

## NON-ISOLATED DC/DC CONVERTERS

2.5V Input 0.9V-1.65V/10A Output



### x7AH-10J Series

- Non-Isolated
- Low profile package (7.82mm)
- Fixed frequency (300KHz)
- Under-voltage lockout (UVLO)
- Remote On/Off
- Short circuit protection
- Over current protection
- Trim Function



### Description

The Bel x7AH-10Jxx0 is part of the low cost non-isolated DC/DC power converter series. The modules use a SMD or SIP package for ease of layout and space savings. The output is closely regulated and the efficiency of 1.5V output is typically 88% at full load. Typical features include remote on/off, input under voltage lockout, over current protection and short circuit protection.

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Part Number Surface Mount	Part Number Vertical Mount
1.5V	2.5V	10A	15W	88%	S7AH-10J150	V7AH-10J150
1.2V	2.5V	10A	12W	83%	S7AH-10J120	V7AH-10J120
1.0V	2.5V	10A	10W	80%	S7AH-10J100	V7AH-10J100

**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)	-0.3V	-	6V	
Output Enable Terminal Voltage	-0.3V	-	7V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-40°C	-	105°C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	2.25V	2.5V	2.75V	
Input Current (no load)	-	75mA	-	
Input Current (full load)				
Vo=1.5V	-	6.8A	-	
Vo=1.2V	-	5.6A	-	
Vo=1.0V	-	4.9A	-	
Remote Off Input Current	-	4mA	8mA	
Input Reflected Ripple Current (pk-pk)	-	80mA	150mA	Tested with simulated source impedance of 500nH, 5Hz to 20MHz; with a 270uF/16V with ESR=0.018 ohm max, at 100KHz at 25°C
Input Reflected Ripple Current (RMS)	-	25mA	50mA	
I <sup>2</sup> t Inrush Current Transient	-	0.04A <sup>2</sup> s	0.10A <sup>2</sup> s	
Turn on Voltage Threshold	2V	2.1V	2.15V	
Turn off Voltage Threshold	1.8V	2V	2.15V	

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## Output Specifications

Parameter	Min	Typ	Max	Notes		
Output Voltage Set Point				Test conditions: Vin=2.5V, Io=full load		
Vo=1.5V	1.470V	1.5V	1.530V			
Vo=1.2V	1.176V	1.2V	1.224V			
	Vo=1.0V	0.980V	1.0V	1.020V		
Line Regulation						
Vo=1.5V	-	2mV	5mV			
Vo=1.2V	-	2mV	5mV			
Vo=1.0V	-	2mV	5mV			
Load Regulation						
Vo=1.5V	-	5mV	10mV			
Vo=1.2V	-	5mV	10mV			
Vo=1.0V	-	5mV	10mV			
Regulation Over Temperature (-40°C to +85°C)						
Vo=1.5V	-	13mV	25mV			
Vo=1.2V	-	10mV	20mV			
Vo=1.0V	-	9mV	20mV			
Output Current	0A	-	10A			
Current Limit Threshold	13A	-	25A			
Short Circuit Surge Transient						
Vo=1.5V	-	0.5A <sup>2</sup> s	1.5A <sup>2</sup> s			
Vo=1.2V	-	0.5A <sup>2</sup> s	1.5A <sup>2</sup> s			
Vo=1.0V	-	0.5A <sup>2</sup> s	1.5A <sup>2</sup> s			
Ripple and Noise (RMS)	-	15mV	25mV	Test conditions: 0-20MHz BW, with a 1uF ceramic capacitor at the output.		
Ripple and Noise (pk-pk)	-	50mV	100mV			
Turn on Time	-	1mS	2mS			
Overshoot at Turn on	-	0%	3%			
Output Capacitance	220uF	-	4000uF			
<b>Transient Response</b>						
50% ~ 100% Max Load	Overshoot	Vo=1.5V	-	90mV	125mV	Test conditions: di/dt = 0.5A/uS; Vin = 2.5V; with a 220uF tantalum capacitor at the output.
	Settling Time		-	30uS	60uS	
100% ~ 50% Max Load	Overshoot		-	90mV	125mV	
	Settling Time		-	30uS	60uS	
50% ~ 100% Max Load	Overshoot	Vo=1.2V	-	80mV	120mV	
	Settling Time		-	30uS	60uS	
100% ~ 50% Max Load	Overshoot		-	80mV	120mV	
	Settling Time		-	30uS	60uS	
50% ~ 100% Max Load	Overshoot	Vo=1.0V	-	80mV	120mV	
	Settling Time		-	30uS	60uS	
100% ~ 50% Max Load	Overshoot		-	80mV	120mV	
	Settling Time		-	30uS	60uS	

