

## ISOLATED DC/DC CONVERTERS

48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



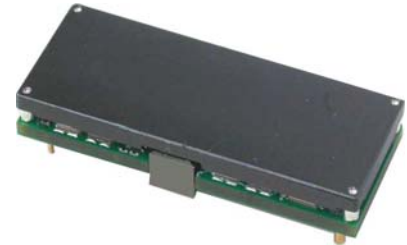
Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

0RCR-40S10x RoHS Compliant Rev.F

### Features

- Isolated
- Fixed Frequency
- High Efficiency
- High Power Density
- Low Cost
- Class 1, Category 2, Non-Isolated DC/DC Converter (refer to IPC-9592)
- UL60950-1 Recognized (UL/cUL) (Pending)
- Input Under-Voltage Lockout
- Input Over-Voltage Shutdown
- OCP/SCP
- Remote On/Off
- Over Temperature Protection



### Applications

- Networking
- Computers and peripherals
- Telecommunications

### Description

The 0RCR-40S10x Series are isolated dc/dc converters that operate from a nominal 48 Vdc source. These converters use a full bridge power train to provide isolation and step down. These units will provide up to 300 W of output power from a nominal 48 Vdc input. These units are designed to be highly efficient and low cost. Features include remote on/off, over current protection and under voltage lockout. These converters are provided in an industry standard eighth-brick package.

### Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active Low	Model Number Active High
9.6 V	38 Vdc-55 Vdc	40 A	300 W	96.5%	0RCR-40S10L	0RCR-40S100

**Notes:** Add "G" suffix at the end of the model number to indicate Tray Packaging.

### Part Number Explanation

0 R CR - 40 S 10 x  
1 2 3 4 5 6 7

- 1---Through hole
- 2---RoHS 6, change "R" to "7" means RoHS 5
- 3---Series name, 1/8 Brick
- 4---Series code
- 5---Input range 48V wide (38-55V)
- 6---Output voltage (9.6V)
- 7---Suffix

# ISOLATED DC/DC CONVERTERS

48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit	Notes
Input Voltage (continuous)	-0.3	-	60	V	
Remote On/Off (Active Low)	-0.3	-	0.8	V	
Remote On/Off (Active High)	2.4	-	18	V	
Ambient Temperature	-40	-	85	°C	
Storage Temperature	-40	-	125	°C	

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

## Input Specifications

Parameter	Min	Typ	Max	Unit	Notes
Input Voltage	38	-	55	V	
Input Current (full load)	-	-	8.8	A	
Input Current (no load)	-	-	150	mA	
Remote Off Input Current	-	-	30	mA	
Input Reflected Ripple Current (pk-pk)	-	20	50	mA	Tested with simulated source impedance of 10 uH, 5 Hz to 20 MHz; use a 100 uF/100 V electrolytic cap with ESR=1 ohm, at 200kHz at the input.
Input Reflected Ripple Current (rms)	-	5	20	mA	
I <sup>2</sup> t Inrush Current Transient	-	0.05	0.1	A <sup>2</sup> s	
Turn-on Voltage Threshold	34	35.5	37	V	
Turn-off Voltage Threshold	32	33.5	35	V	
Input Over-Voltage Lockout	56	58	60	V	

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

## Output Specifications

Parameter	Min	Typ	Max	Unit	Notes
Output Voltage Set Point					
Vin=38 V	7.15	7.30	7.6	V	Io=0 A - Iomax
Vin=48 V	9.10	9.24	9.6	V	
Vin=55 V	10.45	10.62	11.0	V	
Load Regulation					
Vin=38 V	-	0.16	0.25	V	Io=0 A - Iomax
Vin=48 V	-	0.13	0.20	V	
Vin=55 V	-	0.10	0.15	V	
Line Regulation	-	3.4	4.0	V	
Regulation Over Temperature (-40 °C to +85 °C)	-	100	150	mV	
Output Current	0	-	40	A	Max output power 300W
Current Limit Threshold					
Vin=38 V	46	53	60	A	
Vin=48 V	38	44	50	A	
Vin=55 V	31	38	45	A	

# ISOLATED DC/DC CONVERTERS

48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Output Specifications (continued)

