



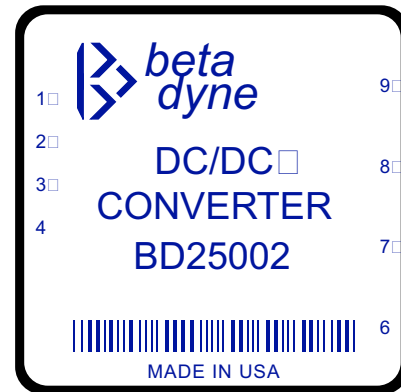
BD25002

25W TRIPLE DC/DC CONVERTER

$33-75V_{IN}$ $3.3V_{OUT}$

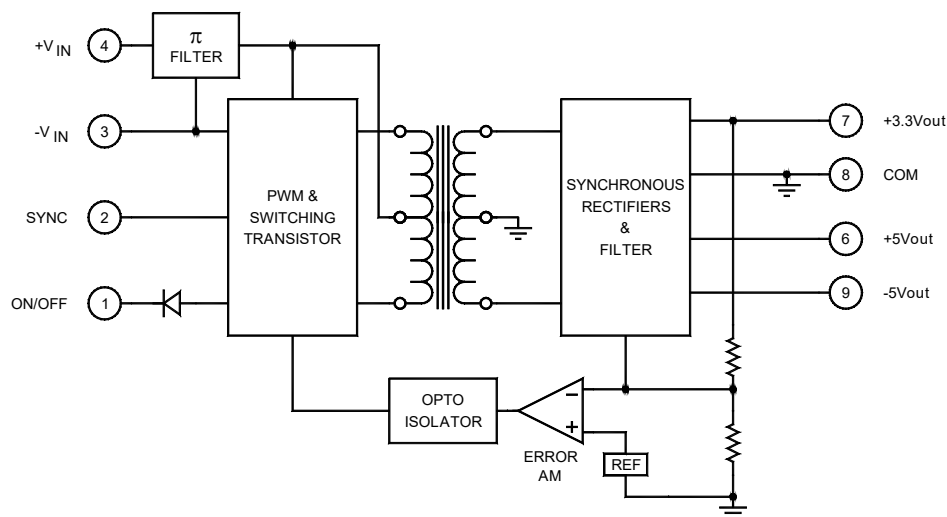
Key Features

- 25 μ S transient response
- 81% efficiency
- Six-sided shielding
- Soft start
- Short circuit protection
- Adjustable output
- 75 μ A off-state current
- Wide input voltage range
- Synchronization
- Industry pinout



Functional Description

The BD25002 is a triple output converter with an input voltage range of $33V_{IN}$ to $72V_{IN}$ and a main output of $3.3V_{OUT}$ and auxiliary output of $\pm 5V_{OUT}$.



Typical Block Diagram

Electrical Specifications

INPUT SPECIFICATIONS

Unless otherwise specified, all parameters are given under typical +25°C with nominal input voltage and under full output load conditions.

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|----------------------------------|---------------------------------------|-----|-----|-----|-------------------|
| Input Voltage Range | | 33 | | 72 | Vdc |
| Input Filter | LC | | | | |
| Reverse Polarity Input Current | | | | 12 | A |
| Input Surge Current (20µS Spike) | | | | 10 | A |
| Short Circuit Current Limit | | | 150 | | % I _{IN} |
| Undervoltage Shutdown | | | 8 | | Vdc |
| Off State Current | | | 75 | | µA |
| Remote ON/OFF Control | | | | | |
| Supply ON | Open (Open circuit voltage: 12V Max.) | | | | |
| Supply OFF | | 0 | | 0.8 | Vdc |
| Logic Input Reference | -Input | | | | |
| Logic Compatibility | TTL Open Collector or CMOS Open Drain | | | | |
| Converter Standby Current | | | 32 | | mA |

