

ISOLATED DC/DC CONVERTERS

48 Vdc Input, 1.2 Vdc /25 A Output

bel
POWER PRODUCTS

0RQB-85TV2x

RoHS Compliant

Rev.B

- Fixed Frequency (300 kHz)
- Isolated
- High Efficiency
- High Power Density
- Output Voltage Trim
- Input Under Voltage Lockout
- Pre-Bias Start Up
- Output Over Voltage Shut Down
- Over Temperature Protection
- SCP/OCP
- Low Cost
- Remote On/Off
- Positive/Negative Remote Sense
- Basic Insulation



Description

The 0RQB-85TV2x is isolated dc/dc converter that operates from a nominal 48 Vdc source. These units will provide up to 30 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 quarter brick package.

Part Selection

Output Voltage	Input Voltage	Max. Output Current	Max. Output Power	Typical Efficiency	Model Number Active High	Model Number Active Low
1.2 V	36 V - 75 V	25 A	30 W	84%	0RQB-85TV20	0RQB-85TV2L

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	
Remote On/Off	-0.3 V	-	18 V	
I/O Isolation Voltage	-	-	1500 V	
Input to Each Output Resistance	10 Mohm	-	-	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-55 °C	-	125 °C	

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

Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	36 V	48 V	75 V	
Input Current (no load)	-	-	60 mA	
Input Current (full load)	-	-	1.2 A	
Remote Off Input Current	-	10 mA	20 mA	
Input Reflected Ripple Current (pk-pk)	-	15 mA	37 mA	With simulated source impedance of 10 uH, 5 Hz to 20 MHz; use a 47uF/100 V electrolytic capacitor with ESR=1 ohm max at 200 kHz
I ² t Inrush Current Transient	-	-	0.1 A ² s	
Input Fuse (not internally)	-	-	3 A	
Turn-on Voltage Threshold	33 V	-	35 V	
Turn-off Voltage Threshold	31 V	-	33 V	

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

ISOLATED DC/DC CONVERTERS

48 Vdc Input, 1.2 Vdc /25 A Output



Output Specifications

Parameter		Min	Typ	Max	Notes	
Output Voltage Set Point		1.176 V	1.200 V	1.224 V	Vin=48 V, Io=50%Load	
Output Voltage Trim Range		0.96 V	-	1.32 V		
Line Regulation		-	-	0.2%Vo		
Load Regulation		-	-	0.2%Vo		
Output Over-voltage Clamp		1.44 V	-	1.68 V	Non-latching	
Output Current		0 A	-	25 A		
Current Limit Threshold		27.5 A	-	35 A		
Ripple and Noise (pk-pk)		-	-	100 mV	Vin=75 V, max load, 20 MHz BW, with 10 uF tantalum and 1uF ceramic capacitor at the output.	
External Admissable Capacitive Load		0 uF	-	20000 uF		
Turn on Time		-	-	20 mS		
Rise Time		-	-	10 mS		
Transient Response						
50% ~ 75% Max Load	Overshoot	Vo=1.2 V	-	-	150 mV	di/dt=0.1A/us, Vin=48 Vdc, Ta=25 °C, with 1 uF ceramic capacitor and a 10 uF tantalum capacitor at the output.
	Settling Time		-	-	100 uS	
75% ~ 50% Max Load	Overshoot		-	-	150 mV	
	Settling Time		-	-	100 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	80%	84%	-	V _{in} =48 V, full load
Switching Frequency	270 kHz	300 kHz	330 kHz	
Isolation Capacitance	-	3900 pF	-	
Remote Sense Compensation	-	-	10%	
Over Temperature Protection	-	125 °C	-	
MTBF	-	TBD	-	Calculated Per Bell Core SR-332 (V _{in} =48 V, V _o =1.2 V, I _o =80%, T _a = 25 °C)
Dimensions Inches (L × W × H) Millimeters (L × W × H)	2.30 x 1.45 x 0.395 58.42 x 36.83 x 10.03			
Weight	-	37 g	-	

