

PRELIMINARY



BD21004

2.5W HIGH-VOLTAGE, FOUR OUTPUT DC/DC CONVERTER

$12V_{IN}$

$100V_{OUT}@5mA, 50V_{OUT}@2.5mA, -350V_{OUT}@2.5mA, 75V_{OUT}@5mA$

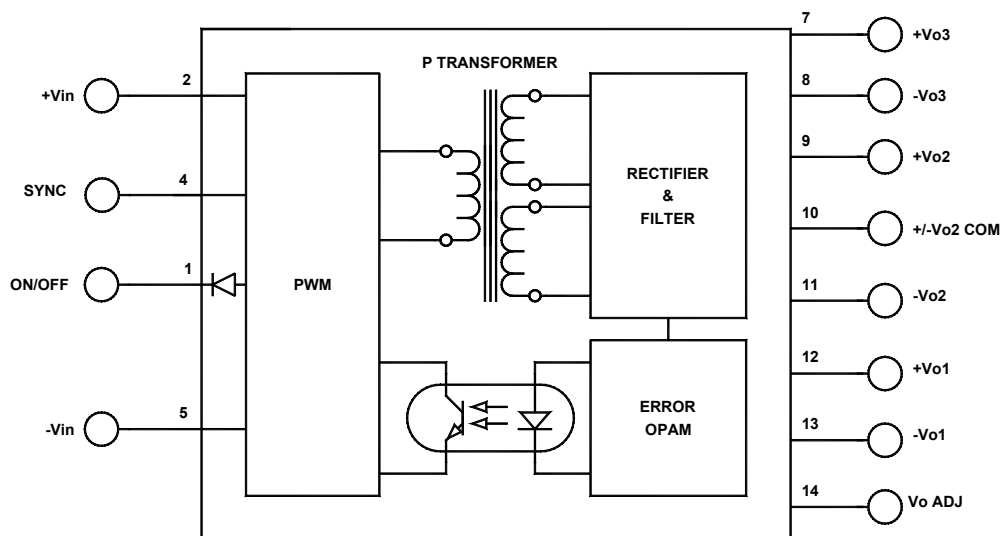
Key Features

- 4 outputs
- Input-to-output isolation
- Output-to-output isolation
- Soft start
- Input LC filter
- Short circuit
- EMI six-sided shielding



Functional Description

The BD21004 is a 2.5W high-voltage, four output DC/DC converter in a 3.00×2.50×0.75-inch package that accepts $12V_{IN}$ and provides four outputs: $100V_o@5mA$, $50V_o@2.5mA$, $-350V_o@2.5mA$, and $75V_o@5mA$ with an operating temperature range from $-25^{\circ}C$ to $+60^{\circ}C$. All outputs are isolated from the input and each other.



Typical Block Diagram

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Electrical Specifications INPUT SPECIFICATIONS

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 Range		11	12	30	Vdc
Input Voltage Slew Rate				10	V/μS
No Load Input Current	@12Vdc		93		mA
Full Load Input Current	@12Vdc		428		mA
Input Filter	LC				
Reflected Ripple Current	Measured with 100μF input capacitor, See Figure 1		100		mA _{pp}
Reverse Voltage Protection	Parallel Diode		5		A
On/Off	Reference to -V _{IN}				
Voltage	Open		10		Vdc
Turn On Delay	Including soft start, See Figure 2		200	250	mS
Startup Input Voltage		11			Vdc

OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Output Voltage	+V ₀₁ (measured from pin#12 to pin#13)		100		Vdc
Output Voltage Accuracy			1		%
Output Current			5		mA
Ripple & Noise (20MHz BW)			1	4	% of V _{OUTPP}
Line Regulation	Outputs fully loaded		1		%
Load Regulation	10% FL to FL		1		%
Output Voltage	+V ₀₂ (measured from pin#9 to pin#10)		50		Vdc
Output Voltage Accuracy			1		%
Output Current			2.5		mA
Ripple & Noise (20MHz BW)			1		% of V _{OUTPP}
Line Regulation	Outputs fully loaded		1		%
Load Regulation	10% FL to FL		1		%
Output Voltage	-V ₀₂ (measured from pin#11 to pin#10)		-350		Vdc
Output Voltage Accuracy			5	10	%
Output Current			2.5		mA
Ripple & Noise (20MHz BW)			2	4	% of V _{OUTPP}
Line Regulation	Outputs fully loaded		5		%
Load Regulation	10% FL to FL, Main fully loaded		5		%
Output Voltage	V ₀₃ (measured from pin#7 to pin#8)		75		Vdc
Output Voltage Accuracy			5	10	%
Output Current			5		mA
Ripple & Noise (20MHz BW)			2	4	% of V _{OUTPP}
Line Regulation	Outputs fully loaded		5	10	%
Load Regulation	10% FL to FL, Main fully loaded		5	10	%
Temperature Coefficient @ FL			±0.02		%/°C
Short Circuit Protection	Continuous, Current Limit				
Short Circuit Restart	Automatic				
Transient Response (to within 1% of Vo), Main	50% FL to 100% FL to 50% FL		250		μS

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GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			57		%
Isolation Voltage (1 min.)		500	1000		Vdc
Isolation Resistance			10^9		Ω
Isolation Capacitance			300		pF
Switching Frequency			93		kHz

ENVIRONMENTAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature Range (Ambient)		-25		+60	°C
Storage Temperature Range		-60		+125	°C
Derating	See Figure 7				
Thermal Protection, Turn Off ¹	Junction Temperature		145		°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 (L×W×H)	3.00×2.50×0.75 in. (76.20×63.50×19.05mm)				
Weight	7.6 oz. (215g)				
Case Material	Coated copper				
Shielding	Six-sided continuous				
Case Connection	-V _{in} (pin#5)				

¹ The input power may have to be recycled after thermal turn off.

