



V-INFINITY
a division of CUI INC

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date 03/2008

PART NUMBER: VHB50W Series

DESCRIPTION: half brick dc-dc converter

Features

- 25-50W isolated output
- Efficiency to 84%
- 300KHz switching frequency
- 4:1 input range
- Regulated outputs
- Continuous short circuit protection
- Five-sided metal case
- Industry standard half-brick package



UL
E222736

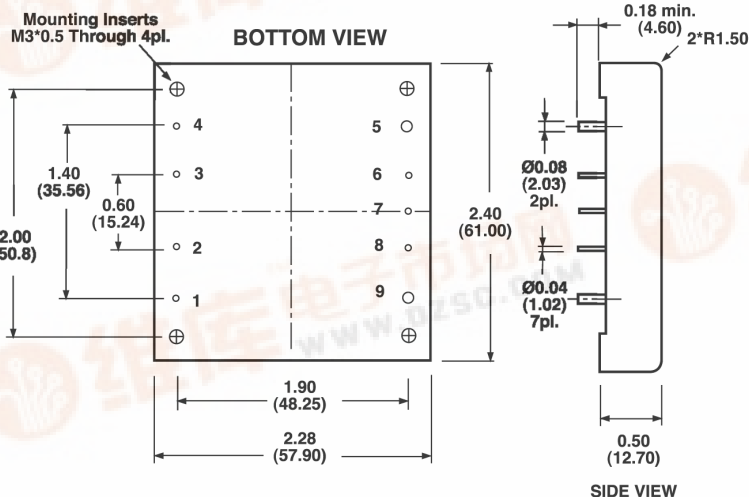
RoHS

Model Number	Input Voltage	Output Voltage	Output Current	Input Current		Efficiency
				No Load	Full Load	
VHB50W-Q24-S3R3	9-36VDC	3.3VDC	10A	50mA	1785mA	77%
VHB50W-Q24-S5	9-36VDC	5VDC	10A	50mA	2570mA	81%
VHB50W-Q24-S12	9-36VDC	12VDC	4.16A	50mA	2510mA	83%
VHB50W-Q24-S15	9-36VDC	15VDC	3.33A	50mA	2510mA	83%
VHB50W-Q24-S24	9-36VDC	24VDC	2.08A	50mA	2510mA	83%
VHB50W-Q24-S48 ¹	9-36VDC	48VDC	1.04A	50mA	2510mA	83%
VHB50W-Q48-S3R3	18-75VDC	3.3VDC	10A	50mA	880mA	78%
VHB50W-Q48-S5	18-75VDC	5VDC	10A	50mA	1270mA	82%
VHB50W-Q48-S12	18-75VDC	12VDC	4.16A	50mA	1240mA	84%
VHB50W-Q48-S15	18-75VDC	15VDC	3.33A	50mA	1240mA	84%
VHB50W-Q48-S24	18-75VDC	24VDC	2.08A	50mA	1240mA	84%

1. VHB50W-Q24-S48 is not UL approved.

All Dimensions In Inches(mm)

Tolerances	Inches	.XX±.02	.XXX±.010	Pin ±0.02
	Millimeters	.X±.5	.XX±.25	±0.5



PIN CONNECTION

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



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Input

Input Voltage Range	24V	9-36V
	48V	18-75V
Under Voltage Lockout	12Vin power up	8.8V
	12Vin power down	8V
	48Vin power up	17V
	48Vin power down	16V
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, 3.3V, 5V	40mV RMS., max
		100mV pk-pk, max
	12V& 15V	60mV RMS., max
		150mV pk-pk, max
	24V	100mV RMS., max
		240mV pk-pk, max.
Temperature Coefficient		±0.03%/°C
Short Circuit Protection		Continuous
Safety		approved to UL60950-1 (E222736)
Line Regulation ¹		±0.2% max
Load Regulation ²		±0.2% max
Over Voltage Protection trip Range, % Vo nom.		115-140%
Current Limit		110-160% 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		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.

