PRELIMINARY

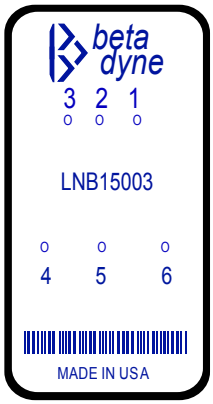
Low-Noise LNB15003 DC/DC Converter

Dual +/-18V_{OUT} 5mV Low Noise Input Range 9-18V_{IN}

US Patent 5,777,519

Key Features

- Wide input voltage range (2:1)
- Efficiency up to 88%
- Six-sided shielding
- Soft start
- Short circuit protection
- Adjustable output
- 1mA off state current
- 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

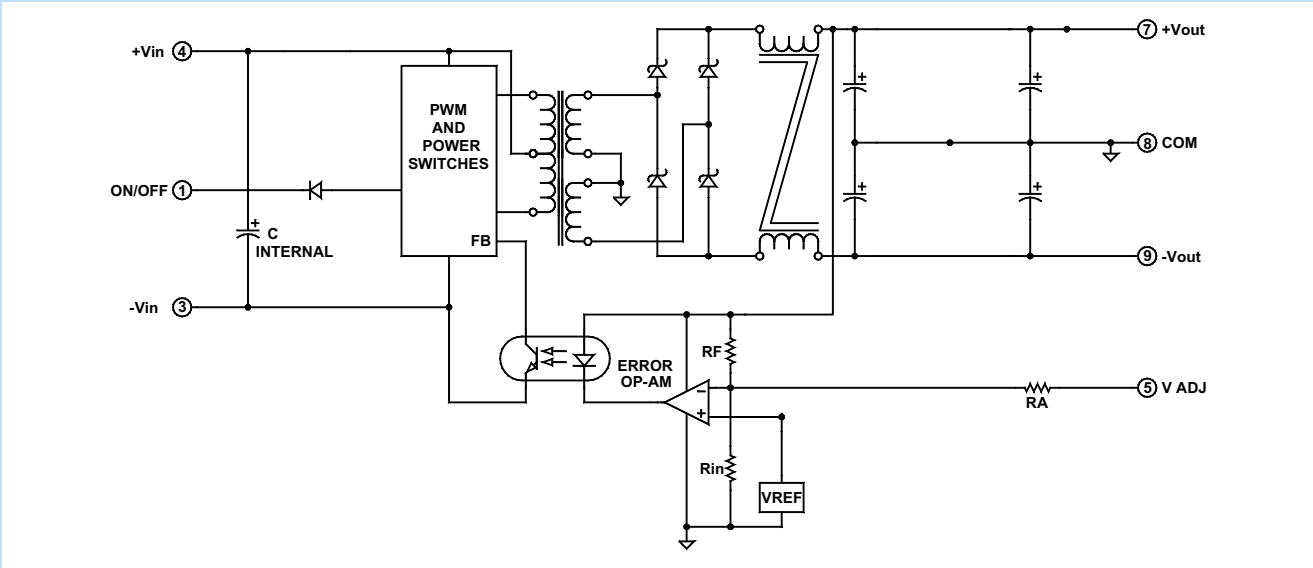
Instrumentation

Test & Measurement

Telecom

Functional Description

The Low-Noise LNB15003 series is a family of high-performance, low-noise, low-cost isolated DC/DC converter consisting of +/-18V_{OUT}. The converter incorporates low switching noise techniques at its input and output sections.



Typical Block Diagram of LNB15003 Dual Output Converter

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		9	12	18	Vdc
Input Filter	LC				
Reverse Polarity Input Current	External series-blocking diode			12	A
Input Surge Current (20µS Spike)				10	A
Input Current			1422		mA
No Load Current			20		mA
Short Circuit Current Limit			150		% I_{IN}
Undervoltage Shutdown, 24V_{in} Models		13			Vdc
Off State Current, 24V_{in}			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_{PP}
Ripple & Noise (20 MHz Bandwidth)	See Figure 6, with extra external capacitor		5		mV_{PP}
Line Regulation, Single and Dual	Minimum V_{IN} to maximum V_{IN}		±.1		%
Load Regulation, Single	NL to FL		±.1		%
Temperature Coefficient @ FL			0.02		%/°C of V_{OUT}
Transient Response Time (to within 0.5% of V_{OUT})	50% FL to FL to 50% FL, See Figure 1		100		µS
Short Circuit Protection	All outputs, by Hiccup technique				

GENERAL SPECIFICATIONS

PARAMETER	CONDITION / NOTE	MIN	TYP	MAX	UNIT
Efficiency			88		%
Isolation Voltage (1 min.)			1500		Vdc
Isolation Resistance			10^9		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)		1×10^6		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, $24V_{IN}$	-Input (Pin 2)				

