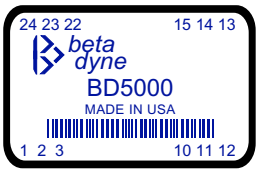
BD5000 & BD5000X

3W DC/DC Converters in 24-Pin DIP

48V_{IN}, ±15V_{OUT}

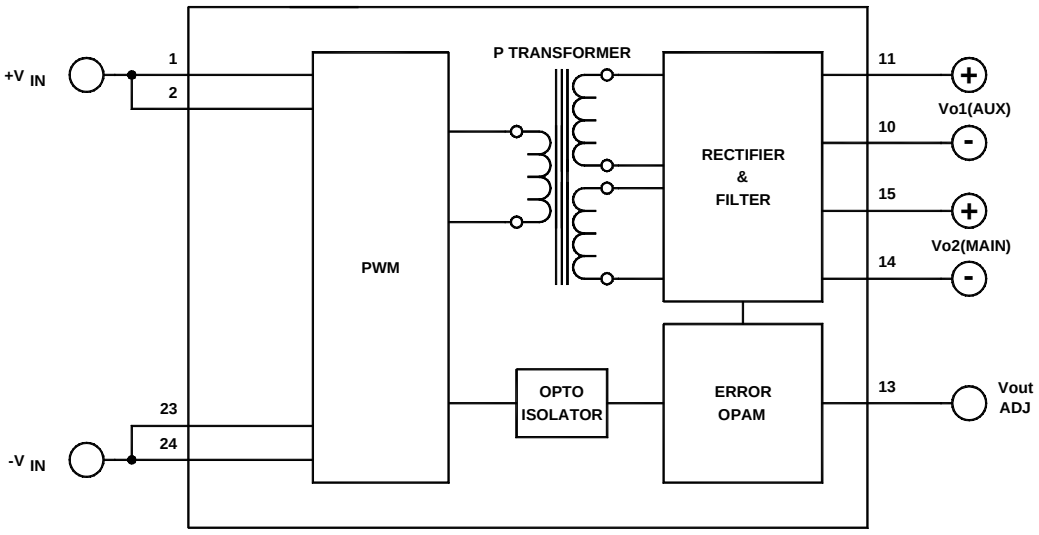
Key Features

- Efficiency up to 87%
- 1500Vdc isolation
- Short circuit and thermal protection
- 2:1 wide input voltage range
- Metal case
- Six-sided shielding
- Industry standard pinout



Functional Description

The BD5000 & BD5000X are 3W DC/DC Converters in a 24-pin DIP configuration. They accept 36–75V_{IN} and provide a dual isolated 15V_{OUT}@100mA each. Standard features include 1500Vdc isolation short circuit and thermal protection and six-sided shielding. The BD5000 operates from -40°C to +70°C; the BD5000X operates from -40°C to +85°C.



Typical Block Diagram

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

Electrical Specifications

ABSOLUTE MAXIMUM RATINGS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage		36	48	75	Vdc
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)		36	48	75	Vdc
No Load Input Current			10		mA
Full Load Input Current			70		mA
Input Filter	See Figure 2				
Reverse Polarity	External series-blocking diode				
Reflected Ripple[1]	I_O = FL, C_{IN} = 10µF				
Input Surge Current (20µS Spike)				10	A
Short Circuit Current Limit	See Short Circuit Protection		150		% I_{IN}

OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Output Voltage			±15		Vdc
Output Voltage Accuracy			±1	±2	%
Ripple & Noise	With specified minimum output capacities		1	2	%V_{PP} of V_{OUT}
Output Current			±100		mA
Line Regulation, V_{O2} (Main)	V_{O1} fully loaded		±1	±2	%
Line Regulation, V_{O1} (Aux)	V_{O2} fully loaded		±3	±5	%
Load Regulation, V_{O2} (Main)			±1	±2	%
Load Regulation, V_{O1} (Aux)	10% FL to FL (V_{O1} fully loaded)		±3	±5	%
Temperature Coefficient @ FL			0.02		%/°C
Transient Response Time	50% FL to FL to 50% FL, See Figures 2 & 3		1	2	mS
Short Circuit Protection[2]	By input current limiting				
Output Adjust Range	See Figure 2; *(See App. Note DC-010)*	±5		±10	%

GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			87		%
Isolation Voltage (1 min.), Input to Output			1500		Vdc
Isolation Voltage (1 min.), Output to Output			500		Vdc
Isolation Resistance			10^9		Ω
Isolation Capacitance			1000		pF
Switching Frequency			125		kHz
Turn On Delay	See Figure 3		5	10	mS
Soft Start Time	See Figure 3		20		mS