OUTPUT SPECIFICATIONS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|--|-----|--------|-----|--------------------------------------|
| Voltage Ratings | | | 3.3/±5 | | Vdc |
| Current Ratings | | | 4/±1.2 | | A |
| Output Voltage Accuracy, Triple (Main) | | | ±1 | | % |
| Output Voltage Accuracy, Triple (Auxiliary) | Fully loaded | | 3 | ±5 | % |
| Voltage Balance, Triple (Auxiliary) | Balanced loads for auxiliary | | ±1 | ±2 | % |
| Minimum Load | | 10 | | | % of FL |
| Ripple & Noise (Main) | (See App. Note DC-003) | | 1 | 2 | %V _{PP} of V _{OUT} |
| Ripple & Noise (Auxiliary) | (See App. Note DC-003) | | 2 | | %V _{PP} of V _{OUT} |
| Line Regulation, Triple (Main) | Minimum V _{IN} to maximum V _{IN} | | ±1 | 2 | % |
| Line Regulation, Triple (Auxiliary) | Minimum V _{IN} to maximum V _{IN} | | ±5 | 6 | % |
| Load Regulation | | | | | |
| Load Regulation, Triple (Main) | Main fully loaded | | ±1 | | % |
| Load Regulation, Triple (Auxiliary) | | | 5 | 6 | % |
| Temperature Coefficient @ FL | | | 0.02 | | %/°C |
| Transient Response Time | 50% FL to FL to 50% FL | | 25 | | µS |
| Short Circuit Protection | All outputs, by input current limiting | | | | |
| Output Short Circuit Duration | Continuous | | | | |

GENERAL SPECIFICATIONS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|----------------------------|------------------|-----|-----------------|-----|------|
| Efficiency | | | 81 | | % |
| Isolation Voltage (1 min.) | | | 1500 | | Vdc |
| Isolation Resistance | | | 10 ⁹ | | Ω |
| Isolation Capacitance | | | 80 | | pF |
| Switching Frequency | | | 160 | | kHz |

ENVIRONMENTAL SPECIFICATIONS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|--|--|-----|---------|------|----------------------|
| Operating Temperature, Industrial (Ambient) ¹ | See Figure 2 | -40 | | +71 | °C |
| Operating Temperature, Extended | (Please contact factory) | | | | |
| Storage Temperature Range | | -55 | | +125 | °C |
| Thermal Resistance | | | | | °C/W _{DISS} |
| Maximum Operating Case Temperature | | | | 105 | °C |
| Thermal Turn Off, Case Temperature | | 95 | 100 | 115 | °C |
| Thermal Hysteresis | | 5 | 10 | | °C |
| Derating | See Figure 2 | | | | |
| Humidity | Up to 95% non-condensing | | | | |
| Cooling | Free-air convection | | | | |
| EMI/RFI | Six-sided continuous shielded metal case | | | | |
| MTBF | per MIL-HNBK-217F (Ground benign, +25°C) | | 718,000 | | hours |

¹ See footnotes 1, 2, 3 and 4

PHYSICAL CHARACTERISTICS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|-----|-----|-----|------|
| Dimensions (L×W×H) | 2.00×2.00×0.395 in. (50.80×50.80×10.03mm) | | | | |
| Weight | 2 oz. (58g) | | | | |
| Case Material | Coated metal | | | | |
| Shielding Connection, 12V _{IN} , 24V _{IN} | -Input (Pin 3) | | | | |
| Shielding Connection, 48V _{IN} | +Input (Pin 4) | | | | |

¹ Contact factory for -55° to +85°C operating temperature range.

² The maximum input current at any given input range measured at minimum input voltage is given as $1.6 \cdot I_{NOMINAL}$. Nominal input current is the typical value measured at the input of the converter under full-load room temperature and nominal input voltage (12, 24 and 48V_{IN}).

³ Adequate insulation is to be provided to the converters at the end usage as per applicable requirements.

⁴ Temperature rise on the case of the converters is to be considered during the end usage as per applicable requirements.

EXTERNAL SYNCHRONIZATION

All models in the 25W series can be synchronized to an external clock by driving the SYNC pin (pin 2) directly or with an open collector-open drain (1 TTL load). The driving signal frequency must be 380kHz ±5% (20% low, 80% high duty cycle). The PWM used in

the 25W series offers bidirectional SYNC ports, which allow multiple unit synchronization by connecting all SYNC pins together. In the absence of an external clock, the faster unit takes control of the SYNC bus and the rest of the units follow.

