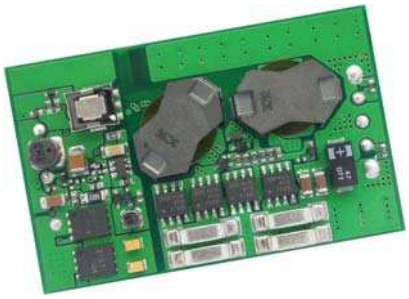
ISOLATED DC/DC CONVERTERS

48 Vdc Input, 12 Vdc /8.3 A Output

0RQB-85T12W RoHS Compliant PRELIMINARY Rev.A

- 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-85T12W is isolated dc/dc converter that operates from a nominal 48 Vdc source. These units will provide up to 100 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 Low
12 Vdc	36 Vdc - 75 Vdc	8.3 A	100 W	91%	0RQB-85T12W

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)	-	-	120 mA	
Input Current (full load)	-	-	3.9 A	
Remote Off Input Current	-	10 mA	20 mA	
Input Reflected Ripple Current (pk-pk)	-	-	30 mA	With simulated source impedance of 10 uH, 5 Hz to 20 MHz; use a 100uF/100 V electrolytic capacitor with ESR=1 ohm max at 200 kHz
Input Reflected Ripple Current (rms)	-	-	5 mA	
I^2t Inrush Current Transient	-	-	0.1 A^2s	
Input Fuse (not internally)	-	-	6 A	
Turn-on Voltage Threshold	32.5 V	-	35.5 V	
Turn-off Voltage Threshold	30.0 V	-	33.0 V	

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

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48 Vdc Input, 12 Vdc /8.3 A Output

Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	11.76 V	1.200 V	12.24 V	V_{in}=48 V, Io=50%Load
Output Voltage Trim Range	9.6 V	-	13.2 V	
Line Regulation	-	-	0.05%Vo	
Load Regulation	-	-	0.15%Vo	
Output Over-voltage Latch	13.8 V	-	16.4 V	
Output Current	0 A	-	8.3 A	
Current Limit Threshold	10 A	-	13 A	
Ripple and Noise (pk-pk)	-	-	120 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	-	3000 uF	
Turn on Time	-	-	30 mS	
Rise Time	-	-	15 mS	

Transient Response

50% ~ 75% Max Load	Overshoot	V_O=12 V	-	300 mV	400 mV	di/dt=0.1A/us, Vin=48 Vdc, Ta=25 ℃, with a 1 uF ceramic capacitor and a 10 uF tantalum capacitor at the output.
	Settling Time		-	200 uS	300 uS	
75% ~ 50% Max Load	Overshoot		-	300 mV	400 mV	
	Settling Time		-	200 uS	300 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	88%	91%	-	V_{in}=48 V, full load
Switching Frequency	270 kHz	300 kHz	330 kHz	
Isolation Capacitance	-	1500 pF	-	
Remote Sense Compesation	-	-	10%	
Over Temperature Protection	-	125 ℃	-	
MTBF	-	TBD	-	Calculated Per Bell Core SR-332 (Vin=48 V, Vo=12 V, Io=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.

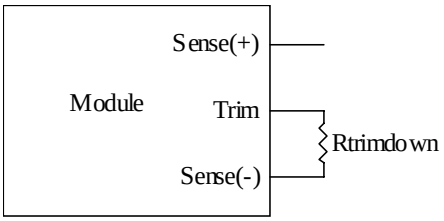
Control Specifications

Parameter		Min	Typ	Max	Notes
Remote On/Off					
Signal Low (Unit On)	Active Low	-0.3 V	-	0.8 V	The Remote On/Off pin is open, Unit off.
Signal High (Unit Off)		2.4 V	-	18 V	
Current Source/Sink		0 mA	-	1 mA	

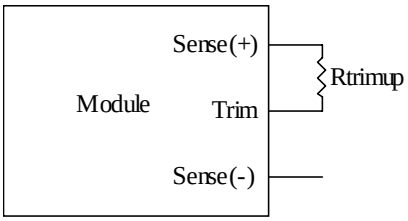
Output Trim Equations

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.

$$Rtrimdown = \frac{511}{|delta|} - 10.22[k\Omega]$$



$$Rtrimup = \frac{(100 + delta) \cdot Vo \cdot 5.11 - 626}{1.225 \cdot delta} - 10.22[k\Omega]$$

