

ISOLATED DC/DC CONVERTERS

48 VDC Input 9.6 VDC/60 A Output, 1/4 Brick

bel
POWER PRODUCTS

ORCM-60S10x

RoHS Compliant

Rev.E

- Isolated
- High Efficiency
- High Power Density
- Low Cost
- Input Under-Voltage Lockout
- Input Over-Voltage Shutdown
- OCP/SCP
- Thermal Shutdown
- Remote On/Off



Description

The ORCM-60S10x is isolated DC/DC converter that operates 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 530 W of output power from a nominal 55 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 quarter -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	48 V	60 A	530 W	97%	ORCM-60S10L	ORCM-60S100

- Notes:** 1. Add "G" suffix at the end of the model number to indicate 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	-	80 V	Non-operating
	-0.3 V	-	57 V	Operating
Remote On/Off (Active Low)	1 V	-	18 V	Module Off
	-0.3 V	-	0.6 V	Module On
Remote On/Off (Active High)	1 V	-	18 V	Module On
	-0.3 V	-	0.6 V	Module Off
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-55 °C	-	125 °C	

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	38 V	-	55 V	
Input Current (full load)	-	-	13.5 A	Vin=38 V
Input Current (no load)	-	80 mA	140 mA	
Remote Off Input Current	-	5 mA	10 mA	Active High
Input Reflected Ripple Current (pk-pk)	-	40 mA	100 mA	Tested with simulated source impedance of 12 uH, 5 Hz to 20 MHz; use a 100 uF/100 V electrolytic capacitor and 1 uF/100 V ceramic capacitor at the input.
Input Reflected Ripple Current (rms)	-	30 mA	50 mA	
I ² t Inrush Current Transient	-	TBD	-	

ISOLATED DC/DC CONVERTERS

48 VDC Input 9.6 VDC/60 A Output, 1/4 Brick



Input Specifications (continued)

Parameter	Min	Typ	Max	Notes
Input Over-Voltage Protection Threshold	58 V	59 V	60 V	Turn-Off Voltage Threshold
Input Over-Voltage Protection Threshold	57 V	58 V	59 V	Turn-On Voltage Threshold
Turn On Voltage Threshold	33 V	34.5 V	36 V	
Turn Off Voltage Threshold	32 V	33.5 V	35 V	

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

Output Specifications

Parameter	Min	Typ	Max	Notes		
Output Voltage Set Point				I _o =no load		
Vin=38 V	7.4 V	7.6 V	7.8 V			
Vin=48 V	9.4 V	9.6 V	9.8 V			
Vin=55 V	10.8 V	11.0 V	11.2 V			
Load Regulation	-	400 mV	600 mV			
Regulation Over Temperature (-40 °C to +85 °C)	-	300 mV	400 mV			
Output Current	0 A	-	60 A			
Operating Output Power Range	0 W	-	530 W			
Current Limit Threshold	110%	125%	140%			
Short Circuit Surge Transient	-	TBD	-			
Ripple and Noise (rms)	-	20 mV	50 mV	Test conditions: 0-20 MHz BW, with a 1 uF ceramic capacitor at the output.		
Ripple and Noise (pk-pk)	-	100 mV	150 mV			
Turn on Time	-	20 mS	30 mS			
Overshoot at Turn on	-	0%	3%			
Output Capacitance	0 uF	-	5000 uF			
Load sharing (2 units)	-	4%	-			
Transient Response						
50% ~ 75% Max Load	Overshoot	Vin=48 V	-	-	450 mV	Test conditions: di/dt = 1 A/uS, Vin=48 V, with a 1 uF ceramic capacitor at the output.
	Settling Time		-	-	200 uS	
75% ~ 50% Max Load	Overshoot		-	-	450 mV	
	Settling Time		-	-	200 uS	