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

ISOLATED DC/DC CONVERTERS

48 Vdc Input, 1.2 Vdc /25 A Output



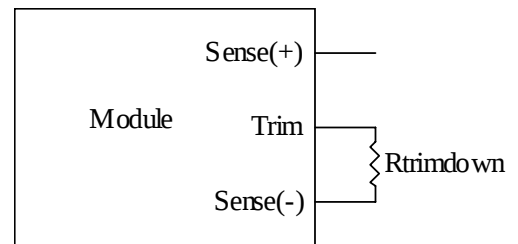
Control Specifications

Parameter		Min	Typ	Max	Notes
Remote On/Off					
Signal Low (Unit On)	Active Low	-0.3 V	-	1.8 V	The Remote On/Off pin is open, Unit off.
Signal High (Unit Off)		3.5 V	-	18 V	
Signal Low (Unit Off)	Active High	-0.3 V	-	1.8 V	The Remote On/Off pin is open, Unit on.
Signal High (Unit On)		3.5 V	-	18 V	
Current Source/Sink		0 mA	-	1 mA	

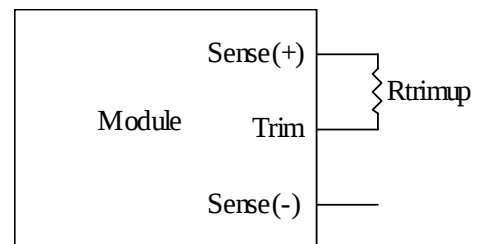
Output Trim Equations

Equations for calculating the trim resistor are shown below. The Trim Down resistor should be connected between the Trim pin and Sense(-) pin. The Trim Up resistor should be connected between the Trim pin and the Sense(+) pin. Only one of the resistors should be used for any given application.

$$R_{trimdown} = \left[\frac{5.777 \times 100\%}{1 - \frac{Vo_{dn}}{1.2}} - 10.887 \right] K\Omega$$



$$R_{trimup} = \left[\frac{8.665 \times Vo_{up}}{1.225 \times \left(\frac{Vo_{up}}{1.2} - 1 \right)} - \frac{5.777 \times 100\%}{\left(\frac{Vo_{up}}{1.2} - 1 \right)} - 10.887 \right] K\Omega$$

