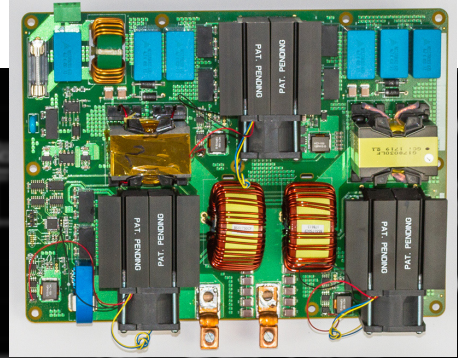




# PRELIMINARY

## BDC-4001/8001 Bidirectional DC DC Converter 48/96Vdc to 380Vdc @ 4kW/8kW



### Description

The BDC4001 and BDC8001 are high efficiency, bidirectional DC DC converters capable of delivering 4kW or 8kW of power in either direction. In boost (battery discharge) mode, the BDC4001 operates from 48-58Vdc and boosts the output to 380Vdc (nominal). In buck (battery charge) mode the BDC 4001 operates from 380Vdc (nominal) to 48-58Vdc. In boost (battery discharge) mode, the BDC8001 operates from 96-106Vdc and boosts the output to 380Vdc (nominal). In buck (battery charge) mode the BDC 8001 operates from 380Vdc (nominal) to 96-106Vdc.

The converters use the buss voltage to determine whether to charge or discharge. When excess power is available and the buss is high the batteries can be charged. Similarly, when the buss goes low, power flows from the batteries to meet the power draw. Additionally, external bit-signalling from a BMS or other such controller can be received via serial data I/O allow user control of the power flow direction. This is especially useful to prevent circular power flow between batteries when multiple battery packs equipped with the converters are operating on the same buss.

The converters are battery chemistry agnostic and will work with virtually all types. Even dissimilar battery types can be paralleled and replacement batteries do not have to match the original batteries. When paired with the BMS001 circuit, complete control over the battery's functionality is achieved.

Galvanic isolation provides safe operation between the battery and the HVDC buss, ensuring that the batteries never see voltages higher than their native terminal voltages.

An optional uGrid communications link provides access to the converter and battery BMS data for analysis and presentation.

### Features & Benefits

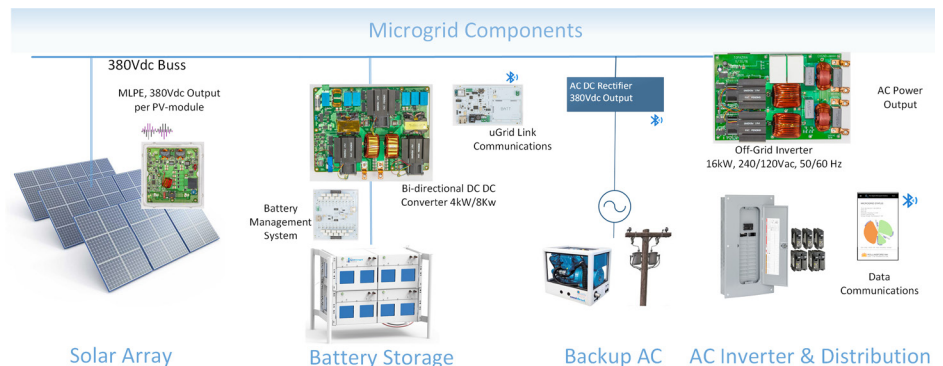
- 380Vdc to 48Vdc Bidirectional converter
- 4kW or 8kW power delivery
- Autonomous power flow direction operation
- Unlimited parallel connections for kW to MW sites
- Galvanic isolation between high and low voltage sides
- State of the art silicon carbide (SiC) devices for high efficiency
- Built-in protection: undervoltage, overvoltage, over current, over temperature
- Serial Interface to BMS or controller
- Battery chemistry agnostic. Lilon (LFP, LTO, NMC) and lead acid types.
- Charge/Discharge rates configurable through the BMS

### Applications

- Solar plus Storage Installations
- Fuel Cell voltage conversion
- Pico, Nano and Microgrids
- Generator Optimization
- Rural Electrification
- Mobile Power Units

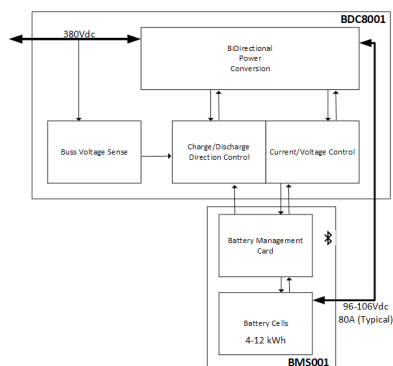
### Microgrid Application

- PV Array w/vBoost at 380Vdc (kW to MW)
- HVDC Buss at 380Vdc
- 6kWh/4kW Battery plus converter at 380Vdc, multiple units can be paralleled
- 16 kW, 240Vac AC DC Rectifier with 380Vdc output, multiple units can be paralleled
- 16kW, 120/240Vac, 50/60Hz off-grid inverter, multiple units can be paralleled



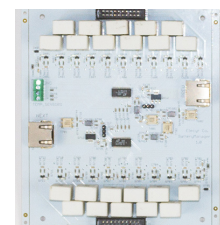
Specifications	BDC4001	BDC8001
Maximum Continuous power	4000W	8000W
Low Side Voltage Range	47 - 58 Vdc	96-106 Vdc
High Side Voltage Range	320 - 400 Vdc	320 - 400 Vdc
High Side Maximum Continuous Current	10A	20A
High Side Maximum Surge Current (3 seconds)	20A	25A
Low Side Maximum Continuous Current		88A
Low Side Maximum Surge Current (3 seconds)		110A
Charge Profile		CC CV
Charge Rate (Typical)		0.5 - 1.0C
Discharge Rate (Typical)		0.5 - 1.0C
Charge/Discharge Mode Transition		Buss voltage level triggering
Charge to Discharge Mode Transition Time		100ms
Discharge to Charge Mode Transition Time		100ms
Software Controlled Functions		Global Charge/Discharge and Enable/Disable, Charge/Discharge Limits
Switching Frequency ( $f_{sw}$ )		180kHz
Conversion Efficiency		96-98% Each Way
Data Reported to BMS		Voltage, Current
BMS Interface		Serial I/O
Protection		OverVoltage, OverCurrent, OverTemperature, Short Circuit, Fused Hi/Lo
Compliance (Pending)		UL1741, FCC Part 15 Class B
Connector Options		MC4, Anderson Power Connectors
Units in parallel on the same HVDC buss		Limited by wire ampacity
Isolation HVDC and Battery Terminals		Galvanic Isolation
Cooling		Temperature controlled forced convection with heatsinks
Temperature Operating Range		-55 to + 60°C
Humidity		0 - 100% (Non-condensing)
Circuit Board Dimensions		20cm X 28cm X 7cm
Weight		2.5kg

## Block Diagram



## Interface With Battery Management Systems

The bi-directional DC DC converters integrate seamlessly with other power products from the Digital Microgrid. The battery management system (BMS) from DMI is designed to work with virtually all battery types and provides battery management functions such as cell optimization, cell balancing, charge and discharge rate control, safety and data reporting. For BMS cards other than DMI's, please contact the company for compatibility.



## uGrid Link

The microgrid link is a communications module that provides a data link between the various components in the microgrid using a variety of communications protocols including Bluetooth LE, RS485, SPI, and UART.

