

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 ² t Inrush Current Transient	-	0.02A ² s	0.05A ² 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 Vo=15V	11.58V 14.475V	12V 15V	12.42V 15.525V	Test condition: Vin=3.3V, Iout=full load	
Line Regulation	Vo=12V Vo=15V	- -	20mV 20mV	40mV 40mV		
Load Regulation	Vo=12V Vo=15V	- -	60mV 75mV	120mV 150mV		
Regulation Over Temperature (-40°C to +85 °C)	Vo=12V Vo=15V	- -	45mV 60mV	80mV 100mV		
Output Current	Vo=12V Vo=15V	0A 0A	- -	0.8A 0.6A		
Ripple and Noise (RMS)	Vo=12V; Io=0A Vo=15V; Io=0A Vo=12V; Io=0.8A Vo=15V; Io=0.6A	- - - -	25mV 25mV 25mV 35mV	50mV 50mV 50mV 60mV	Test conditions: BW = 0-20MHz; 1uF ceramic cap and 33uF tantalum cap at output	
Ripple and Noise (pk-pk)	Vo=12V; Io=0A Vo=15V; Io=0A Vo=12V; Io=0.8A Vo=15V; Io=0.6A	- - - -	85mV 100mV 60mV 100mV	120mV 150mV 100mV 150mV		
Rise Time		-	5mS	-		
Overshoot at Turn on		-	0%	5%		
Output Capacitance		33uF	-	330uF	Tan Cap.	
Transient Response						
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 Vo=12V Vo=15V	82% 81%	86% 85%	- -	Measured at Vin=3.3V, full load
Switching Frequency	500KHz	550KHz	650KHz	
Output Trim Range	90%Vo	-	110%Vo	
MTBF	TBD			Calculated Per Bell Core TR-332 (Io = Nominal; Ta = 25°C)
Dimensions (surface mount) Inches (L × W × H) Millimeters (L × W × H)	0.78 x 0.7 x 0.32 19.812 x 17.78 x 8.128			
Dimensions (vertical) Inches (L × W × H) Millimeters (L × W × H)	0.7 x 0.308 x 0.65 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 (Vadj) and the nominal output voltage of the converter (Vnom) are shown below. The Trim Down resistor should be connected between the Trim pin and Vout. 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.

$$R_{TrimDown} = \frac{A}{V_{nom} - V_{adj}} - B \qquad R_{TrimUp} = \frac{C}{V_{adj} - V_{nom}} - D$$

Vnom	A	B	C	D
12	164.640	21.850	11.760	7.150
15.055	209.542	20.600	11.760	5.900

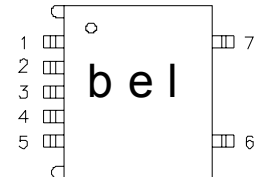
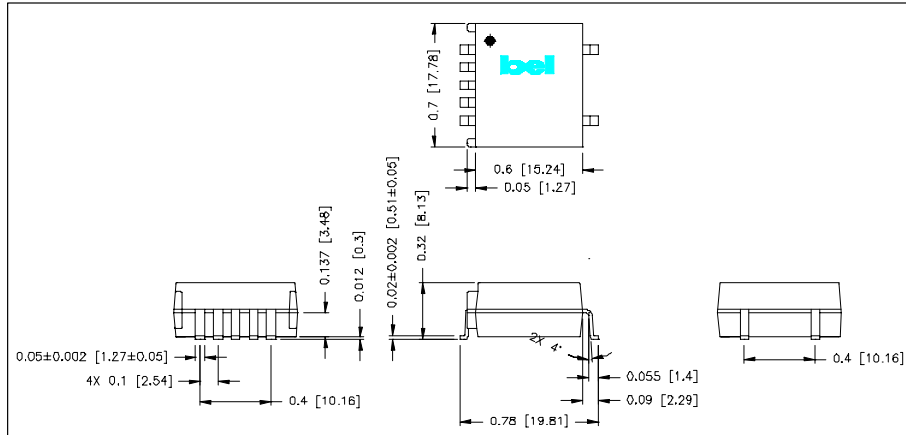
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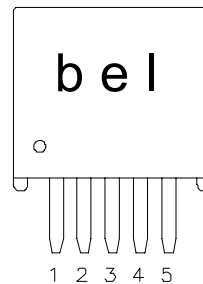
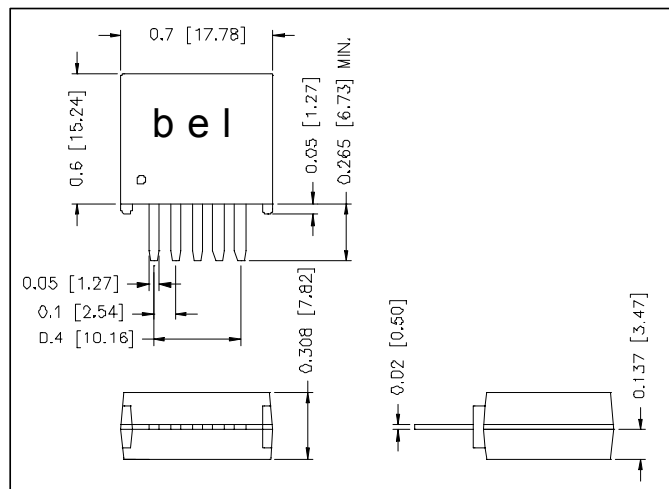
S7AH-01C



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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