

# NON-ISOLATED DC/DC CONVERTERS

3.0V-3.6V Input      12V/0.8A & 15V/0.6A Output



## X7AH-01C Series      PRELIMINARY

- Non-Isolated
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- Low Cost
- Trim Function (option)
- Burst Mode Operation at Light Load

### Description

The Bel X7AH-01CXX0 is part of the low cost non-isolated dc to dc converter Power Module series. The modules use a surface mount package or vertical package for ease of layout and space savings. The output is closely regulated and the efficiency of 12V output module is typically 86% at full load. Typical features include burst mode operation at light load and trim function (option).

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Part Number Surface Mount	Part Number Vertical Mount
12V	3.0 – 3.6V	0.8A	9.6W	86%	S7AH-01CX20	V7AH-01CX20
15V	3.0 – 3.6V	0.6A	9.0W	85%	S7AH-01CX50	V7AH-01CX50

### Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	2.8V	-	4V	
Output Power	-	-	9.6W	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-40°C	-	125°C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	3V	-	3.6V	
Input Current (no load)	-	15mA	-	
Input Current (full load)				
	Vo=12V	-	4.3A	
	Vo=15V	-	4A	
Input Reflected Ripple Current (pk-pk)	-	100mA	150mA	With simulated source impedance of 500nH, 5Hz to 20MHz; Use 270uF/16V cap. with ESR = 0.018 ohm max. at 100KHz at 25°C
Input Reflected Ripple Current (RMS)	-	30mA	60mA	
I <sup>2</sup> t Inrush Current Transient	-	0.02A <sup>2</sup> s	0.05A <sup>2</sup> s	
Turn-on Voltage Threshold	-	2.8V	2.9V	

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## Output Specifications

Parameter		Min	Typ	Max	Notes	
Output Voltage Set Point	Vo=12V	11.58V	12V	12.42V	Test condition: Vin=3.3V, Iout=full load	
	Vo=15V	14.475V	15V	15.525V		
Line Regulation	Vo=12V	-	20mV	40mV		
	Vo=15V	-	20mV	40mV		
Load Regulation	Vo=12V	-	60mV	120mV		
	Vo=15V	-	75mV	150mV		
Regulation Over Temperature (-40°C to +85 °C)	Vo=12V	-	45mV	80mV		
	Vo=15V	-	60mV	100mV		
Output Current	Vo=12V	0A	-	0.8A		
	Vo=15V	0A	-	0.6A		
Ripple and Noise (RMS)	Vo=12V; Io=0A	-	25mV	50mV	Test conditions: BW = 0-20MHz; 1uF ceramic cap and 33uF tantalum cap at output	
	Vo=15V; Io=0A	-	25mV	50mV		
	Vo=12V; Io=0.8A	-	25mV	50mV		
	Vo=15V; Io=0.6A	-	35mV	60mV		
Ripple and Noise (pk-pk)	Vo=12V; Io=0A	-	85mV	120mV		
	Vo=15V; Io=0A	-	100mV	150mV		
	Vo=12V; Io=0.8A	-	60mV	100mV		
	Vo=15V; Io=0.6A	-	100mV	150mV		
Rise Time		-	5mS	-		
Overshoot at Turn on		-	0%	5%		
Output Capacitance		33uF	-	330uF	Tan Cap.	
<b>Transient Response</b>						
50% ~ 100% Max Load	Overshoot	All Outputs	-	130mV	200mV	di/dt = 0.1A/uS; Vin = 3.3V; Ta = 25°C and with 33uF Tan. Cap. on output
	Settling Time		-	100uS	200uS	
100% ~ 50% Max Load	Overshoot		-	130mV	200mV	
	Settling Time		-	100uS	200uS	

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

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## General Specifications

Parameter	Min	Typ	Max	Notes	
Efficiency					
	V <sub>O</sub> =12V	82%	86%	-	Measured at Vin=3.3V, full load
	V <sub>O</sub> =15V	81%	85%	-	
Switching Frequency	500KHz	550KHz	650KHz		
Output Trim Range	90%V <sub>O</sub>	-	110%V <sub>O</sub>		
MTBF	TBD			Calculated Per Bell Core TR-332 (I <sub>o</sub> = Nominal; T <sub>a</sub> = 25°C)	
Dimensions (surface mount)					
	Inches (L × W × H)	0.78 x 0.7 x 0.32			
	Millimeters (L × W × H)	19.812 x 17.78 x 8.128			
Dimensions (vertical)					
	Inches (L × W × H)	0.7 x 0.308 x 0.65			
	Millimeters (L × W × H)	17.78 x 7.82 x 16.51			
Weight	-	5.2g	-		

