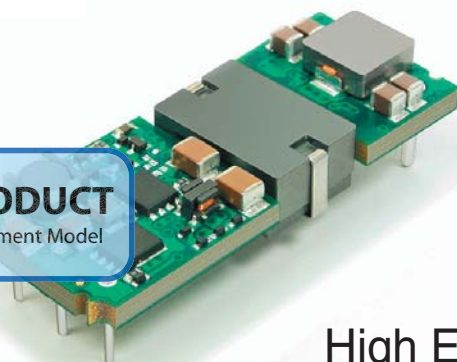


OBSOLETE PRODUCT

Contact Factory for Replacement Model



Single Output EBC Models

48V_{IN}, 8V/16A Output
High Efficiency, 1/8-Brick Bus Converter

Features

- 128 Watts total output power
- 95% Ultra-high efficiency @ full load
- 48V Input (38 to 55V range)
- 8V/16A Output for Intermediate Bus Architectures with POL converters
- Input Over/Under Voltage Shutdown
- Synchronous-rectifier topology
- 130kHz fixed switching frequency
- Output current sharing
- Fully isolated, 2250V (BASIC)
- Low 80mVp-p ripple/noise
- Standard eighth-brick package
- Stable no-load condition
- Thermal shutdown
- Fully I/O protected
- IEC/EN/UL/cUL60950 certification pending

The EBC-8/16-L48 DC/DC converter is one of DATEL's new generation, fully isolated, Intermediate Bus Converters, designed and optimized for total on-board solutions in combination with our non-isolated point of load converters of the HEN, LEN, LQN, LSM and LSN series.

The EBC's convert the standard 48V (38 to 55V limited range) to a non-regulated 8V (7.8 to 8.2V range) bus voltage with a total output power of 128 Watts. Taking full advantage of a synchronous-rectifier topology, the EBC-series achieve ultra-high efficiency of 95%, minimizing power losses and enabling full-power operation to ambient temperatures up to +45°C with minimal air flow.

These high-density, open-frame DC/DC converters are standard eighth-brick packages with industry-standard footprint and are only 0.4 inches (10.16mm) high.

Assembled using fully automated, SMT-on-pcb techniques, EBC's provide fixed frequency conversion, output On/Off control with choice of positive (standard) or negative (optional) logic, stable no-load operation, current sharing capability, and low output ripple/noise (80mVp-p).

The fully functional EBC bus converters feature full I/O fault protection including input overvoltage and undervoltage shutdown, output overvoltage, output current limiting, with choice of "hiccup" (standard) or "latching" (optional), short-circuit protection, and thermal shutdown.

All models have IEC/EN/UL60950 certification and EMC compliance pending.

Refer to the DATEL application note, *Bus Converters Aim to Boost Efficiency In IBA-Based Power Designs*.

