



# BD10015C

3W HIGH-VOLTAGE DC/DC CONVERTER  
 Single  $28V_{IN}$  -  $300V_{OUT}$  @  $10mA$

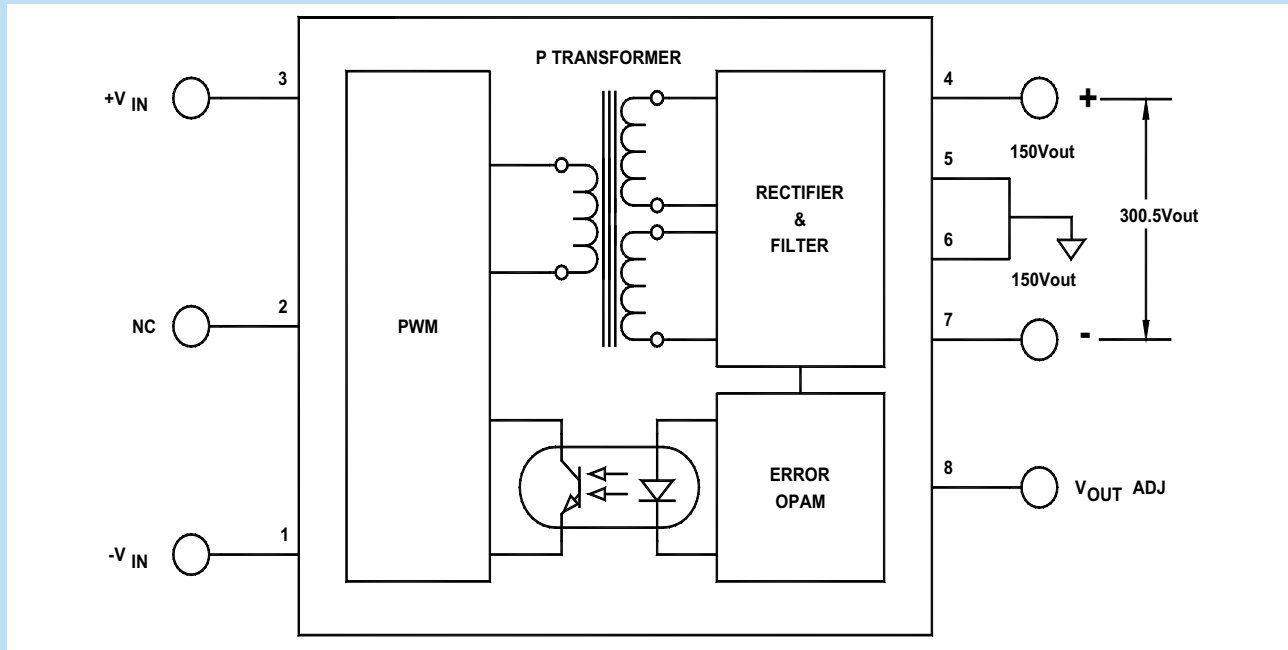
## Key Features

- 84% efficiency
- Input-to-output isolation
- Short circuit and thermal protection
- Adjustable outputs
- 50 $\mu$ A off state current



## Functional Description

The BD10015C is a 3W High-Voltage DC/DC Converter that accepts an input voltage of  $28V_{IN}$  and provides  $300V_{OUT}$  between Pin 4 positive and Pin 7 negative.



Typical Block Diagram

**Electrical Specifications**  
**ABSOLUTE MAXIMUM RATINGS**

*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	175% of Nominal input line				
Output Short Circuit Duration	Continuous				
Internal Power Dissipation				3.4	W

**INPUT SPECIFICATIONS**

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage Range (2:1)			28		Vdc
No Load Input Current			10		mA
Full Load Input Current			270		mA
Input Filter	C				
Reflected Ripple Current <sup>1</sup>			90		mA <sub>pp</sub>
Reverse Voltage Protection	Parallel Diode		5		A
Turn On Delay	Including soft start	7	10	15	mS
Startup Input Voltage		11	16		Vdc

**OUTPUT SPECIFICATIONS**

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Voltage			300		Vdc
Current		0	10		mA
Output Voltage Accuracy			±1	±2	%
Output Adjust Range			±5		%
Ripple & Noise (20MHz BW)	See Figure 1 for required external components	0.5	±1	±2	%
Line Regulation	See Figure 1 for required external components	0.5	±1	±2	%
Load Regulation	See Figure 1 for required external components	0.5	±1	±2	%
Temperature Coefficient @ FL				±0.02	%/°C
Short Circuit Protection	Continuous, Current Limit				
Short Circuit Restart	Automatic				
Transient Response (to within 1% of V <sub>OUT</sub> )	50% FL to 100% FL to 50% FL		500		µS

**GENERAL SPECIFICATIONS**

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			84		%
Isolation Voltage (1 min.)		500	1000		Vdc
Isolation Resistance			10 <sup>9</sup>		Ω
Isolation Capacitance			300		pF
Switching Frequency		108	125	130	kHz

