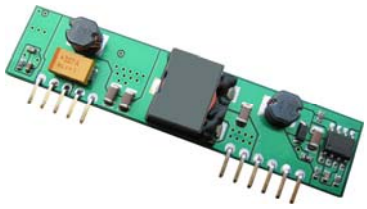
NON-ISOLATED DC/DC CONVERTERS

3.3 Vdc Input 5.0 Vdc / 4 A Output

xRPC-04C50x RoHS Compliant Rev.B



- Non-Isolated
- High Efficiency
- Fixed Frequency
- UL60950-1 Recognized (UL/cUL)
- Low Cost
- High Power Density
- Industry Standard Footprint
- TUV Certified to EN 60950-1

Description

The xRPC-04C50x series are part of low-cost non-isolated boost dc/dc converters that operate from a nominal 3.3 Vdc 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 Vdc 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 Vdc	3.3 Vdc	4 A	20 W	92.5%	VRPC-04C50A	VRPC-04C50W[1]

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".
4. 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	-	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)	-	80 mA	150 mA	Input filter for noise, not for EMI. C1-L-C2 filter, C1= 270uF/10V, ESR=0.03 ohm max, at 100KHz@25°C, L=500nH, C2= 270uF/10V, ESR=0.03 ohm max, at 100KHz@25°C.
Input Reflected Ripple Current (rms)	-	20 mA	50 mA	
I^2t Inrush Current Transient	-	0.01 A^2s	0.02 A^2s	

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

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3.3 Vdc Input 5.0 Vdc / 4 A Output

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	60 mV	0-20MHz BW, external 1uF/10V ceramic cap on output, max load, 3.3Vdc input, 5Vdc output, Ta=25 deg C.
Output Ripple and Noise (rms)		-	15 mV	20 mV	
Output Ripple and Noise (pk-pk)		-	100 mV	120 mV	0-20MHz BW, over all load, line and temperature conditions with external 1uF/10V ceramic cap on output.
Output Ripple and Noise (rms)		-	30 mV	40 mV	
Turn on Time		-	10 mS	15 mS	
Overshoot at Turn on		-	0%	3%	
Output Capacitance		0 uF	-	1600 uF	
Transient Response					
50% ~ 100% Max Load	V_O = 5.0 V	-	100 mV	200 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	500 uS	
100% ~ 50% Max Load		-	100 mV	200 mV	
Settling Time		-	200 uS	500 uS	

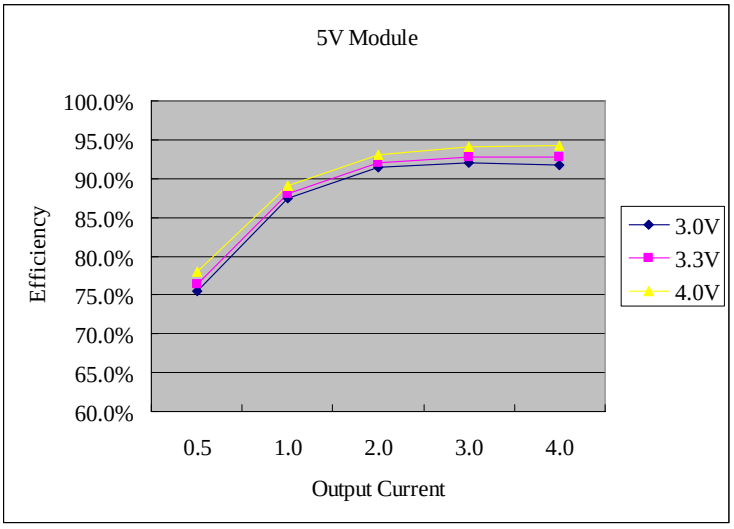
Notes: 1. This module has no internal OVP. An external OVP protection is always employed.
2. All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.

