

## NON-ISOLATED DC/DC CONVERTERS

9.0 Vdc - 18 Vdc Input

15 Vdc/0.8 A Output

**bel**  
POWER PRODUCTS

xRAH-01KX50

RoHS Compliant

Rev.A

- Non-Isolated
- High Efficiency
- Fixed Frequency (500 kHz)
- Low Profile Package
- Remote On/Off
- Active Low



### Description

The Bel xRAH-01KX50 is part of the low cost non-isolated dc/dc 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 15 Vdc 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
15 V	9 V - 18 V	0.8 A	12 W	87%	SRAH-01KX50	VRAH-01KX50

- Notes:** 1. Add "0" suffix at the end of the model number to indicate "Tube Packaging", and "R" for "Reel Packaging", and "G" for "Tray Packaging".  
2. All part numbers above indicate RoHS 6. Change the second letter "R" to "7" for RoHS 5 part numbers.

### Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3 V	-	20 V	
Remote On/Off (Active Low)	-0.3 V	-	20 V	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-40 °C	-	125 °C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	9 V	12 V	18 V	
Input Current (no load)	-	30 mA	45 mA	
Input Current (full load)	-	-	2.6 A	
Remoted Off Input Current		18 mA	25 mA	
Input Reflected Ripple Current (pk-pk)	-	75 mA	110 mA	With simulated source impedance of 500 nH, 5 Hz to 20 MHz; Use one 100 uF/20 V tantalum capacitor at the input.
Input Reflected Ripple Current (rms)	-	20 mA	30 mA	
I <sup>2</sup> t Inrush Current Transient	-	0.003 A <sup>2</sup> s	0.01 A <sup>2</sup> s	
Turn-on Voltage Threshold	8.0 V	8.5 V	8.8 V	
Turn-off Voltage Threshold	7.2 V	7.6 V	8.2 V	

**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	14.7 V	15.0 V	15.3 V	Vin=12 V, Iout=full load	
Line Regulation	-	50 mV	75 mV		
Load Regulation	-	20 mV	30 mV		
Regulation Over Temperature (-40°C to +85 °C)	-	50 mV	80 mV		
Output Current	0.03 A	-	0.8 A		
Output DC Current Limit	1 A	-	1.5 A		
Ripple and Noise (rms)	-	35 mV	50 mV	BW = 0-20 MHz; with two 10 uF ceramic capacitors at the output	
Ripple and Noise (pk-pk)	-	100 mV	150 mV		
Turn On Time	-	20 mS	40 mS		
Overshoot at Turn on	-	0%	5%		
Output Capacitance	0 uF	-	100 uF		
<b>Transient Response</b>					
50% ~ 75% Max Load	Overshoot	-	300 mV	400 mV	di/dt = 0.5 A/ uS; Vin = 12 V; and with two 10 uF ceramic capacitors at the output
	Settling Time	-	150 mS	200 mS	
75% ~ 50% Max Load	Overshoot	-	300 mV	400 mV	
	Settling Time	-	150 mS	200 mS	

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

### General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	85%	87%	-	Measured at Vin=12 V, full load
Switching Frequency	450 kHz	500 kHz	550 kHz	
MTBF	TBD			Calculated Per Bell Core SR-332 (Io = Nominal; Ta = 25 °C)
Dimensions (surface mount)				
Inches (L x W x H)	0.78 x 0.7 x 0.32			
Millimeters (L x W x H)	19.81 x 17.78 x 8.13			
Dimensions (vertical)				
Inches (L x W x H)	0.7 x 0.308 x 0.65			
Millimeters (L x W x H)	17.78 x 7.82 x 16.51			
Weight	-	5 g	-	

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

### Control Specifications

Parameter	Min	Typ	Max	Notes
<b>Remote On/Off</b>				
Signal Low (Unit On)	-0.3 V	-	0.4 V	xRAH-01KX50 Remote On/Off pin open, unit on.
Signal High (Unit Off)	2.8 V	-	Vin	

