

NON-ISOLATED DC/DC CONVERTERS

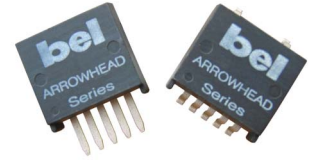
3 V-3.6 V Input

12 V/0.8 A & 15 V/0.6 A Output

bel
POWER PRODUCTS

x7AH-01C Series

- Non-Isolated
- High Efficiency
- Fixed Frequency (550 kHz)
- Low Profile Package
- Trim Function (option)
- Allows Burst Mode Operation at Low Load Currents



Description

The Bel x7AH-01Cxx0 is part of the low cost non-isolated dc/dc converter series. The modules use a SMD or SIP package or vertical package for ease of layout and space savings. The output is closely regulated and the efficiency of 12 V output module is typically 86% at full load. Typical features include allows burst mode operation at low load currents 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
12 V	3 V – 3.6 V	0.8 A	9.6 W	86%	S7AH-01CX20	V7AH-01CX20
15 V	3 V – 3.6 V	0.6 A	9.0 W	85%	S7AH-01CX50	V7AH-01CX50

Note: Add “0” suffix at the end of the model number to indicate “Tube Packaging”, and “R” for “Reel Packaging”, and “G” for “Tray Packaging”.

Absolute Maximum Ratings

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

Input Specifications

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

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Output Specifications

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

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

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General Specifications

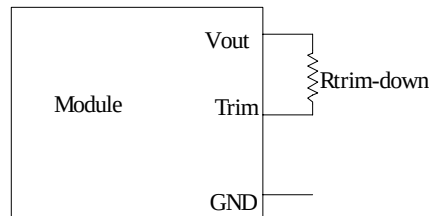
Parameter	Min	Typ	Max	Notes
Efficiency Vo=12 V Vo=15 V	82% 81%	86% 85%	- -	Measured at Vin=3.3 V, full load
Switching Frequency	500 kHz	550 kHz	650 kHz	
Output Trim Range	90% Vo	-	110% Vo	
MTBF	6,800,000 hours			Calculated Per Bell Core TR-332 (Vin=3.3 V; Vo=12 V; Io = 0.64 A; Ta = 25°C)
Dimensions (surface mount) Inches (L × W × H) Millimeters (L × W × H)	0.78 x 0.7 x 0.32 19.81 x 17.78 x 8.13			
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	-	5.2 g	-	

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

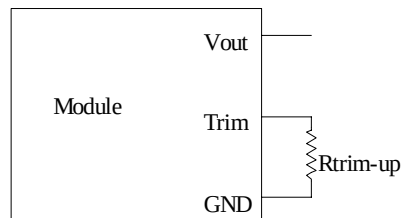
Output Trim Equations

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.

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



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



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

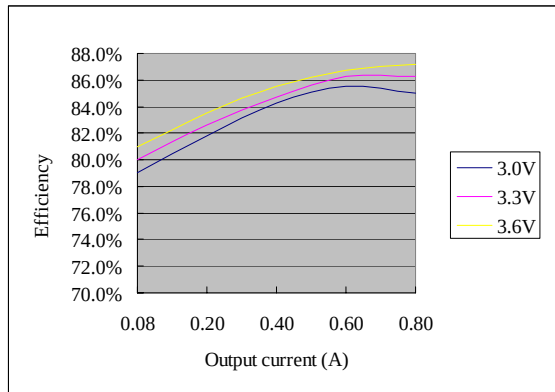
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3 V-3.6 V Input