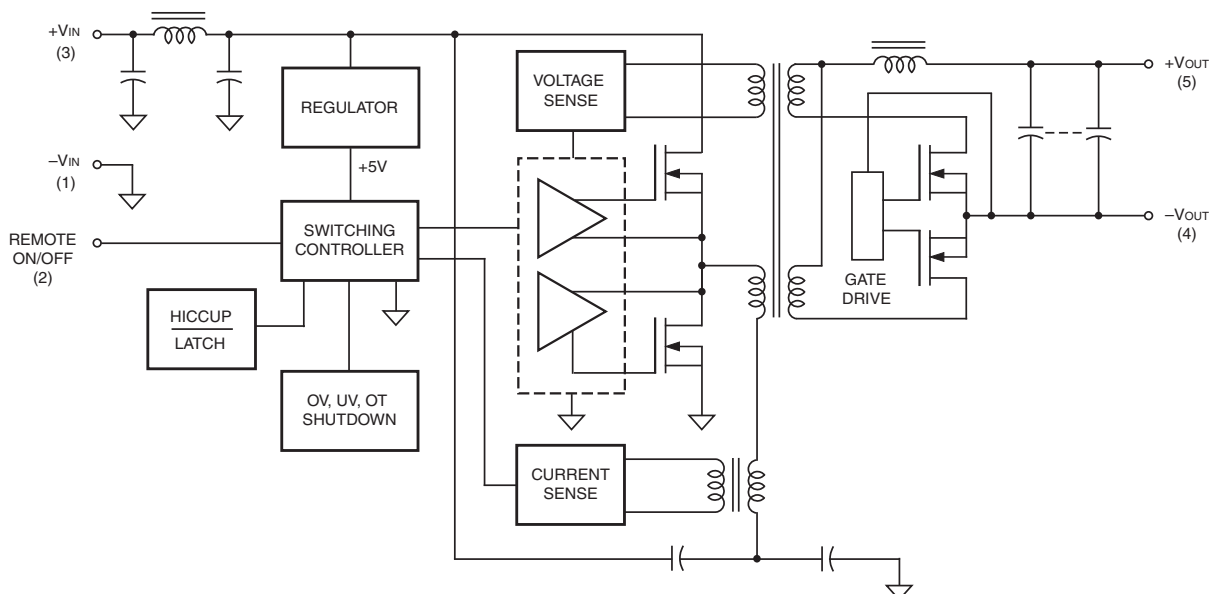


Figure 1. Simplified Schematic

Performance Specifications ^①

Model	Output			Input		Efficiency		Package/ Pinout
	V _{OUT} (Volts)	I _{OUT} (Amps)	R/N Typ.	V _{IN} (Volts) Range	I _{IN} (mA/A) (4)	Min.	Typ.	
EBC-8/16-L48	8	16	80	38-55	75/2.67	93%	95%	C53/P65

① Typical at T_A = +25°C under nominal line voltage and nominal-load conditions, unless noted.

All models are specified with an external 0.1µF multi-layer ceramic capacitor and 10µF tantalum capacitor installed across their output pins.

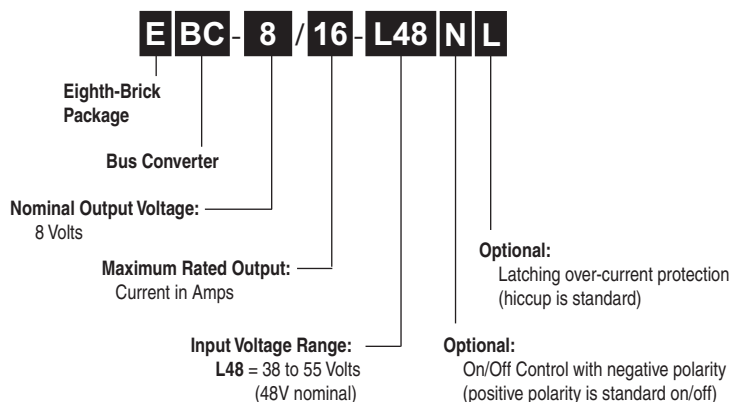
② Ripple/Noise (R/N) is tested/specified over a 20MHz bandwidth.

③ Devices have no minimum-load requirements and will regulate under no-load conditions.

Regulation specifications describe the output-voltage deviation as the line voltage or load is varied from its midpoint value to either extreme.

④ Nominal line voltage, no-load/full-load conditions. At V_{IN} = 38V, full load, I_{IN} = 3.45A maximum.

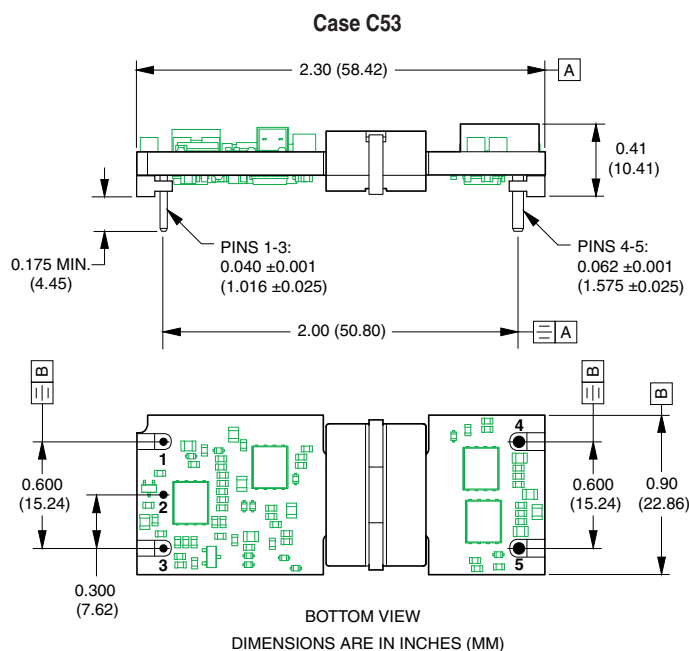
PART NUMBER STRUCTURE



Models Available

Model Number	On/Off Control Input	Over Current Response
EBC-8/16-L48	Positive logic	Hiccup (auto reset)
EBC-8/16-L48N	Negative logic	Hiccup (auto reset)
EBC-8/16-L48L	Positive logic	Latching (manual restart)
EBC-8/16-L48NL	Negative logic	Latching (manual restart)

