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V.I Chip™ High Voltage BCM™ Customer Evaluation Board

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Features

- Oscilloscope probe jack for output voltage and ripple measurements
- Simple to use
- Ring lug or solder connections



Introduction

⚠ WARNING: The High Voltage BCM™ Customer Evaluation Board contains exposed metal carrying lethal voltages when under power. Care should be taken to protect the user from accidental contact when under power.

The BCM™ Evaluation Board offers a convenient means to evaluate the performance of Vicor’s BCM™ bus converter and has been optimized for user convenience. Refer to the appropriate data sheet for performance and operating limits. Data sheets are available at vicorpower.com.

It is important to remember the fast response of most BCM™ modules can readily show the limitations of the source, load, and associated wiring connected to the evaluation board. Care should be exercised to minimize stray source and load impedances in order to fully exercise the module.

Please refer to *Figure 1* for locations of the input and output connections as viewed from the component side. Wires may be soldered directly to the pads instead of ring lugs if desired to minimize circuit impedances.

Figure 1
BCM™ Customer Evaluation Board
layout and dimensional drawing,
component side.

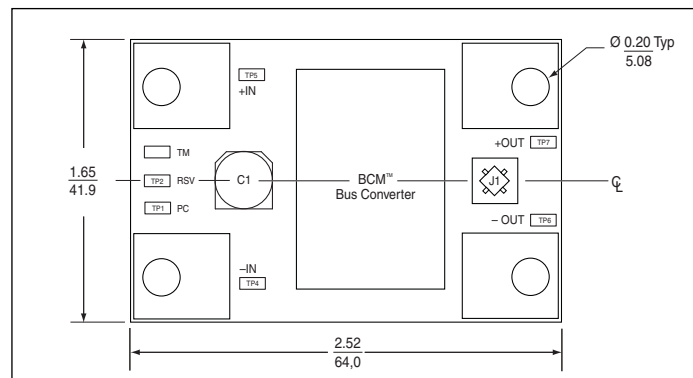
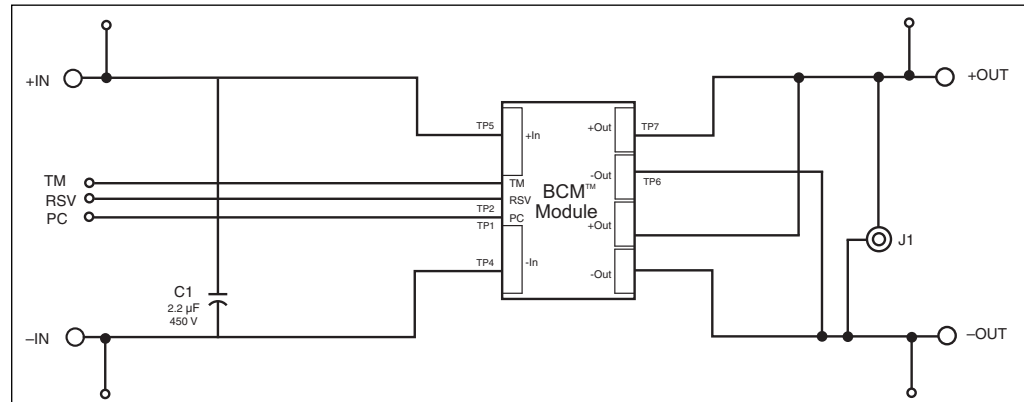


Figure 2
BCM™ Customer
Evaluation Board schematic



Using the High Voltage BCM™ Evaluation Board

Important Information

⚠ WARNING: Hazardous voltages are present on the High Voltage BCM Evaluation Board under power. PERSONAL CONTACT WITH LINE VOLTAGE MAY RESULT IN SEVERE INJURY, DISABILITY, OR DEATH. IMPROPER OR UNSAFE HANDLING OF THIS BOARD MAY RESULT IN SERIOUS INJURY OR DEATH.