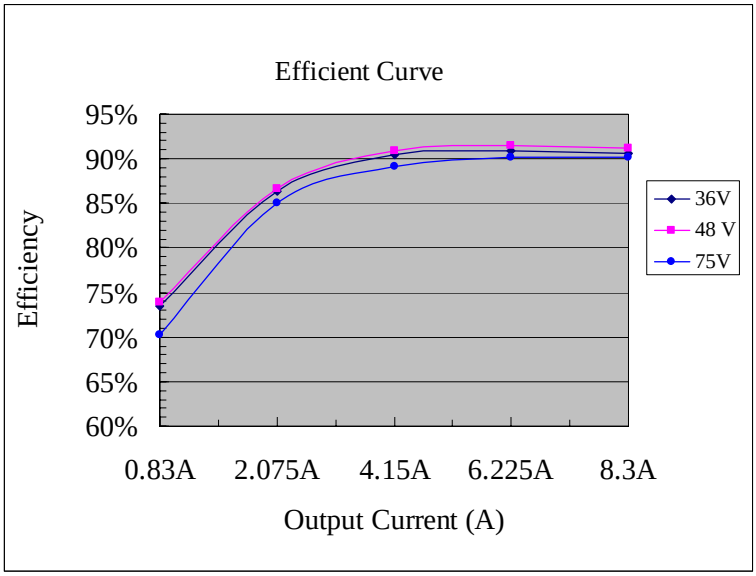


Note: $$delta = \frac{(Vo\_req - Vo)}{Vo} \times 100[\%]$$

Vo_req=Desired (trimmed) output voltage [V]

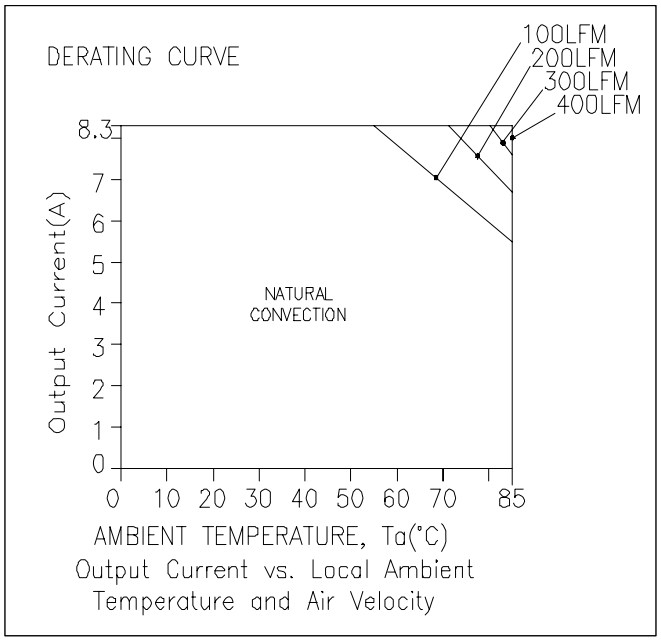
Output voltage Vo=12.000 V

Efficiency Data

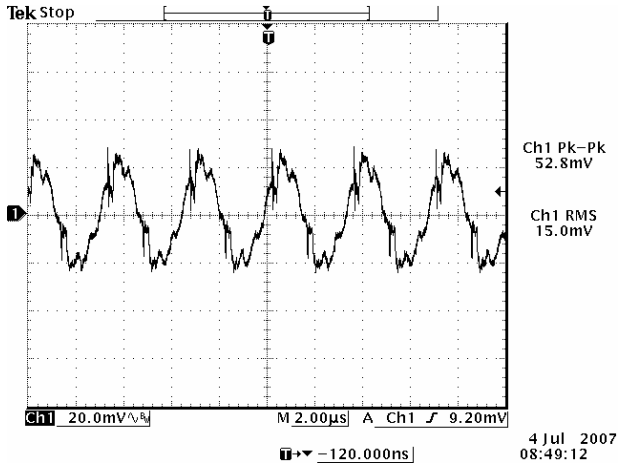


Thermal Derating Curve

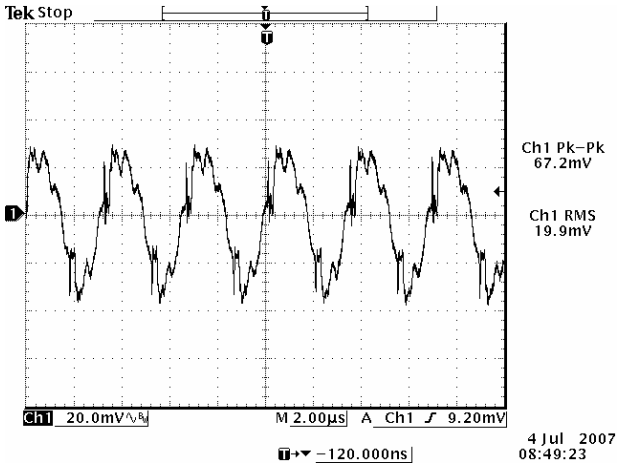
Vin=48 V, with maximum junction temperature of semiconductors derated to 120 degree C.



