

**FEATURES**

- Single Output Up to 14A
- High Efficiency up to 91%
- RoHS Directive Compliant
- Fixed Switching Frequency
- No Minimum Load Required
- Six-Sided Continuous Shield
- 2:1 Wide Input Voltage Range
- Approved for Basic Insulation
- 60 Watts Maximum Output power
- Standard 2.02" x 2.02" x 0.4" Package



UL  
TUV  
CB  
CE MARK (Pending)



**SPECIFICATIONS: DD Series**

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

**INPUT SPECIFICATIONS**

|   |                                     |                         |
|---|-------------------------------------|-------------------------|
| Input Voltage Range .....                                 | 24V nominal input .....             | 18 - 36VDC              |
|   | 48V nominal input .....             | 36 - 75VDC              |
| Under Voltage Lockout                                     |                                     |                         |
| 24V nominal input.....                                    | DC-DC ON .....                      | 17VDC typ.              |
|   | DC-DC OFF .....                     | 15VDC typ.              |
| 48V nominal input.....                                    | DC-DC ON .....                      | 34VDC typ.              |
|   | DC-DC OFF .....                     | 32VDC typ.              |
| Input Filter .....  |                                     | Pi Type                 |
| Input Voltage Variation.....                              | dv/dt .....                         | 5V/ms max               |
|   | (Complies with ETS300 132 part 4.4) |                         |
| Input Surge Voltage (100ms max) .....                     | 24V input .....                     | 50VDC                   |
|   | 48V input .....                     | 100VDC                  |
| Input Reflected Ripple Current (nominal Vin and FL) ..... |                                     | 20mA <sub>p-p</sub>     |
| Start Up Time (nominal Vin and constant resistive load)   |                                     |                         |
| Power Up.....   |                                     | 20ms max.               |
| Remote ON/OFF .....                                       |                                     | 20ms max.               |
| Remote ON/OFF (See Note 2)                                |                                     |                         |
| 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   |
| Remote Off Input Current (nominal Vin) .....              |                                     | 3mA                     |

**OUTPUT SPECIFICATIONS**

|  |               |
|--|---------------|
| Output Voltage .....   | see table     |
| Voltage Accuracy (nom Vin and full load) .....               | ±1%           |
| Voltage Adjustability (See Note 1) .....                     | ±10%          |
| Output Current .....   | see table     |
| Output Power .....   | 60 watts max. |
| Line Regulation (LL to HL at FL) .....                       | ±0.2%         |
| Load Regulation (no load to 100% load) .....                 | ±0.5%         |
| Minimum Load .....   | 0mA           |
| Output Ripple & Noise .....                                  | see table     |
| Transient Response Recovery Time (25% load step change)..... | 250us         |

**PROTECTION SPECIFICATIONS**

|   |                       |                            |
|---|-----------------------|----------------------------|
| Over Voltage Protection .....                         | 3.3V Output .....     | 3.7V - 5.4V                |
|   | (Ctrl. voltage clamp) |                            |
|   | 5V Output .....       | 5.6V - 7.0V                |
|   | 12V Output .....      | 13.5V - 19.6V              |
|   | 15V Output .....      | 16.8V - 20.5V              |
| 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.              |
| Isolation Voltage (Input to Case).....                            | 1600VDC min.              |
| Isolation Voltage (Output to Case) .....                          | 1600VDC min.              |
| Case Grounding (connect case to -Vin with decoupling Y cap) ..... | TBD                       |
| Isolation Resistance .....  | 10 <sup>9</sup> ohms min. |
| Isolation Capacitance .....                                       | 1500pF 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 (See Note 4)      |  |                             |
| Without Heat-Sink.....              | 9.2°C / Watt                               |                             |
| With Heat-Sink.....                 | 7.6°C/Watt                                 |                             |
| Thermal Shock .....                 | MIL-STD-810D                               |                             |
| Vibration .....                     | 10~55Hz, 10G, 30 minutes along X, Y, and Z |                             |
| MTBF (See Note 3) .....             | Bellcore TR-NWT-000332 .....               | 1.093 x 10 <sup>6</sup> hrs |
|                                     | MIL-STD-217F .....                         | 1.096 x 10 <sup>5</sup> 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 5)**

|                               |                                   |
|-------------------------------|-----------------------------------|
| 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*