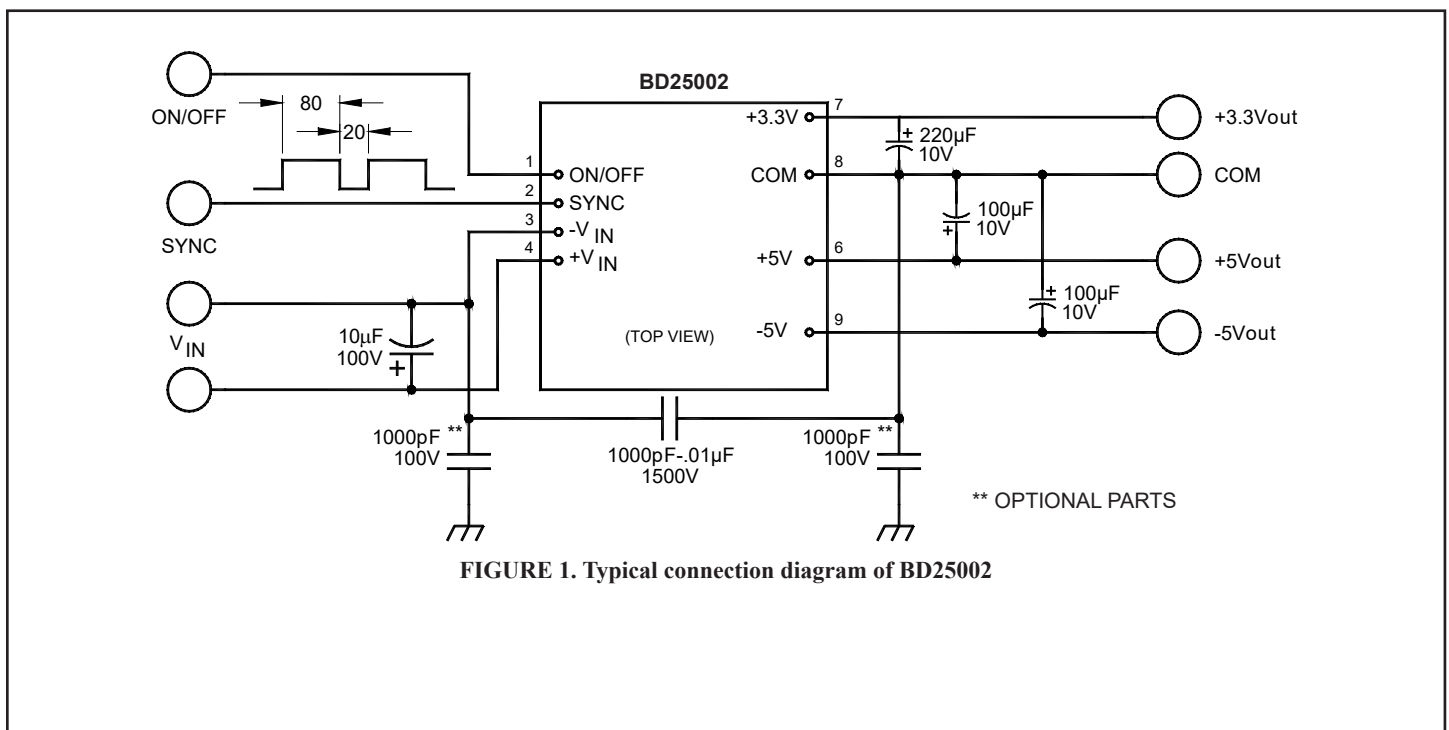


FIGURE 1. Typical connection diagram of BD25002

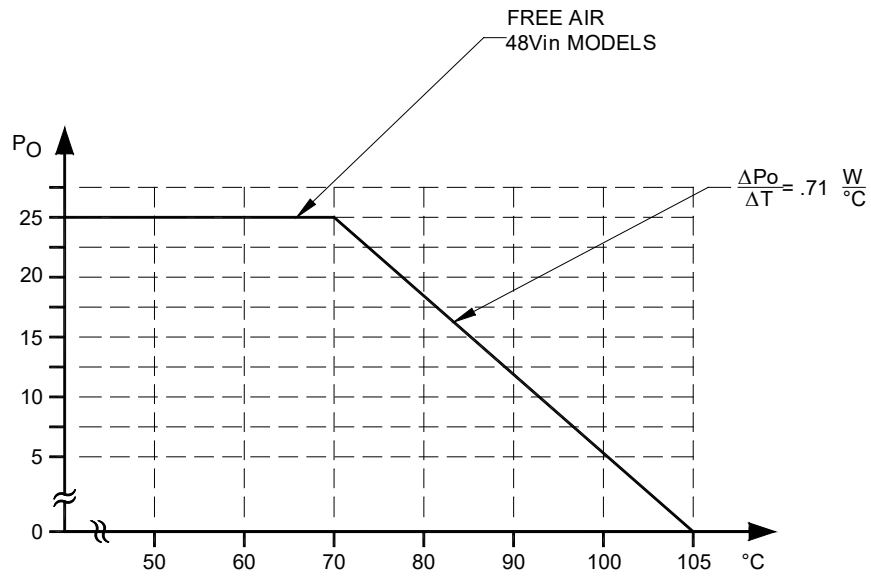
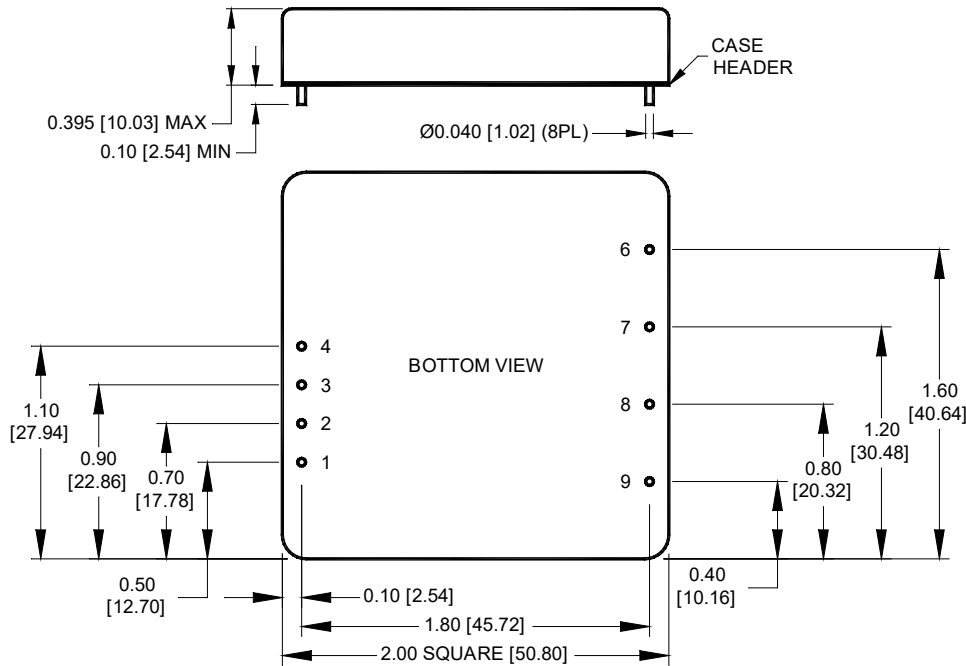


FIGURE 2. Typical derating curve of BD25002

MECHANICAL SPECIFICATIONS
in inches [mm]



| Pin | Function |
|-----|-------------------|
| | TRIPLE |
| 1 | ON/OFF |
| 2 | SYNC |
| 3 | -V _{IN} |
| 4 | +V _{IN} |
| 5 | No Pin |
| 6 | +V _{AUX} |
| 7 | +V _{OUT} |
| 8 | GND |
| 9 | -V _{AUX} |