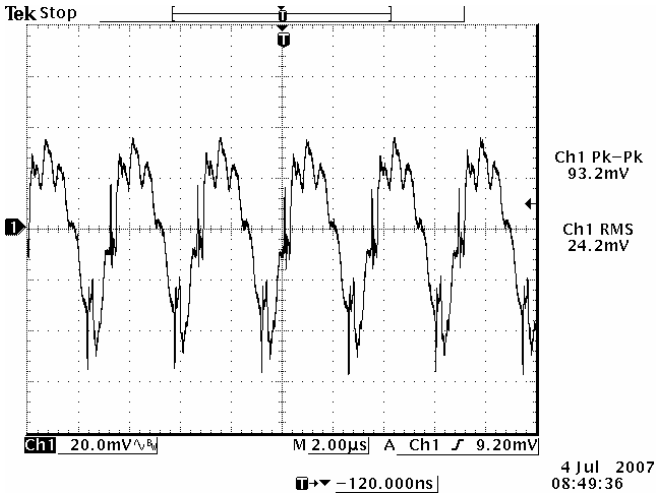
Ripple and Noise Waveforms



Vin =36 V and Iout = 8.3 A



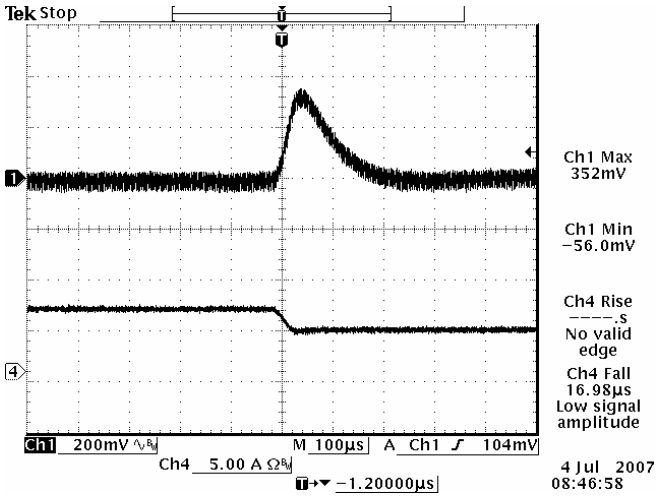
Vin =48 V and Iout = 8.3 A



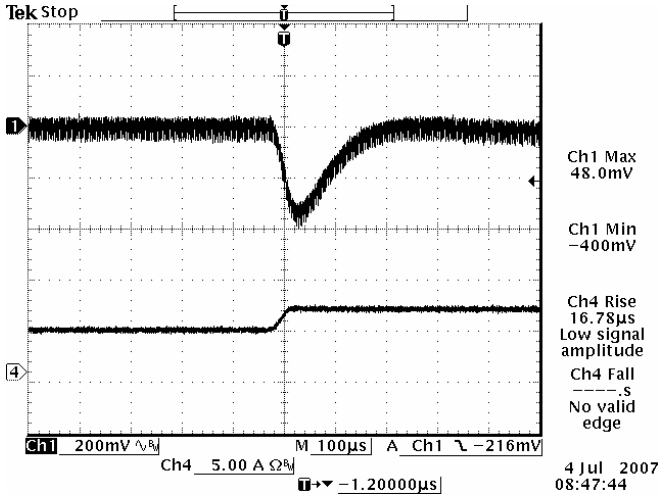
Vin =75 V and Iout = 8.3 A

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

Transient Response Waveforms

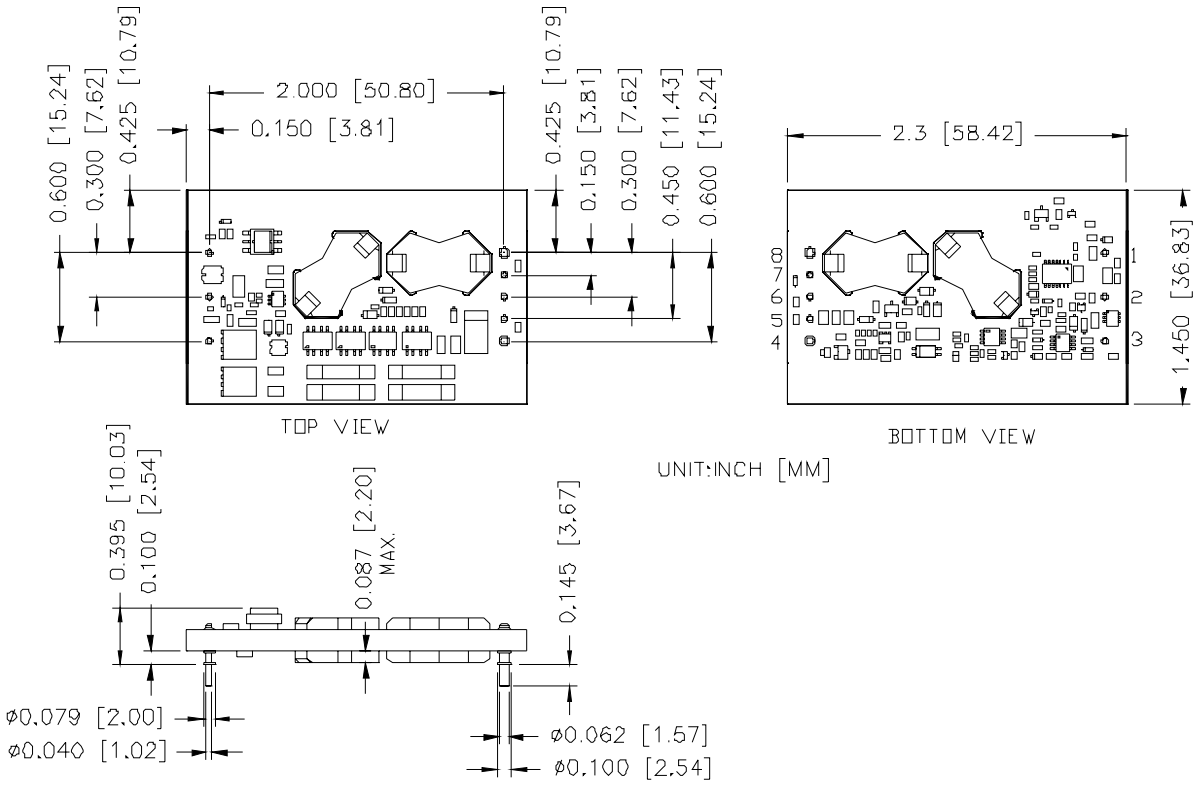


Dynamic load transients @ Vin = 48 V, Ta = 25℃, Io= (75%-50%)Ionom, di/dt=0.1 A/uS



