

NON-ISOLATED DC/DC CONVERTERS

9.0V-18V Input

5V/1A & 9V/1A & 12V/1A Output



x7AH-01K Series

- Non-Isolated
- High Efficiency
- Fixed Frequency (450kHz)
- Low Profile Package
- Remote On/Off
- Active Low/High



Description

The Bel x7AH-01Kxx0 is part of the low cost non-isolated DC/DC converter series. The modules use a SMD or vertical package for ease of layout and space savings. The output is closely regulated and the efficiency of 12V output module is typically 87% at full load.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Part Number Surface Mount	Part Number Vertical Mount
5V	9V – 18V	1A	5W	81%	S7AH-01K50x	V7AH-01K50x
9V	9V – 18V	1A	9W	86%	S7AH-01K90x	V7AH-01K90x
12V	9V – 18V	1A	12W	87%	S7AH-01KX2x	V7AH-01KX2x

Note: Use "0" to replace "x" in the above part number to indicate Active High, and "L" to indicate Active Low. 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	-	24V	
Remote On/Off	-0.3V	-	24V	
Ambient Temperature	-40°C	-	85°C	
Storage Temperature	-40°C	-	125°C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	9V	-	18V	
Input Current (no load)	-	30mA	45mA	
Input Current (full load)				
Vo=5.0V	-	-	0.8A	
Vo=9.0V	-	-	1.3A	
Vo=12.0V	-	-	1.8A	
Input Reflected Ripple Current (pk-pk)				With simulated source impedance of 500nH, 5Hz to 20MHz; Use one 100uF/25V tantalum capacitor at the input.
Vo=5.0V	-	55mA	80mA	
Vo=9.0V	-	75mA	110mA	
Vo=12.0V	-	95mA	130mA	
Input Reflected Ripple Current (RMS)				
Vo=5.0V	-	15mA	25mA	
Vo=9.0V	-	20mA	30mA	
Vo=12.0V	-	30mA	40mA	
I ² t Inrush Current Transient	-	0.003A ² s	0.01A ² s	
Turn-on Voltage Threshold	8.0V	8.5V	8.8V	
Turn-off Voltage Threshold	7.2V	7.6V	8.2V	

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

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Output Specifications

Parameter	Min	Typ	Max	Notes	
Output Voltage Set Point					
Vo=5.0V	4.90V	5V	5.10V	Test condition: Vin=12V, Iout=full load	
Vo=9.0V	8.82V	9V	9.18V		
Vo=12.0V	11.76V	12V	12.24V		
Line Regulation					
Vo=5.0V	-	8mV	15mV		
Vo=9.0V	-	15mV	25mV		
Vo=12.0V	-	20mV	35mV		
Load Regulation					
Vo=5.0V	-	15mV	25mV		
Vo=9.0V	-	25mV	45mV		
Vo=12.0V	-	35mV	60mV		
Regulation Over Temperature (-40°C to +85 °C)					
Vo=5.0V	-	50mV	80mV		
Vo=9.0V	-	70mV	100mV		
Vo=12.0V	-	90mV	140mV		
Output Current	0.005A	-	1A		
Output DC Current Limit	1.1A	-	1.8A		
Ripple and Noise (RMS)					
Vo=5.0V	-	3mV	5mV	Test conditions: BW = 0-20MHz; with π filter (Co1=10uF, L=0.47uH, Co2=10uF) at the output	
Vo=9.0V	-	3mV	5mV		
Vo=12.0V	-	4mV	6mV		
Ripple and Noise (pk-pk)					
Vo=5.0V	-	10mV	15mV		
Vo=9.0V	-	15mV	20mV		
Vo=12.0V	-	20mV	30mV		
Ripple and Noise (RMS)					
Vo=5.0V	-	15mV	25mV	Test conditions: BW = 0-20MHz; with two 10uF ceramic capacitors at the output	
Vo=9.0V	-	25mV	35mV		
Vo=12.0V	-	35mV	50mV		
Ripple and Noise (pk-pk)					
Vo=5.0V	-	40mV	70mV		
Vo=9.0V	-	70mV	100mV		
Vo=12.0V	-	110mV	160mV		
Turn On Time					
Vo=5.0V	-	20mS	30mS		
Vo=9.0V	-	30mS	45mS		
Vo=12.0V	-	30mS	45mS		
Overshoot at Turn on	-	0%	5%		
Output Capacitance	0uF	-	47uF		
Transient Response					
50% ~ 75% Max Load	Overshoot	5.0V	-	200mV	di/dt = 0.5A/uS; Vin = 12V; and with two 10uF ceramic capacitors at the output
	Settling Time		-	100uS	
75% ~ 50% Max Load	Overshoot	9.0V	-	200mV	
	Settling Time		-	100uS	
50% ~ 75% Max Load	Overshoot	12.0V	-	300mV	
	Settling Time		-	150uS	
75% ~ 50% Max Load	Overshoot	12.0V	-	300mV	
	Settling Time		-	150uS	
50% ~ 75% Max Load	Overshoot	12.0V	-	350mV	
	Settling Time		-	150uS	
75% ~ 50% Max Load	Overshoot	12.0V	-	350mV	
	Settling Time		-	150uS	

