

# PRELIMINARY

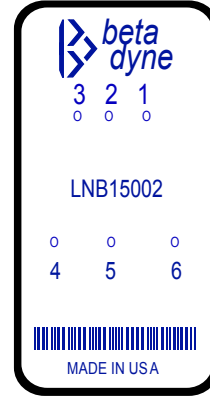


## Low-Noise LNB15002 DC/DC CONVERTER

Dual  $\pm 18V_{OUT}$  5mV Low Noise Input Range 18-36V<sub>IN</sub>  
US Patent 5,777,519

### Key Features

- Wide input voltage range (2:1)
- Less than 5mV output noise
- Efficiency up to 89%
- Six-sided shielding
- Soft start
- Short circuit protection
- Adjustable output
- 1mA off state current
- 250mV dropout linear regulators
- Dual output tracking linear regulator
- 5 $\mu$ S transient response
- Industry pinouts



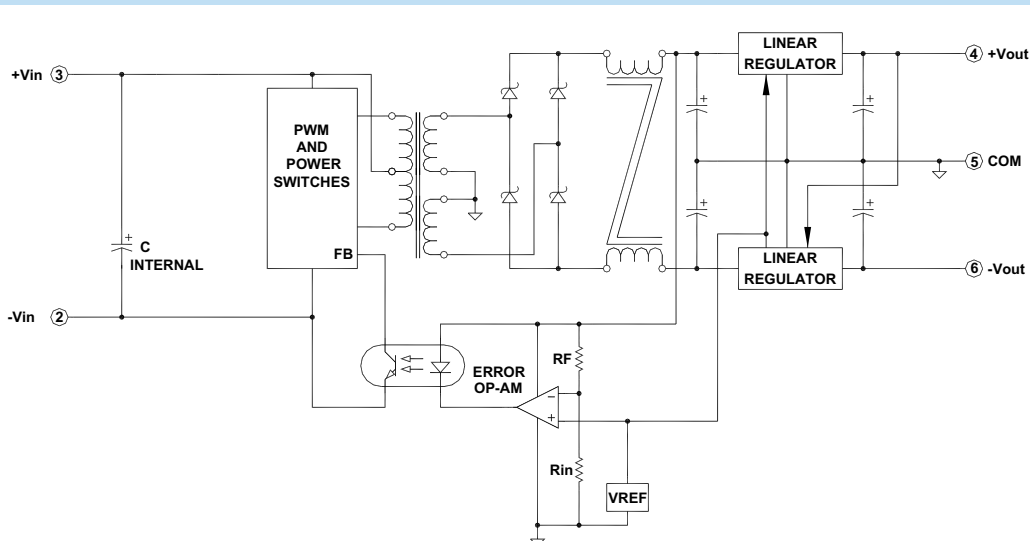
Beta Dyne is protected under various patents, including but not limited to U.S. Patent numbers: 5,777,519; 6,188,276; 6,262,901; 6,452,818; 6,473,3171.

### Applications

High-Resolution Data Converters  
Instrumentation  
Test & Measurement  
Telecom

### Functional Description

The Low-Noise LNB15002 series is a family of high-performance, low-noise, low-cost isolated DC/DC converter consisting of  $\pm 18V_{OUT}$ . The converter incorporates low switching noise techniques at its input and output sections. Low dropout linear regulators reduce the output noise to 5mV<sub>pp</sub>, while a patented control circuit maintains minimum constant dropout voltage over line, load, temperature and output adjust ranges.



Typical Block Diagram of LNB15002 Dual Output Converter

## 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		18	24	36	Vdc
Input Filter	LC				
Reverse Polarity Input Current	External series-blocking diode			12	A
Input Surge Current (20µS Spike)				10	A
Input Current			696		mA
No Load Current			10		mA
Short Circuit Current Limit			150		% I <sub>IN</sub>
Undervoltage Shutdown, 24V <sub>in</sub> Models		13			Vdc
Off State Current, 24V <sub>in</sub>			750		µA
Remote ON/OFF Control					
Converter ON	Open (Open circuit voltage at Pin 1: 10V Max.)				
Converter OFF		-0.6	0	0.2	Vdc
Logic Input Reference	-Input				
Logic Compatibility	TTL Open Collector or CMOS Open Drain				

