

# C-BUS (CBE)

12V 1/8th Brick Bus Module for Telecom & Network Applications



## Features

- Delivers up to 14A at 12V
- Industry Standard 1/8 brick form factor
- Standard Bus Converter pin-out.
- Onboard input differential LC filter
- High efficiency (no heat sink required)
- No minimum load requirements
- Meets Basic Insulation requirements of EN60950
- Fixed switching frequency operation
- Fully protected
  - Input under-voltage lockout and over voltage disables converter at against abnormal input voltages
  - Output current limit and short circuit protection protects converter from excessive load current or short circuits
  - Output over-voltage protection protects load from damaging voltages
  - Thermal shutdown protects converter from abnormal environmental conditions
- Enable ON/OFF
- Safety tested for UL60950, TUV (per EN60950), CUL and CE Marked.
- Meets EMI requirements of Bellcore TSYNWT 1089 with external filter
- Board and plastic components meet 94V-0 flammability requirements
- Through-hole and Surface mount platforms
- Pin material: Copper (through hole)
- Pin finish: Tin/Lead over Nickel

## Description

The C-Bus DC-DC converter provides a high efficiency isolated step down voltage from 48V to 12V in a standard single output eighth brick footprint.

This board mountable, isolated, fixed switching frequency open loop dc-dc converter is able to achieve extremely high efficiencies with very low heat dissipation. The C-Bus will provide up to **168W** at 12V from a nominal 48V input. This implies operating currents of **14A** without the need for a heat-sink.

The loosely regulated 12V intermediate bus dc-dc converter can be used to power downstream non-isolated, point of load regulators.

The C-Bus is available in both SMT and through-hole packaging.



## Applications

- 12V Intermediate Bus Voltage Architectures
- For low output voltage POLs from a 48V power source
- Servers and Storage Applications
- Enterprise Networks
- Networking Equipment

## Options

- Positive or negative logic
- Through hole or surface mount package
- Pin lengths: 0.180", 0.145", 0.110"

## Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

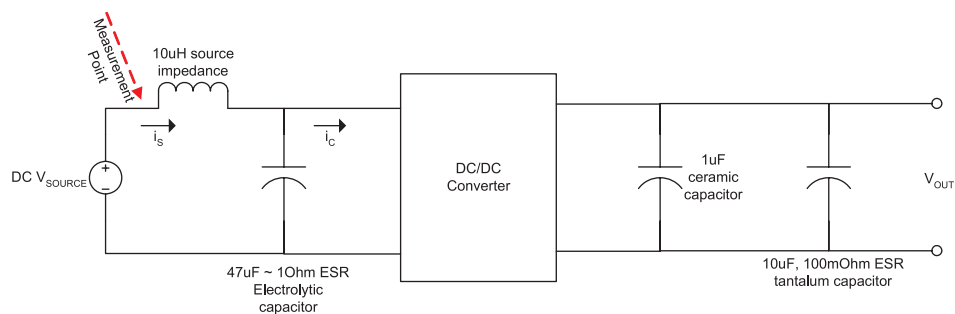
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Input Voltage: Continuous (Operating)	$V_i$	–	–	56	Vdc
Operating Temperature	$T_c$	-40	–	85	°C
Storage Temperature	$T_{stg}$	-55	–	125	°C

All specifications apply over  $T_A=25^{\circ}\text{C}$ , 300LFM and  $V_{in}=48\text{Vdc}$  unless otherwise specified.

## Input Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Input Voltage	$V_i$	42	48	53	Vdc
Inrush Transient	$I^2t$	–	0.01	–	$\text{A}^2\text{s}$
Maximum Input Current	$I_{in}$ , @ 42Vin $I_{in}$ , @ 53Vin	–	–	3.60 3.80	A A
Under-voltage Lockout - Turn off - Turn on	–	37.6 40.9	39.1 42.5	40.7 44.2	Vdc Vdc
Over-voltage Lockout - Turn off - Turn on	–	53.2 48.3	55.2 50.1	57.4 52.1	Vdc Vdc
Input Reflected-Ripple Current (Reference drawing below)	$I_r$	–	5	–	mArms

All specifications apply over  $T_A=25^{\circ}\text{C}$ , 300LFM and  $V_{in}=48\text{Vdc}$  unless otherwise specified.