Parameter	Min	Typ	Max	Unit	Notes			
Short Circuit Surge Transient	-	1.5	2.5	A <sup>2</sup> s				
Ripple and Noise (rms)	-	25	50	mV	Vin=48 V, 0-20 MHz BW, with a 1 uF ceramic cap and a 47 uF tantalum cap at the output.			
Ripple and Noise (pk-pk)	-	90	150	mV				
Turn on Time	-	20	30	mS				
Overshoot at Turn on	-	0	3	%				
Output Capacitance	47	-	3750	uF				
<b>Transient Response</b>								
$\Delta V$ 50%~75% of Max Load	Overshoot	Vin= 48 V	-	100	150	mV	Test conditions: di/dt = 0.5 A/uS, Vin=48 V, Ta=25°C, with a 47 uF tantalum cap at the output.	
	Settling Time		-	-	-			uS
$\Delta V$ 75%~50% of Max Load	Overshoot		-	100	150			mV
	Settling Time		-	-	-			uS

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

## General Specifications

Parameter	Min	Typ	Max	Unit	Notes
Efficiency	95.5	97	-	%	Vin=48 V, full load
Switching Frequency	120	150	180	kHz	
Isolation Capacitance	-	1500	-	pF	
Input to Output Isolation Voltage	-	1500	-	V	
Over Temperature Protection	-	120	-	°C	Average PCB temperature will not exceed 120°C.
FIT	TBD			-	Calculated Per Bell Core SR-332 (Vin=48 V; Io=80% full load; Ta = 25 °C)
Weight	-	45	-	g	
Dimensions				-	
Inches (L x W x H)	2.30 x 0.896 x 0.48				
Millimeters (L x W x H)	58.41 x 22.76 x 12.2				

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

# ISOLATED DC/DC CONVERTERS

48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



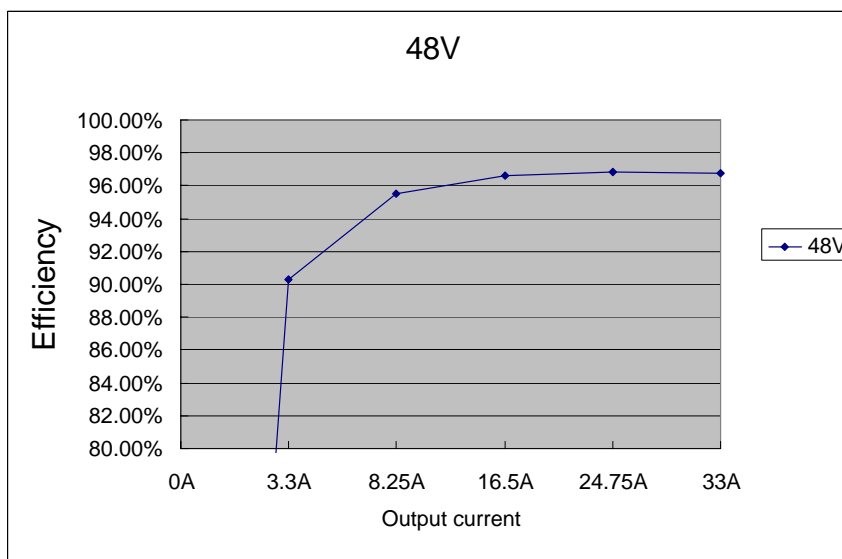
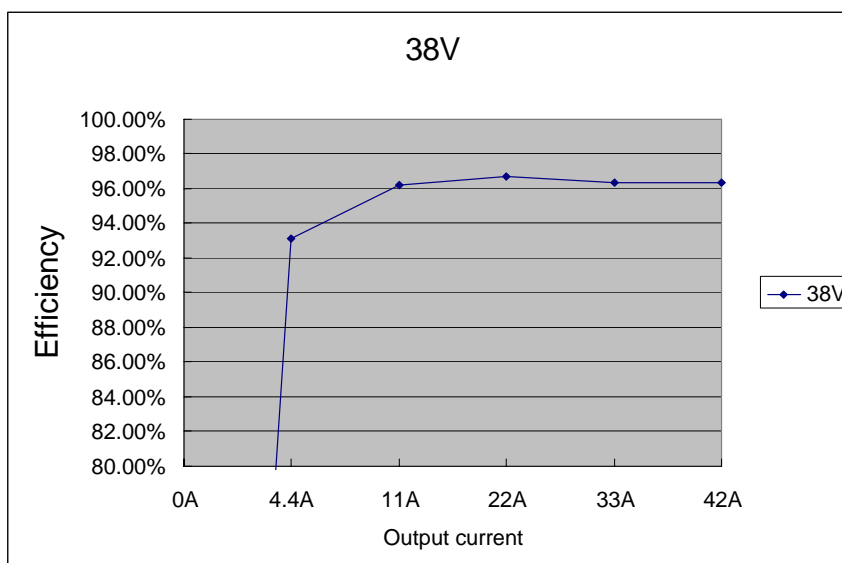
Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Control Specifications