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

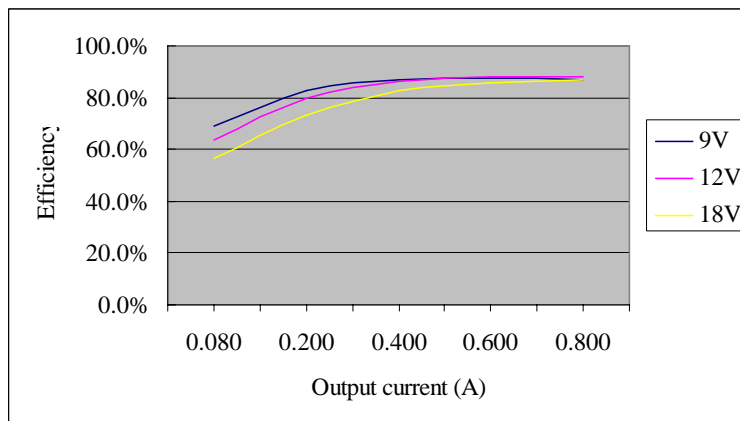
# NON-ISOLATED DC/DC CONVERTERS

9.0 Vdc - 18 Vdc Input

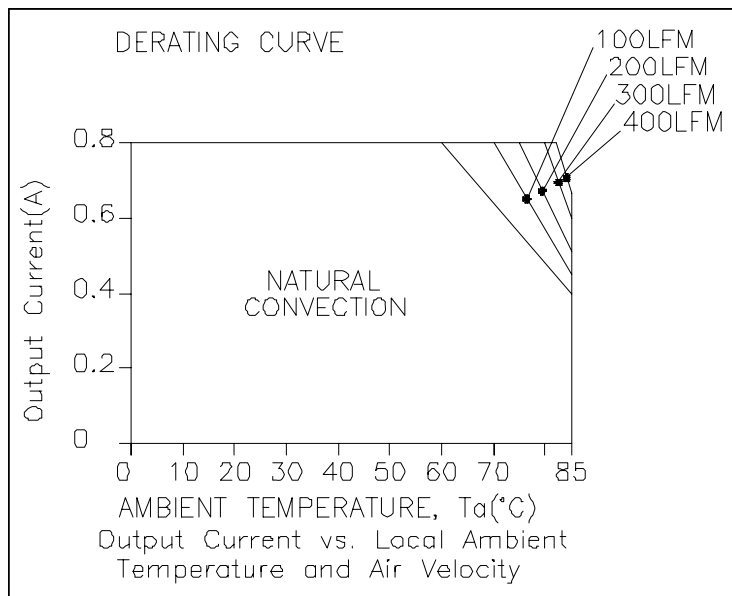
15 Vdc/0.8 A Output



## Efficiency Data



## Thermal Derating Curve



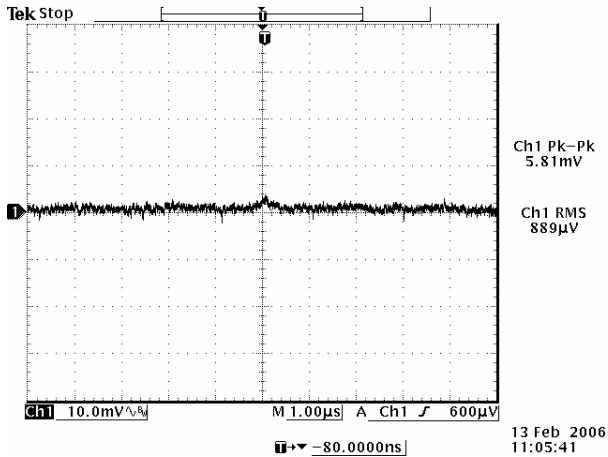
# NON-ISOLATED DC/DC CONVERTERS

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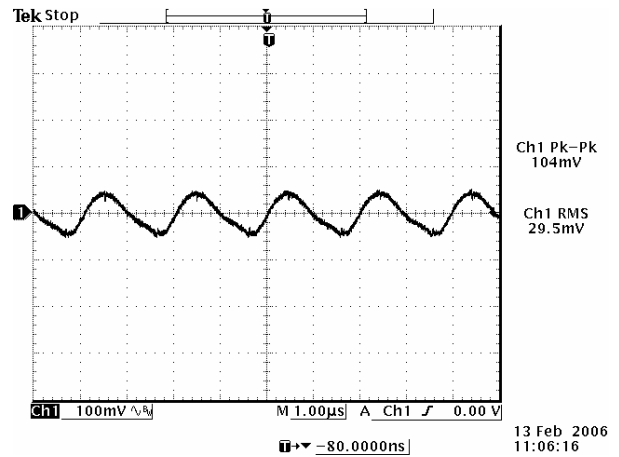
15 Vdc/0.8 A Output