## Fusing Considerations

**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

To achieve maximum safety and system protection, always use an input fuse. The safety agencies require a normal-blow fuse with a maximum rating of 8A. Based on the information provided in this datasheet on inrush energy and maximum dc input current, the same type of fuse with a lower rating can be used. Refer to the fuse manufacturer's data for further information.

## Input Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Output Voltage Set Point (At No Load)	Vo, set	–	N/A	–	Vdc
Total Output Voltage Range <sup>1</sup> (Line/Load)	Vo	9.7	–	13.3	Vdc
Output Regulation: Line Load Over Temperature Drift	–	–	±1.80 700 ±200	–	V mV mV
Output Ripple and Noise (Full Load) RMS Peak-to-Peak	–	–	50 130	–	mVrms mVp-p
Output Current	Io	–	14	–	A
Output Current-Limit Inception (Output voltage 10% low)	Io	14.50	–	22.00	A
Short-Circuit Current RMS	–	–	–	7	A
Output Over-Voltage Protection (Non-Latching)	–	–	14.9	–	V
Efficiency (@ full load) (@ half load)	η	–	93.5 94.0	–	% %
Switching Frequency	–	–	300	–	kHz
Dynamic Response Load Change from Io = 50% to 75% of Io:  ΔIo/Δt = 0.1A/μs: Peak Deviation Settling Time to 1%  ΔIo/Δt = 1A/μs: Peak Deviation Settling Time to 1%	–	–	200 100  300 100	–	mV μs  mv μs
Output Load Capacitance (12Vout at 14A resistive load)	–	0	–	5,000	μF
Turn-On Transient (Full load, Vo=90% nom) Turn-On Time Output Voltage Overshoot (at 5,000μF)	–	–	10 2	–	ms %

All specifications apply over TA=25°C, 300LFM and Vin=48Vdc unless otherwise specified.

<sup>1</sup>Voltage range specified at 12A load.

## Isolation Specifications

Parameter	Minimum	Typical	Maximum	Unit
Isolation Capacitance	–	2,200	–	PF
Isolation Resistance	10	–	–	MΩ
Isolation Voltage	–	1,500	–	VDC

## General Specifications

Parameter	Minimum	Typical	Maximum	Unit
Calculated MTBF (Bellcore method)	–	2.7M	–	Hours

## Input Specifications

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Positive Logic Control:					
Converter Off <sup>1</sup>	-	-17	-	0.8	Vdc
Converter On <sup>2</sup>	-	2.8	-	17	Vdc
Negative Logic Control:					
Converter Off <sup>1</sup>	-	2.8	-	17	Vdc
Converter On <sup>2</sup>	-	-17	-	0.8	Vdc
Over-Temperature Shutdown (Non-Latching)	-	-	120	-	°C
Current Share (Droop Method)	-	-	±10	-	%

All specifications apply over  $T_A=25^{\circ}\text{C}$ , 300LFM and  $V_{in}=48\text{Vdc}$  unless otherwise specified.

