Ultra-High Voltage Bus Converter Module for Unmanned vehicles

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Introduction

Ultra-High Voltage Bus Converter Modules (UHV BCMs) are power components that provide voltage transformation, current multiplication and isolation for designs that require high power density, high efficiency, small size and low weight.

With its unique wide range “Ultra-high voltage” input, it offers Industry benchmark efficiency and power density along with parallel operation for Multi-kW arrays. The BCM’s are packed in a thermally adept VIA package with chassis mount or PCB mount form-factor for added ease. They are also Bidirectional in operation and best for High power transmission for remote tethered vehicles.

Figure 1
Photo of BCM® Ultra High Voltage Bus Converter Module

Salient features

- Unique wide-range "Ultra-High-Voltage" input
- Industry benchmark efficiency and power density
- Parallel Operation for multi-kW arrays
- Integrated PMBus Interface
- Thermally adept VIA package
- Chassis mount or PCB mount form-factor

- Integrated EMI and transient filtering
- OV, OC, UV, short circuit and thermal protection
- 4,300 Vdc Isolation
- Bi-directional Operation
- Enables flexible 3-phase power solutions
- Enables high power transmission for remote tethered vehicles
- Weight 145 Grams

The Ultra High Voltage BCM has a high efficiency K=1/16 fixed ratio converter operating from either a 400 - 700 V primary input to produce an unregulated SELV DC output voltage.

Initial products are available in the Vicor Integrated Adapter (VIA) package which simplifies customer cooling approaches as well as providing integrated PMBus control, EMI filtering, and transient protection.

Figure 2
Part numbers

Part Numbers

Model Number	Input Voltage	Output Voltage	Output Power	Output Current	Package	Control Interface
BCM4414xG0F4440yzz	544V (400 – 700V)	34V (25 – 43.75V)	1600W	40.0A	VIA	Digital
BCM4414xH0E5035yzz	650V (500 – 800V)	40.6V (31.3 – 50V)		35.0A		

Essentially a very small high-frequency DC-DC transformer, the UHV BCM steps down its input voltage by a ratio of 1:16 and provides 4300V of galvanic isolation. Buck or Buck-Boost regulators can then be connected to the UHV BCM output to provide the necessary regulated voltage for specific system loads.

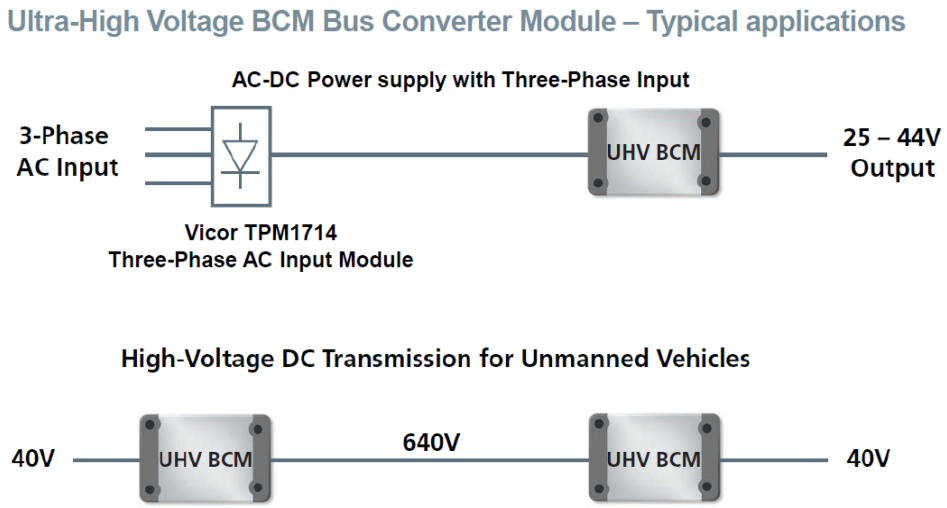
Available in the thermally adept 4414 VIA package, UHV BCMs are offered in either a chassis-mount or board-mount form-factor that measures 111 x 36 x 9.4mm.

The family is available in either T-grade (–40 to 100˚C) or M-grade (–55 to 100˚C) temperature grades. The robust VIA package also provides integrated PMBus™ [a] communication and EMI filtering. These flexible modules can be easily paralleled into higher power arrays. In addition, the UHV BCM outputs can be connected in series to achieve higher VOUT. Utilizing Vicor resonant Sine Amplitude Converter™ (SAC) topology, UHV BCMs leverage high-frequency Zero-Voltage Switching (ZVS) and Zero-Current

Switching (ZCS) to deliver unmatched efficiency and power density with low noise and fast transient response. In addition, the BCM's low AC impedance, beyond the bandwidth of most downstream regulators, enables bulk capacitance, normally located at the input of a regulator, to be placed at the high-voltage input to the BCM.

This reduces bulk capacitance requirement and offers saving of board area and system cost. Offered in a range of package options and power levels, UHV BCMs provide unmatched performance to meet the demanding requirements of modern power system designs.

Applications



Benefits

- 400 – 700V or 500 – 800V input
- High peak efficiency: Up to 97%
- High power density: Up to 700W/in³
- Parallel inputs and outputs for high-powered arrays
- Connect outputs in series for higher output voltages
- VIA Package
- Available in chassis- or PCB-mount form-factor
- Simplifies thermal design
- Provides integrated filtering
- Available with PMBus™ Communication
- Bidirectional capability

Learn more here: http://www.vicorpower.com/dc-dc/isolated-fixed-ratio/uhv-bus-converter-module#FeaturesandBenefits