ENVIRONMENTAL SPECIFICATIONS

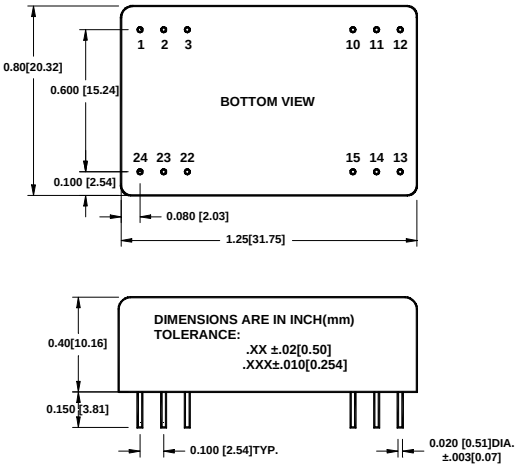
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient)	BD5000, See Figure 1	-40		+70	°C
	BD5000X, See Figure 1	-40		+85	°C
Storage Temperature Range		-60		+105	°C
Thermal Shutdown[2]	Case temperature (Input power must be recycled)	96	100	104	°C
Thermal Resistance	Maximum case temperature is 36°C above ambient		36	43	°C/W
Derating	See Figure 1				
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	0.65 oz. (20.2g)				
Case Material	Coated metal				
Shielding	Six-sided continuous				
Case Connection	Case and header connected to Pin 3, Floating				

[1] With a 10µH input inductor and 10µF input capacitor.
[2] 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
	DUAL ISOLATED
1	$+V_{IN}$
2	$+V_{IN}$
3	CASE
10	$-V_{O1}$ (AUX)
11	$+V_{O1}$ (AUX)
12	No Pin
13	V_{OUT} ADJ
14	$-V_{O2}$ (MAIN)
15	$+V_{O2}$ (MAIN)
22	No Pin
23	$-V_{IN}$
24	$-V_{IN}$

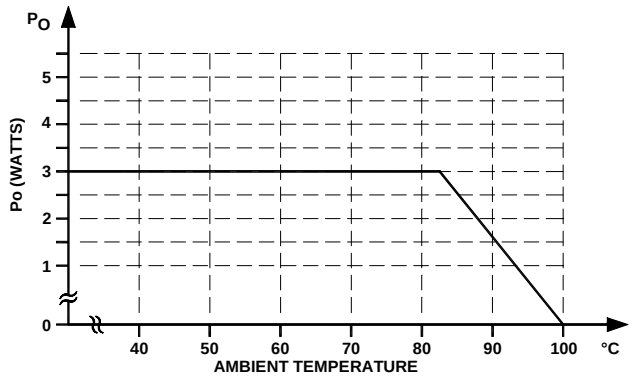


FIGURE 1. Typical derating curve of BD5000X

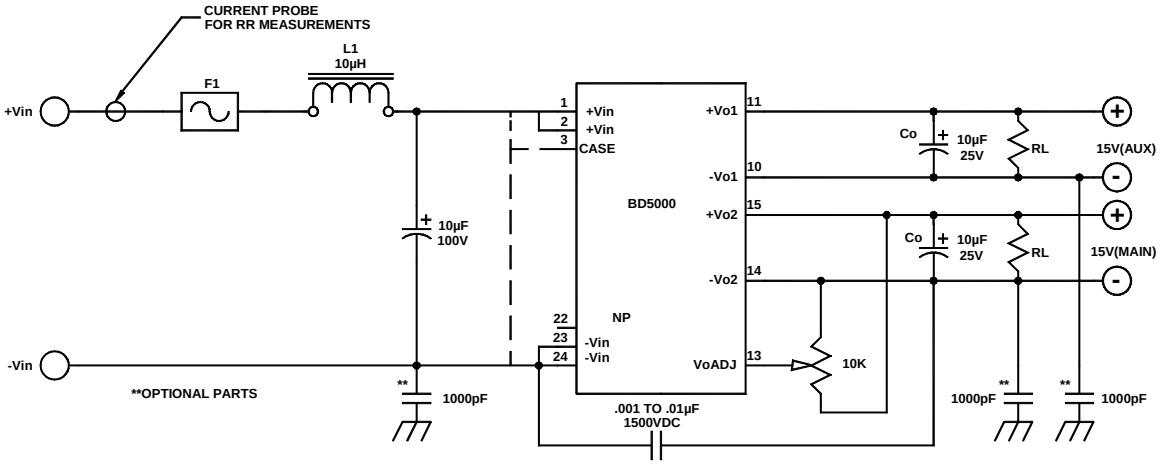


FIGURE 2. Typical connection diagram of BD5000 and BD5000X (±15V)