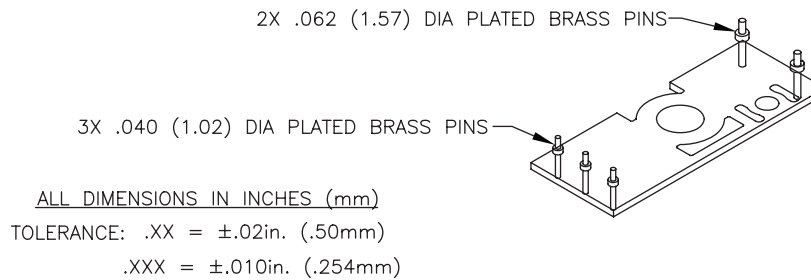
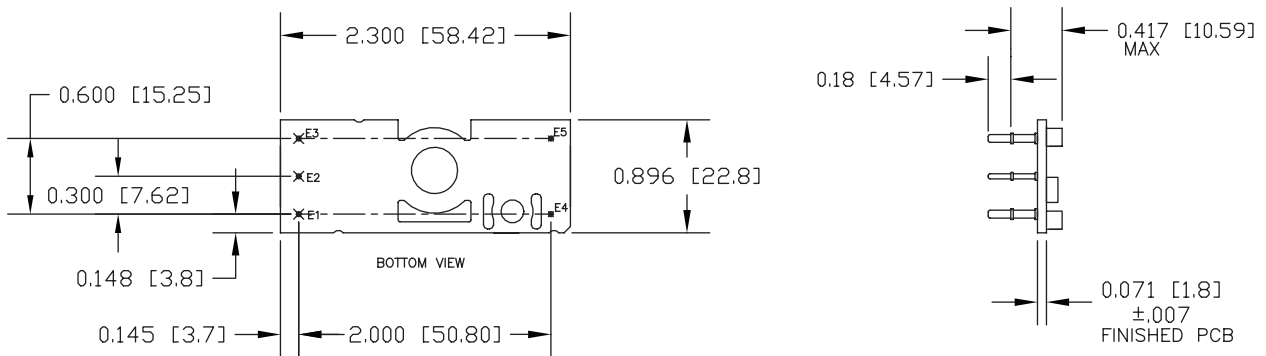
<sup>1</sup>Apply a TTL low signal or a negative signal down to -17V.

<sup>2</sup>Leave Signal open or apply a positive voltage up to 17V.

### Mechanical Specifications

Parameter	Typical	Maximum	Unit
Device Weight	0.90 (25.5)		Oz. (g)
Standard Footprint	0.89 (22.76) x 2.30 (58.42)		in (mm)
Profile		0.417 (10.6)	in (mm)

