PRELIMINARY

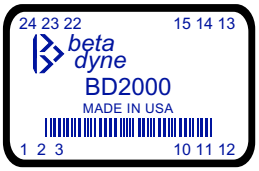
# BD2000

## 2W High-Voltage Isolated DC/DC Converter

*Single 302$V_{OUT}$*

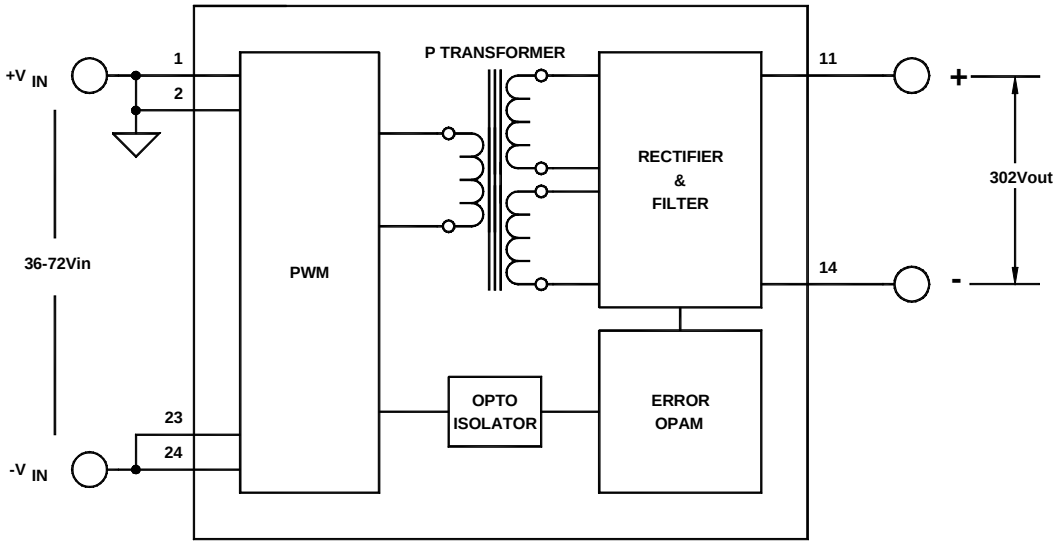
### *Key Features*

- Short circuit and thermal protection
- Wide input voltage range (36–72Vdc)
- Metal case
- Six-sided shielding




### *Functional Description*

The BD2000 is a 2W High-Voltage Isolated DC/DC Converter that accepts an input voltage from -36$V_{IN}$ to -72$V_{IN}$ and generates -302$V_{OUT}$@6mA.




**Typical Block Diagram**

## *Electrical Specifications*

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

### *ABSOLUTE MAXIMUM RATINGS*

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Input Voltage | | 36 | 48 | 72 | Vdc |
| Output Short Circuit Duration | Continuous | | | | |
| Internal Power Dissipation | | | | 0.5 | W |

### *INPUT SPECIFICATIONS*

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Input Voltage Range (2:1) | | 36 | 48 | 75 | Vdc |
| No Load Input Current | | | 10 | | mA |
| Full Load Input Current | | | 50 | | mA |
| Input Filter | C = 2.2µF | | | | |
| Reflected Ripple Current | Without external capacitor, See Figure 2 | | 200 | | $mA_{PP}$ |
| Turn On Delay | With soft start, $C_O$ = 0.5µF, See Figure 1 | | 35 | 40 | mS |
| Startup Input Voltage | | 11 | 16 | | Vdc |

### *OUTPUT SPECIFICATIONS*

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Voltage | | 297.7 | 302 | 307.3 | Vdc |
| Current | | | 6 | | mA |
| Output Voltage Accuracy | | | ±1 | | % |
| Ripple & Noise (20MHz BW) | See Figure 2 | | ±1 | | % |
| Line Regulation | | | ±1 | | % |
| Load Regulation | | | ±1 | | % |
| Temperature Coefficient @ FL | | | | ±0.02 | %/°C |
| Short Circuit Protection | Continuous, Current Limit | | | | |
| Short Circuit Restart | By recycling input voltage | | | | |
| Transient Response (to within 1% of $V_{OUT}$) | 50% FL to 100% FL to 50% FL, See Figure 3 | | 500 | | µS |