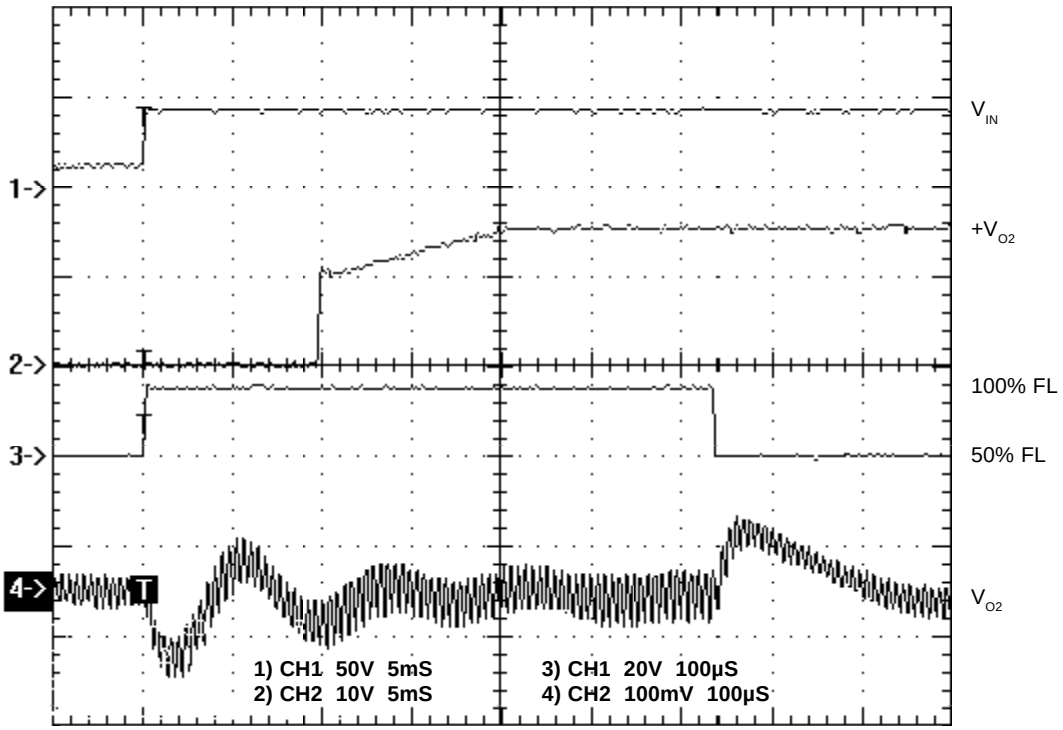


FIGURE 3. Turn on delay with soft start and transient response of BD5000 and BD5000X (Obtained with components in Figure 2)

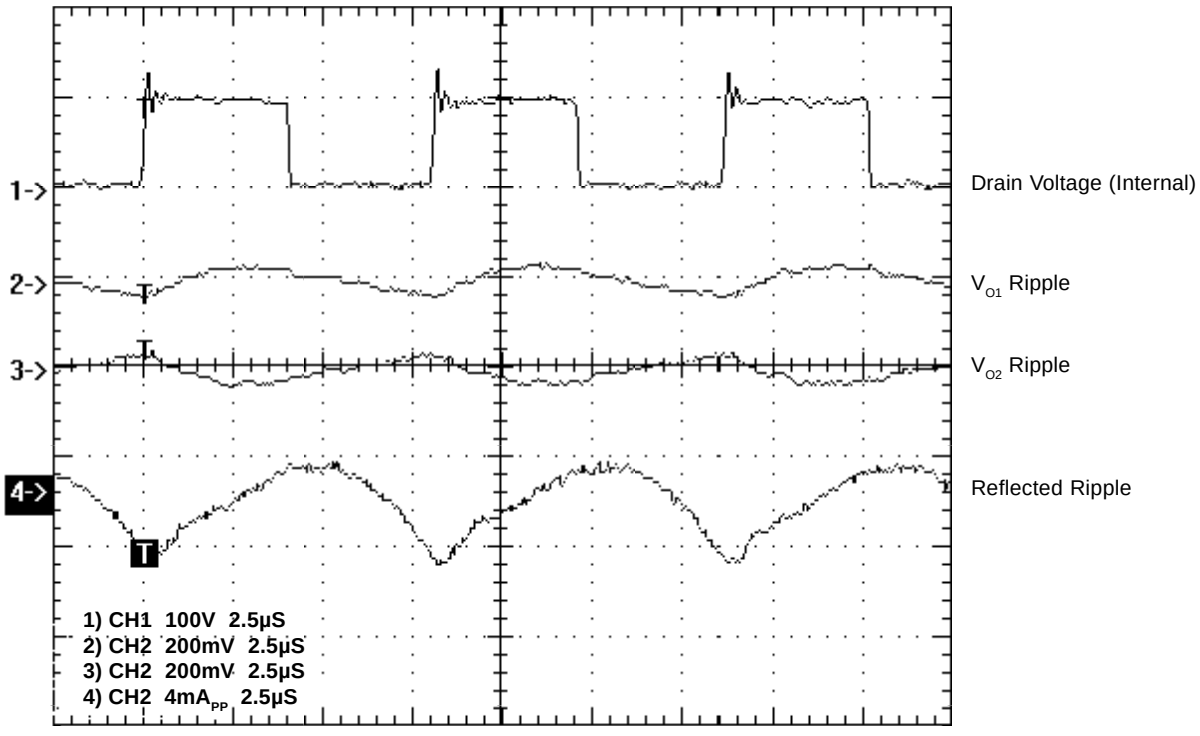


FIGURE 4. Output ripple V_{O1}, V_{O2} and reflected ripple of BD5000 and BD5000X (Obtained with components in Figure 2)