MECHANICAL SPECIFICATIONS



I/O Connections	
Pin	Function P65
1	-Input
2	Remote On/Off
3	+Input
4	-Output
5	+Output

Performance/Functional Specifications

Typical @ $T_A = +25^\circ\text{C}$ under nominal line voltage and full-load conditions unless noted. ①

Input	
Input Voltage Range	38-55 Volts (48V nominal)
Overvoltage Shutdown	57-60 Volts
Start-Up Threshold ②	36.5-38 Volts
Undervoltage Shutdown ②	35-37.5 Volts
Input Current	See Performance Specifications
Short Circuit Current (latch mode)	200mA maximum
Input Reflected Ripple Current ③	5mA _{p-p}
Internal Filter Type	Pi
Reverse Polarity Protection	None (see Absolute Max. Ratings)
On/Off Control ④	
Positive Logic (no suffix)	On = open (internal pull-up) Off = 0 to 0.8V (0.8mA max.)
Negative Logic ("N" Suffix)	On = pulled low to 0-0.8V (0.8mA max.) Off = open (internal pull-up)
Output	
Accuracy @ 48V _{IN} , no load	8V $\pm 2.5\%$ maximum
Minimum Loading	No minimum load
Ripple/Noise (20MHz BW) ③	See Performance Spec
Line/Load Regulation	See Performance Spec
Efficiency	See Performance Spec
Current Share Accuracy: 2 units paralleled on input/output	$\pm 10\%$
Isolation Voltage: Input/Output	2250Vdc min. (BASIC)
Isolation Resistance	10M Ω
Isolation Capacitance	470pF
Current Limit Inception	18-22 Amps
Short Circuit Current	TBD
Capacitive Loading (Resistive Load)	5000 μF ⑤
Temperature Coefficient	$\pm 2\%$ over range
Dynamic Characteristics	
Dynamic Load Response (50-100-50%) load step to within $\pm 2.5\%$ of V_{OUT}	300 μsec
Start up time: ⑥	
V_{IN} to V_{OUT}	15msec
On/Off to V_{OUT}	15msec
Switching Frequency, Fixed	140kHz $\pm 20\text{kHz}$
Environmental	
Calculated MTBF ⑦	>2.5 million hours
Operating PCB Temperature ⑧ without Derating	-40 to +100°C
Thermal Shutdown	+115 to +125°C
Storage Temperature	-55 to +125°C
Physical	
Dimensions	See Mechanical Dimensions
Pin Material	Copper, solder coated over nickel underplate
Weight	1 ounce (28.4 grams)
Primary to Secondary Insulation Level	Basic

- ① All models are tested and specified with 1 μF /10 μF ceramic/tantalum output and no external input capacitors, and 300 lfm air flow, unless otherwise noted. All models will effectively regulate under no-load conditions (with perhaps a slight increase in output ripple/noise).
- ② See Technical Notes/Performance Curves for additional explanations and details.
- ③ Input Ripple Current is tested/specified over a 5-20MHz bandwidth with an external 33 μF input capacitor and a simulated source impedance of 220 μF and 12 μH . See I/O Filtering, Input Ripple Current and Output Noise for details.
- ④ The On/Off Control is designed to be driven with open collector transistor or by appropriate voltage levels. CAUTION: Prevent damaging overvoltage at the On/Off Input.
- ⑤ Capacitive load must be low ESR, 0.025 Ω maximum. No inductive reactance.
- ⑥ For Start-Up-Time specifications, output settling time is defined as the output voltage having reached $\pm 1\%$ of its final value and the load current having reached at least 80% of its final value.
- ⑦ MTBF is calculated using TELCORDIA SR-332 Method 1 Case 3, ground fixed, +25°C ambient air and full-load conditions. Contact DATEL for demonstrated life test data.
- ⑧ All models are fully operational and meet all published specifications, including "cold start," at -40°C.
- ⑨ The outputs are not intended to sink appreciable reverse current. Damage may result.

Absolute Maximum Ratings

Input Voltage:	
Continuous or transient	60 Volts
Input Reverse-Polarity Protection	None
Output Current ⑨	Current limited. Devices can withstand an indefinite output short circuit without damage.
Storage Temperature	-55 to +125°C
Lead Temperature (soldering, 10 sec.)	+300°C (soldering 10 seconds max.)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability. Proper operation under conditions other than those listed in the Performance/Functional Specifications Table is not implied.