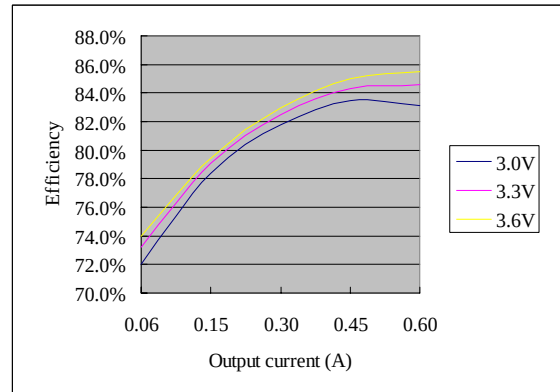
12 V/0.8 A & 15 V/0.6 A Output



Efficiency Data

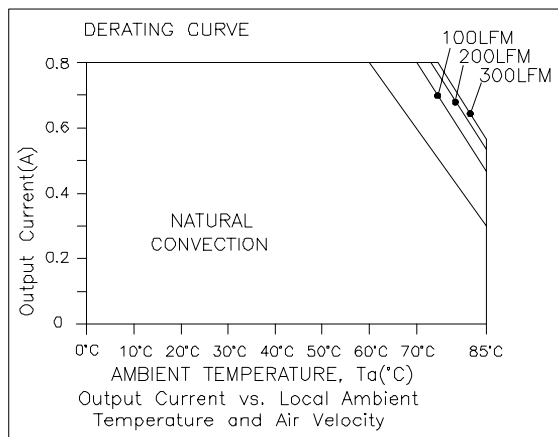


x7AH-01CX20

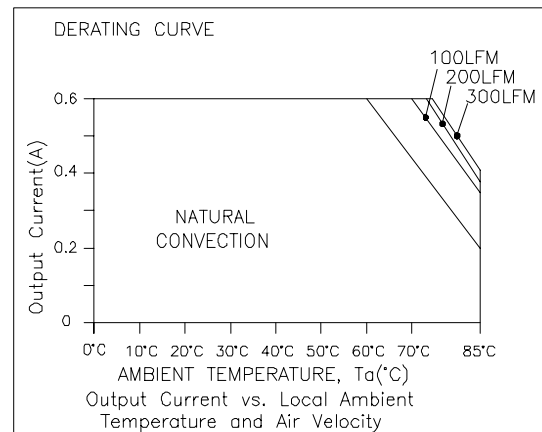


x7AH-01CX50

Thermal Derating Curves



x7AH-01CX20



x7AH-01CX50

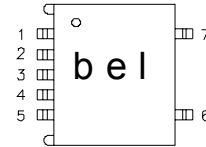
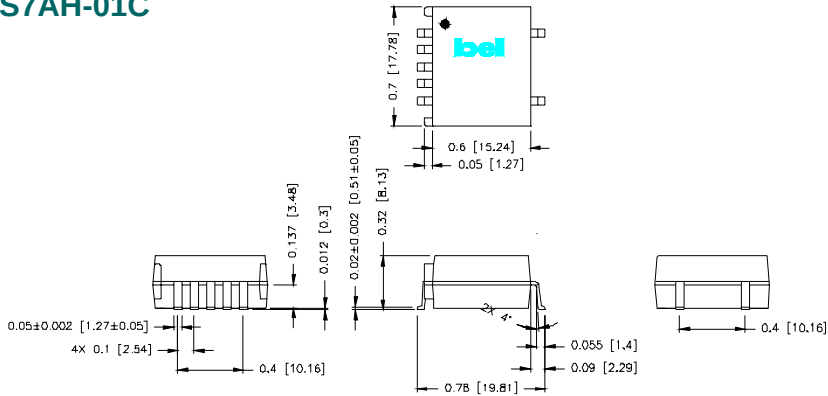
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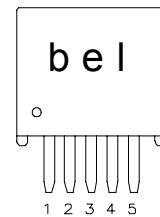
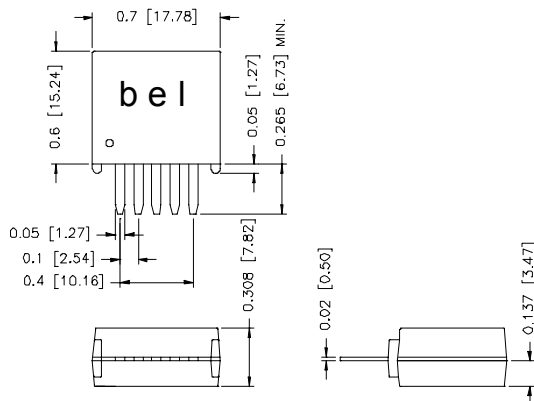
S7AH-01C



Pin Connections

Pin	Function
1	Remote On/Off
2	Vin
3	Ground
4	Vout
5	Trim
6	N/A
7	N/A

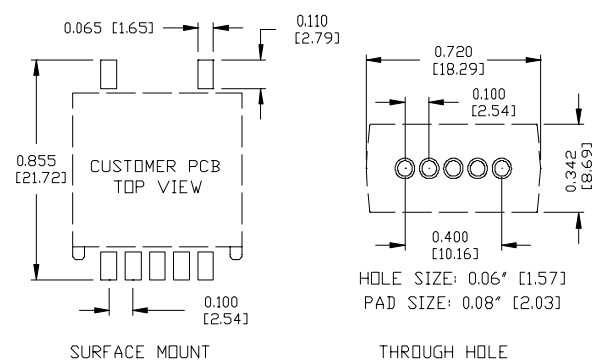
V7AH-01C



Pin Connections

Pin	Function
1	Remote On/Off
2	Vin
3	Ground
4	Vout
5	Trim

RECOMMENDED PCB PAD LAYOUT



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