### OUTPUT SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Output Voltage			±18		Vdc
Output Current			±417		mA
Output Voltage Accuracy			±1	±1.5	%
Minimum Load		10			% of FL
Ripple & Noise (20 MHz Bandwidth)	See Figure 6, without external capacitor		20		mV <sub>PP</sub>
Ripple & Noise (20 MHz Bandwidth)	See Figure 6, with extra external capacitor		5		mV <sub>PP</sub>
Line Regulation, Single and Dual	Minimum V <sub>IN</sub> to maximum V <sub>IN</sub>		±.1		%
Load Regulation, Single	NL to FL		±.1		%
Temperature Coefficient @ FL			0.02		%/°C of V <sub>OUT</sub>
Transient Response Time (to within 0.5% of V <sub>OUT</sub> )	50% FL to FL to 50% FL, See Figure 1				µS
Short Circuit Protection	All outputs, by Hiccup technique				

### GENERAL SPECIFICATIONS

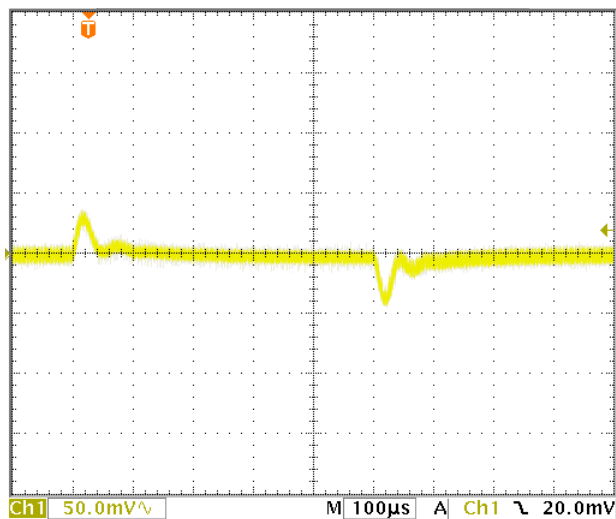
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			89		%
Isolation Voltage (1 min.)			1500		Vdc
Isolation Resistance			10 <sup>9</sup>		Ω
Isolation Capacitance			80		pF
Switching Frequency			160		kHz

### ENVIRONMENTAL SPECIFICATIONS

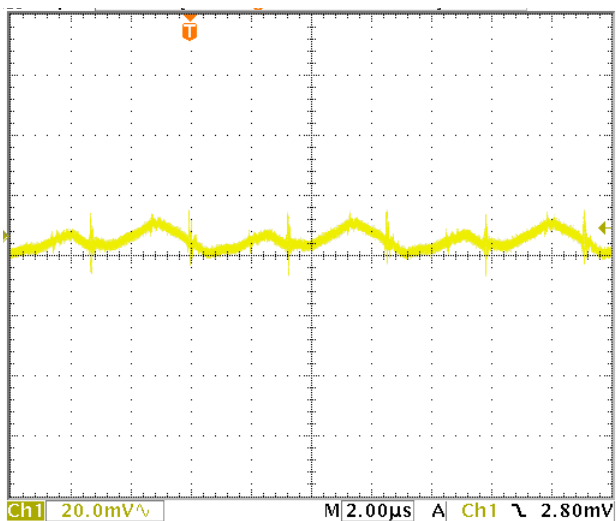
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Operating Temperature, Industrial (Ambient)*		-40		+75	°C
Operating Temperature, Extended (X)	See Ordering Guide (Please contact factory)	-55		+85	°C
Storage Temperature Range		-55		+125	°C
Maximum Operating Case Temperature				105	°C
Humidity	Up to 95% non-condensing				
Cooling	Free-air convection				
EMI/RFI	Six-sided continuous shielded metal case				
MTBF	per MIL-HNBK-217F (Ground benign, +25°C)		1×10 <sup>6</sup>		hours

