VHB50 Series Half Brick DC to DC Converter

Rev. 06-2006

Features

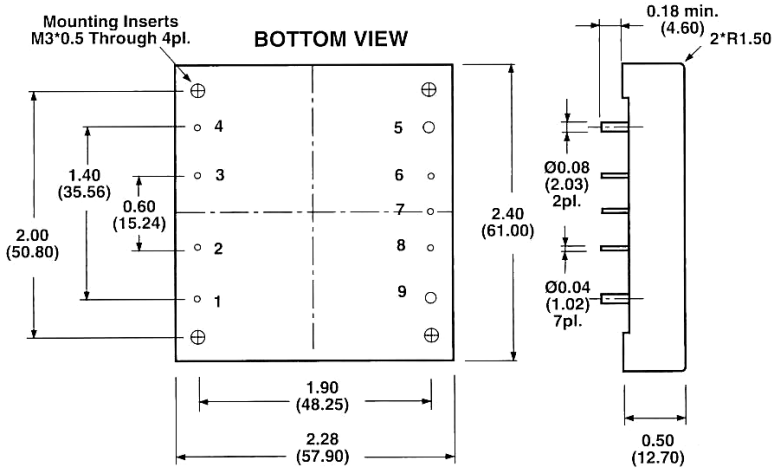
- 25/50W isolated output
- Efficiency to 85%
- 300KHz switching frequency
- 2:1 input range
- Regulated outputs
- Continuous short circuit protection
- Five-sided metal case
- Industry standard half-brick package

Model Number	Input Voltage	Output Voltage	Output Current	Input Current		Efficiency
				No Load	Full Load	
VHB50-D12-S2R5	9-18VDC	2.5VDC	10A	50mA	2740mA	76%
VHB50-D12-S3R3	9-18VDC	3.3VDC	10A	50mA	3525mA	78%
VHB50-D12-S5	9-18VDC	5VDC	10A	50mA	5145mA	81%
VHB50-D12-S12	9-18VDC	12VDC	4.16A	50mA	4950mA	84%
VHB50-D12-S15	9-18VDC	15VDC	3.33A	50mA	4950mA	84%
VHB50-D12-S24	9-18VDC	24VDC	2.08A	50mA	4950mA	84%
VHB50-D24-S2R5	18-36VDC	2.5VDC	10A	50mA	1353mA	77%
VHB50-D24-S3R3	18-36VDC	3.3VDC	10A	50mA	1740mA	79%
VHB50-D24-S5	18-36VDC	5VDC	10A	50mA	2540mA	82%
VHB50-D24-S12	18-36VDC	12VDC	4.16A	50mA	2450mA	85%
VHB50-D24-S15	18-36VDC	15VDC	3.33A	50mA	2450mA	85%
VHB50-D24-S24	18-36VDC	24VDC	2.08A	50mA	2419mA	86%
VHB50-D48-S2R5	36-75VDC	2.5VDC	10A	50mA	676mA	77%
VHB50-D48-S3R3	36-75VDC	3.3VDC	10A	50mA	870mA	79%
VHB50-D48-S5	36-75VDC	5VDC	10A	50mA	1250mA	83%
VHB50-D48-S12	36-75VDC	12VDC	4.16A	50mA	1220mA	85%
VHB50-D48-S15	36-75VDC	15VDC	3.33A	50mA	1220mA	85%
VHB50-D48-S24	36-75VDC	24VDC	2.08A	50mA	1290mA	86%

PIN CONNECTION	
Pin	Function
1.	+Vin
2.	ON/OFF
3.	CASE
4.	-Vin
5.	-Vout
6.	-Sense
7.	Trim
8.	+Sense
9.	+Vout

All Dimensions In Inches(mm)