General Specifications

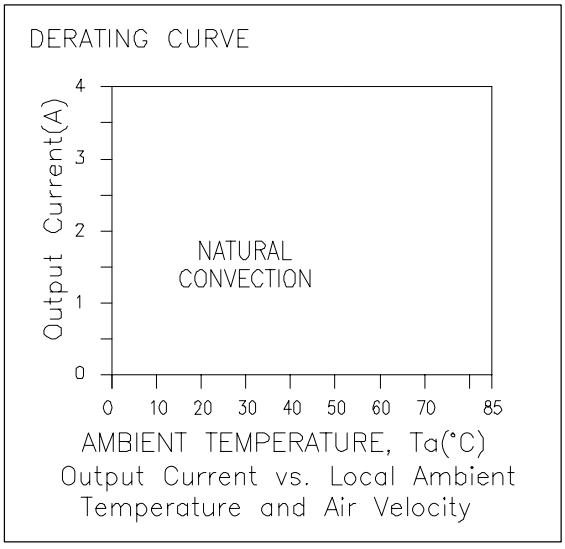
Parameter	Min	Typ	Max	Notes
Efficiency	89%	92.5%	-	Vin=3.3 V, full load
Switching Frequency	200 kHz	250 kHz	300 kHz	
MTBF	8,754,928 hours			Calculated Per Bell Core SR-332 (I_O = 80% load; Vin=3.3 V; T_a = 25 °C)
Dimensions Inches (L × W × H)	2.5 x 0.55 x 0.34			VRPC-04C50x
Millimeters (L × W × H)	63.50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

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

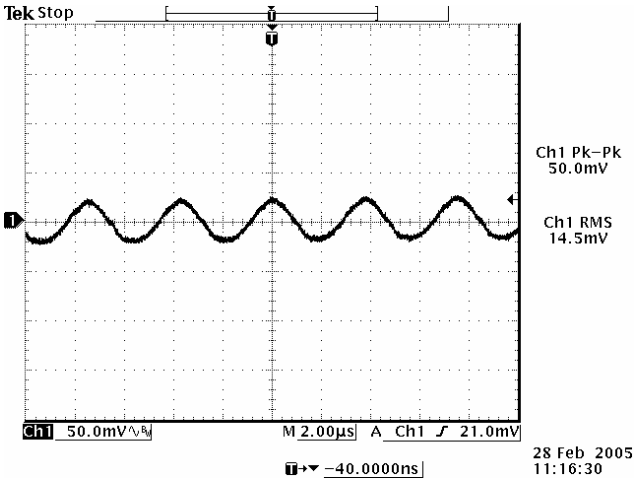
Efficiency Data



Thermal Derating Curve

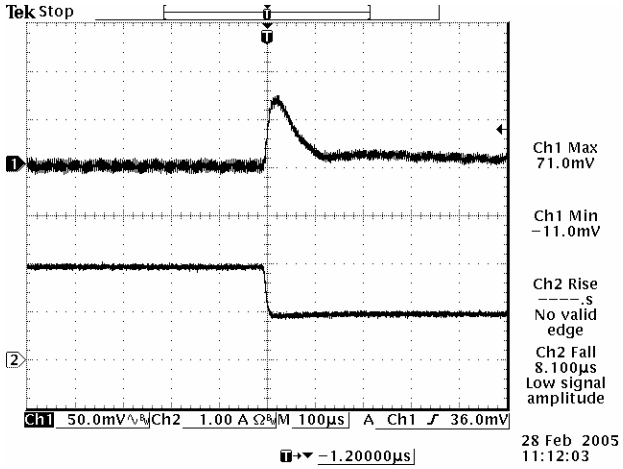


Ripple and Noise Waveform

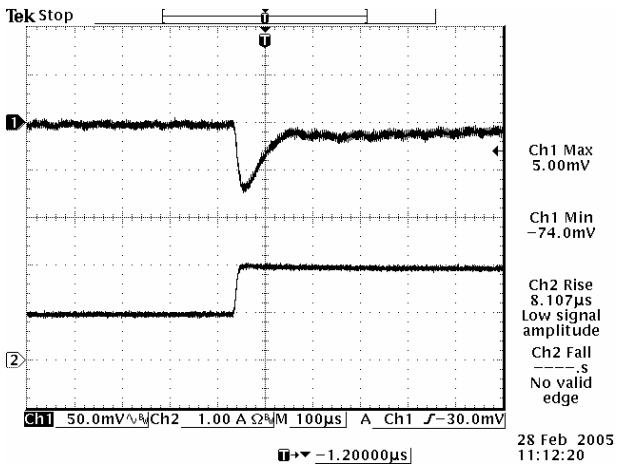


Note: Ripple and noise at max load, 3.3 Vdc input, 5 Vdc output, 0-20 MHz BW, with 1 uF/10 V ceramic capacitor, and Ta=25 deg C