**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=1.5V Vo=1.2V Vo=1.0V	85% 83% 79%	88% 86% 82%	- - -	Measured at Vin=2.5V, full load and Ta=25°C.
Switching Frequency	250KHz	300KHz	350KHz	
Output Trim Range	90%Vo	-	110%Vo	
MTBF	4,447,157 hours			Calculated Per Bell Core TR-332 (Io = Nominal; Ta = 25°C)
Dimensions (surface mount) Inches (L x W x H) Millimeters (L x W x H)	0.78 x 0.70 x 0.32 19.81 x 17.78 x 8.13			
Dimensions (vertical) Inches (L x W x H) Millimeters (L x W x H)	0.70 x 0.308 x 0.65 17.78 x 7.82 x 16.51			
Weight	-	4.7g	-	

## Control Specifications

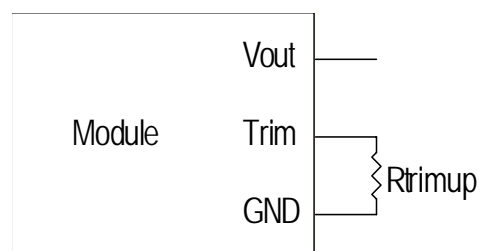
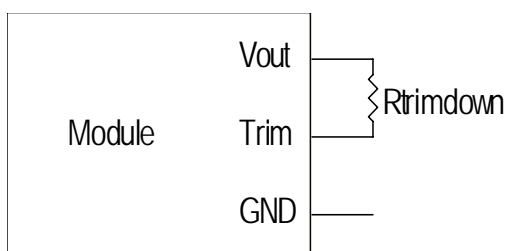
Parameter	Min	Typ	Max	Notes
<b>Remote On/Off</b>				
Signal Low (Unit Off)	0V	-	0.5V	Remote on/off pin open, the module is on.
Signal High (Unit On)	2V	-	5.5V	

## 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
1.5V	49.788	287.900	43.330	226.000
1.2V	31.241	223.900	43.330	162.000
1.0V	11.029	92.800	25.550	56.200

