

## NON-ISOLATED DC/DC CONVERTERS

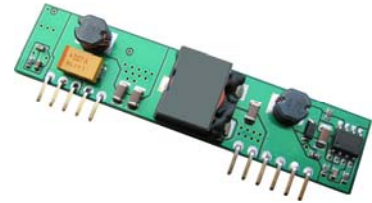
3.3 V Input 5.0 V / 4 A Output

**bel**  
POWER PRODUCTS

### xRPC-04C50x

### RoHS Compliant

- Non-Isolated
- High Efficiency
- Fixed Frequency
- Low Cost
- High Power Density
- Industry Standard Footprint



### Description

The xRPC-04C50x series are part of low-cost non-isolated boost dc/dc converters that operate from a nominal 3.3 V source. The modules use a SIP package for ease of layout and space savings. The output is closely regulated and the efficiency for 5.0 V output is typically 92.5% at full load. Standard features include high efficiency, fixed frequency, industry standard footprint and high power density.

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Without Coating	Model Number With Coating
5.0 V	3.3 V	4 A	20 W	92.5%	VRPC-04C50A	VRPC-04C50W <sup>1</sup>

**Notes:** 1. "W" indicates special coating.

2. Replace the first letter of the model number with "0" for horizontal mount package.

3. Add "G" suffix at the end of the model numbers listed above to indicate "Tray Packaging".

### Absolute Maximum Ratings

Parameter	Min	Typ	Max	Notes
Input Voltage (continuous)	-0.3 V	-	5 V	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-40 °C	-	125 °C	

**Note:** Use beyond the maximum ratings may cause a reliability degradation of the dc/dc converter or may permanently damage the device.

### Input Specifications

Parameter	Min	Typ	Max	Notes
Operating Input Voltage	3 V	-	4 V	
Input Current (full load)	-	-	8 A	
Input Current (no load)	-	-	400 mA	
Input Reflected Ripple Current (pk-pk)	-	120 mA	200 mA	Tested with a 270 uF/10 V input capacitor with ESR=0.03 ohm max at 100 kHz & simulated source impedance of 500 nH, 5 Hz to 20 MHz.
Input Reflected Ripple Current (rms)	-	25 mA	50 mA	
I <sup>2</sup> t Inrush Current Transient	-	0.01 A <sup>2</sup> s	0.02 A <sup>2</sup> s	

**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	4.9 V	5.0 V	5.1 V	
Load Regulation	-	10 mV	25 mV	
Line Regulation	-	5 mV	15 mV	
Regulation Over Temperature (-40 °C to 85 °C)	-	15 mV	45 mV	
Output Current	0 A	-	4 A	
Output Ripple and Noise (pk-pk)	-	50 mV	100 mV	Test conditions: 0-20 MHz BW, with external 1 uF / 10 V ceramic capacitor at the output
Output Ripple and Noise (rms)	-	15 mV	30 mV	
Turn on Time	-	10 mS	-	
Overshoot at Turn on	-	0%	3%	
Output Capacitance	0 uF	-	1600 uF	
<b>Transient Response</b>				
50% ~ 100% Max Load	Vo = 5.0 V	-	100 mV	di/dt=0.1 A/uS; Vin=3.3 V; and with external 220 uF Tantalum capacitor & 1 uF / 10 V ceramic capacitor at the output.
Settling Time		-	200 uS	
100% ~ 50% Max Load		-	100 mV	
Settling Time		-	200 uS	

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

### General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	89%	92.5%	-	Vin=3.3 V, full load
Switching Frequency	200 kHz	250 kHz	300 kHz	
MTBF	8,754,928 hours			Calculated Per Bell Core SR-332 (Io = 80% load; Vin=12 V; Ta = 25 °C)
Dimensions Inches (L x W x H) Millimeters (L x W x H)	2.5 x 0.55 x 0.34 63.50 x 13.98 x 8.64			VRPC-04C50x
	2.5 x 0.55 x 0.375 63.50 x 13.98 x 9.53			0RPC-04C50x
Weight	-	9.2 g	-	