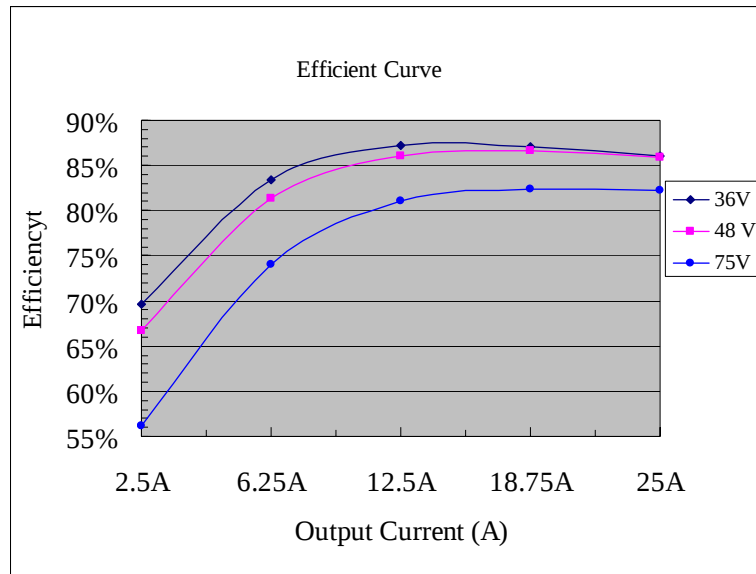


ISOLATED DC/DC CONVERTERS

48 Vdc Input, 1.2 Vdc /25 A Output

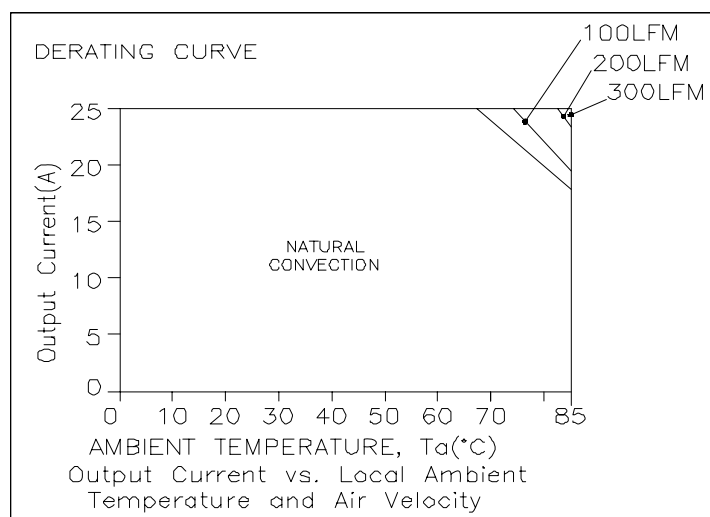


Efficiency Data



Thermal Derating Curve

Vin=48 V, with maximum junction temperature of semiconductors derated to 120 degree C.