Tolerances				Pin
	Inches	.XX±.02	.XXX±.01	±0.02
	Millimeters	.X±.5	.XX±.25	±0.5



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Input

Input Voltage Range	12V	9-18V
	24V	18-36V
	48V	36-75V
Under Voltage Lockout	12Vin power up	8.8V
	12Vin power down	8V
	24Vin power up	17V
	24Vin power down	16V
	48Vin power up	34V
	48Vin power down	32.5V
Positive Logic Remote ON/OFF[3,4]		
Input Filter		PI Type

Output

Voltage Accuracy		±1% max.
Transient Response: 25% Step Load Change		<500µ sec.
External Trim Adj. Range		±10%
Ripple & Noise	20MHz BW, 2.5V, 3.3V, 5V	20mV RMS., max
		75mV pk-pk, max
	12V& 15V	30mV RMS., max
		100mV pk-pk, max
	24V	100mV RMS., max
		240mV pk-pk, max.
Temperature Coefficient		±0.03%/°C
Short Circuit Protection		Continuous
Line Regulation[1]		±0.2% max
Load Regulation[2]		±0.2% max
Over Voltage Protection trip Range, % Vo nom.		115-140%
Current Limit		110-150% Nominal Output

General Specifications

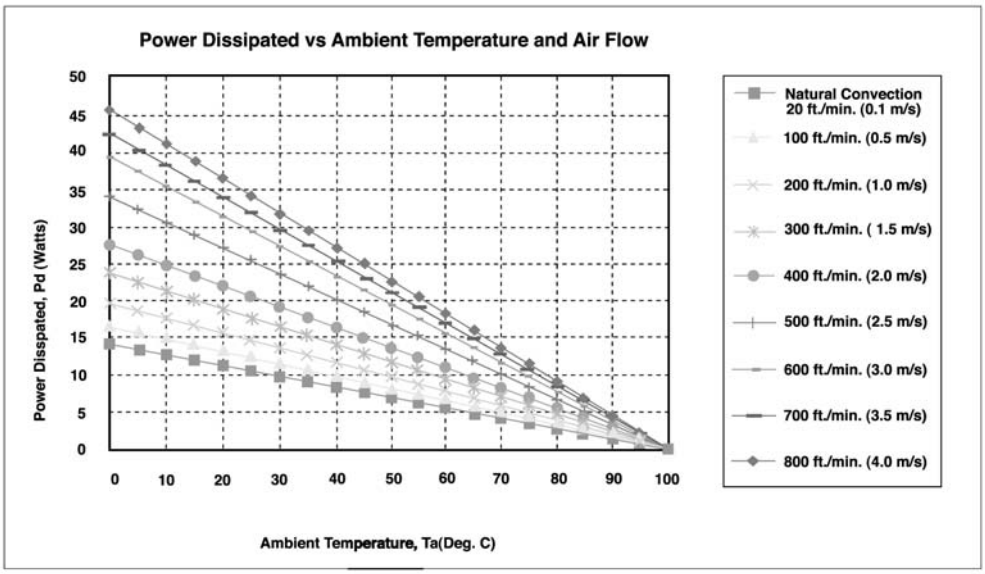
Efficiency		see table
Isolation Voltage	Input/Output	1500VDC min.
	Input/Case	1500VDC min.
	Output/Case	1500VDC min.
Isolation Resistance		10^7 Ohm min.
Switching Frequency	(12/24) Vin.	400KHz, Typ.
	48 Vin.	300KHz, Typ.
Operating Case Temperature		-40°C to 100°C
Storage Temperature		-55°C to 105°C
Thermal Shutdown, Case Temp.		100°C Typ.
Dimensions		2.28x2.40x0.50 inches
		57.9x61.0x12.7mm
Case Material		aluminum

NOTES:
1. Measured from High Line to Low Line
2. Measured from Full Load to Zero Load
3. Logic Compatibility: Open Collector ref to -Input
   Module ON: Open Circuit
   Module OFF: < 0.8VDC
4. Suffix “N” to the model number with negative logic remote ON/OFF.