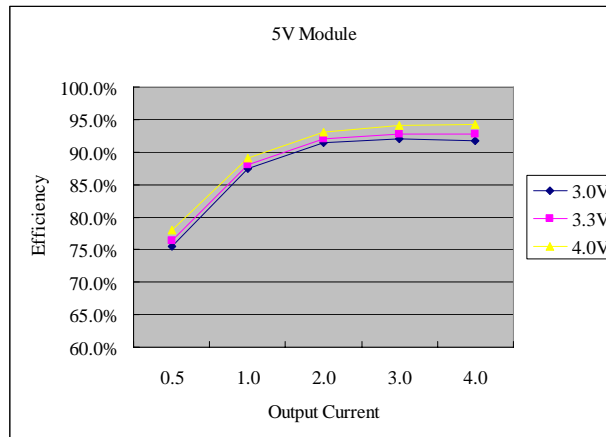
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# NON-ISOLATED DC/DC CONVERTERS

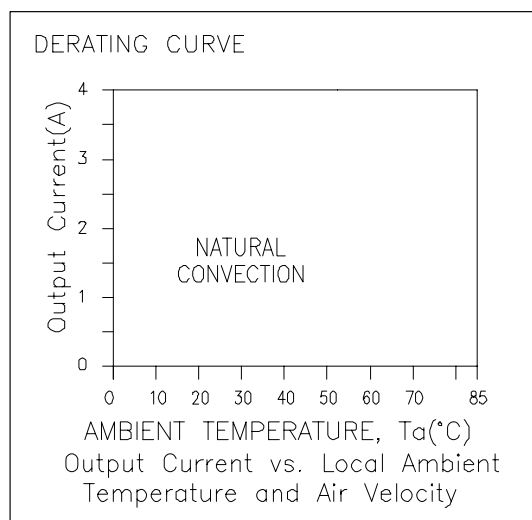
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## Efficiency Data



## Thermal Derating Curve



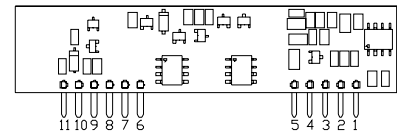
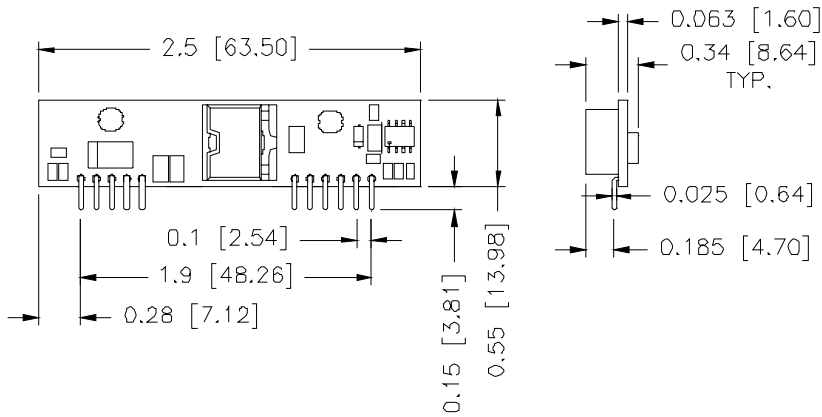
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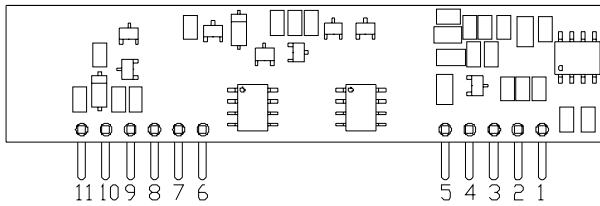


## Mechanical Outline

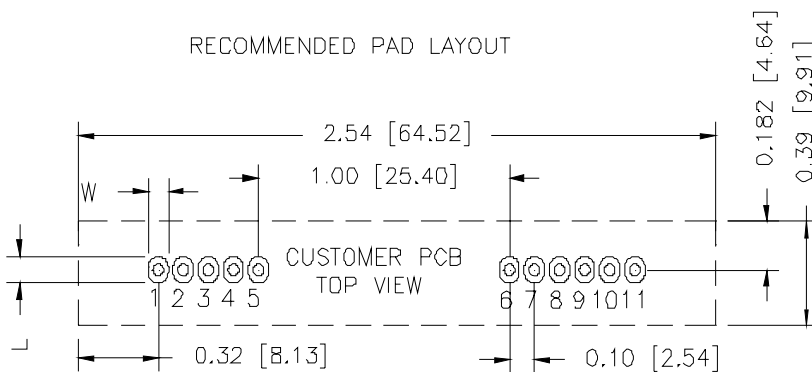
### VRPC-04C50x



UNIT: INCH [MM]