## Ripple and Noise Waveforms



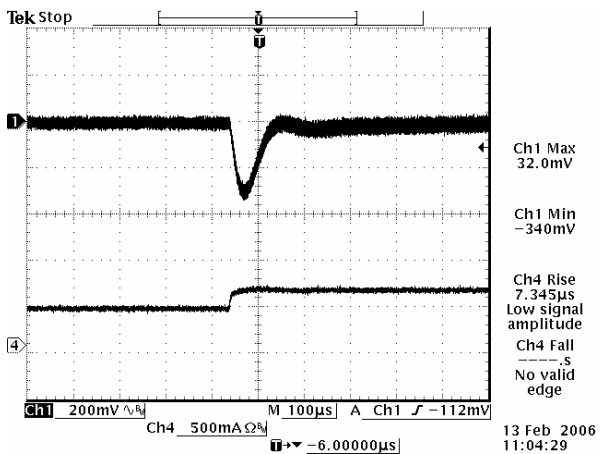
Ripple and noise at no load



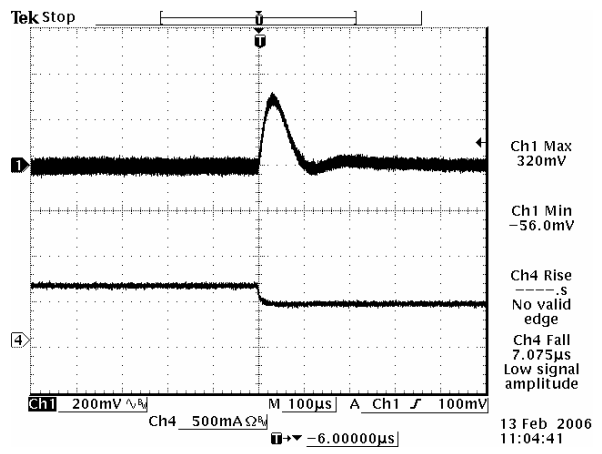
Ripple and noise at full load

**Note:** Ripple and noise at 12 Vdc input, 15 Vdc output, with two 10 µF ceramic capacitors at the output, Ta=25 deg C.

## Transient Response Waveforms



50% to 75% load at 15 Vdc output



75% to 50% load 15 Vdc output

**Note:** Transient response at 12 V input, di/dt=0.5 A/uS, with two 10 µF ceramic capacitors at the output, and Ta=25 deg C.