Parameter	Min	Typ	Max	Unit	Notes
<b>Remote On/Off</b>					
Signal Low (Unit On)	-0.3	-	0.8	V	The remote on/off pin open, Unit Off.
Signal High (Unit Off)					
Signal Low (Unit On)	2.4	-	18	V	
Signal High (Unit Off)					
Signal Low (Unit On)	-0.3	-	0.8	V	The remote on/off pin open, Unit On.
Signal High (Unit Off)					
Signal Low (Unit On)	2.4	-	18	V	
Signal High (Unit Off)					

## Efficiency Data



# ISOLATED DC/DC CONVERTERS

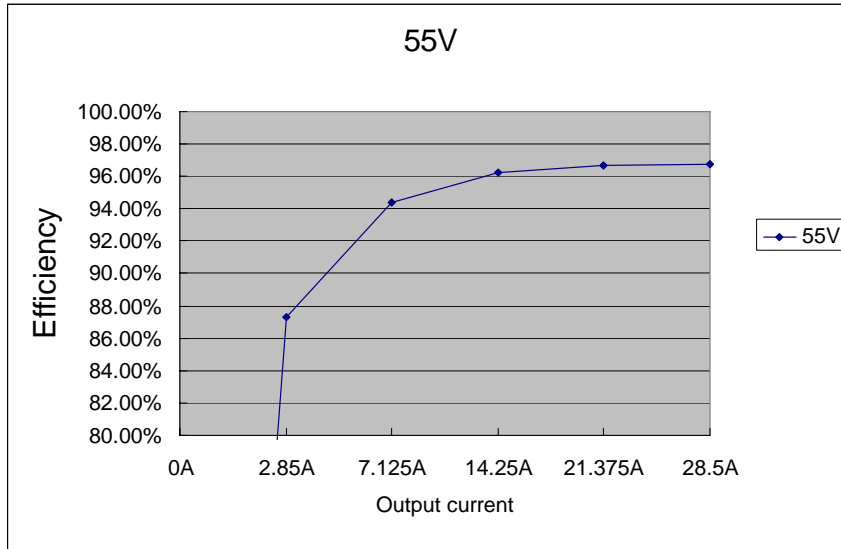
48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



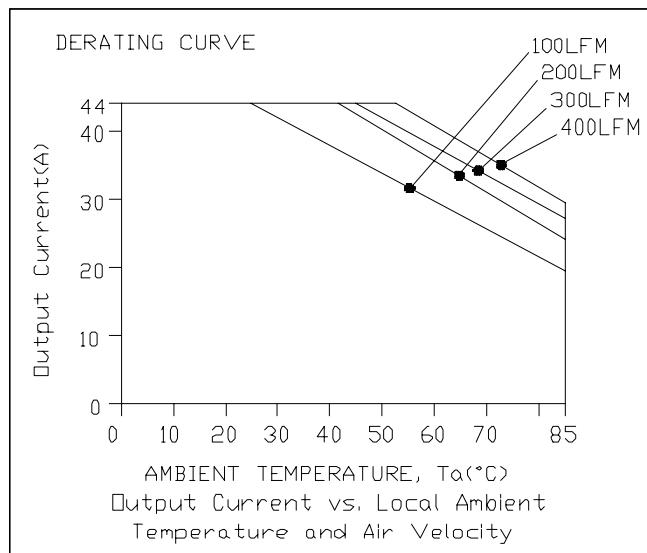
Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Efficiency Data (continued)