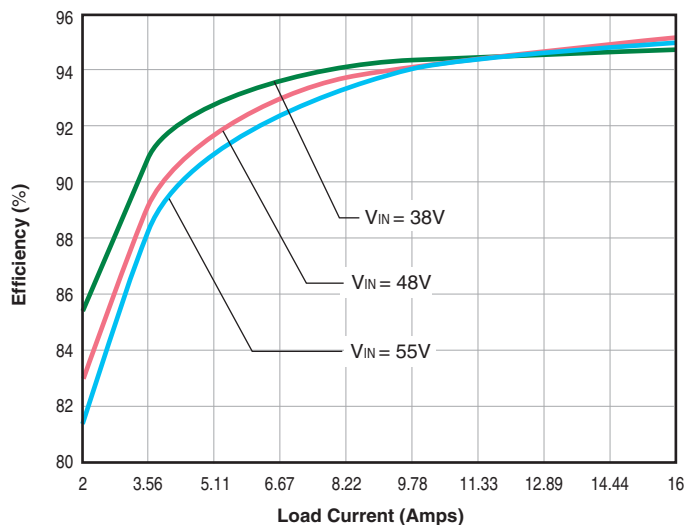
Definitions

Line Regulation This is the change in the output if the input changes. With a bus converter, this specification is essentially unregulated. Changes in the input voltage are almost fully reflected in proportional 6:1 (ratiometric) changes in the output voltage. Therefore line regulation has much less meaning compared to other DC/DC converters. In other words, line regulation is one of the specifications which is forfeited in order to achieve the high efficiency and small size of the bus converter architecture.

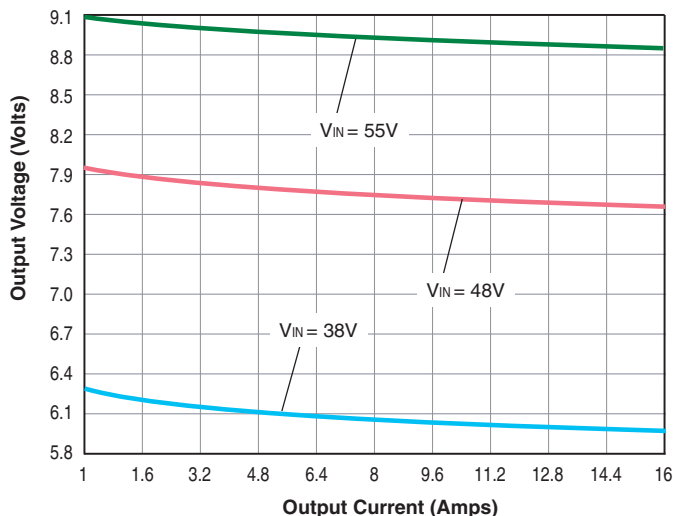
Load Regulation This specification is what most regulated DC/DC's provide – an essentially non-changing output with excursions from zero to full output load. Here again, the bus converter is essentially unregulated. However, there is, in effect, output “load regulation” if you consider equivalent internal source impedance. Low output impedance means that the output voltage does not vary much from no load to full load at fixed input voltage.

Typical Performance Curves

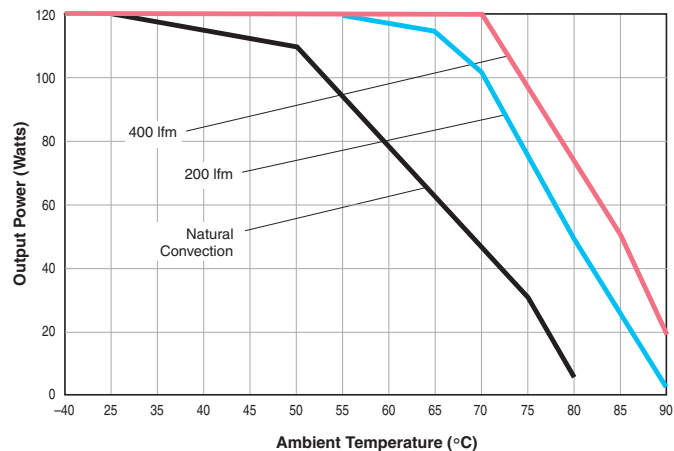
EBC-8/16-L48
Efficiency vs. Line Voltage and Load Current @ +25°C



Output Voltage vs. Output Current @ +25°C (Ratio 6:1)



EBC-8/16-L48 Maximum Power Derating
VIN = 48V (transverse air flow)



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