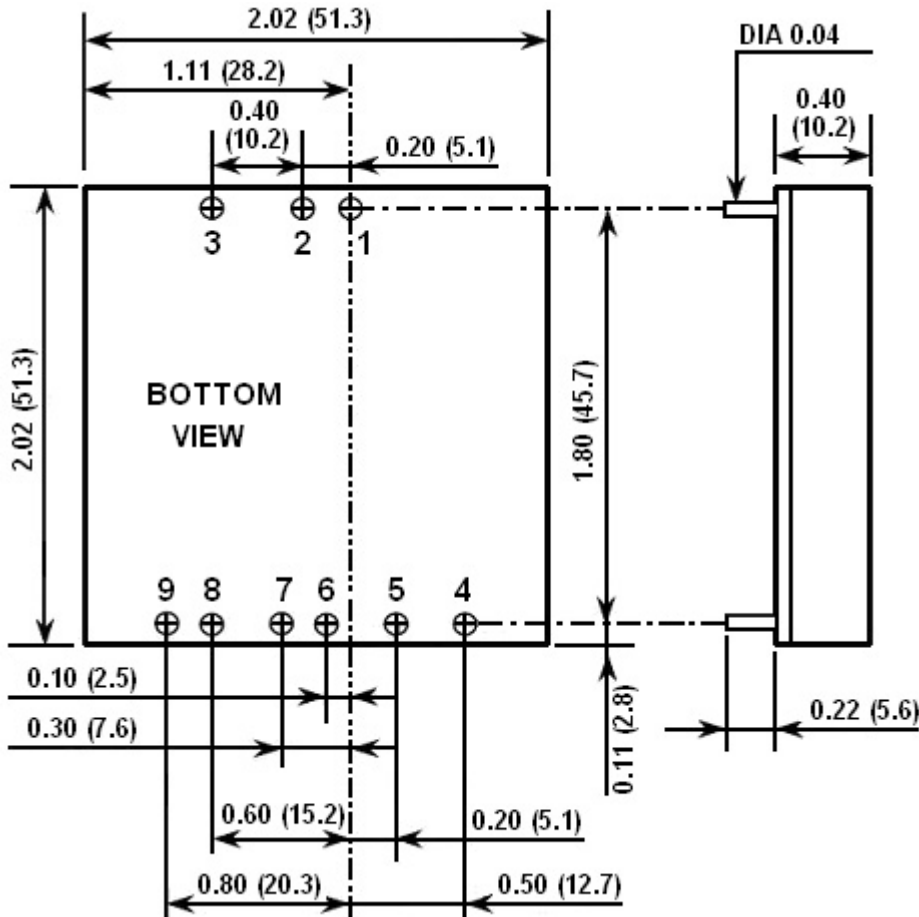


Figure 1

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 |

