



# BD5002D

## 5W HIGH-VOLTAGE LOW NOISE DC/DC CONVERTER

### 24-PIN DIP

$24V_{IN}$   $48V_{OUT}$  @100mA

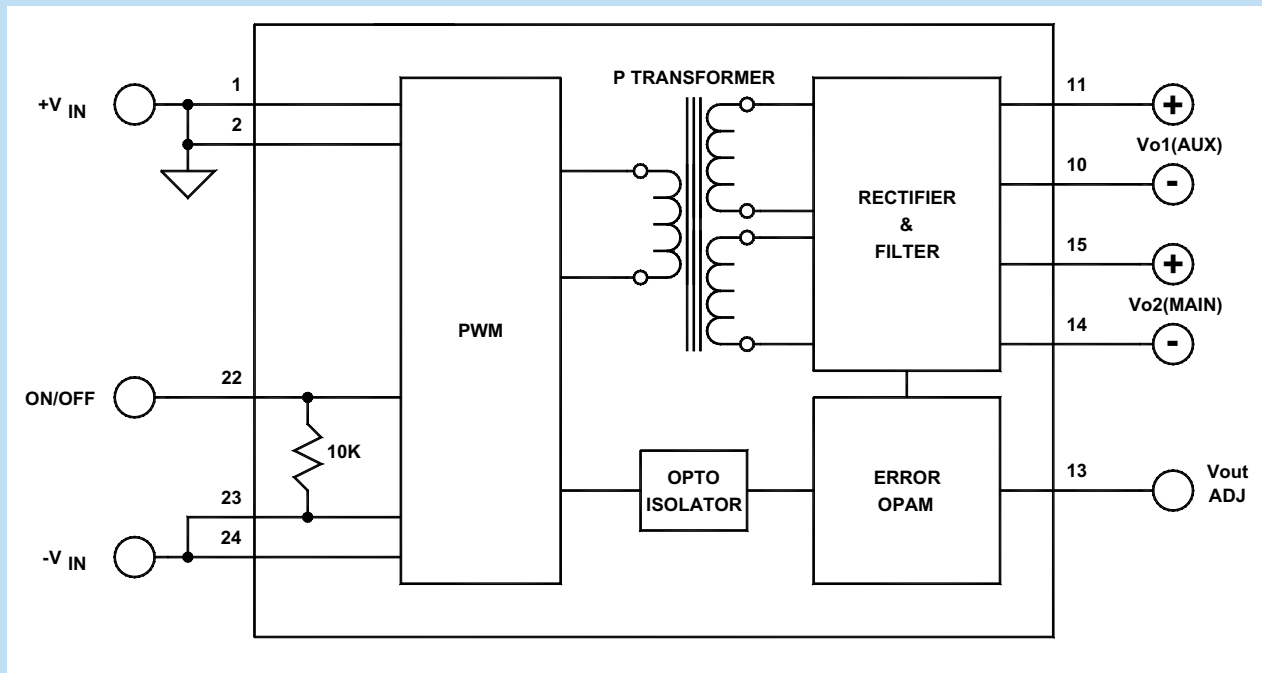
### Key Features

- Efficiency up to 83%
- 1500Vdc isolation
- Short circuit and thermal protection
- 2:1 input voltage range
- Metal case
- Six-sided shielding
- 2mA off state current
- Industry standard pinout



### Functional Description

The BD5002D is a 5W DC/DC Converter packaged in a 24-Pin DIP. It accepts  $24V_{IN}$  and provides  $48V_{OUT}$  @100mA. With the output filter given in Fig. 2, its output ripple will be reduced to  $2mV_{pp}$ . Features include total input-to-output isolation, short circuit protection, thermal protection, soft start, adjustable outputs, and efficiency up to 83%.



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		18	24	36	V
Output Short Circuit Duration	Continuous				
Internal Power Dissipation				1.2	W

**INPUT SPECIFICATIONS**

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage Range (2:1)		18	24	36	V
No Load Input Current			10		mA
Full Load Input Current			240		mA
Input Filter	C = 3.3 for 24V <sub>IN</sub>				μF
Reverse Polarity	External series-blocking diode				
Reflected Ripple	I <sub>O</sub> = FL, C <sub>IN</sub> = 10μF, SEE APPROPRIATE CONNECTION DIAGRAM				
Input Surge Current (20μS Spike)				10	A
Short Circuit Current Limit	See Short Circuit Protection		150		% I <sub>IN</sub>
Off State Current			2		mA
Remote ON/OFF Control					
Supply ON	Pin 22 Open (Open circuit voltage: 0V)				
Supply OFF	Pin 22	5	10	15	Vdc
Logic Input Reference	-Input for ON/OFF				