## Thermal Derating Curves



$V_{in}=38\text{ V}$

# ISOLATED DC/DC CONVERTERS

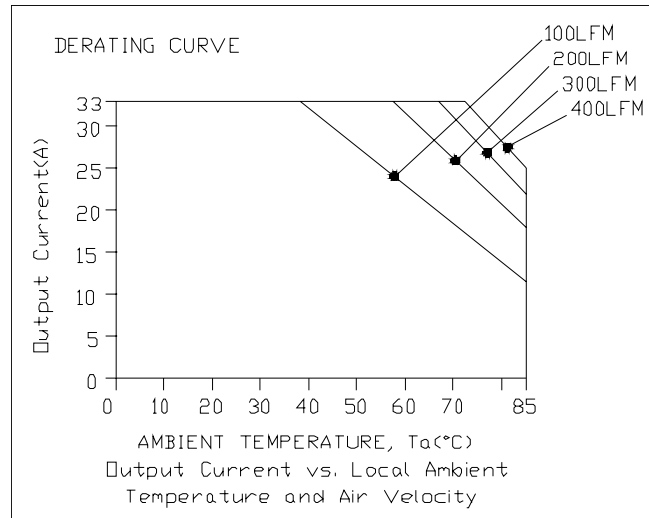
48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



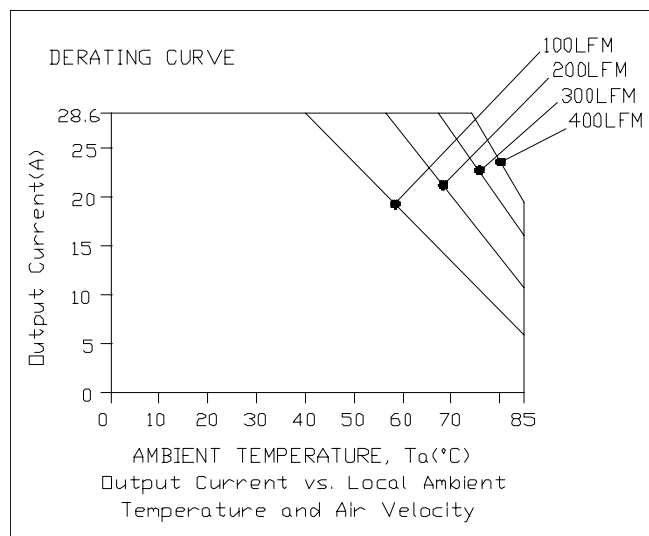
Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Thermal Derating Curves (continued)



Vin=48 V



Vin=55 V

**Note:** Maximum output power derating curves vs. ambient air temperature for airflow rates of 0 LFM through 400 LFM with air flowing from input to output.

# ISOLATED DC/DC CONVERTERS

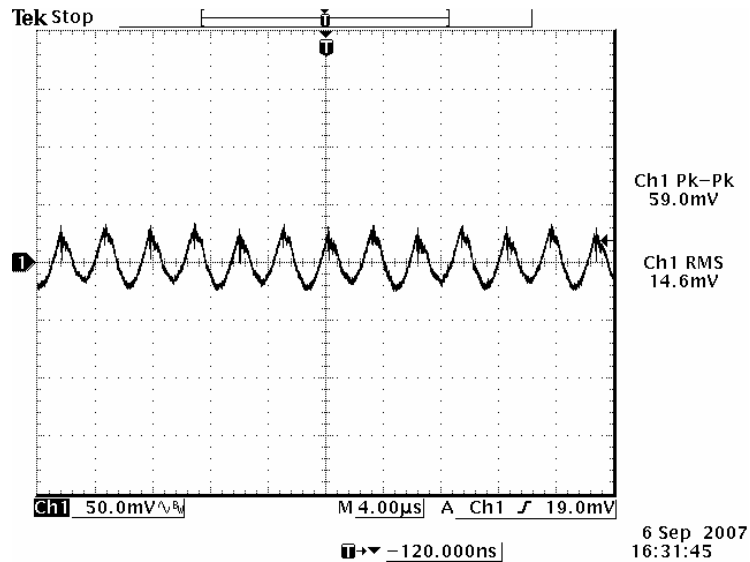
48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