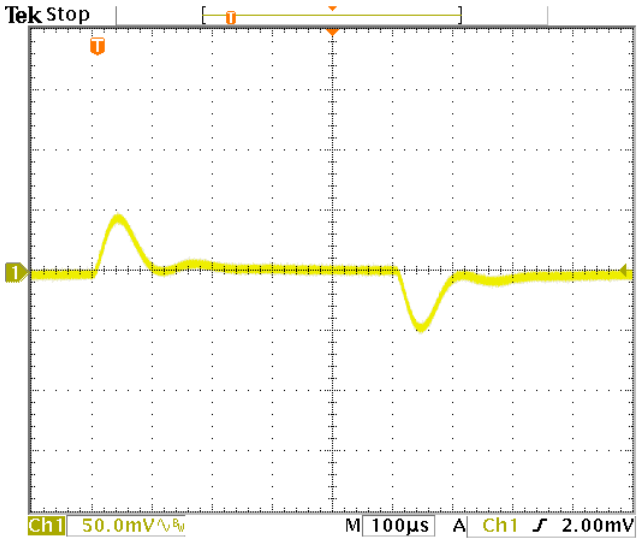


FIGURE 1. Transient response of LNB15003 from Full Load to Half Load to Full Load

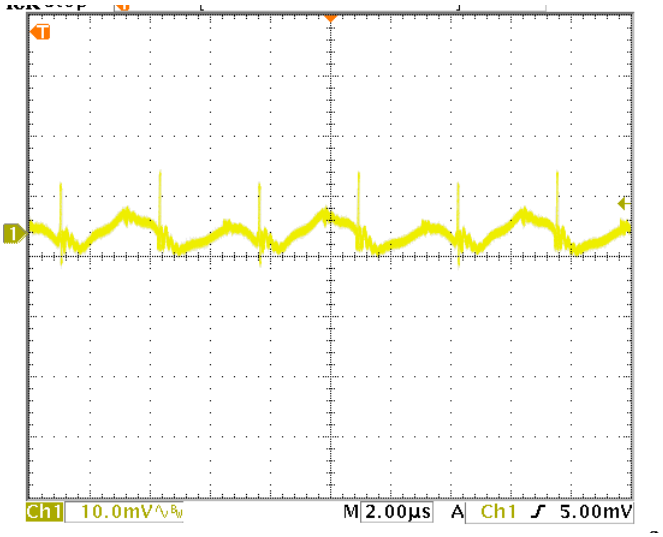


FIGURE 2. Output ripple of LNB15003 on +Vout as shown in Figure 6 without external capacitors.

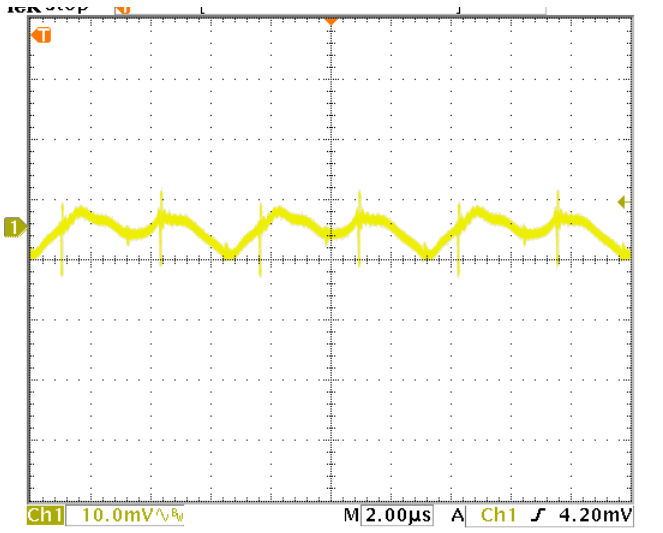


FIGURE 3. Output ripple of LNB15003 on -Vout as shown in Figure 6 without external capacitors.

[1] Contact factory for -55° to +85°C operating temperature range.
[2] The maximum input current at any given input range measured at minimum input voltage is given as $1.6*I_{NOMINAL}$. Nominal input current is the typical value measured at the input of the converter under full-load room temperature and nominal input voltage ($24V_{IN}$).
[3] Adequate insulation is to be provided to the converters at the end usage as per applicable requirements.
[4] Temperature rise on the case of the converters is to be considered during the end usage as per applicable requirements.

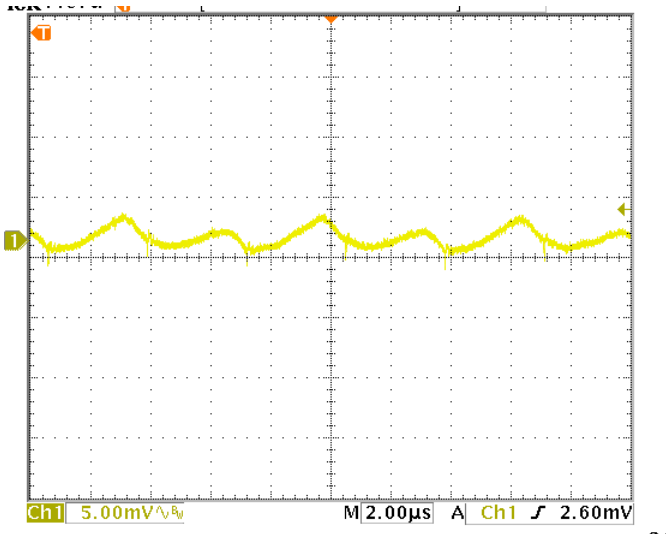


FIGURE 4. Output ripple of LNB15003 on +Vout with another external cap of 47µF@25V as shown in Figure 6.