### *GENERAL SPECIFICATIONS*

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Efficiency | | | 74 | | % |
| Switching Frequency | | 108 | 125 | 130 | kHz |
| Isolation (1 min.) | | | 1500 | | Vdc |

### *ENVIRONMENTAL SPECIFICATIONS*

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Operating Temperature Range (Ambient) | | -40 | | +70 | °C |
| Storage Temperature Range | | -60 | | +105 | °C |
| Thermal Shutdown | Case temperature | 96 | 100 | 104 | °C |
| Thermal Resistance | Maximum case temperature is 18°C above ambient | | 36 | | °C/W |
| Derating | None required | | | | |
| Humidity | Up to 95% non-condensing | | | | |
| Cooling | Free-air convection | | | | |
| MTBF | per MIL-HNBK-217F (Ground benign, +25°C) | | $1.3x10^6$ | | hours |

### *PHYSICAL CHARACTERISTICS*

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Dimensions (L×W×H) | 1.25×0.80×0.40 in. (31.75×20.32×10.16mm) | | | | |
| Weight | 0.56 oz. (15.8g) | | | | |
| Case Material | Coated metal | | | | |
| Shielding | Six-sided continuous | | | | |
| Case Connection | Pin 3 | | | | |

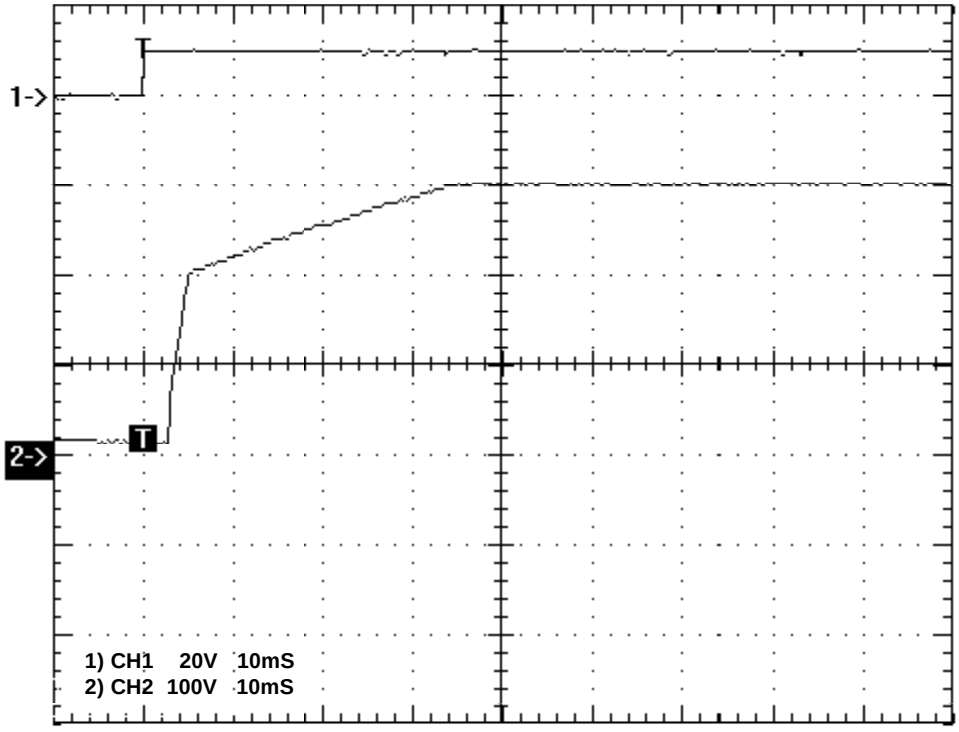
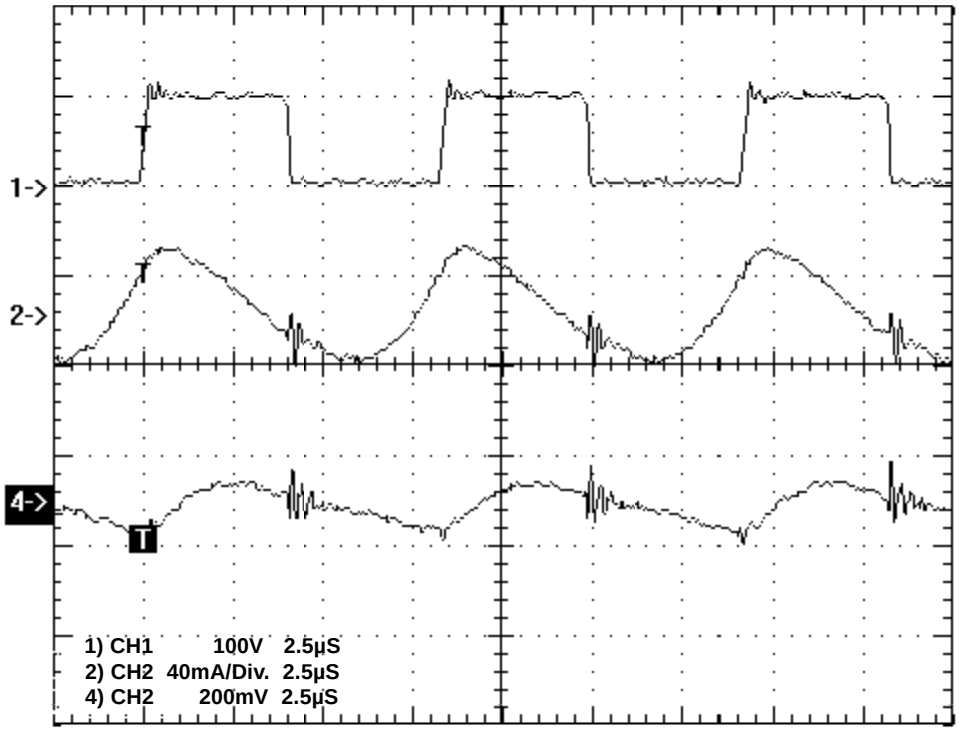



