

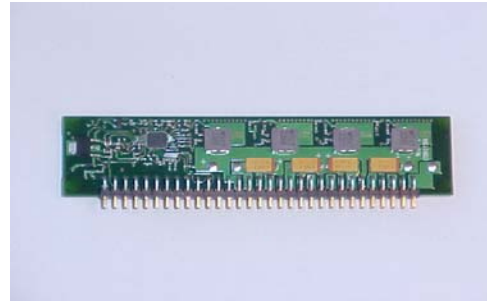
# NON-ISOLATED DC/DC CONVERTERS

12V Input / Programmable Output / 60A VRM 9/10 Compatible



## V7NB-60A160

- Remote on/off
- 2-Wire Remote sense
- Optional 5 bit or 6 bit VID schemes
  - Intel VRM 9.x compatible 1.1V to 1.6V
  - Intel VRM 10.x compatible 0.8375V to 1.6V
- Adaptive voltage positioning
- **Wider input range available – consult factory**



### Description

The V7NB-60A Series are non-isolated step down DC/DC converters providing up to 60A of peak output current and designed to be compatible to the Intel VRM 9 and VRM10 VID codes (maximum output voltage = 1.6V). Standard features include remote on/off, over current protection, remote sense and a power good signal. This product also makes use of adaptive positioning to improve transient response performance. Typical applications include file servers, work stations and other computing applications.

### Part Selection

Output Voltage	Input Voltage	Output Current (Thermal Design)	Output Current (Peak Current)	Typical Efficiency	Model Number
0.83 – 1.6V	12V	30A	60A	82%	V7NB-60A160

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage Range	10.3 VDC		13.2 VDC	
Input Current (disabled)		30mA		
Input Current (full load)			11.5A	
Reflected Ripple Current			150mA rms	With 100uF, 25mOhm capacitor and 200nH of input inductance.

### Output Specifications

Parameter	Min	Typ	Max	Notes
Output Current	0A		30A 60A	Thermal design Peak current rating
Set Point Accuracy	1.26V	1.28V	1.30V	no load, excluding Adaptive positioning, VID 10110
Adaptive Positioning (Droop Impedance)		1.0 mOhm		
Ripple and Noise		30mV		pk-pk, 0 to 20MHz Bandwidth Full load with 3 X 470uF polymer + 500uF ceramic on output.
Turn on Time		8mS	16mS	
Transient Response Deviation Settling Time		90mV 100uS		di/dt = 50A/uS Load step =0A to 60A. Cout = 3 X 470uF polymer + 500uF ceramic
Remote Sense Compensation		±0.3VDC		
Output Capacitance		2400uF		For applications requiring higher or lower output capacitance please consult