Application Notes

Derating:

The operating case temperature range of the VHB50 series is -40°C to +100°C. When operating the VHB50, proper derating or cooling is needed. Following is the derating curve of VHB50 without heat sink.



Forced Convection Power Derating without Heat Sink

Where:

The power dissipation (Pd):

$$Pd = Pi - Po = Po (1-\eta) / \eta$$

The thermal resistance are list below:

Chart of Thermal Resistance vs Air Flow:

AIR FLOW RATE	TYPICAL Rca
Natural Convection 20ft./min. (0.1m/s)	7.12 °C/W
100 ft./min. (0.5m/s)	6.21 °C/W
200 ft./min. (1.0m/s)	5.17 °C/W
300 ft./min. (1.5m/s)	4.29 °C/W
400 ft./min. (2.0m/s)	3.64 °C/W
500 ft./min. (2.5m/s)	2.96 °C/W
600 ft./min. (3.0m/s)	2.53 °C/W
700 ft./min. (3.5m/s)	2.37 °C/W
800 ft./min. (4.0m/s)	2.19 °C/W

The temperature rise ($\triangle T$):

$$\triangle T = Pd * Rca$$

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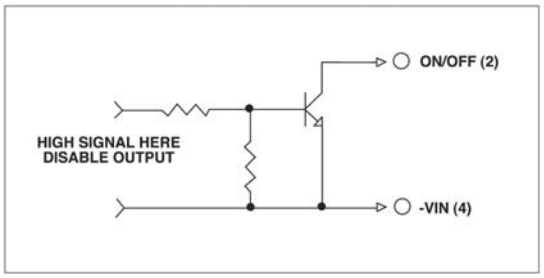
Remote ON/OFF Control

The VHB50 series allows the user to switch the module on and off electronically with the remote on/off feature. The VHB50 series is available with “positive logic” or “negative logic” options.

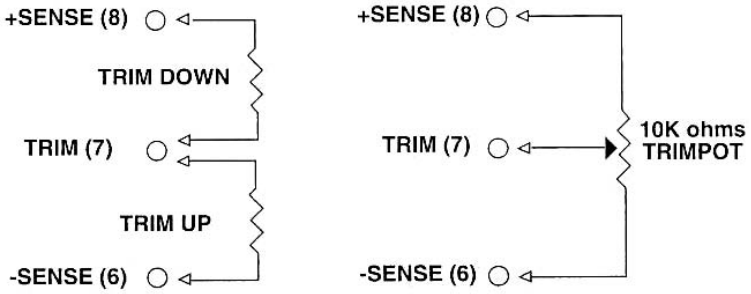


Logic Table

Logic State (PIN 2)	Negative Logic	Positive Logic
Logic Low - Switch Closed	Module on	Module off
Logic High - Switch Open	Module off	Module on

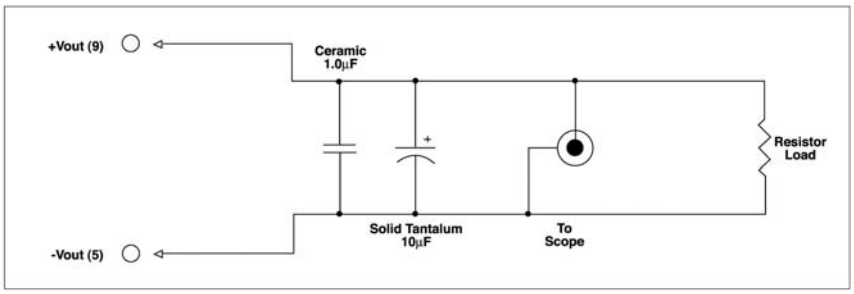
External Output Trimming

Output may optionally be externally trimmed (±10%) with a fixed resistor or an external trimpot as shown.



Output Noise

The output noise is measured with a 10µF tantalum capacitor and a 1.0µF ceramic capacitor across the output.



Output Noise Test Circuit schematic