



BD5000 & BD5000X

3W DC/DC CONVERTERS IN 24-PIN DIP
 $48V_{IN} \pm 15V_{OUT}$

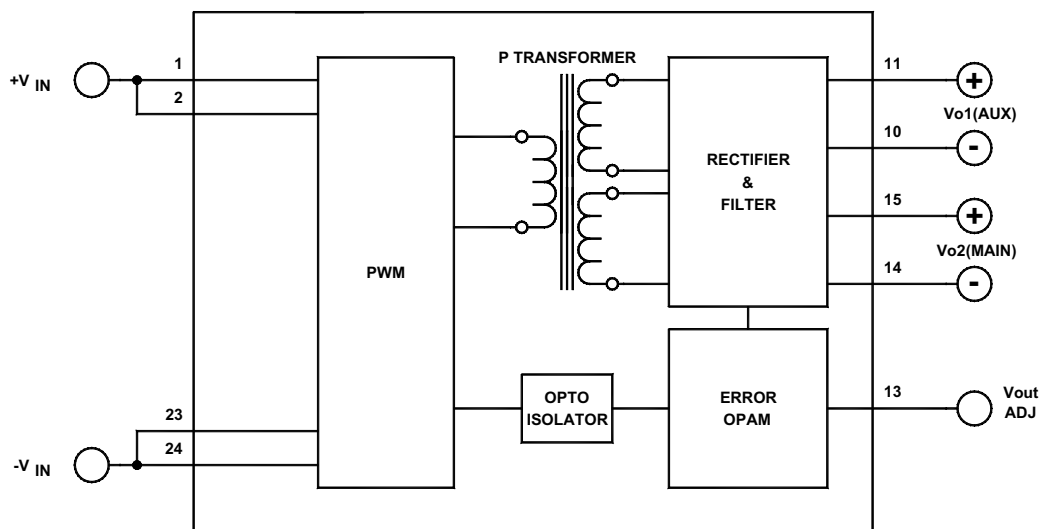
Key Features

- 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 $-40^{\circ}C$ to $+70^{\circ}C$; the BD5000X operates from $-40^{\circ}C$ to $+85^{\circ}C$.



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	$I_o = FL, C_{IN} = 10\mu F$				
Input Surge Current (20 μ S 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		%/ $^{\circ}$ 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	± 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