Transient Response Waveforms



25% to 50% load step at 3.3 Vdc input, 5 Vdc output

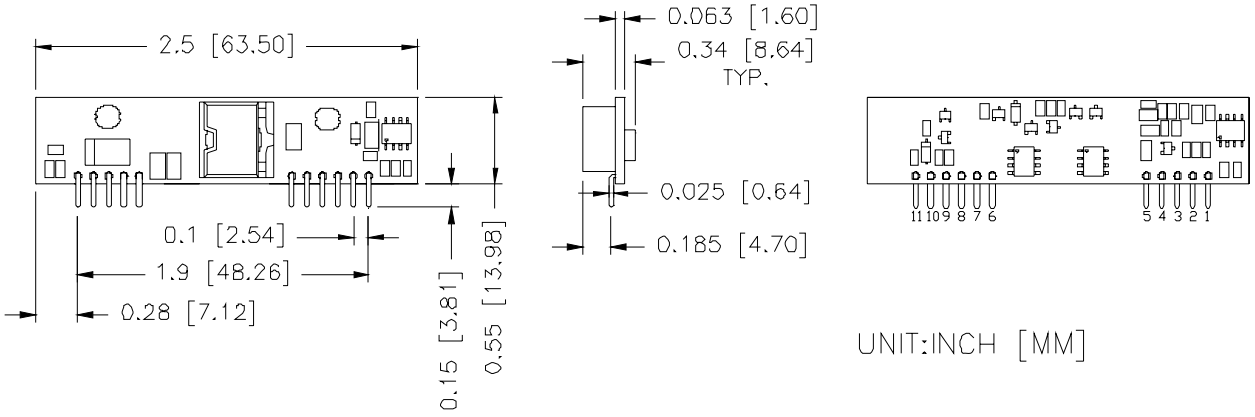


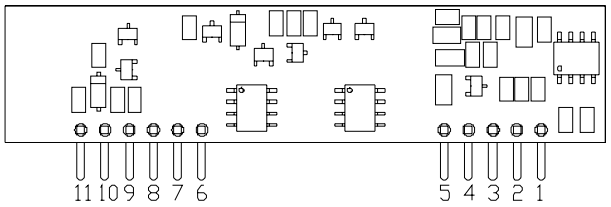
50% to 25% load step at 3.3 Vdc input, 5 Vdc output

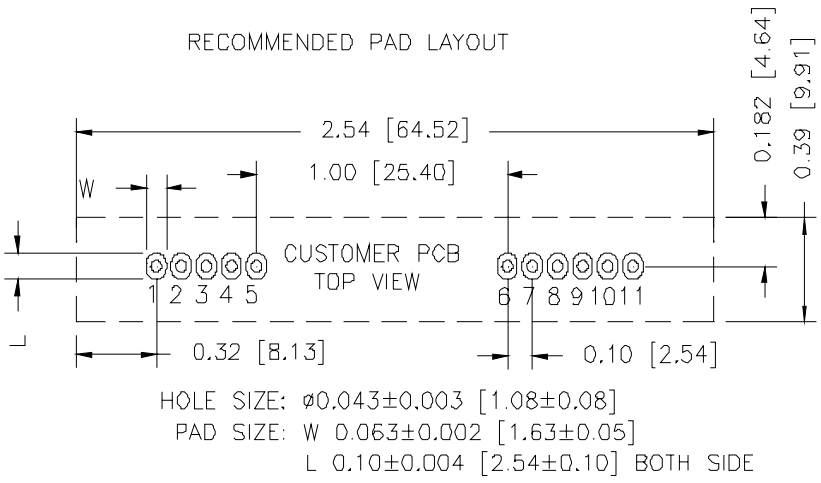
Note: Transient response at di/dt=0.1 A/uS, with 220 uF/10 V tantalum capacitor at the output, and Ta=25 deg C.