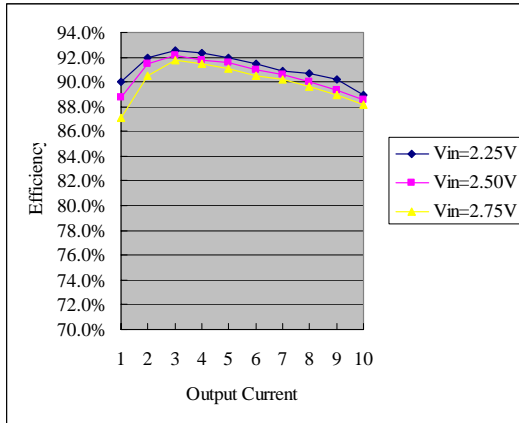


# NON-ISOLATED DC/DC CONVERTERS

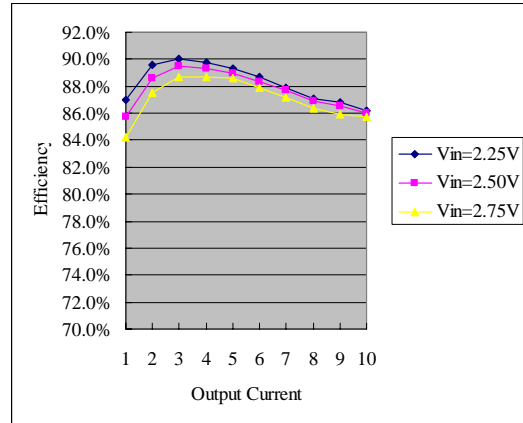
2.5V Input 0.9V-1.65V/10A Output



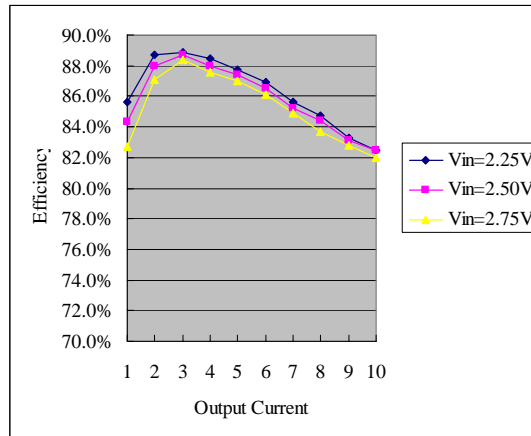
## Efficiency Data



X7AH-10J150

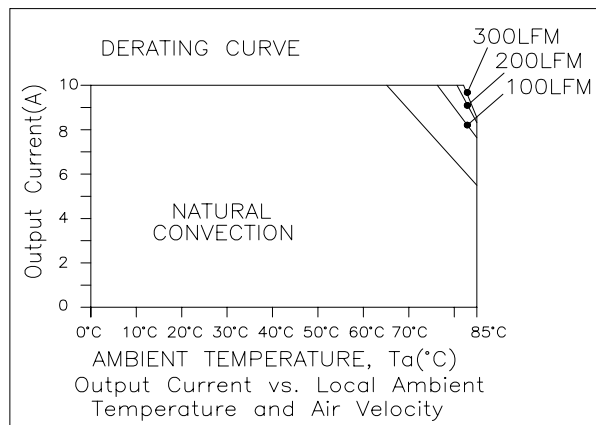


X7AH-10J120



X7AH-10J100

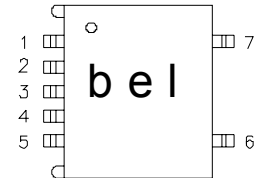
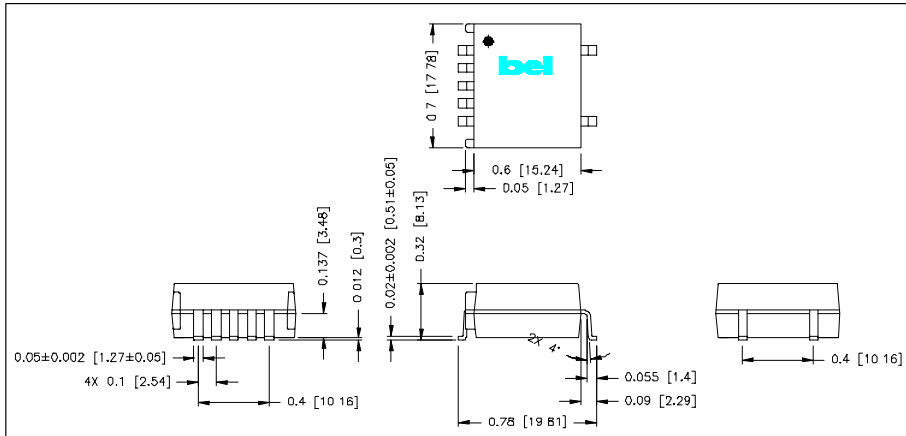
## Thermal Derating Curve



**Note:** Derating curve is for 1.2V output and tested at nominal input voltage.

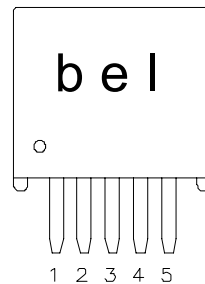
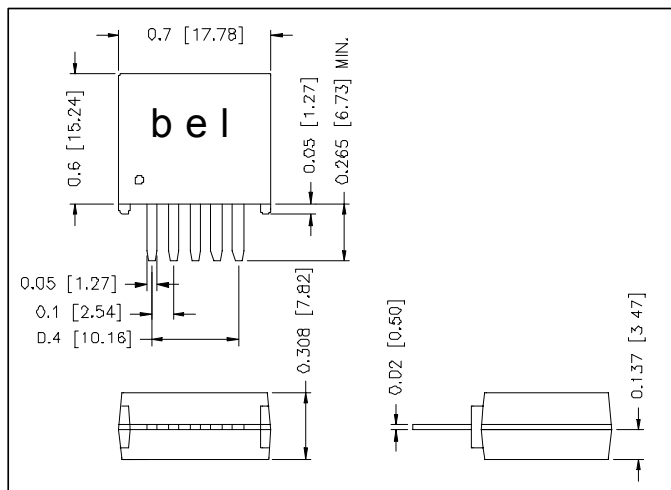
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### Pin Connections

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



### Pin Connections

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

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