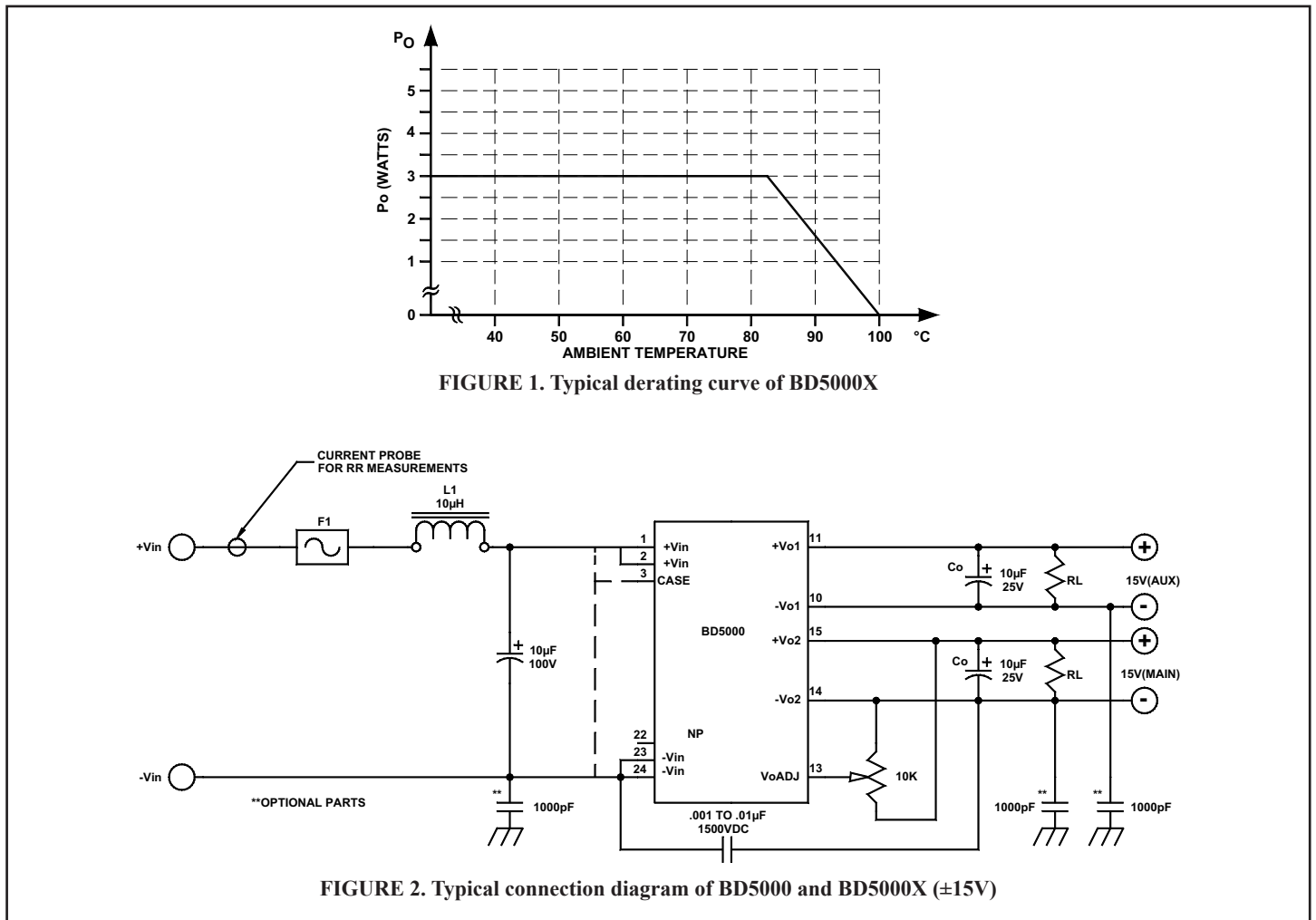
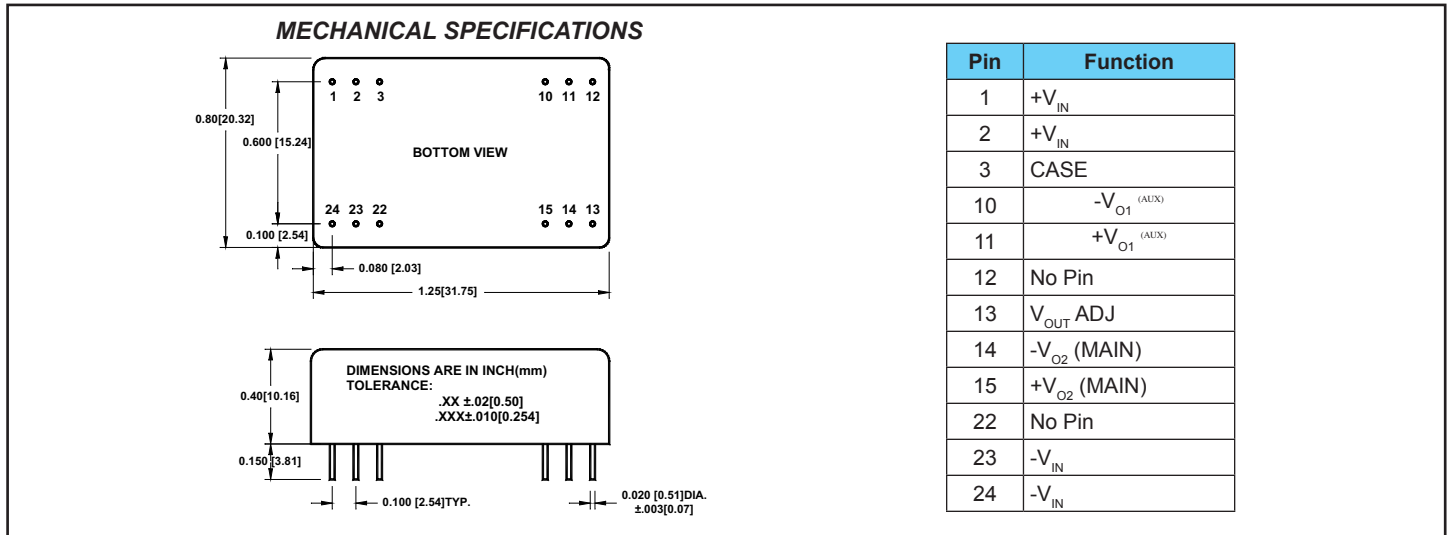
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient)	BD5000, See Figure 1	-40		+70	$^{\circ}$ C
	BD5000X, See Figure 1	-40		+85	$^{\circ}$ C
Storage Temperature Range		-60		+105	$^{\circ}$ C
Thermal Shutdown ²	Case temperature (Input power must be recycled)	96	100	104	$^{\circ}$ C
Thermal Resistance	Maximum case temperature is 36 $^{\circ}$ C above ambient		36	43	$^{\circ}$ C/W
Derating	See Figure 1				
Humidity	Up to 95% non-condensing				
Cooling	Free-air convection				
MTBF	per MIL-HNBK-217F (Ground benign, +25 $^{\circ}$ C)		1.3×10^6		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				
EMI/RFI	Six-sided continuous				
Shielding Connection	Case (Pin 3)				

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.