RECOMMENDED PAD LAYOUT



HOLE SIZE:  $\varnothing 0.043 \pm 0.003$  [1.08  $\pm$  0.08]  
 PAD SIZE: W  $0.063 \pm 0.002$  [1.63  $\pm$  0.05]  
 L  $0.10 \pm 0.004$  [2.54  $\pm$  0.10] BOTH SIDE

## Pin Connections

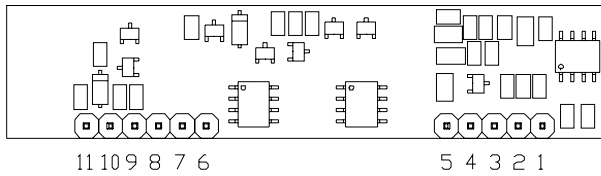
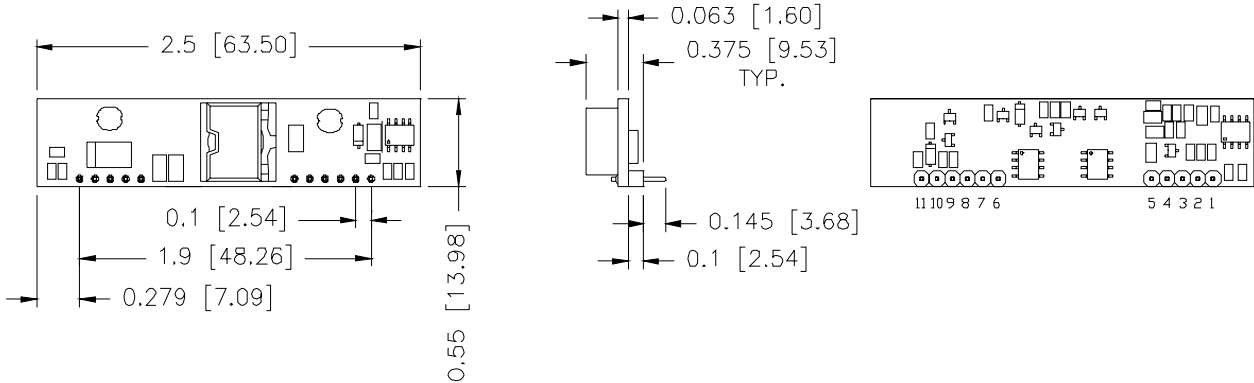
Pin	Function
1	Vo+
2	Vo+
3	Vo+
4	Vo -
5	Vo -
6	Vin -
7	Vin -
8	Vin+
9	Vin+
10	Vin+
11	Vin+

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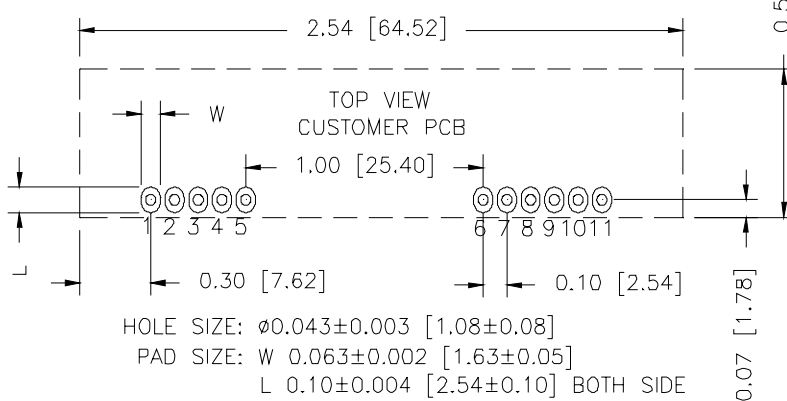
## 0RPC-04C50x



### Pin Connections

Pin	Function
1	Vo+
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3	Vo+
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10	Vin+
11	Vin+

### RECOMMENDED PAD LAYOUT



### RoHS Compliance

Complies with the European Directive 2002/95/EC, calling for the elimination of lead and other hazardous substances from electronic products.



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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](http://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](http://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](http://www.belfuse.com)