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

## Output Trim Equations

Equations for calculating the trim resistor (in kΩ) given the desired adjusted voltage (V<sub>adj</sub>) and the nominal output voltage of the converter (V<sub>nom</sub>) are shown below. The Trim Down resistor should be connected between the Trim pin and V<sub>out</sub>. The Trim Up resistor should be connected between the Trim pin and Ground. Only one of the resistors should be used for any given application.

$$R_{TrimDown} = \frac{A}{V_{nom} - V_{adj}} - B$$

$$R_{TrimUp} = \frac{C}{V_{adj} - V_{nom}} - D$$

V <sub>nom</sub>	A	B	C	D
12	164.640	21.850	11.760	7.150
15.055	209.542	20.600	11.760	5.900

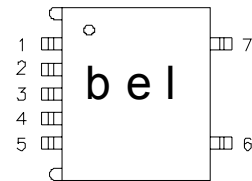
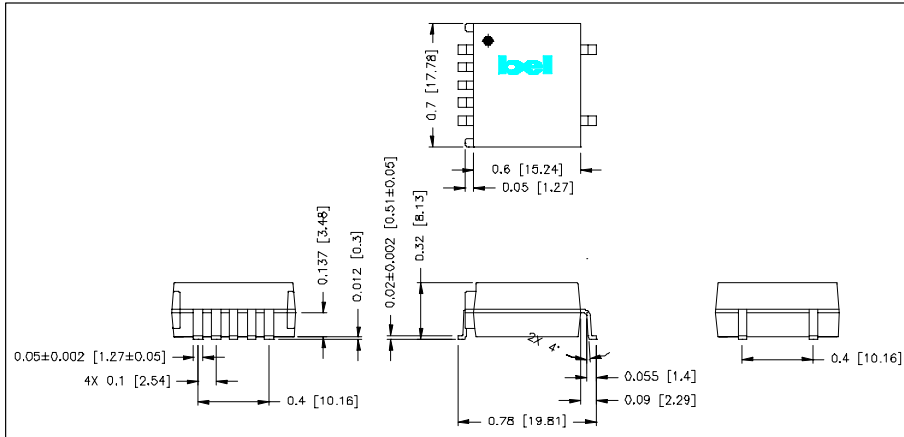
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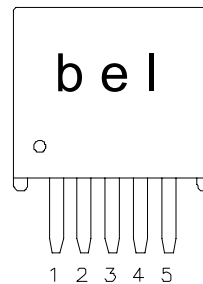
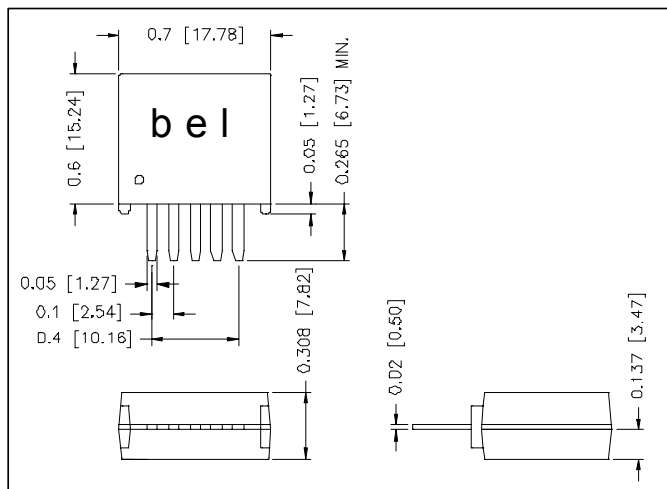
## S7AH-01C



### Pin Connections

Pin	Function
1	N/A
2	Vin (+)
3	Ground
4	Vout (+)
5	Trim (option)
6	N/A
7	N/A

## V7AH-01C



### Pin Connections

Pin	Function
1	N/A
2	Vin (+)
3	Ground
4	Vout (-)
5	Trim (option)

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