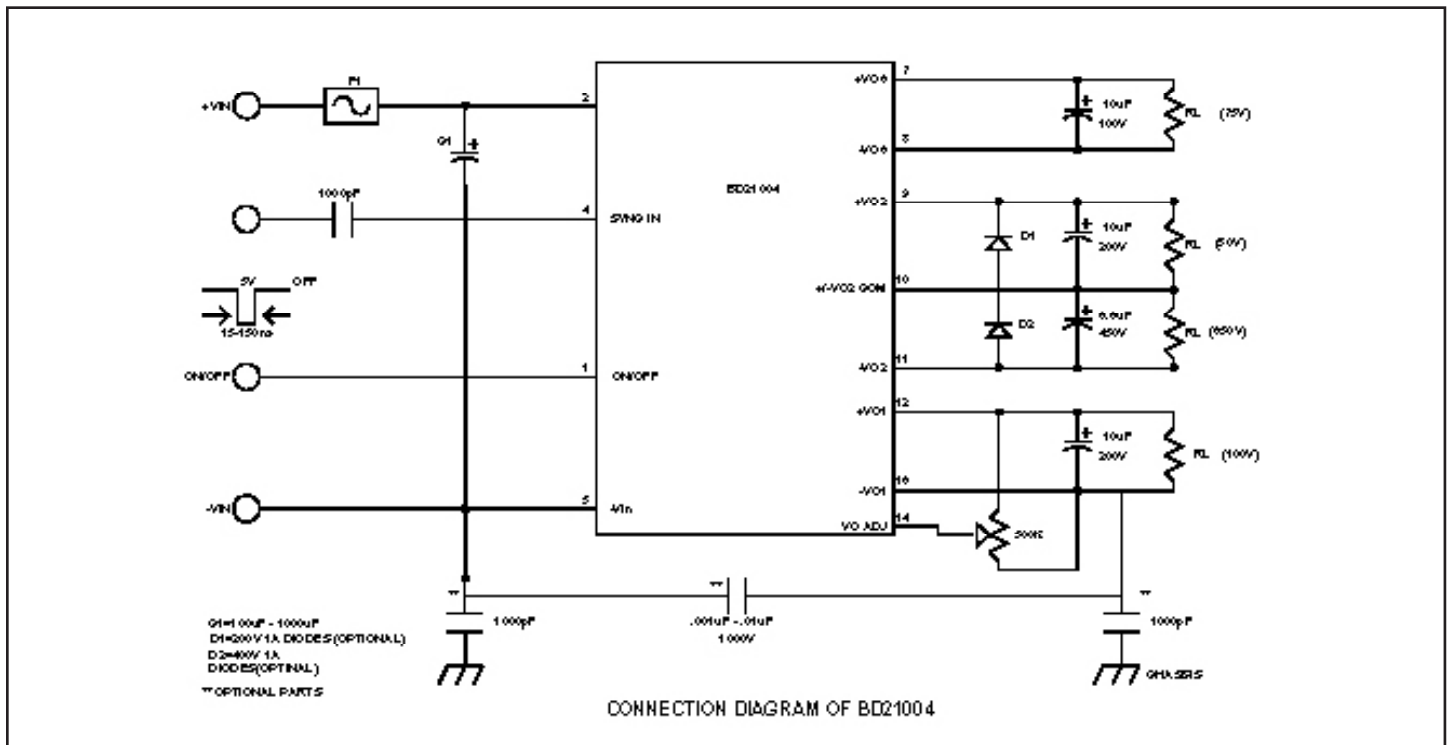
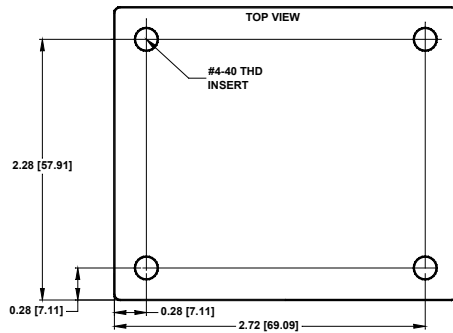


FIGURE 1. Connection diagram

MECHANICAL SPECIFICATIONS



Pin	Function	Pin	Function
1	ON/OFF	7	+V _{O3} (+75V)
2	+V _{IN}	8	-V _{O3} (-75V)
3	No Pin	9	+V _{O2} (+50V) *
4	SYNC	10	±V _{O2} , COM
5	-V _{IN}	11	-V _{O2} (-350V) *
		12	+V _{O1} (+100V)
		13	-V _{O1} (-100V)
		14	V _{OUT} ADJ

* For 400V, connect the load between Pin 9 (+50V) and Pin 11 (-350V)