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

ISOLATED DC/DC CONVERTERS

48 VDC Input 9.6 VDC/60 A Output, 1/4 Brick



General Specifications

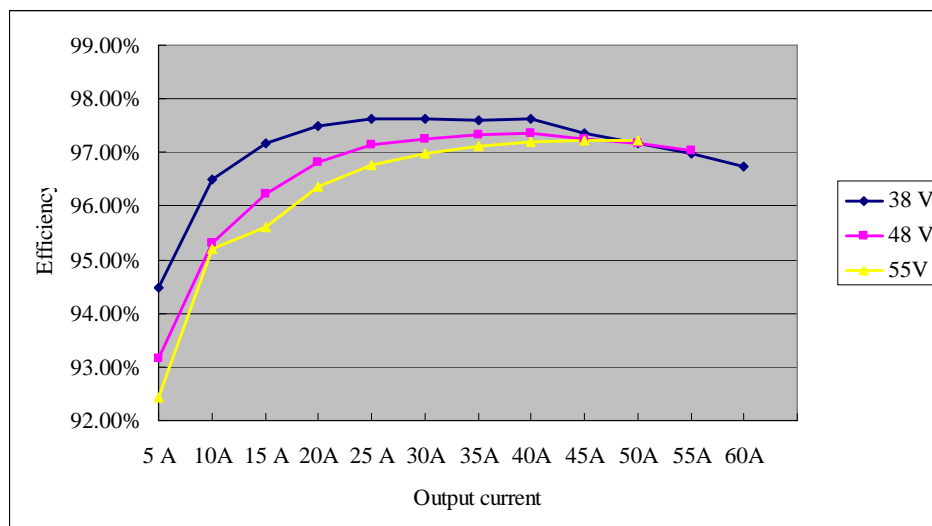
Parameter	Min	Typ	Max	Notes
Efficiency	-	97%	-	Vin=48 V, full load
Switching Frequency	96 kHz	125 kHz	-	
Isolation Capacitance	-	1500 pF	-	
Isolation Voltage	-	1500 V	-	
Over Temperature Protection	-	120 °C	-	
MTBF	2,535,556 hours			Calculated Per Bell Core SR-332 (Vin=48 V; Io=80% full load; Ta = 25 °C)
Dimensions				
Inches (L x W x H)	2.30 x 1.45 x 0.500			
Millimeters (L x W x H)	58.42 x 36.83 x 12.70			
Weight	-	75 g	-	

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

Control Specifications

Parameter	Min	Typ	Max	Notes
Remote On/Off				
Signal High (Unit On)	1 V	-	12 V	The remote on/off pin is open: If active low, the Unit Off; If active high, the Unit On.
Signal Low (Unit Off)				
Signal High (Unit On)	-0.3 V	-	0.6 V	
Signal Low (Unit Off)				
Signal High (Unit On)	1 V	-	12 V	
Signal Low (Unit Off)				-0.3 V