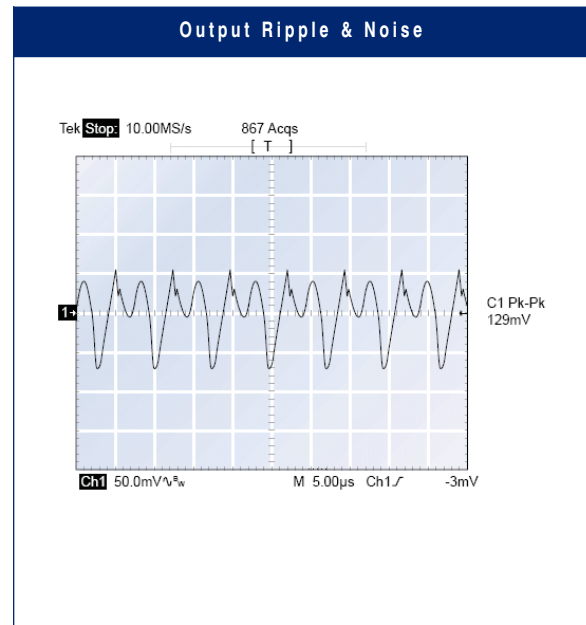
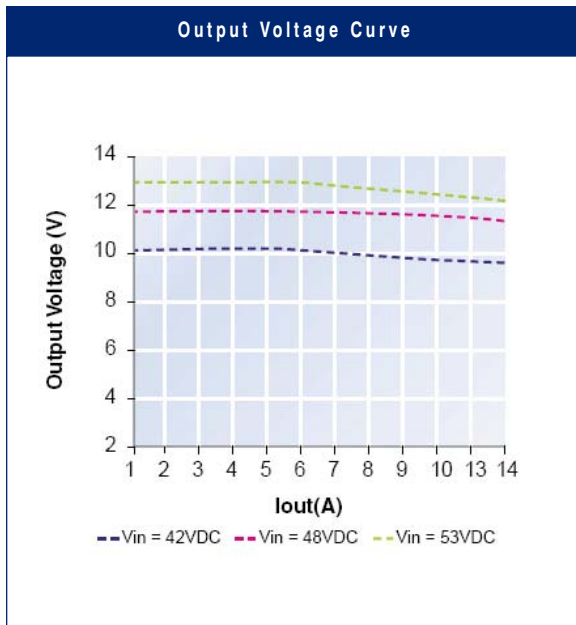
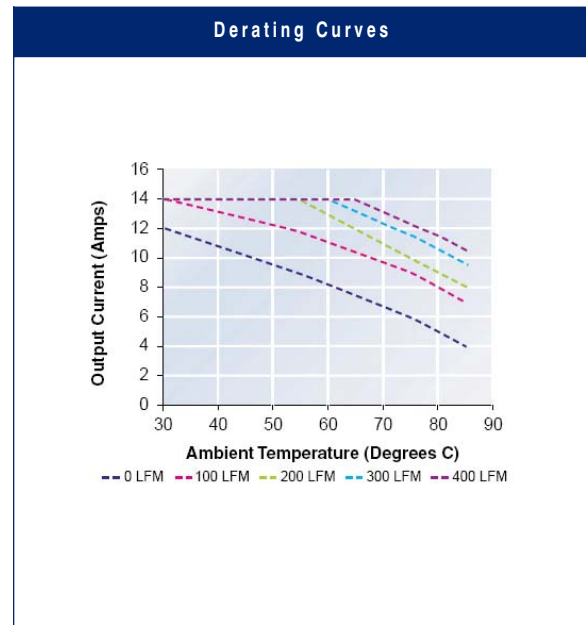
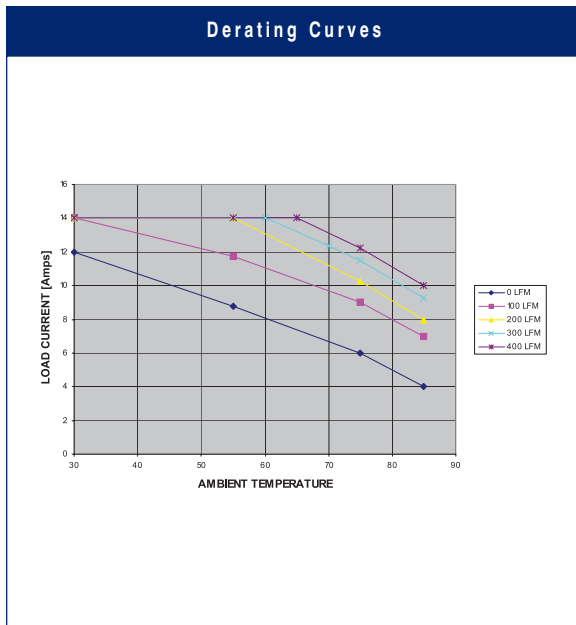
### Mechanical Outline (All Dimensions in Inches)



### Pin Functions

Pin	Function	Pin	Function
E1	Vin (+)	E4	Vout
E2	Enable On/Off	E5	Return
E3	Vin (-)		

**Performance Curves**



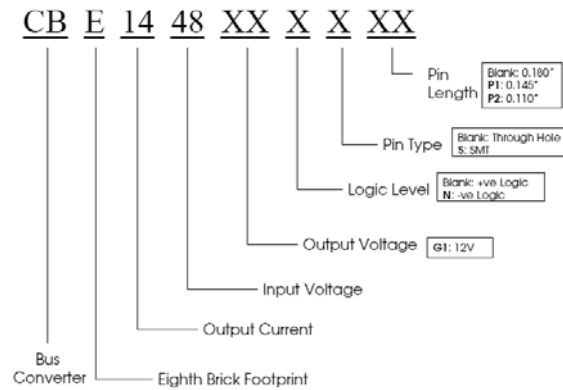
## Models

Input Voltage	Output Voltage	Output Current	Output Power	Model
42 - 53 Vdc	12V	14A	168W	CBE1448G1

## Options

Option	Model Suffix
Negative logic remote on/off	N
SMT package platform	S
Pin Length: 0.145"	P1
Pin Length: 0.110"	P2

## Model Selection Guide



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