**PHYSICAL CHARACTERISTICS**

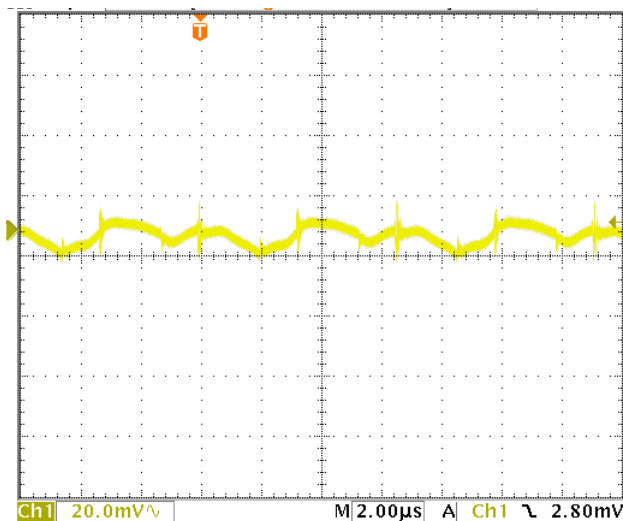
PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Dimensions (L×W×H)	2.00×1.00×0.445 in. (50.80×25.40×11.43mm)				
Weight	1.04 oz. (30g)				
Case Material	Coated metal				
Shielding Connection, 24V <sub>IN</sub>	-Input (Pin 2)				



**FIGURE 1. Transient response of LNB15002 from Full Load to Half Load to Full Load**



**FIGURE 2. Output ripple of LNB15002 on +Vout as shown in Figure 6.**



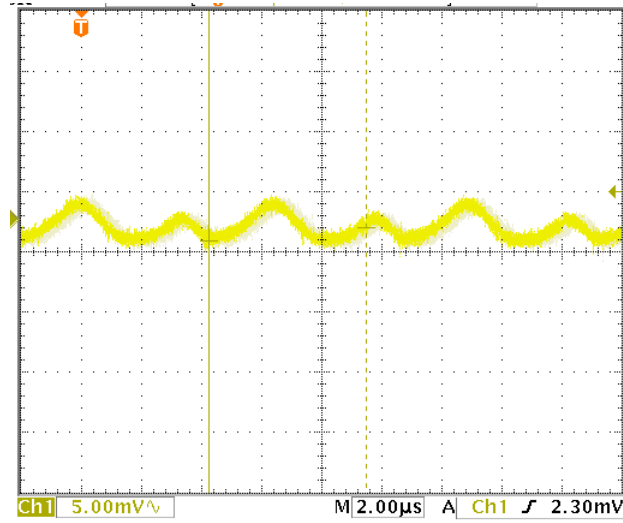
**FIGURE 3. Output ripple of LNB15002 on -Vout as shown in Figure 6.**

<sup>1</sup> Contact factory for -55° to +85°C operating temperature range.

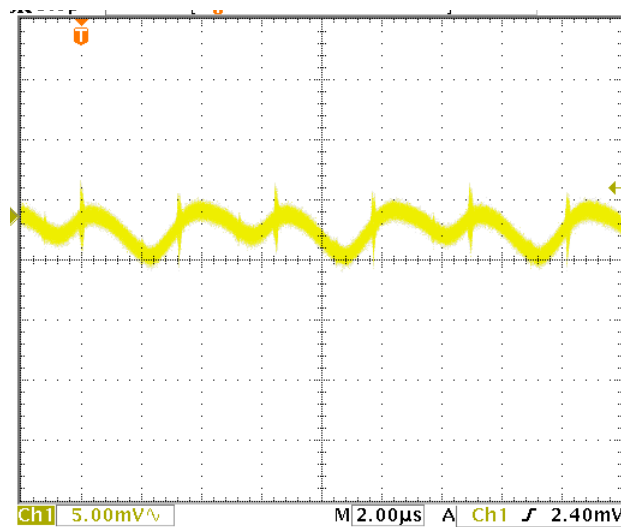
<sup>2</sup> The maximum input current at any given input range measured at minimum input voltage is given as  $1.6 \cdot I_{\text{NOMINAL}}$ . Nominal input current is the typical value measured at the input of the converter under full-load room temperature and nominal input voltage ( $24V_{\text{IN}}$ ).

<sup>3</sup> Adequate insulation is to be provided to the converters at the end usage as per applicable requirements.