Efficiency Data

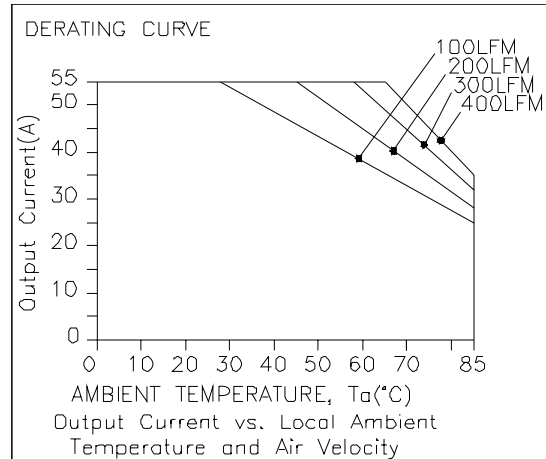


ISOLATED DC/DC CONVERTERS

48 VDC Input 9.6 VDC/60 A Output, 1/4 Brick

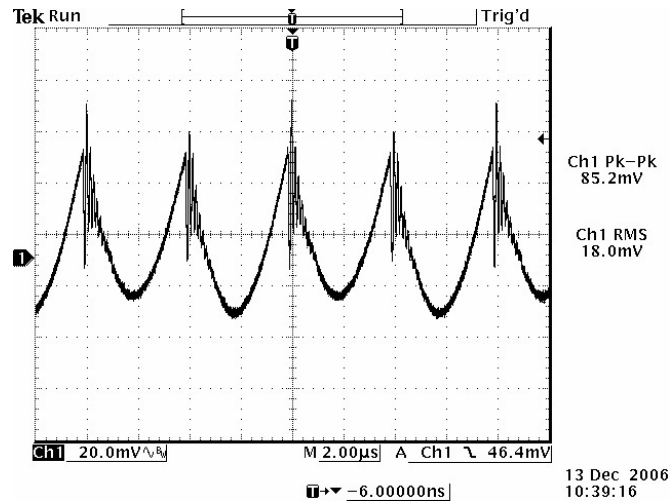


Thermal Derating Curve



$V_{in}=48\text{ V}$

Ripple and Noise Waveform

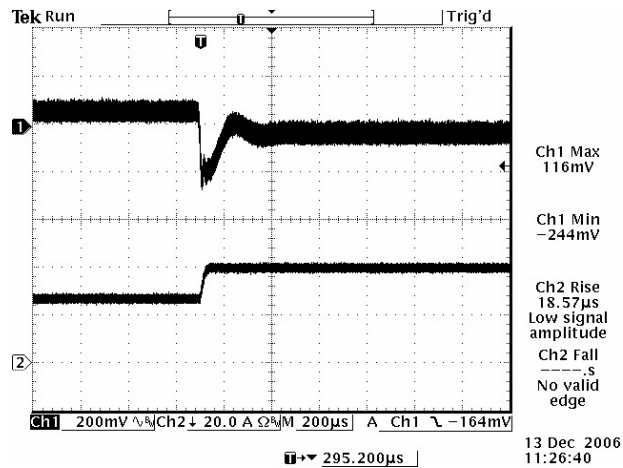


Note: Ripple and noise at full load, 48 V input and $T_a=25$ deg C, with a 1 μF ceramic capacitor at the output.

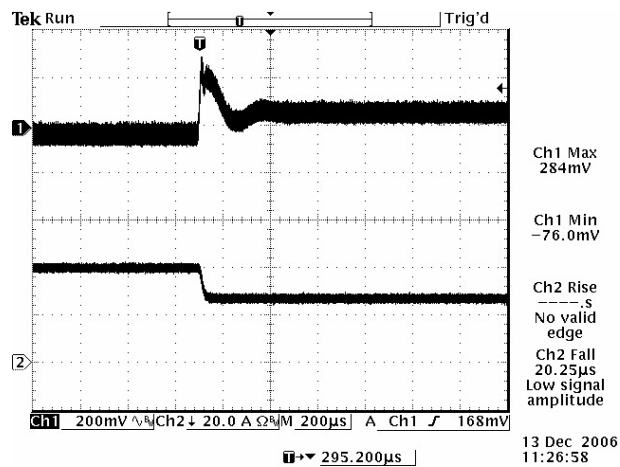
ISOLATED DC/DC CONVERTERS
 48 VDC Input 9.6 VDC/60 A Output, 1/4 Brick