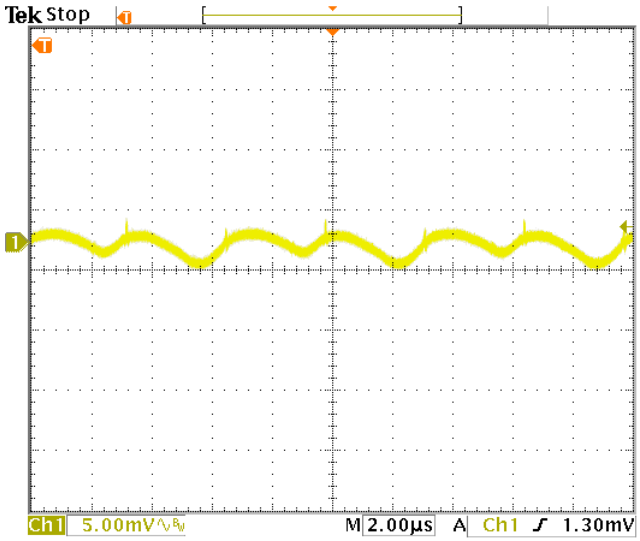
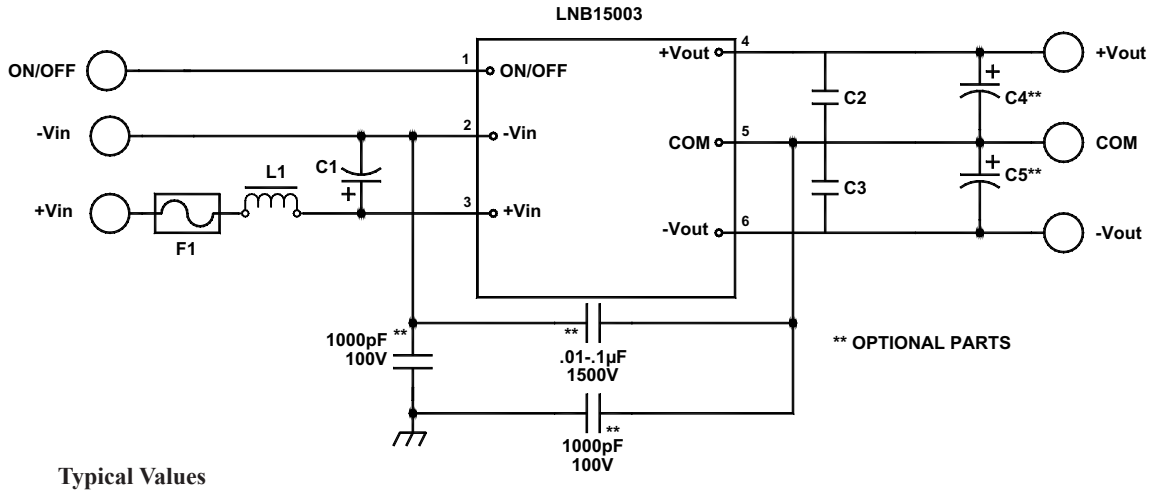


FIGURE 5. Output ripple of LNB15003 on -Vout with another external cap of 47µF@25V as shown in Figure 6.

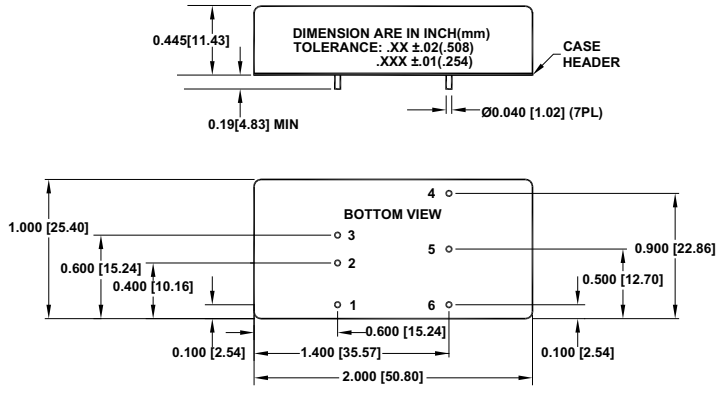


Typical Values

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

FIGURE 6. Typical connection diagram of LNB15003 DC/DC Converter

MECHANICAL SPECIFICATIONS



Pin	Function
	DUAL
1	ON/OFF
2	$-V_{IN}$
3	$+V_{IN}$
4	$+V_{OUT}$
5	Common
6	$-V_{OUT}$

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