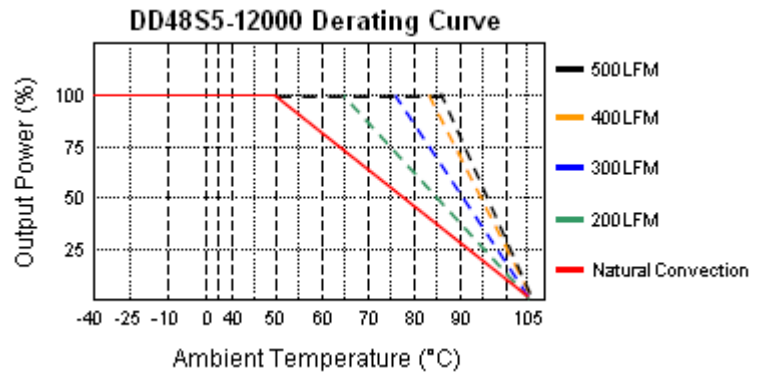
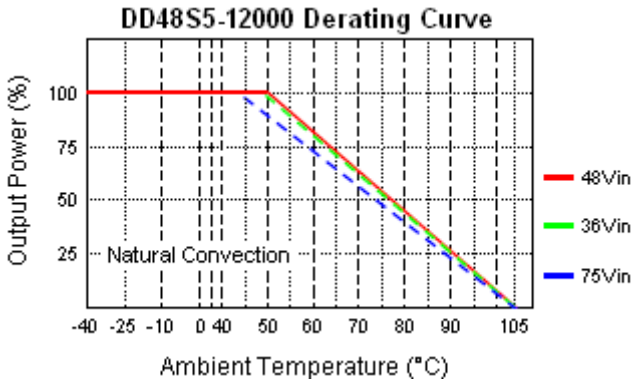
**OUTPUT VOLTAGE / CURRENT RATING CHART**

| Model Number   | Input Range            | Output Voltage | Output Current |           | Output Ripple & Noise | Input Current          |                          | Efficiency <sup>(8)</sup> | Max Capacitive Load <sup>(9)</sup> |
|----------------|------------------------|----------------|----------------|-----------|-----------------------|------------------------|--------------------------|---------------------------|------------------------------------|
|                |                        |                | Min. Load      | Full Load |                       | No load <sup>(6)</sup> | Full Load <sup>(7)</sup> |                           |                                    |
| DD24S3.3-14000 | 24VDC<br>(18 – 36 VDC) | 3.3 VDC        | 0mA            | 14,000mA  | 75mVp-p               | 90mA                   | 2264mA                   | 89%                       | 36,000µF                           |
| DD24S5-12000   |                        | 5 VDC          | 0mA            | 12,000mA  | 75mVp-p               | 100mA                  | 2874mA                   | 91%                       | 20,400µF                           |
| DD24S12-5000   |                        | 12 VDC         | 0mA            | 5000mA    | 100mVp-p              | 120mA                  | 2907mA                   | 90%                       | 3550µF                             |
| DD24S15-4000   |                        | 15 VDC         | 0mA            | 4000mA    | 100mVp-p              | 120mA                  | 2907mA                   | 90%                       | 2300µF                             |
| DD48S3.3-14000 | 48VDC<br>(36 – 75 VDC) | 3.3 VDC        | 0mA            | 14,000mA  | 75mVp-p               | 90mA                   | 1132mA                   | 89%                       | 36,000µF                           |
| DD48S5-12000   |                        | 5 VDC          | 0mA            | 12,000mA  | 75mVp-p               | 100mA                  | 1437mA                   | 91%                       | 20,400µF                           |
| DD48S12-5000   |                        | 12 VDC         | 0mA            | 5000mA    | 100mVp-p              | 100mA                  | 1453mA                   | 90%                       | 3550µF                             |
| DD48S15-4000   |                        | 15 VDC         | 0mA            | 4000mA    | 100mVp-p              | 100mA                  | 1453mA                   | 90%                       | 2300µF                             |