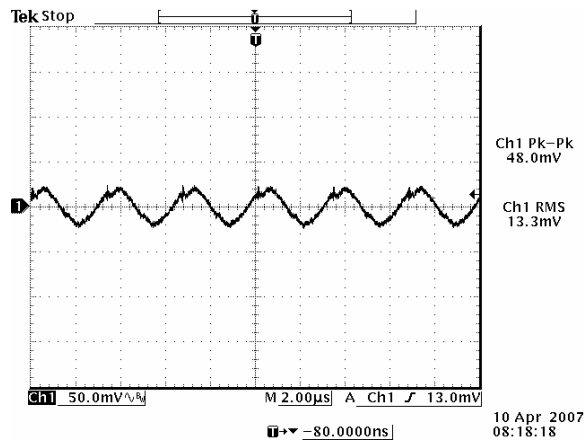


ISOLATED DC/DC CONVERTERS

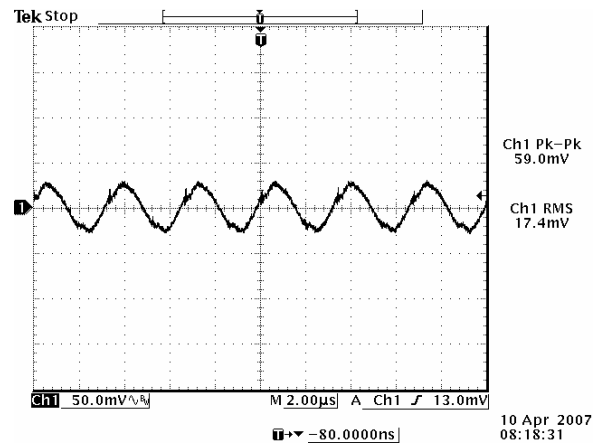
48 Vdc Input, 1.2 Vdc /25 A Output

bel
POWER PRODUCTS

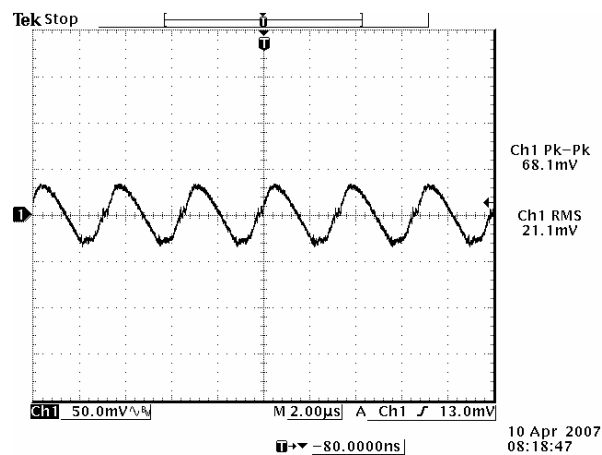
Ripple and Noise Waveforms



Vin =36 V and Iout = 25 A



Vin =48 V and Iout = 25A



Vin =75 V and Iout = 25 A

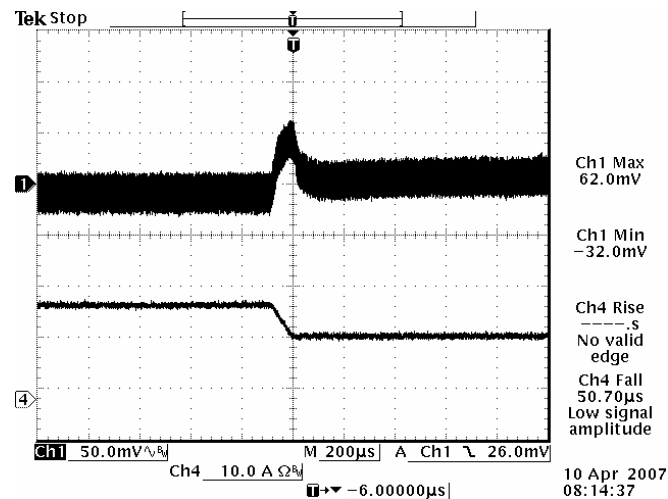
Note: Ripple and Noise at Vin=75 V, max load, 20 MHz BW, with 10 uF tantalum and 1uF ceramic capacitor at the output, and Ta=25 deg C.

ISOLATED DC/DC CONVERTERS

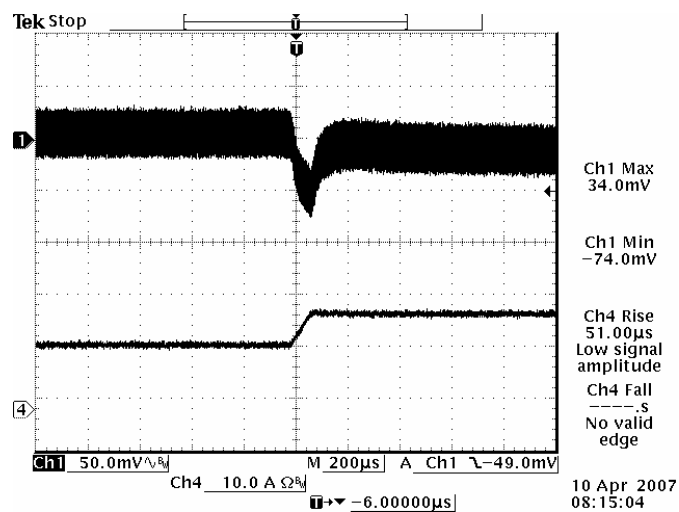
48 Vdc Input, 1.2 Vdc /25 A Output



Transient Response Waveforms



Dynamic load transients @ $V_{in} = 48\text{ V}$, $T_a = 25^\circ\text{C}$, $I_o = (75\%-50\%)I_{onom}$, $di/dt = 0.1\text{ A/uS}$



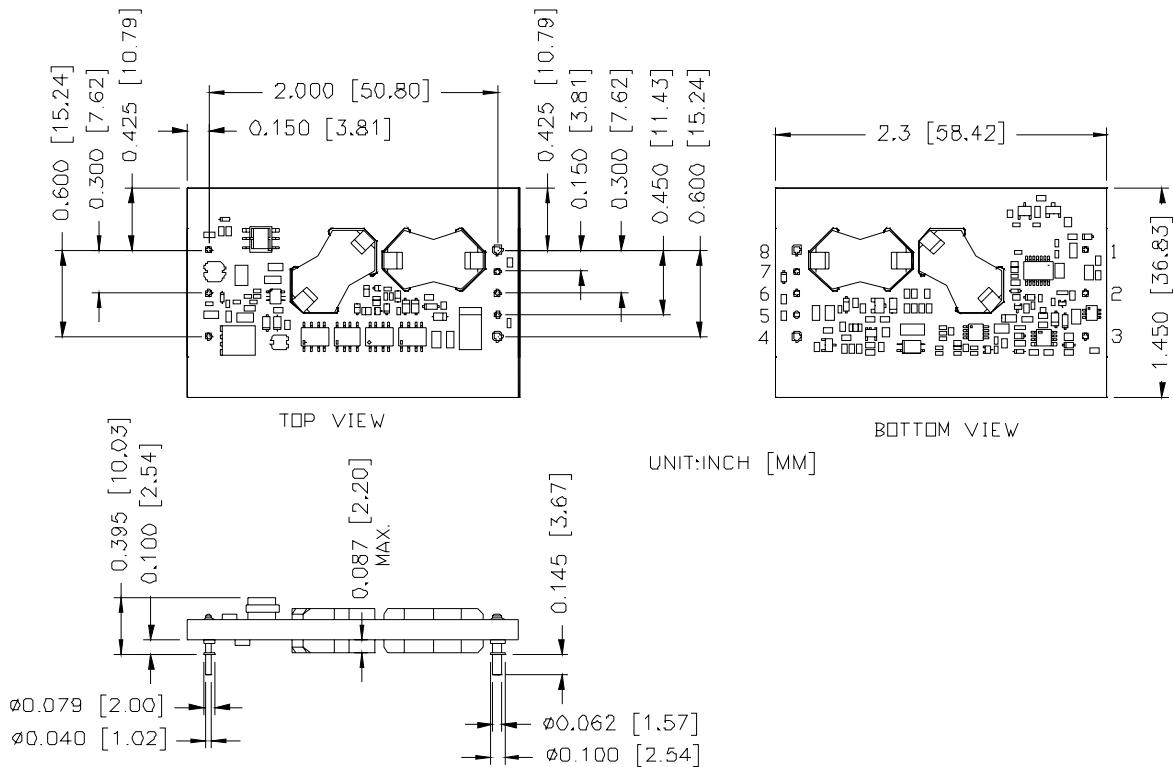
Dynamic load transients @ $V_{in} = 48\text{ V}$, $T_a = 25^\circ\text{C}$, $I_o = (50\%-75\%)I_{onom}$, $di/dt = 0.1\text{ A/uS}$