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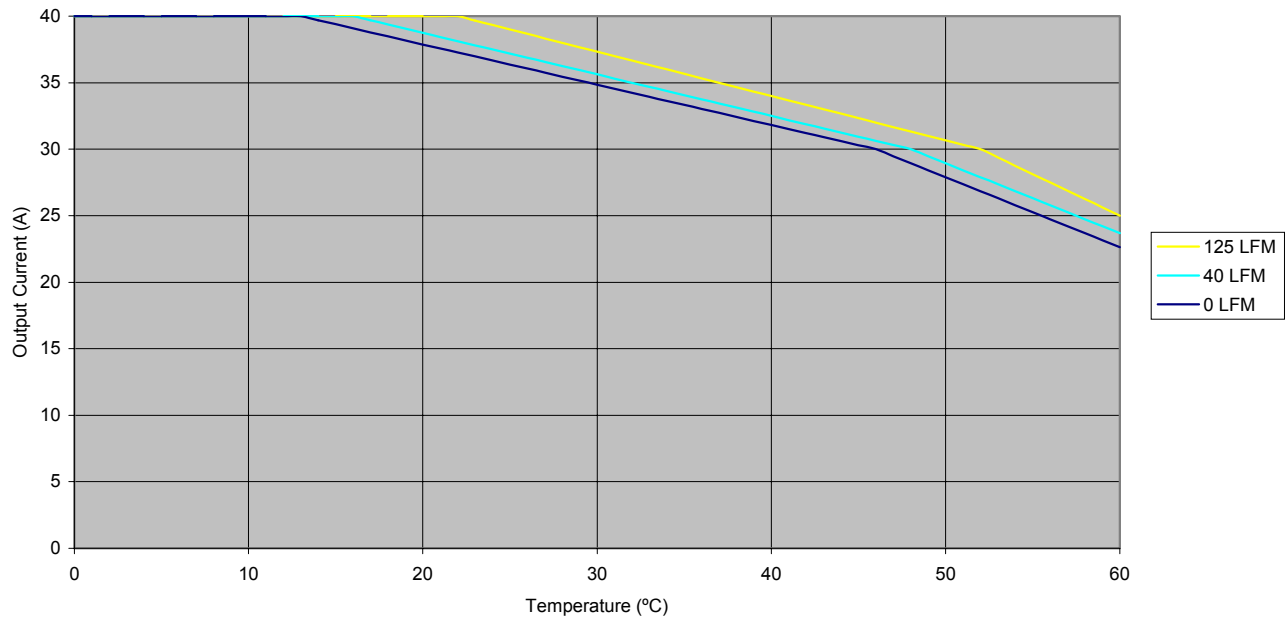


factory.

## General Specifications

Parameter	Specification
Switching Frequency	1.4 MHz typical (fixed)
Dimensions	
inches	3.8 x 1.0 x 0.40
mm	96.5 x 25.4 x 10.2
Operating Temperature	0°C to 60°C
Non-Operating Temperature	-40°C to 100°C
Protection Features	
Over current	110% to 170% max I <sub>o</sub>
Undervoltage	UVLO Vin < 9.5V
Remote On/Off	Active High
Efficiency (full load)	
1.30V output	82%

V7NB-60A160 Derating Curve



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### CORPORATE

**Bel Fuse Inc.**  
 206 Van Vorst Street  
 Jersey City, NJ 07302  
 Tel 201-432-0463  
 Fax 201-432-9542  
[www.belfuse.com](http://www.belfuse.com)

### FAR EAST

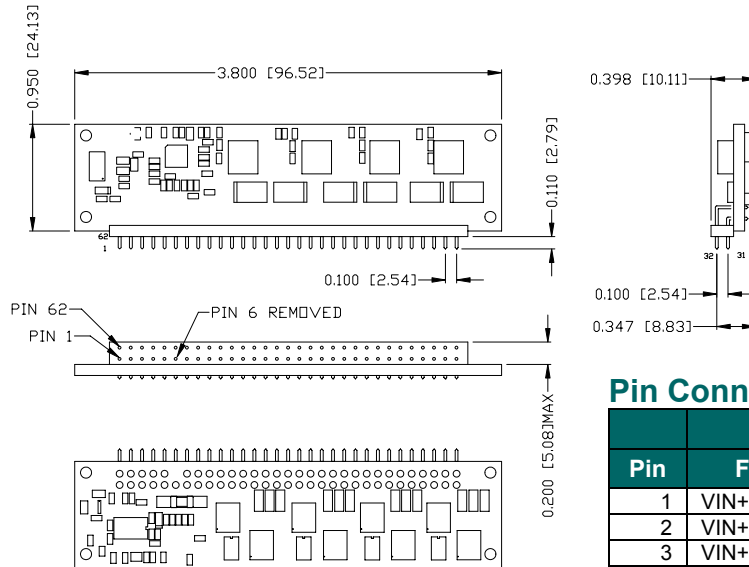
**Bel Fuse Ltd.**  
 8F/ 8 Luk Hop Street  
 San Po Kong  
 Kowloon, Hong Kong  
 Tel 852-2328-5515  
 Fax 852-2352-3706  
[www.belfuse.com](http://www.belfuse.com)