**OUTPUT SPECIFICATIONS**

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Output Voltage Accuracy			±1	±2	%
Ripple & Noise	With specified output filter (See Figure 1)		1	2	mV <sub>pp</sub>
Output Current			100		mA
Line Regulation			±1	±2	%
Load Regulation			±1	±2	%
Temperature Coefficient @ FL			0.02		%/°C
Short Circuit Protection <sup>1</sup>	By input current limiting				
Output Adjust Range	See Figure 2	±5		±10	%

**GENERAL SPECIFICATIONS**

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			83		%
Isolation Voltage (1 min.), Input to Output			1500		Vdc
Isolation Voltage (1 min.), Output to Output			500		Vdc
Isolation Resistance			10 <sup>9</sup>		Ω
Isolation Capacitance			1000		pF
Switching Frequency			125		kHz
Turn On Delay	See Figure 1		5	10	mS
Soft Start Time	See Figure 1		20		mS

**PHYSICAL CHARACTERISTICS**

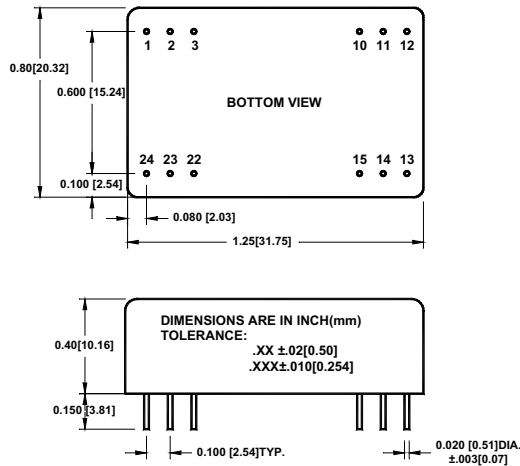
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimension	1.25 x 0.80 x 0.40 in. (31.75 x 20.32 x 10.16mm)				
Weight	0.56 oz. (15.8g)				
Case Material	Coated metal				
Shielding	Six-sided continuous				
Case Connection	Case and header connected to Pin 3, Floating				

## ENVIRONMENTAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient), 24V		-40		+60	°C
Storage Temperature Range		-60		+105	°C
Thermal Shutdown	Case temperature (Input power must be recycled)	96	100	104	°C
Thermal Resistance	Maximum case temperature is 36°C above ambient		36	43	°C/W
Humidity	Up to 95% non-condensing				
Cooling	Free-air convection				
MTBF	per MIL-HNBK-217F (Ground benign, +25°C)		1.3x10 <sup>6</sup>		hours

<sup>1</sup> Input power may need to be recycled if the input overcurrent threshold is exceeded after a hard output short circuit or thermal shutdown.

## MECHANICAL SPECIFICATIONS



Pin	Function
1	+V <sub>IN</sub>
2	+V <sub>IN</sub>
3	CASE
10	-V <sub>O1</sub> (CONNECT TO PIN 14)
11	+V <sub>O1</sub> (CONNECT TO PIN 15)
12	No Pin
13	V <sub>OUT</sub> ADJ
14	-V <sub>O2</sub> (CONNECT TO PIN 10)
15	+V <sub>O2</sub> (CONNECT TO PIN 11)
22	ON/OFF
23	-V <sub>IN</sub>
24	-V <sub>IN</sub>