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

NON-ISOLATED DC/DC CONVERTERS

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General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency Vo=5.0V Vo=9.0V Vo=12.0V	77% 82% 83%	81% 86% 87%	- - -	Measured at Vin=12V, full load
Switching Frequency	400KHz	450KHz	480KHz	
MTBF	14,760,000 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 0.7 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)	0.7 x 0.308 x 0.65 17.78 x 7.82 x 16.51			
Weight	-	5g	-	

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

Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal Low (Unit On)	-0.3V	-	0.4V	x7AH-01KxxL Remote On/Off pin open, unit on.
Signal High (Unit Off)	2.5V	-	Vin	
Signal Low (Unit Off)	-0.3V	-	0.4V	x7AH-01Kxx0 Remote On/Off pin open, unit on.
Signal High (Unit On)	2.5V	-	Vin	

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

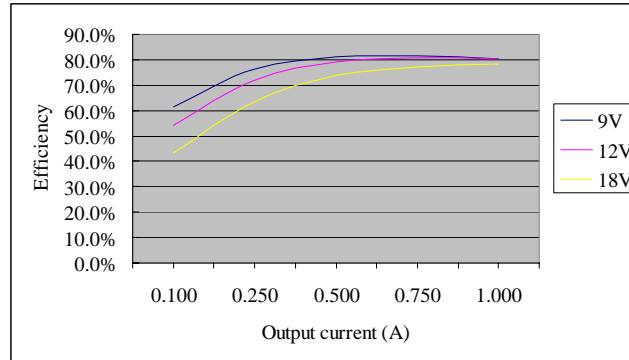
NON-ISOLATED DC/DC CONVERTERS

9.0V-18V Input

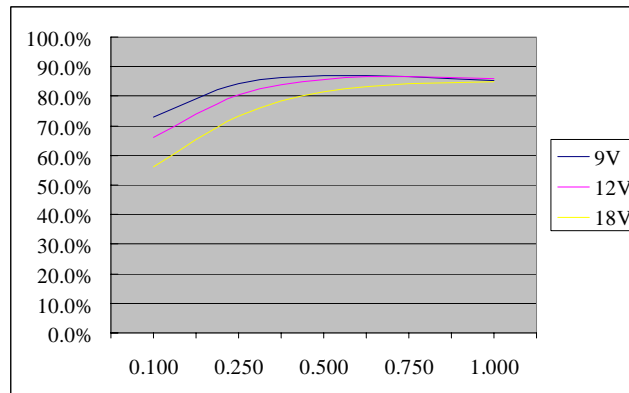
5V/1A & 9V/1A & 12V/1A Output



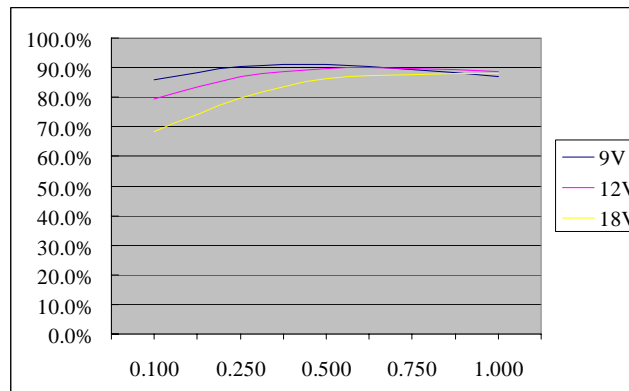
Efficiency Data



x7AH-01K500



x7AH-01K900



x7AH-01KX20

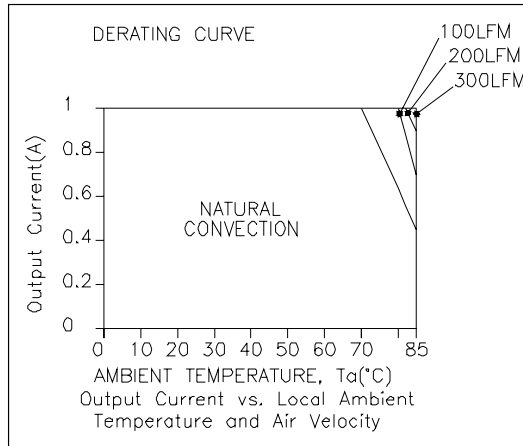
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9.0V-18V Input