**FIGURE 1. Turn on delay and soft start of BD2000**




Drain voltage

Input reflected ripple

Output ripple

**FIGURE 2. Input/output noise of BD2000**
**$C_{IN}$=10µF, $C_O$(External)=0.5µF, $V_{IN}$=48V**

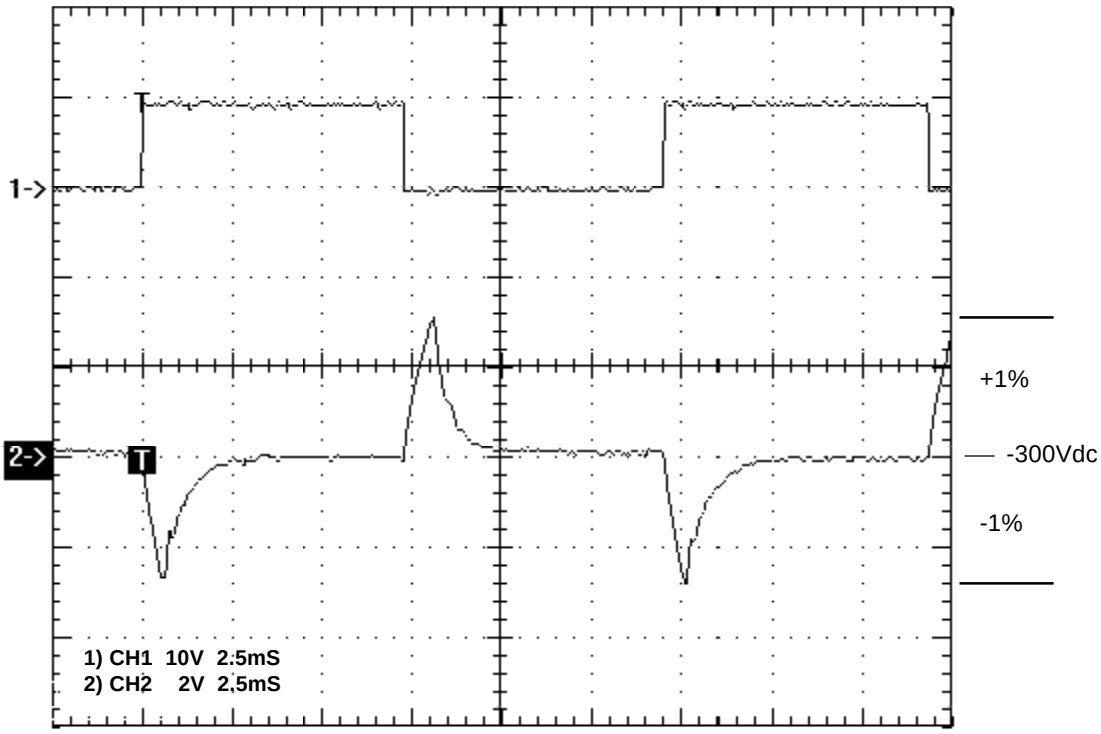



**FIGURE 3. Transient response of BD2000**
**50% FL (95k) to FL (45k) to 50% FL (95k)**

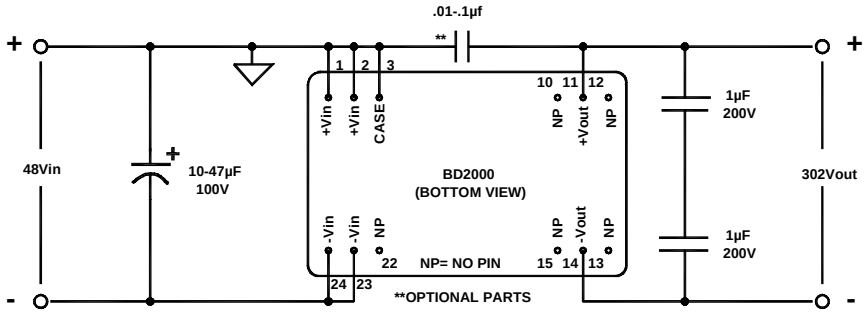
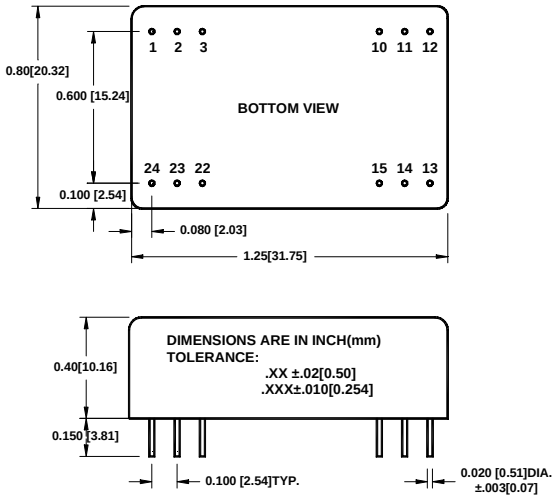



**FIGURE 4. Typical connection diagram**

## *MECHANICAL SPECIFICATIONS*

in inches [mm]




| Pin | Function |
|---|---|
| 1 | $+V_{IN}$ |
| 2 | $+V_{IN}$ |
| 3 | CASE |
| 10 | No Pin |
| 11 | $+V_{OUT}$ |
| 12 | No Pin |
| 13 | No Pin |
| 14 | $-V_{OUT}$ |
| 15 | No Pin |
| 22 | No Pin |
| 23 | $-V_{IN}$ |
| 24 | $-V_{IN}$ |