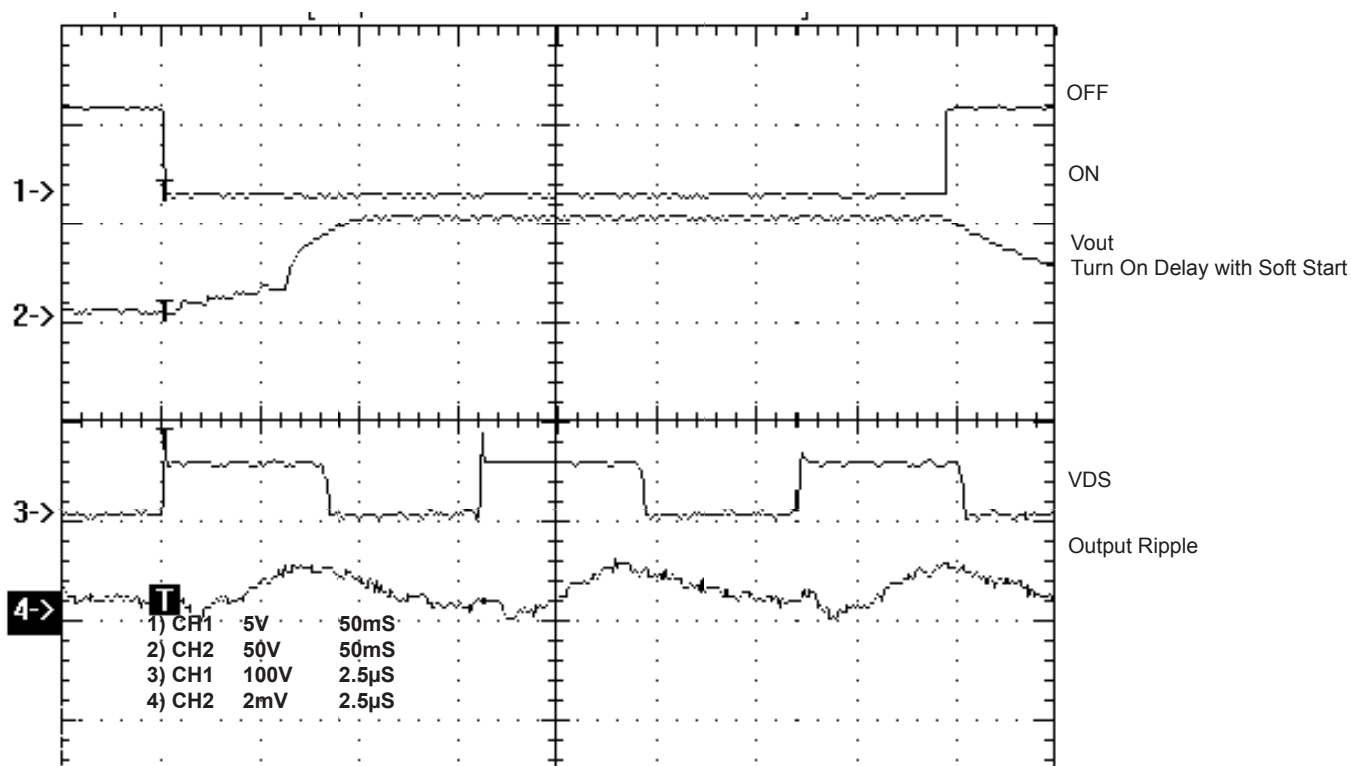


FIGURE 1. Output Ripple with Filter given in Figure 2

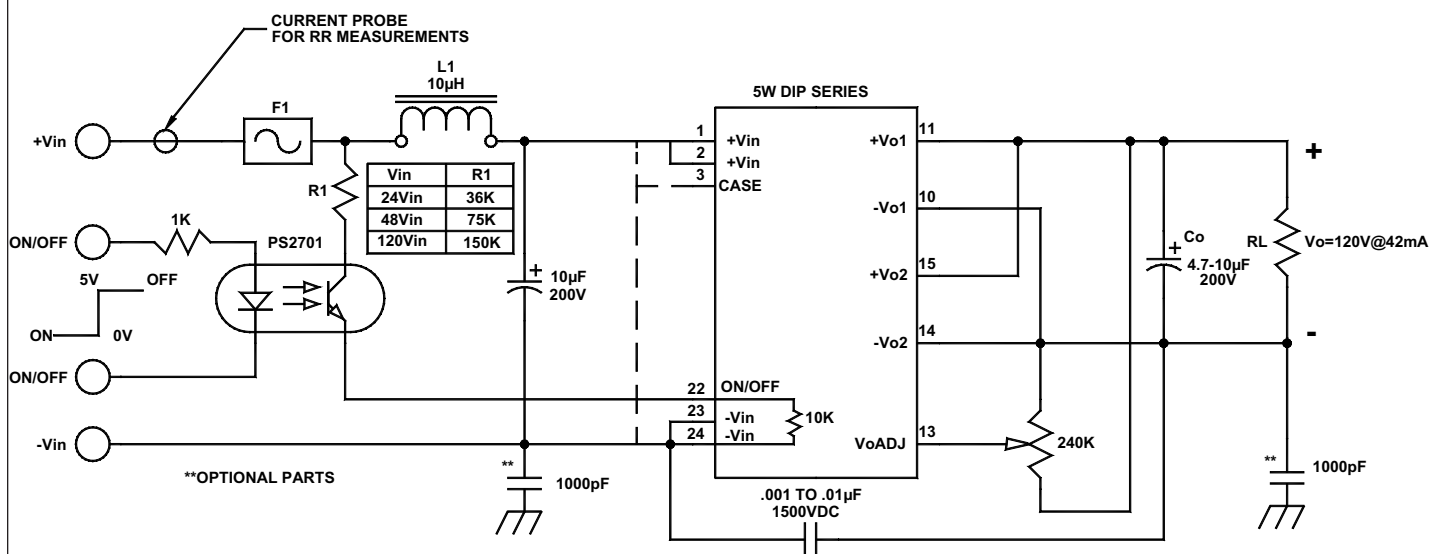


FIGURE 2. Typical connection diagram of BD5002D