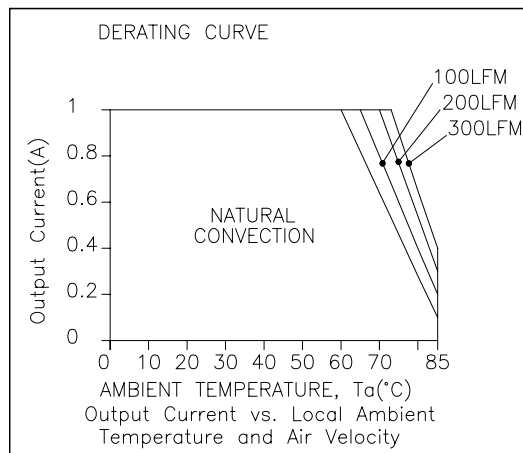
5V/1A & 9V/1A & 12V/1A Output



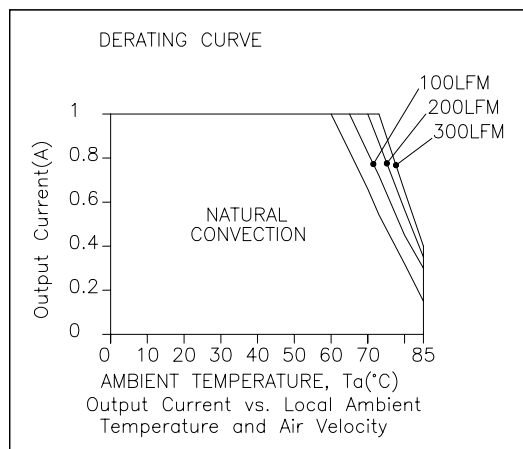
Thermal Derating Curves



Vin=12.0V, Vo=5.0V



Vin=12.0V, Vo=9.0V



Vin=12.0V, Vo=12.0V

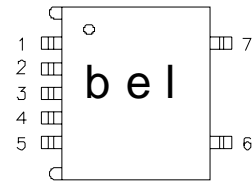
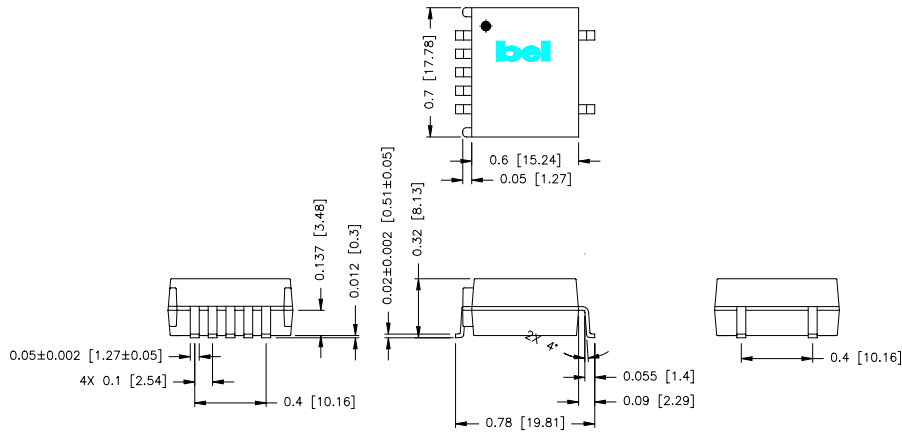
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9.0V-18V Input

5V/1A & 9V/1A & 12V/1A Output



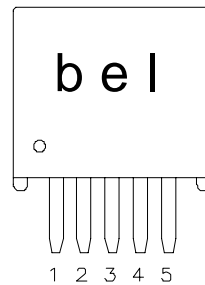
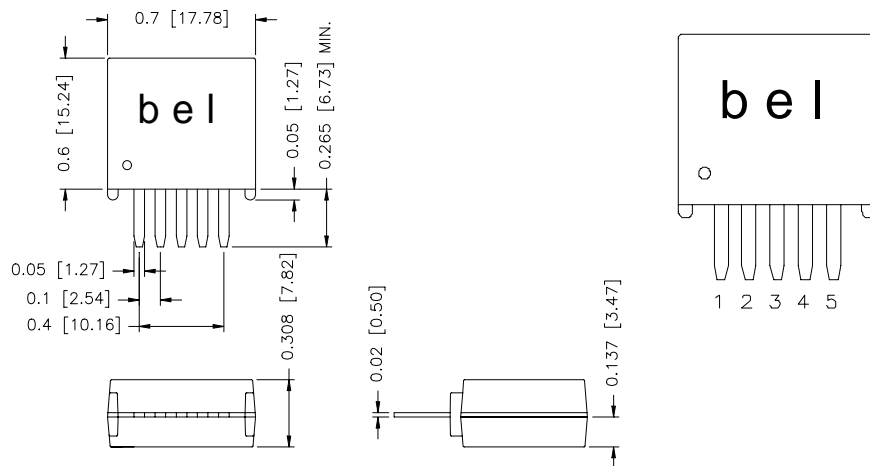
S7AH-01Kxx0



Pin Connections

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

V7AH-01Kxx0



Pin Connections

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

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CORPORATE

Bel Fuse Inc.
206 Van Vorst Street
Jersey City, NJ 07302
Tel 201-432-0463
Fax 201-432-9542
www.belfuse.com

FAR EAST

Bel Fuse Ltd.
8F/ 8 Luk Hop Street
San Po Kong
Kowloon, Hong Kong
Tel 852-2328-5515
Fax 852-2352-3706
www.belfuse.com

EUROPE

Bel Fuse Europe Ltd.
Preston Technology Management Centre
Marsh Lane, Suite G7, Preston
Lancashire, PR1 8UD, U.K.
Tel 44-1772-556601
Fax 44-1772-888366
www.belfuse.com