

NON-ISOLATED DC/DC CONVERTERS

4.5V-14V Input

0.75V-3.63V/16A Output



S7BC-16E2AX

Series

PRELIMINARY

- Non-Isolated
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- Low Cost
- Flexible Output Voltage Sequencing (option)
- Able to Sink & Source Current
- Industrial Temperature Range
- Under-voltage Lockout (UVLO)
- Over Temperature Protection
- OCP/SCP
- Wide Input
- Wide Trim
- Remote On/Off
- Active Low/High (option)
- Remote Sense

Description

The Bel S7BC-16E2AX is part of the non-isolated dc to dc converter Power Module series. The modules use a SMT package. These converters are available in a range of output voltages from 0.75V to 3.63V over a wide range of input voltage (V_{in} = 4.5V-14V). The Bel S7BC-16E2AX has a sequencing feature that enables designers to implement various types of output voltage sequencing when powering. The efficiency is typically 92% at 3.3V output at full load.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active Low	Model Number Active High
0.75 – 3.63V	4.5V – 14V	16A	58W	92%	S7BC-16E2AL	S7BC-16E2A0

Note: Add “G” suffix at the end of the model number to indicate Tray Packaging.

Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3V	-	15V	
Output Enable Terminal Voltage	-0.3V	-	15V	
Sequencing Voltage ¹	-0.3V	-	V_{in}	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-55°C	-	125°C	

Notes: All specifications are typical at 25°C unless otherwise stated.

1. S7BC-16E2AX series of modules include a sequencing feature that enables users to implement various types of output voltage sequencing in their applications. This is accomplished via an additional sequencing pin. When not using the sequencing feature, either, tie the SEQ pin to V_{in} or leave it unconnected.

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Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	4.5V	-	14V	
Input Current (full load)	-	-	15A	
Input Current (no load)	-	100mA	-	
Remote Off Input Current	-	2mA	-	
Input Reflected Ripple Current (pk-pk)	-	-	400mA	Tested with one 1000uF/25V AL input capacitor with ESR=0.03 ohm max and 6 × 47uF/16V tan capacitors with ESR=0.013 ohm max at 100KHz, & simulated source impedance of 1000nH, 5Hz to 20MHz.
Input Reflected Ripple Current (RMS)	-	-	150mA	
I ² t Inrush Current Transient	-	0.2A ² s	0.4A ² s	
Turn-on Voltage Threshold	-	4.2V	-	
Turn-off Voltage Threshold	3.7V	-	4.2V	

Output Specifications

Parameter		Min	Typ	Max	Notes
Output Voltage Set Point		-2%Vo,set	-	2%Vo,set	Vin=12V, full load
Load Regulation		-	0.1%Vo,set	-	Io=Io, min to Io, max
Line Regulation		-	0.1%Vo,set	-	Vin=Vin, min to Vin, max
Regulation Over Temperature (-40°C to +85°C)		-	0.3%Vo,set	-	Tref=Ta, min to Ta, max
Output Current		0A	-	16A	
Current Limit Threshold		-	180% Io,out	-	
Short Circuit Surge Transient		-	1A ² s	3A ² s	
Ripple and Noise (pk-pk)		-	30mV	75mV	Tested with 0-20MHz, 10uF tantalum capacitor & 1uF TDK ceramic capacitor at the output
Ripple and Noise (RMS)		-	12mV	30mV	
Turn on Time		-	8mS	15mS	
Overshoot at Turn on		0%Vo,set	-	1%Vo,set	
Output Capacitance		0uF	-	5000uF	ESR ≥ 10mohm
Transient Response					
50% ~ 100% Max Load	All	-	150mV	-	di/dt=2.5A/uS; Vin=12V; and with 2 × 150uF polymer capacitors at the output
Settling Time		-	50uS	-	
100% ~ 50% Max Load		-	150mV	-	
Settling Time		-	50uS	-	

Note: All specifications are typical at nominal input, full load at 25°C unless otherwise stated.

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4.5V-14V Input

0.75V-3.63V/16A Output



General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency				
Vo=3.3V	-	92%	-	Measured at Vin=12V, full load
Vo=2.5V	-	90%	-	
Vo=1.8V	-	88%	-	
Vo=1.5V	-	87%	-	
Vo=1.2V	-	85%	-	
Vo=0.75V	-	79%	-	
Efficiency				
Vo=3.3V	-	92%	-	Measured at Vin=5V, full load
Vo=2.5V	-	90%	-	
Vo=1.8V	-	87%	-	
Vo=1.5V	-	86%	-	
Vo=1.2V	-	83%	-	
Vo=0.75V	-	78%	-	
Switching Frequency	200KHz	230KHz	260KHz	
Over Temperature Shutdown ¹	-	130°C	-	
Output Trim Range (Wide Trim)	0.7525V	-	3.63V	
Remote Sense Compensation	-	-	0.5V	
Dimensions				
Inches (L × W × H)	1.30 x 0.53 x 0.315			
Millimeters (L × W × H)	33.02 x 13.46 x 8.00			
Weight	-	8g	-	

Note: All specifications are typical at 25°C unless otherwise stated.

Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit Off)	-0.2V	-	0.3V	S7BC-16E2A0; Remote On/Off pin open, Unit on.
Signal High (Unit On)	-	-	Vin, max	
Signal Low (Unit On)	-0.2V	-	0.3V	S7BC-16E2AL; Remote On/Off pin open, Unit on.
Signal High (Unit Off)	2.5V	-	Vin, max	
Voltage Sequencing				
Sequencing Slew Rate Capability	-	-	2V/mS	
Sequencing Delay Time	-	15mS	25mS	Delay from Vin, min to application of voltage on SEQ pin
Tracking Accuracy				
Power-Up	-	100mV	200mV	
Power-Down	-	200mV	400mV	

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4.5V-14V Input

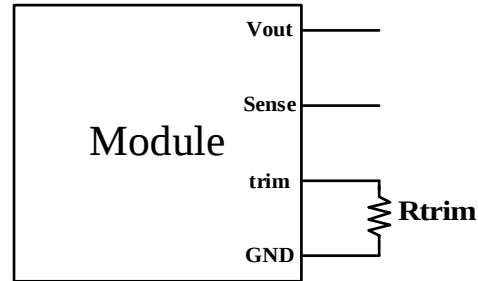
0.75V-3.63V/16A Output



Output Trim Equations

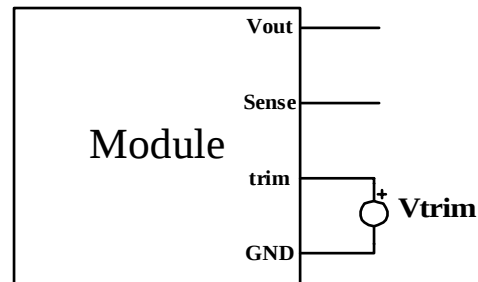
Equation for calculating the trim resistor (in Ω) given the desired output voltage (V_o) is shown below. The Trim Up resistor should be connected between the Trim pin and Ground.

$$R_{TrimUp} = \frac{10500}{V_o - 0.7525} - 1000$$



Equation for calculating the trim voltage (in V) given the desired output voltage (V_o) is shown below. The Trim Up voltage should be connected between the Trim pin and Ground.

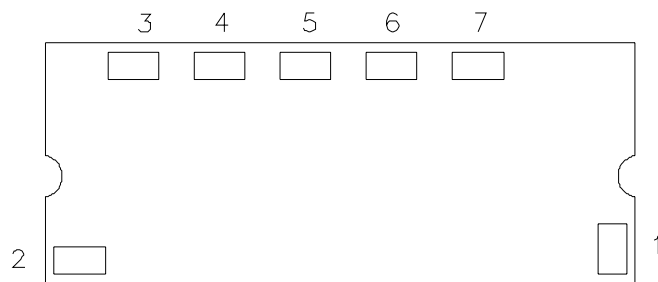
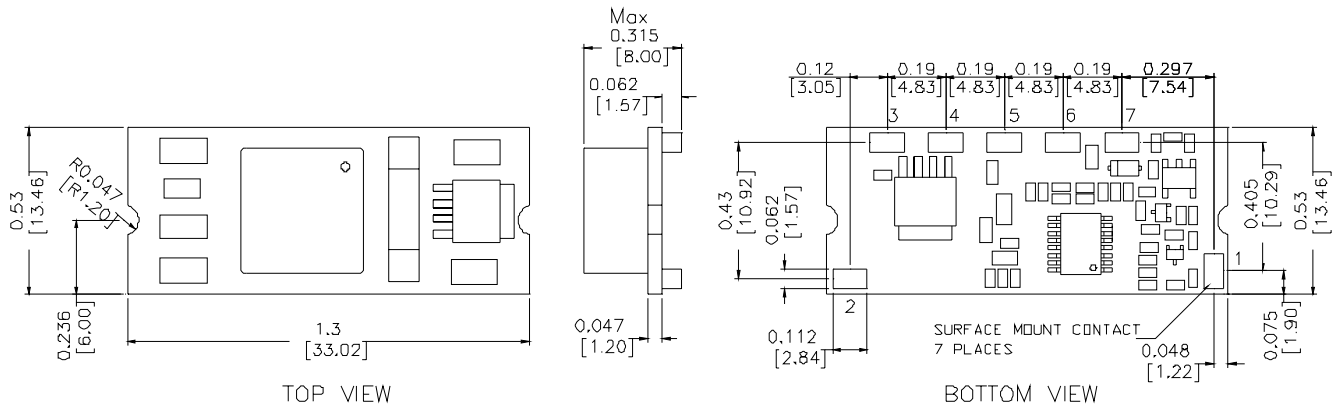
$$V_{TrimUp} = 0.7 - 0.0667 \times (V_o - 0.7525)$$



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BOTTOM VIEW

Pin Connections

Pin	Function
1	Remote On/Off
2	Vin+
3	SEQ (option)
4	Ground
5	Vout+
6	Trim
7	Remote Sense

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