Jun. 08, 2010

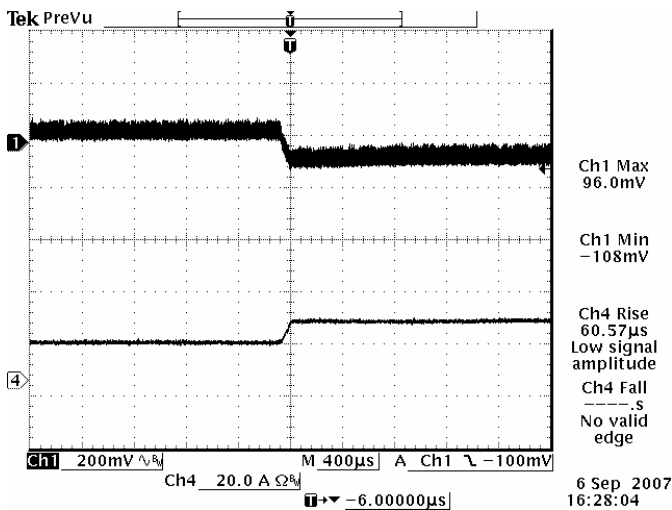
Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Ripple and Noise Waveform

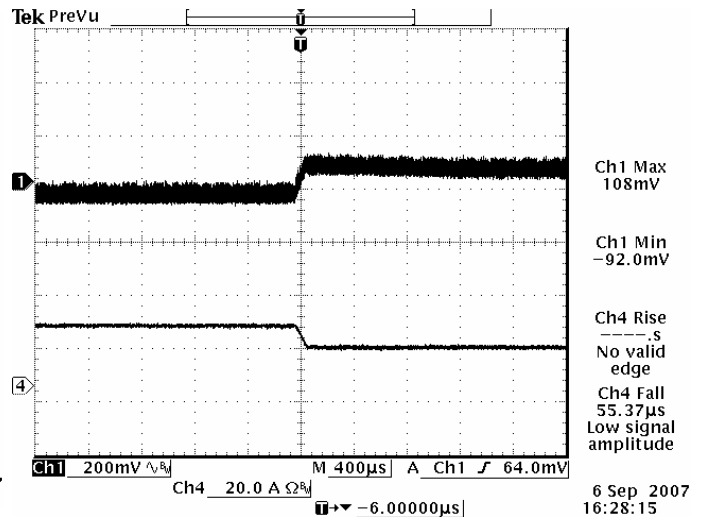


**Note:** Ripple and noise at full load, 48 Vdc input, with a 1µF ceramic capacitor and 47µF tantalum capacitor at the output, and Ta=25 deg C.