Mechanical Outline

VRPC-04C50x





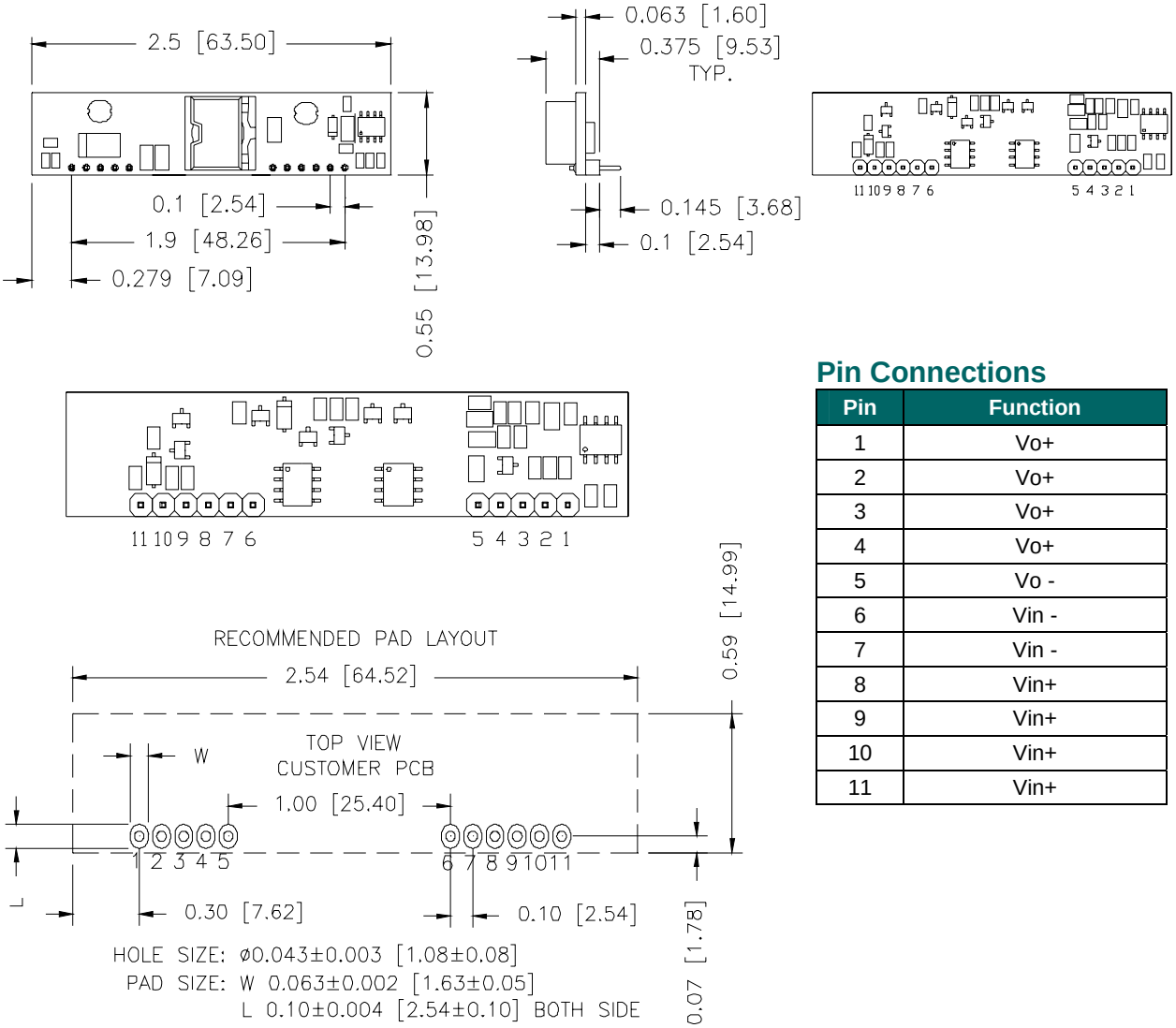


Pin Connections

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

Mechanical Outline (continued)

0RPC-04C50x



Pin Connections

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

RoHS Compliance

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

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