Transient Response Waveforms



50% to 75% load Transient at 48 V input



75% to 50% load Transient at 48 V input

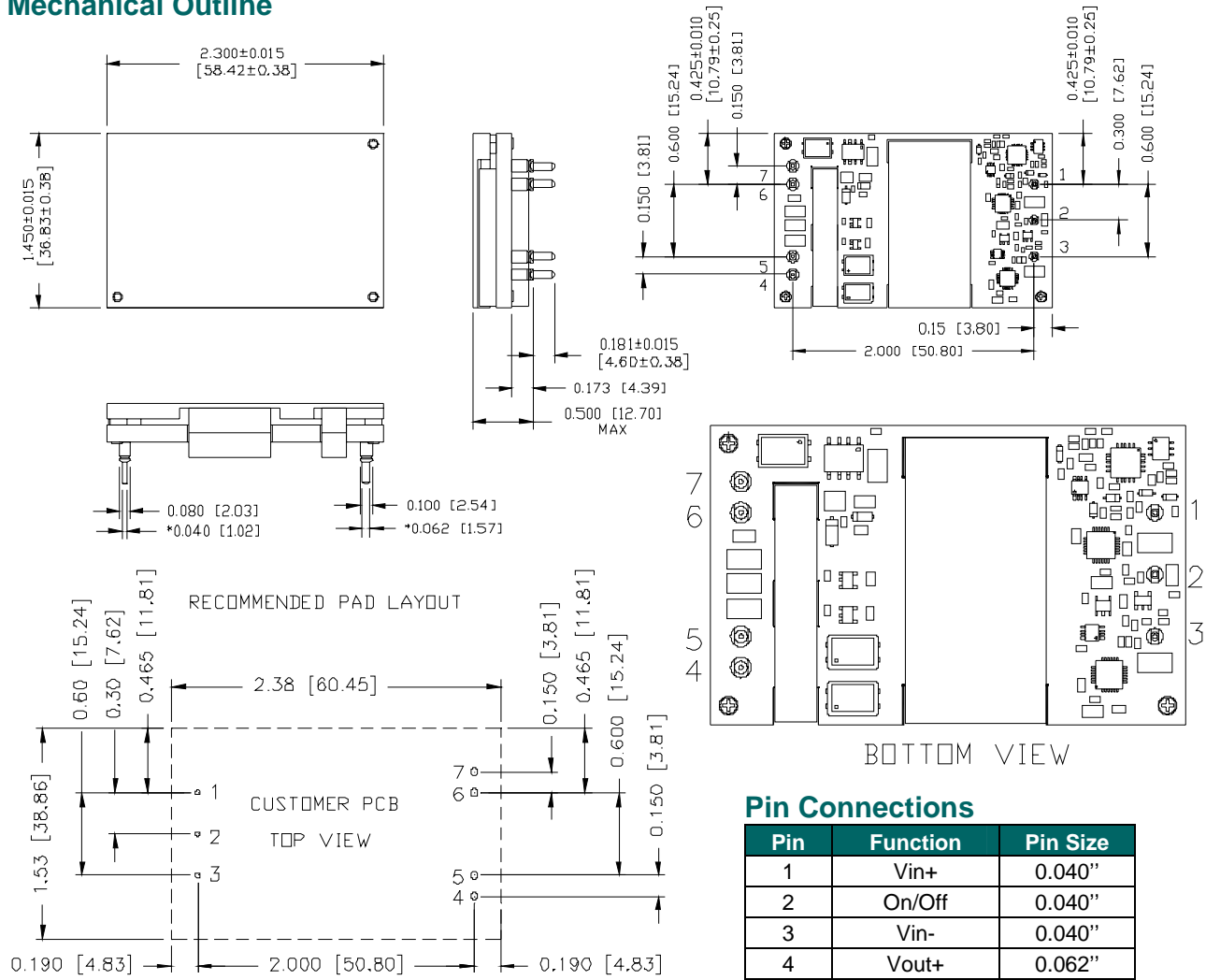
Note: Transient Response at $di/dt=1 \text{ A}/\mu\text{s}$, with a 1 μF ceramic capacitor at the output, and $T_a=25 \text{ deg C}$.

ISOLATED DC/DC CONVERTERS

48 Vdc Input 9.6 Vdc/60 A Output, 1/4 Brick Converter



Mechanical Outline



1,2,3 $\varnothing 0.047$ HOLE SIZE, $\varnothing 0.08$ min PAD SIZE
 4,5,6,7 $\varnothing 0.07$ HOLE SIZE, $\varnothing 0.10$ min PAD SIZE

Pin Connections

Pin	Function	Pin Size
1	Vin+	0.040"
2	On/Off	0.040"
3	Vin-	0.040"
4	Vout+	0.062"
5	Vout-	0.062"
6	Vout+	0.062"
7	Vout-	0.062"

Note: The heat sink can be custom made.

RoHS Compliance

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



©2008 Bel Fuse Inc. Specifications subject to change without notice. 103108

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