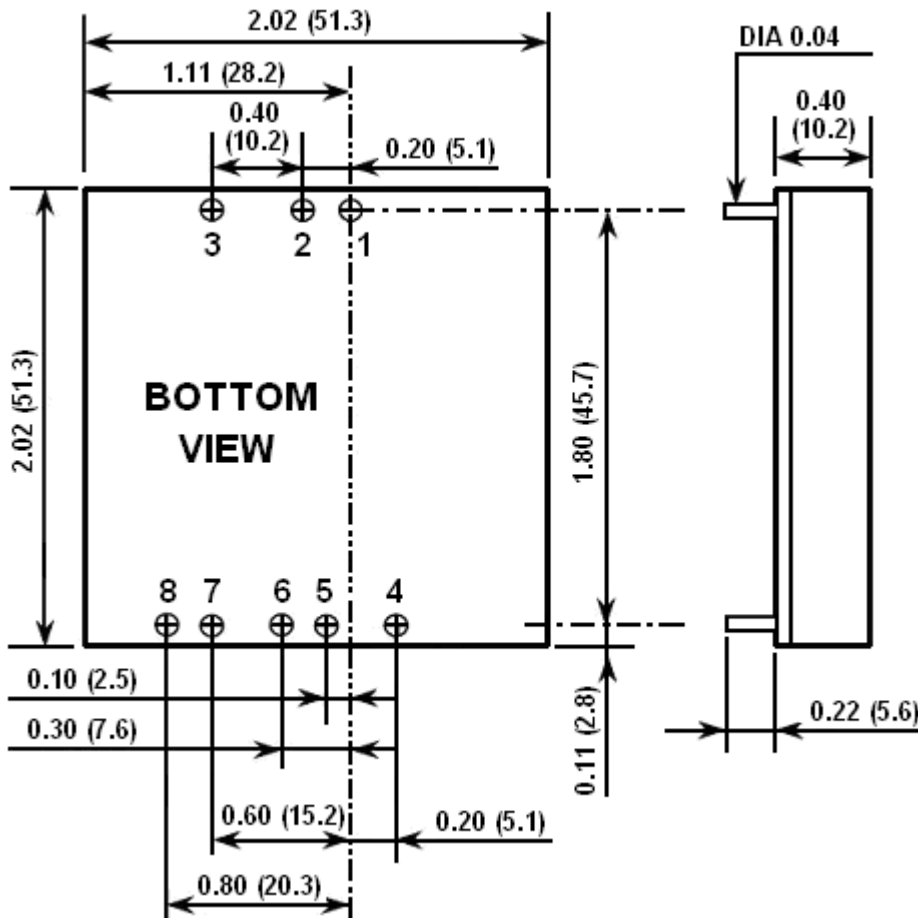
**NOTES**

1. Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +sense should be connected to its corresponding +OUTPUT and likewise the -sense should be connected to its corresponding –OUTPUT.
2. 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: DD48S5-12000R)
3. BELLCORE TR-NWT-000332. Case I: 50% Stress, Temperature at 40°C. (Ground fixed and controlled environment). MIL-STD-217F Notice2 @ Ta=25°C, Full Load (Ground, Benign, controlled environment).
4. Heat sink is optional. Please call factory for ordering details.
5. The DD series required an external filter to meet EN55022 class A. (TBD)
6. Typical Value at nominal input voltage.
7. Maximum value at nominal input voltage and full load
8. Typical Value at nominal input voltage and full load.
9. Test by minimum Vin and constant resistive load.

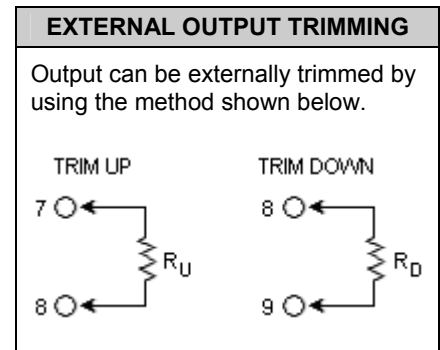
**DERATING CURVES & EFFICIENCY GRAPHS**



**MECHANICAL DRAWING**



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



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