



# BD10013

## 5W TRIPLE DC/DC CONVERTER

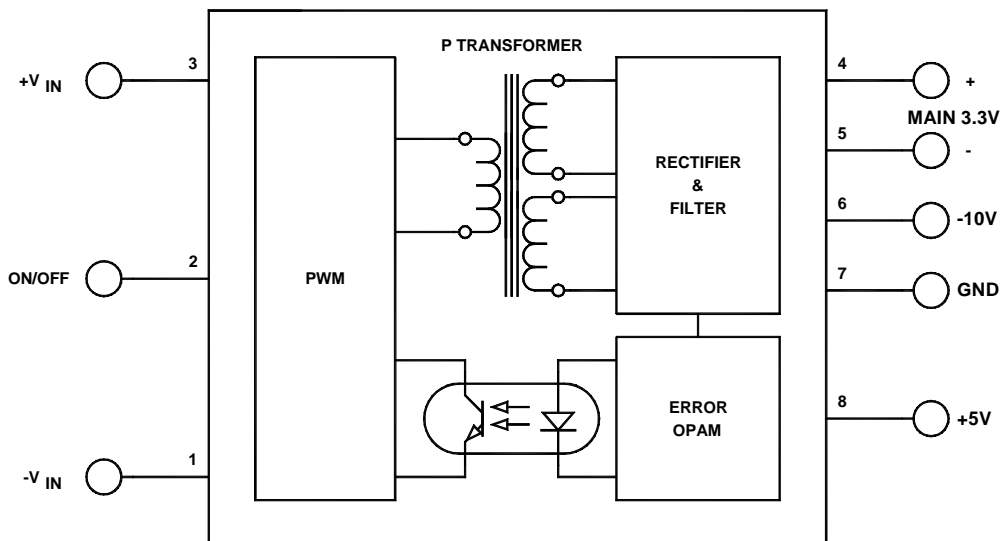
### Key Features

- Input-to-output isolation
- Soft start
- Hot pluggable
- Input Pi filter
- Short circuit and thermal protection
- 50 $\mu$ A off state current
- Wide input voltage range (24–48Vdc)
- EMI six-sided shielding



### Functional Description

The BD10013 is a 5W Triple DC/DC Converter in a 2x1x0.395-inch package that provides +3.3V<sub>OUT</sub>@1A, +5V<sub>OUT</sub>@200mA and -10V<sub>OUT</sub>@100mA with an operating temperature range from -55°C to +85°C. The 3.3V<sub>OUT</sub> is isolated from input to output and from the other two outputs.



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.

### INPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Input Voltage Range (2:1)		24	34	48	V
Input Filter	$\pi$ (Pi)				
Reflected Ripple Current			100		mA <sub>PP</sub>
Reverse Voltage Protection	Parallel diode		5		A
On/Off	Reference to $-V_{IN}$				
Voltage	Open		10		V
Unit On	Open				
Unit Off	Short to $-V_{IN}$				
Off State Current	Pin 2 short to Pin 3		50	120	$\mu$ A
Turn On Delay	Including soft start		5	8	mS
Startup Input Voltage		11	16		V

### OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
<b>3.3V OUTPUT</b>					
Output Voltage Accuracy			1		%
Output Current			1		A
Ripple & Noise (20MHz BW)			1	3	% of $V_{OUTPP}$
Line Regulation	Outputs fully loaded		1		%
Load Regulation	0 FL to FL		1		%
OVP			3.9		V
<b>5V OUTPUT</b>					
Output Voltage Accuracy			5		%
Output Current			200		mA
Ripple & Noise (20MHz BW)			2	3	% of $V_{OUTPP}$
Line Regulation	Outputs fully loaded		2		%
Load Regulation	10% FL to FL		5		%
OVP			6.8		V
<b>10V OUTPUT</b>					
Output Voltage Accuracy			5		%
Output Current			100		mA
Ripple & Noise (20MHz BW)			2	3	% of $V_{OUTPP}$
Line Regulation	Outputs fully loaded		2		%
Load Regulation	10% FL to FL		5		%
OVP			15		V
Temperature Coefficient @ FL			$\pm 0.02$		%/°C
Short Circuit Protection	Continuous, Current limit				
Short Circuit Restart	Automatic				
Transient Response (to within 1% of $V_{OUT}$ )	50% FL to 100% FL to 50% FL		100	200	$\mu$ S

### GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			74		%
Isolation Voltage (1 min.)		500	1000		Vdc
Isolation Resistance			$10^9$		$\Omega$
Isolation Capacitance			300		pF
Switching Frequency		108	125	130	kHz

## ENVIRONMENTAL SPECIFICATIONS

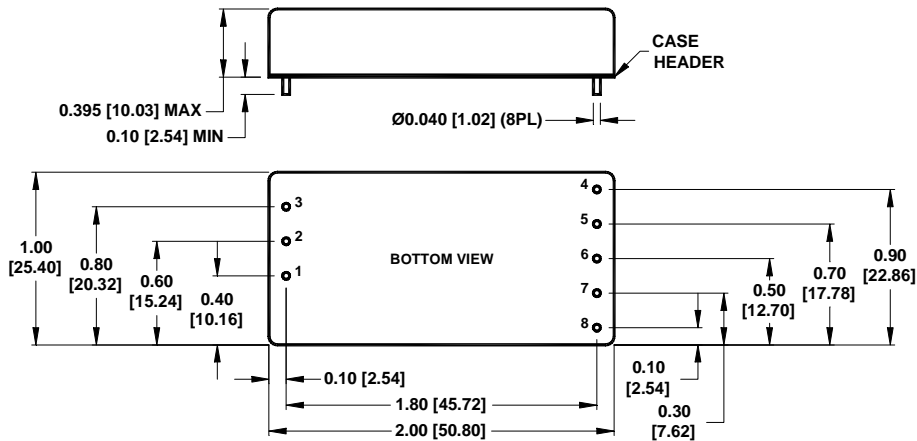
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient)		-55		+85	°C
Storage Temperature Range		-60		+125	°C
Derating	None required				
Thermal Protection, Turn Off	Junction temperature		145		°C
Thermal Protection, Turn On after Thermal Shutdown	Junction temperature		115		°C
Thermal Hysteresis			30		°C
Humidity	Up to 95% non-condensing				
Cooling	Free air convection				
MTBF	per MIL-HNBK-217F (Ground benign, +25°C)		TBD		hours

## PHYSICAL CHARACTERISTICS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimensions (LxWxH)	2.00x1.00x0.395 in. (50.80x25.40x10.03mm)				
Weight	1.04 oz. (30g)				
Case Material	Coated metal				
Shielding	Six-sided continuous				
Case Connection	-V <sub>N</sub> (Pin 1)				

## MECHANICAL SPECIFICATIONS

in inches [mm]



Pin	Function
1	-V <sub>IN</sub>
2	ON/OFF
3	+V <sub>IN</sub>
<b>TRIPLE</b>	
4	+3.3V <sub>OUT</sub>
5	-3.3V <sub>OUT</sub>
6	-10V <sub>OUT</sub>
7	GND (for +5V <sub>OUT</sub> & -10V <sub>OUT</sub> )
8	+5V <sub>OUT</sub>