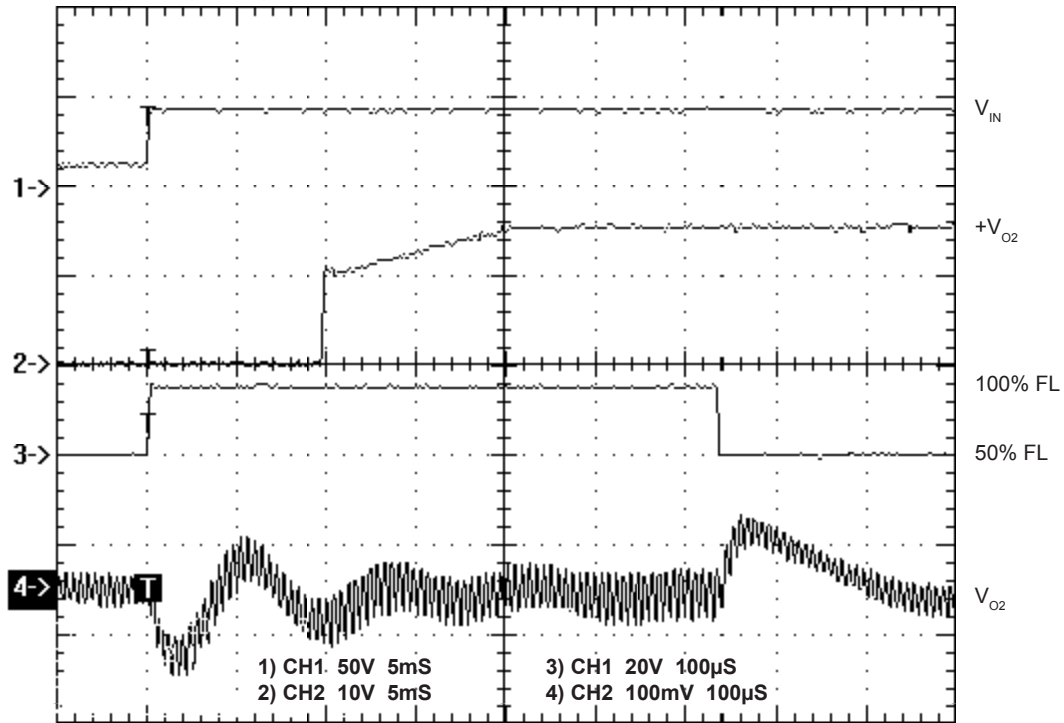


FIGURE 3. Turn on delay with soft start and transient response of BD5000 and BD5000X
(Obtained with components in Figure 2)

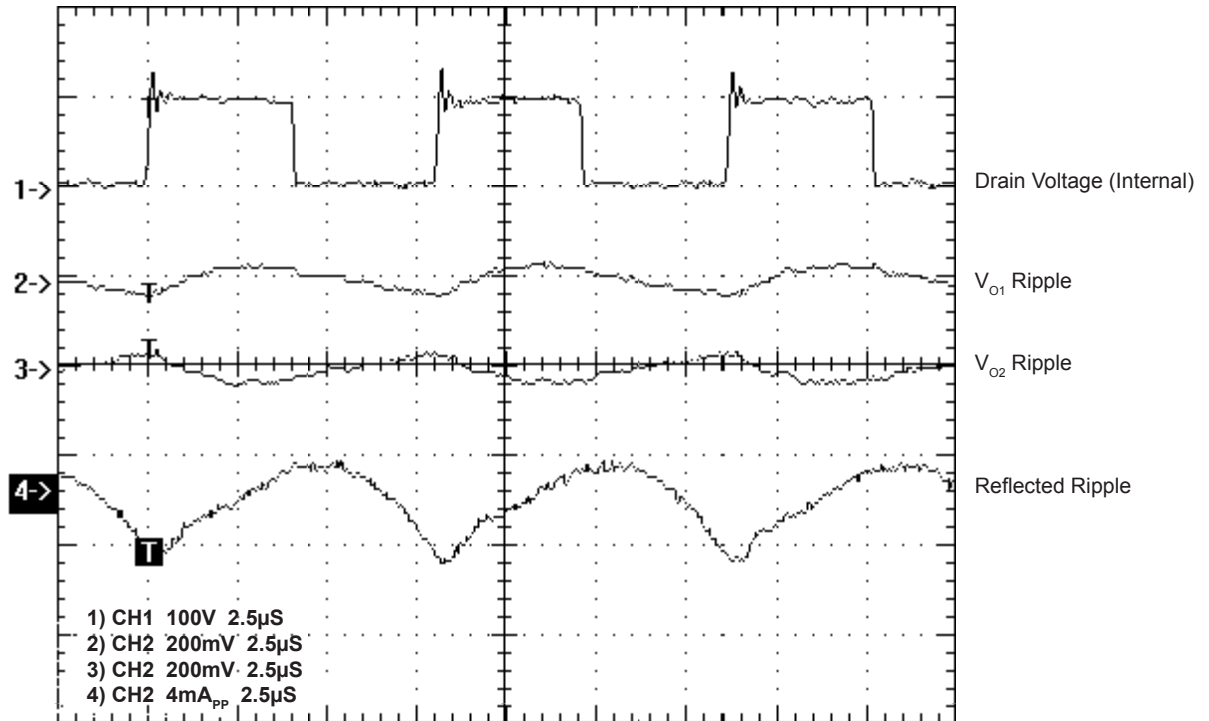


FIGURE 4. Output ripple V_{O1} , V_{O2} and reflected ripple of BD5000 and BD5000X
(Obtained with components in Figure 2)