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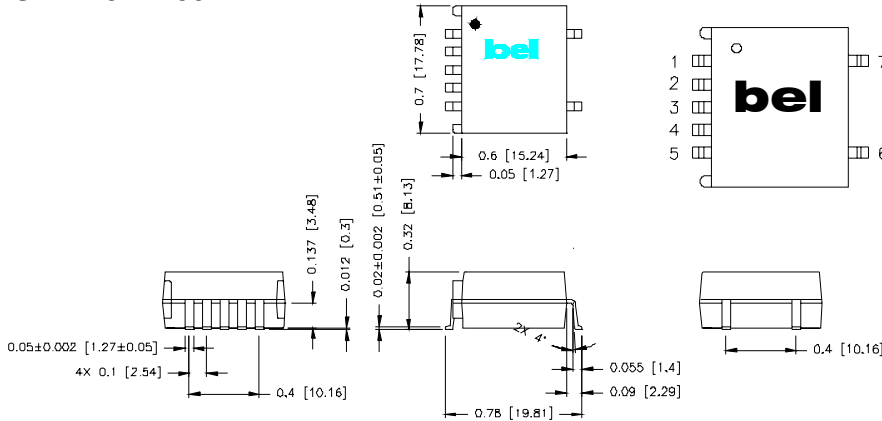
9.0 Vdc - 18 Vdc Input

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## Mechanical Outline

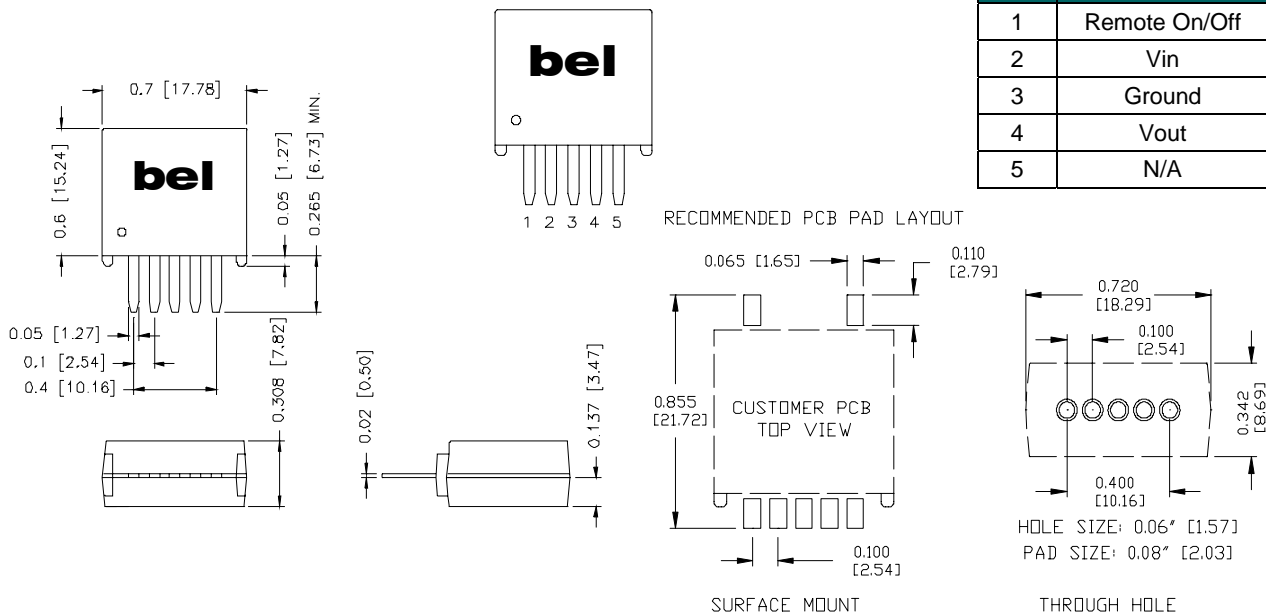
### SRAH-01KX50



### Pin Connections

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

### VRAH-01KX50



### Pin Connections

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

## RoHS Compliance

Complies with the European Directive 2002/95/EC, calling for the elimination of lead and other hazardous substances from electronic products. These parts are not however compatible with the higher temperatures associated with lead free solder processes and must be soldered using a reflow profile with a peak temperature of no more than 240 °C.



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