

NON-ISOLATED DC/DC CONVERTERS

12V Input / Programmable Output / 40A VRM 9.0 Compatible

bel
POWER PRODUCTS

VRNB-40A180 PRELIMINARY RoHS Compliant

- High efficiency means less power dissipation
- Remote on/off
- 2-Wire Remote sense
- Optional 5 bit voltage programming schemes
 - Intel VRM 9.x compatible 1.1V to 1.85V
 - Motorola compatible 1.0V to 1.68V
- Adaptive voltage positioning



Description

The VRNB-40A Series are non-isolated step down dc/dc converters providing up to 40A of output current and designed to be compatible to the Intel VRM 9.0 / 9.1 VID codes. 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. These products are specifically design to power a wide variety of high performance microprocessors but may be used almost anywhere low-voltage silicon is being employed and a nominal 12V source is available. Typical applications include file servers, work stations and other computing applications.

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage Range	10.8 VDC		13.2 VDC	
Input Current (disabled)		30mA		
Input Current (full load)			8A	
Reflected Ripple Current			150mA rms	With 100uF, 25mOhm capacitor and 200nH of input inductance.

Output Specifications

Parameter	Min	Typ	Max	Notes
Output Current	0A		40A	
Set Point Accuracy	1.76V	1.80	1.82	no load, excluding Adaptive positioning, VID 00000
Adaptive Positioning (Droop Impedance)		3.5 mOhm		
Ripple and Noise		30mV		pk-pk, 0 to 20MHz Bandwidth Full load with two external 560uF oscon capacitors on output.
Turn on Time		8mS	16mS	
Transient Response Deviation Settling Time		90mV 175uS		di/dt = 5A/uS Load step =50% of max load. Cout = two 820uF OSCON
Remote Sense Compensation		±0.3VDC		
Output Capacitance	1200uF		20,000uF	For applications requiring higher or lower output capacitance please consult factory.

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General Specifications

Parameter	Specification
Switching Frequency	1.2 MHz typical (fixed)
Dimensions	3.8 x 1.0 x .81 inches 96.5 x 25.4 x 20.6 mm
Operating Temperature	0°C to 70°C
Non-Operating Temperature	-40°C to 100°C
Protection Features	Over current Undervoltage
Remote On/Off	Active High
Efficiency (full load)	86%
	1.85V output

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	1	0	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
0	1	0	0	1	1.625
0	1	0	0	0	1.65
0	0	1	1	1	1.675
0	0	1	1	0	1.7
0	0	1	0	1	1.725
0	0	1	0	0	1.75
0	0	0	1	1	1.775
0	0	0	1	0	1.8
0	0	0	0	1	1.825
0	0	0	0	0	1.85

Note: Grounding pin 9 of this device doubles the output voltages shown in this table.

Pin Connections

Pin	Row A Function	Pin	Row B 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	Memory	54	NC
10	PWRGD	53	OUTEN
11	VO-sen-	52	VO-sen+
12	UVLO_SET	51	Reserved
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-

Part Numbers

There are two different models in this series based on different loop compensation for various types of capacitor banks. These models are as follows:

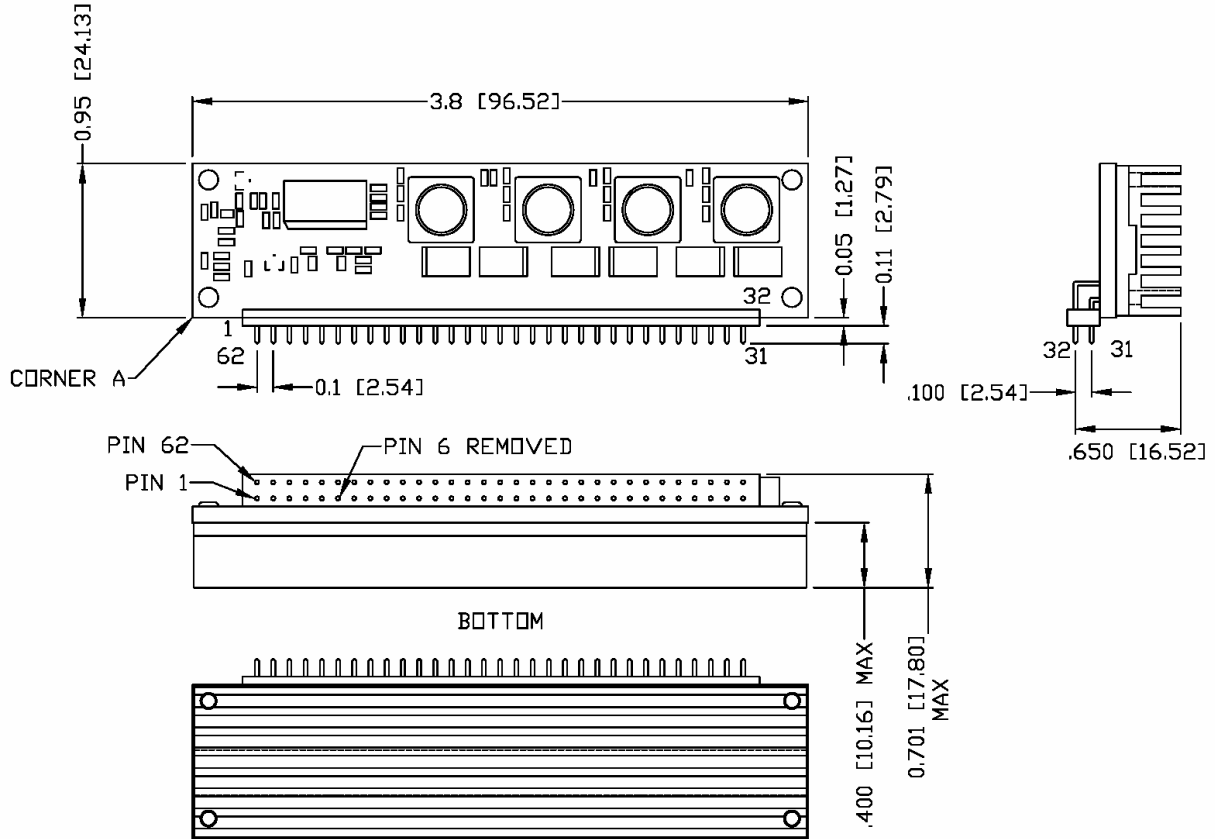
VRNB-40A18B: Compensated for capacitor bank utilizing 4-6 820uF Oscon capacitors.

VRNB-40A18M: Compensated for Oscon caps but all output voltages are divided by 1.1 yielding an effective range of 1.0 to 1.68V compatible with the requirements for new Motorola microprocessors.

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Mechanical Outline



Mechanical Drawing of the VRNB-40A18 Series Converters

RoHS Compliance

Complies with the European Directive 2002/95/EC, calling for the elimination of lead and other hazardous substances from electronic products.



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