**ENVIRONMENTAL SPECIFICATIONS**

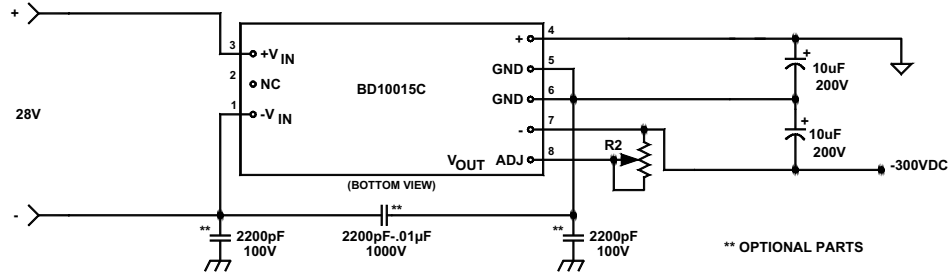
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient)	(For -55°C to +85°C, please contact factory)	-40		+70	°C
Storage Temperature Range		-60		+105	°C
Thermal Shutdown <sup>2</sup>	Case Temperature	96	100	104	°C
Thermal Resistance			6		°C/W
Derating	None required				
Humidity	Up to 95% non-condensing				
Cooling	Free-air convection				
MTBF	per MIL-HNBK-217F (Ground benign, +25 °C)		1.1 x 10 <sup>6</sup>		hours

<sup>1</sup> Maximum Input Current: The maximum input current at any given input range measured at minimum input voltage is given as 1.6<sup>\*</sup><sub>NOMINAL</sub>. Nominal input current is the typical value measured at the input of the converter under full load room temperature and nominal input voltage (28Vdc).

<sup>2</sup> Input voltage must be recycled after a thermal shutdown.

**PHYSICAL CHARACTERISTICS**

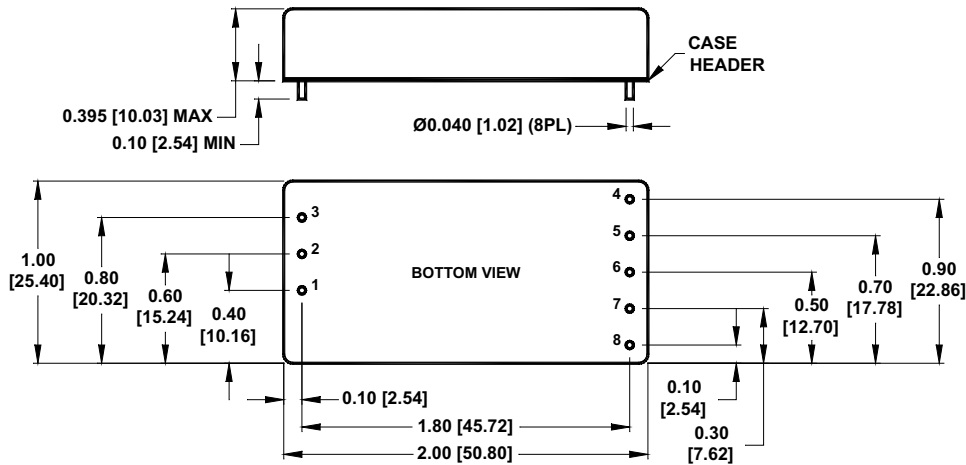
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimensions (L x W x H)	2.00 x 1.00 x 0.395 in. (50.80 x 25.40 x 10.03)				
Weight	1.04 oz. (30g)				
Case Material	Coated metal				
Shielding	Six-sided continuous				
Case Connection	-V <sub>IN</sub> (pin 1)				



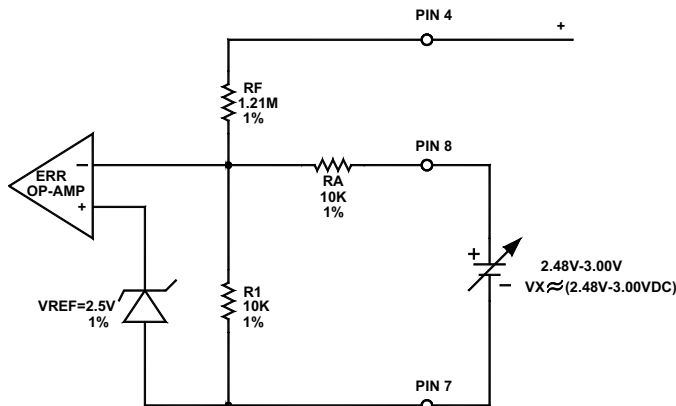
**FIGURE 1. Single connection diagram**

**MECHANICAL SPECIFICATIONS**

in inches [mm]



Pin	Function
1	-V <sub>IN</sub>
2	No Connection
3	+V <sub>IN</sub>
4	+V <sub>OUT</sub>
5	GND (CONNECT PIN 5 TO 6)
6	GND (CONNECT PIN 5 TO 6)
7	-V <sub>OUT</sub>
8	V <sub>OUT</sub> ADJ



**FIGURE 2. Output error amplifier circuit**

$$V_o = \left( \frac{R_F + 1}{R_1} \right) V_{REF} \text{ (with Pin 8 open)}$$

$$V_o = \left( \frac{1.21 \times 10^6 + 1}{1 \times 10^4} \right) 2.5 = 305 \text{ (with Pin 8 open)}$$

$$V_o = V_{REF} \left( \frac{R_F}{R_1} + \frac{R_F + 1}{R_1} \right) \frac{R_F V_x}{R_1}$$

$$R_{ADJUST} = R_A + R_R$$

$$R_1' = R_1 // (R_A + R_R) = \frac{R_F}{\frac{V_o}{V_{REF}} - 1}$$

For  $V_x = V_{REF}$ ,  $V_o = 305V_{dc}$

For  $V_x = 3.0$ ,  $V_o = 249.5V_{dc}$