Read the precautions below entirely **BEFORE** using the High Voltage BCM Evaluation Board. Do not operate the evaluation board unless you have the appropriate safety precautions in place on your bench to guarantee safety. **The list below is not comprehensive and is not a substitute for common sense and good practice.**

- 1) The High Voltage BCM Evaluation Board does not contain a fuse. **ALWAYS** use a fuse upstream of the evaluation board when operating under power.
- 2) **ALWAYS** remove power before touching, servicing, or attaching probes to the High Voltage BCM Evaluation Board. Verify that the power is removed before touching. Physically disconnect input power or use a lockout / tagout (LOTO) system to prevent the accidental application of power while servicing the evaluation board.
- 3) While the High Voltage BCM Evaluation Board is designed to demonstrate the use of BCM bus converters in offline systems, for general laboratory evaluation, it is highly recommended for safety purposes to use an isolated high voltage source for the evaluation board. This source can be a bench top regulated high voltage DC source, or an offline PFC front end powered through an ISO-VAC or line isolation transformer.
- 4) **NEVER** leave the High Voltage BCM Evaluation Board unattended when under power.
- 5) Provide strain relief for wires and place the High Voltage BCM Evaluation Board on the bench in such a way as to prevent accidental dislodgement from the bench top. Connecting wires or attached probes should not hang off the bench.
- 6) Use appropriate shielding of exposed high voltage areas of the High Voltage BCM Evaluation Board to prevent accidental casual contact.
- 7) The High Voltage BCM Evaluation Board is designed for use in a laboratory environment. Use of the evaluation board in other environments is not recommended.

Set Up

The High Voltage BCM™ Evaluation Board should be set up as follows:

Note: Care should be taken to avoid reversing polarities if connecting to the opposite (solder) side of the board.

+ IN, – IN

Connect a high-quality, low-noise power supply to the +IN and –IN terminals of the evaluation board. The interconnect leads should be heavy gauge and as short as possible. Additional capacitance may have to be added on the evaluation board to make up for impedances in the interconnect leads as well as deficiencies in the source. It is important to remember that noise from the source, as well as any input source voltage drops, will appear at the output of the bus converter multiplied by its K factor. Test points 4 (–IN) and 5 (+IN) can be used to monitor the input and are located on the PCB adjacent to the input terminals.

+ OUT, –OUT

An electronic or passive load should be connected to +OUT and –OUT terminals of the evaluation board with short heavy-gauge leads. Most commercially available electronic loads do not have current slew rates capable of fully exercising the BCM module. The evaluation board can be connected directly to the application for which the module is intended. However, the interconnect impedances between the evaluation board and the application can greatly affect the transient response. For applications where transient response is critical, the user should consider mounting the BCM module directly to the target application PCB. Test points 6 (–OUT) and 7 (+OUT) can be used to monitor the output and are located on the PCB adjacent to the output terminals.

Output Voltage Measurement Jack (J1)

This connector is provided to make accurate measurements of the output voltage of the BCM module. Many types of scope probes may be directly connected to this point if the probe is equipped with a removable plastic sheath. To avoid creating ground loops when making measurements of the output or input voltage, these measurements should be made separately.

Input Current Measurement

A current probe can be passed around the +IN lead connected to the BCM module. Input capacitors on the evaluation board are downstream of this measurement point.

Temperature Monitor (TM)

Refer to specific High Voltage BCM module data sheet for details.

RSV - Do not connect, for factory use only.

Primary Control (PC)

The PC can be used to disable the BCM™ module, monitor status, or provide a primary referenced bias supply.

- a.) Connecting PC to the –IN will disable the module.
- b.) Connecting a DVM or oscilloscope between PC (positive) and –IN (negative) will indicate the status of the module. Please note that the PC does not have active current sinking capability.
- c.) Connecting a load between PC (positive) and –IN (negative) will provide a primary referenced bias supply.

Efficiency Measurement

As the BCM module can deliver and consume large currents, the effect of the PCB must be considered when making an efficiency measurement. Be certain to accurately measure the voltage directly at the module using the appropriate pair of contact points located at the corners of the module.

Recommended Hardware:

QTY	Description	Manufacturer P/N	Vicor P/N
4	ring lug	Panduit LCAS6-10-L	
4	#10-32 screw	} —————→	Kit # 26647
4	#10 flat washer		
4	#10 lock washer		
4	#10 hex nut		

All hardware is stainless steel except the ring lug.
Kit # 26647 is included with the High Voltage BCM Evaluation Board.

Thermal Considerations

For most lab environments a fan blowing across the evaluation board and heat sink assembly is recommended. For more information, see application note AN:008 at vicorpower.com or contact Vicor Applications Engineering for assistance (800) 927-9474.

⚠ WARNING: The BCM module and High Voltage BCM Evaluation Board can comfortably operate at surface temperatures which may pose a thermal hazard to the operator. Be careful not to touch any exposed surface. Certain BCM modules may operate at potentially dangerous voltages, use care in such cases. The High Voltage BCM Evaluation Board is not intended for use in end item equipment.