### EUROPE

**Bel Fuse Europe Ltd.**  
 Preston Technology Management Centre  
 Marsh Lane, Suite G7, Preston  
 Lancashire, PR1 8UD, U.K.  
 Tel 44-1772-556601  
 Fax 44-1772-888366  
[www.belfuse.com](http://www.belfuse.com)

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## Pin Connections

Row A		Row B	
Pin	Function	Pin	Function
1	VIN+	62	VIN-
2	VIN+	61	VIN-
3	VIN+	60	VIN-
4	VIN+	59	VIN-
5	Reserved	58	VRM-pres
6	No pin	57	VID4
7	VID3	56	VID2
8	VID1	55	VID0
9	TRIM (note 1)	54	NC (note 3)
10	PWRGD	53	OUTEN
11	VO-sen-	52	VO-sen+
12	Reserved	51	VID5 (note 2)
13	VO-	50	VO+
14	VO+	49	VO+
15	VO-	48	VO-
16	VO+	47	VO+
17	VO-	46	VO-
18	VO+	45	VO+
19	VO-	44	VO-
20	VO+	43	VO+
21	VO-	42	VO-
22	VO+	41	VO+
23	VO-	40	VO-
24	VO+	39	VO+
25	VO-	38	VO-
26	VO+	37	VO+
27	VO-	36	VO-
28	VO+	35	VO+
29	VO-	34	VO-
30	VO+	33	VO+
31	VO-	32	VO-

### Notes:

1. Consult factory for trim option.
2. Pin 51 is VID5 for VRM10 applications. If you are not using this pin, leave it floating. Consult factory for VRM10 VID table.
3. Current share is not implemented on this module. Consult factory for applications requiring current share.
4. Module leads, header, and any portion of the component that is exposed directly to molten solder will withstand a temperature of 260 degrees C for a minimum of 10 seconds. Component sections not exposed directly to the solder will withstand 150 degrees C. Lead Solderability meets ANSI/J-STD-002.

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### Signal Definitions

Symbol	Definitions
VIN+	Input power to the converter
VIN-	Common return for both input and output
VID0, VID1, VID2, VID3, VID4, VID5	Logic level inputs used to set the output voltage, refer to VID table below. Connect these pins either to open-drain outputs with or without external pull-up resistors or to active-pull-up outputs. VID0-VID5 have 20uA internal pull-up current sources that diminish to zero as the voltage rises above 2.5V. These inputs can be pulled up as high as 5.3V. See note 2.
Trim	Optional trim pin, used to adjust the output voltage. See note 1.
PWRGD	The open drain power good signal detects output under voltage only. It transitions to the high state after soft start has completed. If the output voltage falls below 74% of the nominal VID voltage, the signal is de-asserted.
VO-sen+ VO-sen-	Remote voltage sense lines. Connect these at the point of load, to VO+ and VO- respectively.
VO-	Common return for both input and output
VO+	Output voltage available to the load.
OUTEN	Logic level input used to enable the converter when high.
VRM-pres	Pin is tied to ground on module and is used by system to detect if a VRM is present.

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### Voltage Identification (VID) Code

VID4	VID3	VID2	VID1	VID0	Vo (VDC)
1	1	1	1	1	Output Off
1	1	1	1	0	1.1
1	1	1	0	1	1.125
1	1	1	0	0	1.15
1	1	0	1	1	1.175
1	1	0	1	0	1.2
1	1	0	0	1	1.225
1	1	0	0	0	1.25
1	0	1	1	1	1.275
1	0	1	1	0	1.3
1	0	1	0	1	1.325
1	0	1	0	0	1.35
1	0	0	1	1	1.375
1	0	0	1	0	1.4
1	0	0	0	1	1.425
1	0	0	0	0	1.45
0	1	1	1	1	1.475
0	1	1	1	0	1.5
0	1	1	0	1	1.525
0	1	1	0	0	1.55
0	1	0	1	1	1.575
0	1	0	1	0	1.6