## Transient Response Waveforms



50% to 75% load Transient



75% to 50% load Transient

**Note:** Transient at 48 Vdc input and Ta=25 deg C, External Load Capacitance Co=47uF (Tantalum).

# ISOLATED DC/DC CONVERTERS

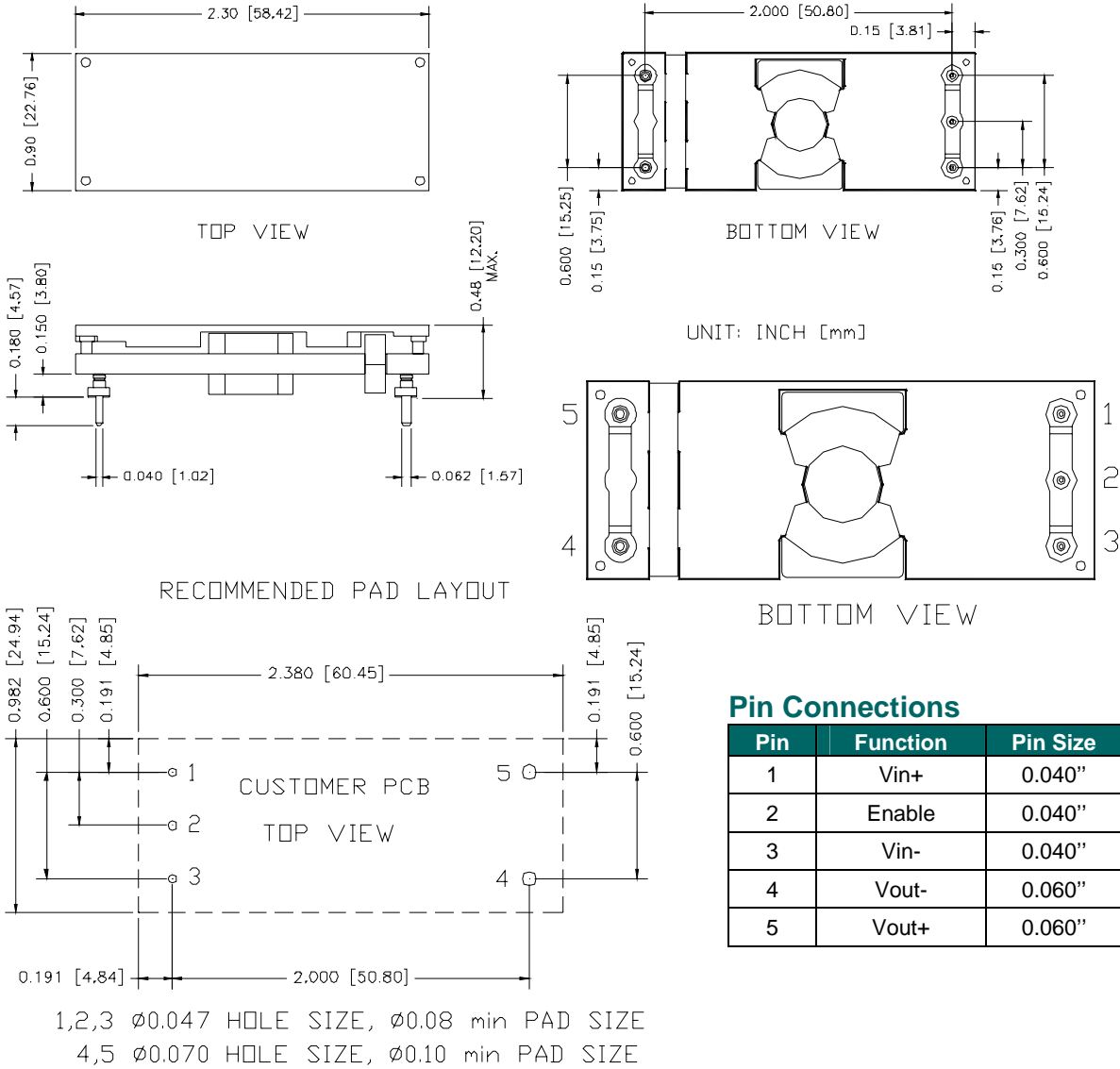
48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Mechanical Outline



**Note:** This module is recommended and compatible with Pb-Free Wave Soldering and must be soldered using a peak solder temperature of no more than 260 °C for less than 5 seconds.



# ISOLATED DC/DC CONVERTERS

48 Vdc Input 9.6 Vdc/40 A Output, 1/8 Brick



Jun. 08, 2010

Bel Power Inc., a subsidiary of Bel Fuse Inc.

## Revision History

Date	Revision	Changes Detail	Approval
2007-05-16	A	First release	XQ Han
2007-09-12	B	1,Add mechanical drawing; 2.Add thermal derating curve; 3.Add Efficiency curve; 4.Add ripple and noise picture; 5.Add Transient Response picture	XQ Han
2007-12-26	C	1.Increase the no load input current; 2. Add the output DC Current Limit @Vin=48V, Vin=55V; 3.Decrease the minimum output voltage set point; 4.Turn on Time	XQ Han
2008-09-08	D	1.Input Reflected Ripple Current; 2.Load Regulation; 3.Output Ripple and Noise; 4.Efficiency;5.Turn on Voltage Threshold;6.Turn off Voltage Threshold;6.No Load Input Current.7.Mechanical Drawing.	XQ Han
2008-12-18	E	Update description	XQ Han
2010-06-08	F	1. Update output capacitance; 2. Update mechanical drawing, change the max height to 0.48	XF Jiang

### RoHS Compliance

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



©2010 Bel Fuse Inc. Specifications subject to change without notice. 060810

9

#### 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)