ISOLATED DC/DC CONVERTERS

48 Vdc Input, 1.2 Vdc /25 A Output

bel
POWER PRODUCTS

Mechanical Outline



Note: The module doesn't guarantee at least 0.7mm as clearance distance on bottom side.
This issue should be considered if any copper traces are on the top side of the user's board.

ISOLATED DC/DC CONVERTERS

48 Vdc Input, 1.2 Vdc /25 A Output



Mechanical Outline (continued)

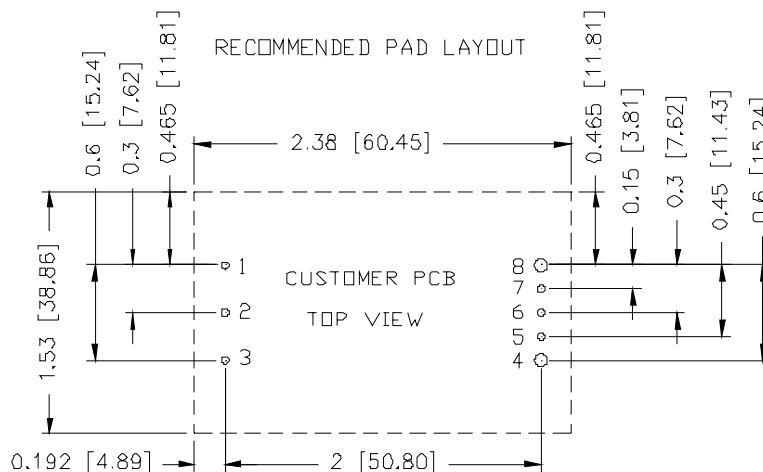


BOTTOM VIEW

Pin Connections

Pin	Name	Function	Pin Dia
1	Vin+	Positive input voltage	0.040"
2	On/Off	Input to turn converter on and off, referenced to Vin-	0.040"
3	Vin-	Negative input voltage	0.040"
4	Vout-	Negative output voltage	0.062"
5	Sense-	Negative remote sense	0.040"
6	Trim	Output voltage trim	0.040"
7	Sense+	Positive output voltage	0.040"
8	Vout+	Positive output voltage	0.062"

Notes: 1. Pin 5 must be connected to Vout-.
2. Leave Pin 6 open for nominal voltage.
3. Pin 7 must be connected to Vout+.



1,2,3,5,6,7 $\varnothing$ 0.047 HOLE SIZE, $\varnothing$ 0.08 min PAD SIZE
4,8 $\varnothing$ 0.07 HOLE SIZE, $\varnothing$ 0.10 min PAD SIZE

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. 120908

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