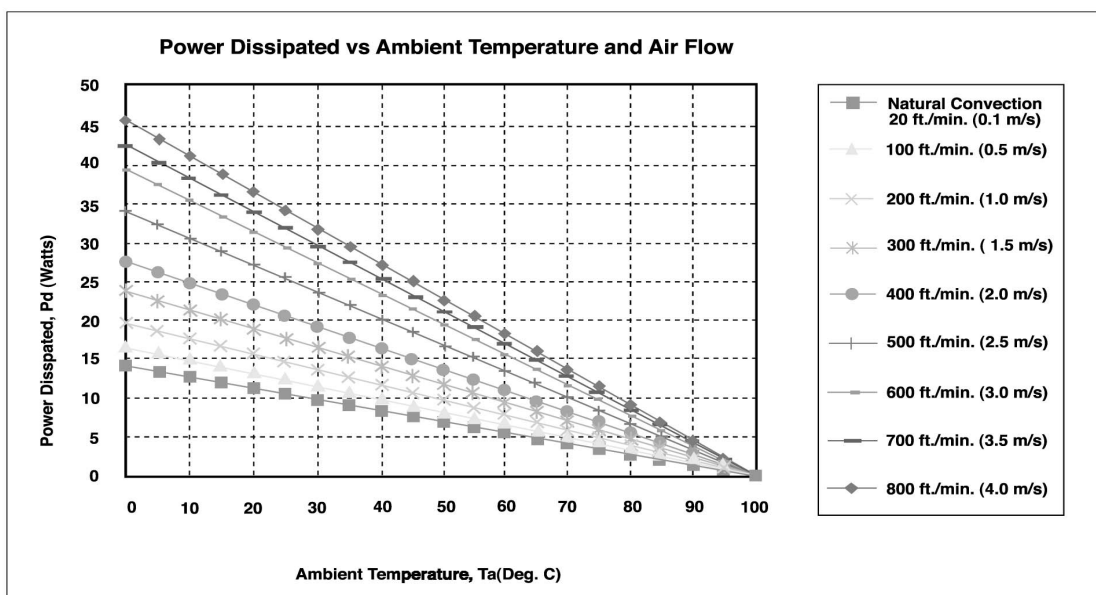
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Application Notes

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 (ΔT):

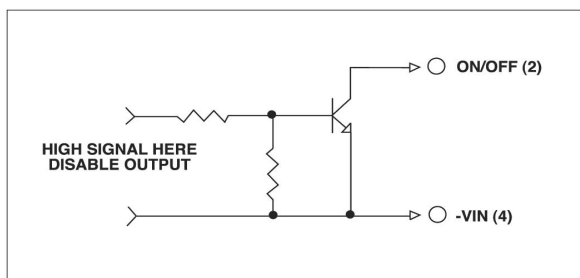
$$\Delta T = Pd * Rca$$

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Remote ON/OFF Control

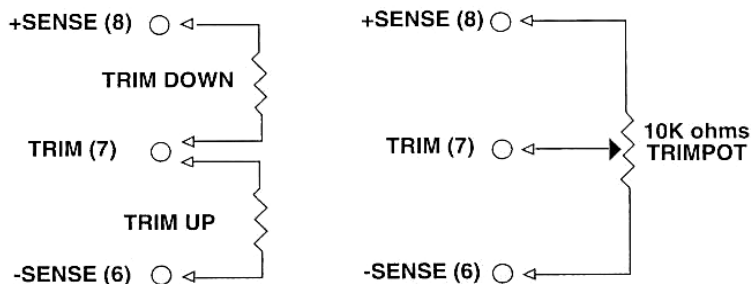
The VHB50 series allows the user to switch the module on and off electronically with the remote on/off feature. The VHB50 series is available with “positive logic” or “negative logic” options.


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

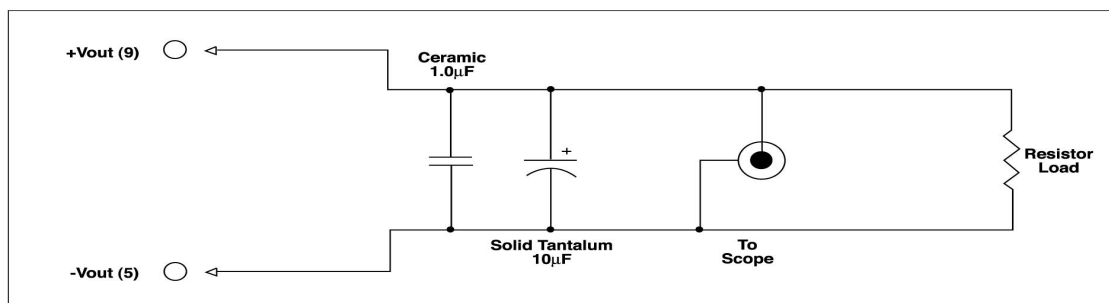
External Output Trimming

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



Output Noise

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



Output Noise Test Circuit schematic