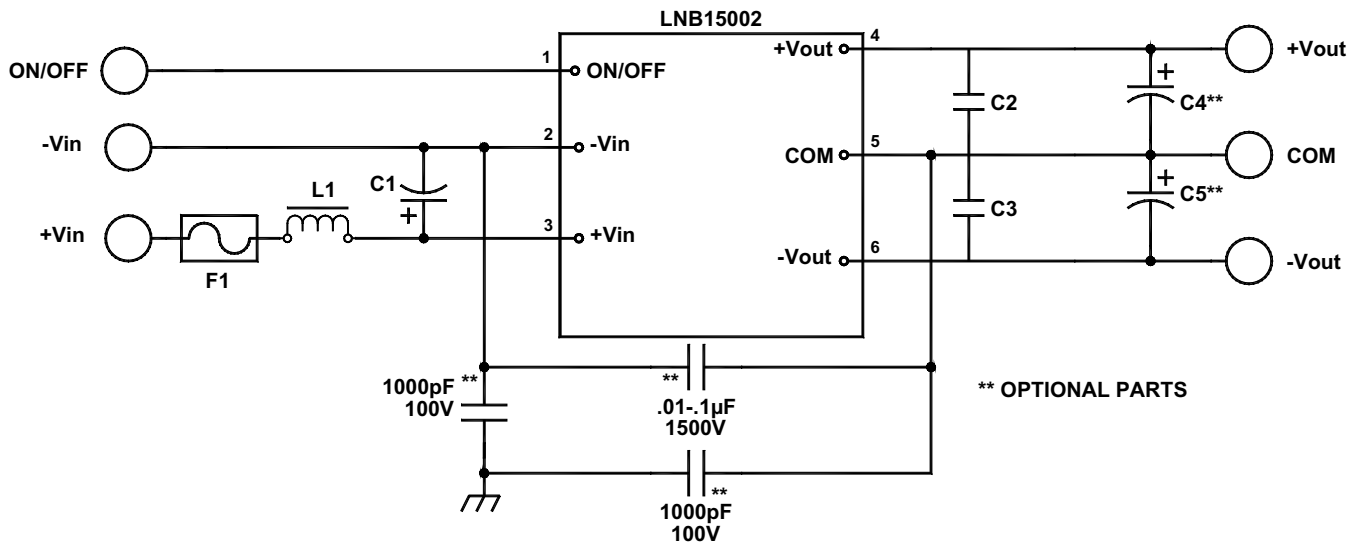
<sup>4</sup> Temperature rise on the case of the converters is to be considered during the end usage as per applicable requirements.



**FIGURE 4. Output ripple of LNB15002 on +Vout with another external cap of  $47\mu\text{F}@25\text{V}$  as shown in Figure 6.**



**FIGURE 5. Output ripple of LNB15002 on -Vout with another external cap of  $47\mu\text{F}@25\text{V}$  as shown in Figure 6.**

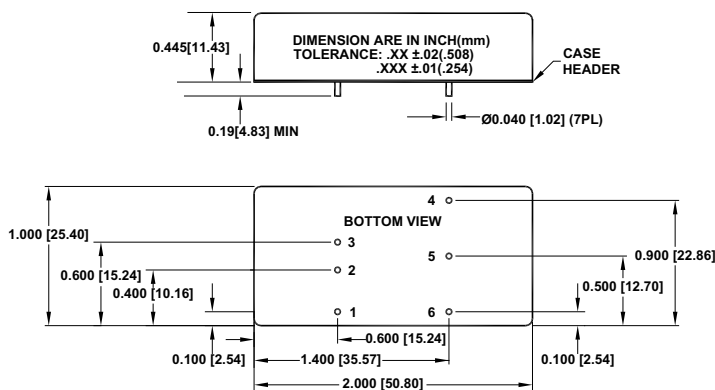


**Typical Values**

- F1 2 A Slow Blow
- C1 = 100µF@100V
- C2,C3 = 10µF@25V
- C4,C5 = 47µF@25V Low ESR

**FIGURE 6. Typical connection diagram of LNB15002 DC/DC Converter**

**MECHANICAL SPECIFICATIONS**



Pin	Function
<b>DUAL</b>	
1	ON/OFF
2	-V <sub>IN</sub>
3	+V <sub>IN</sub>
4	+V <sub>OUT</sub>
5	Common
6	GND

**PRELIMINARY**