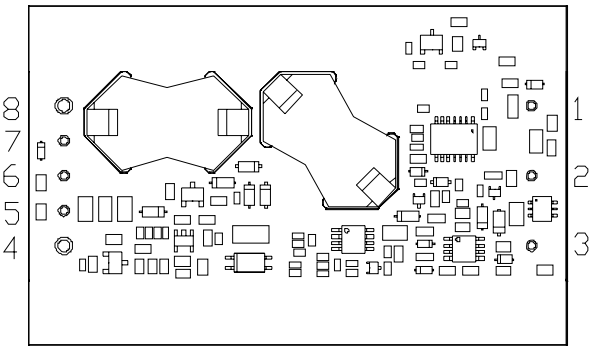
Dynamic load transients @ Vin = 48 V, Ta = 25℃, Io= (50%-75%)Ionom, di/dt=0.1 A/uS

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.

Mechanical Outline (continued)

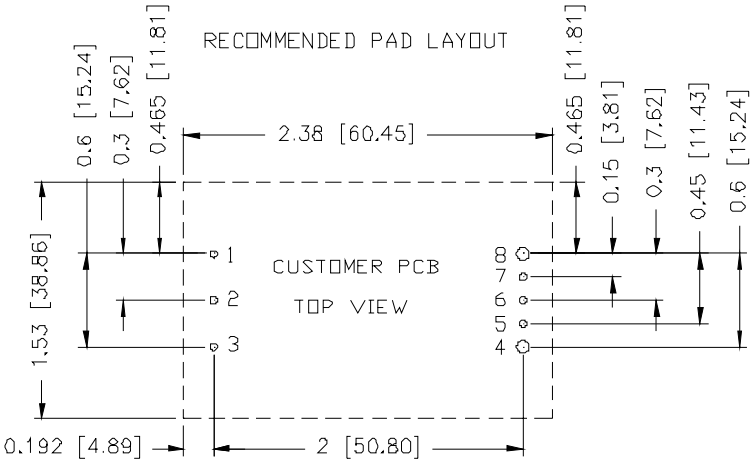


BOTTOM VIEW

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 Ø0.047 HOLE SIZE, Ø0.08 min PAD SIZE
4,8 Ø0.07 HOLE SIZE, Ø0.10 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.

RoHS 2002/95/EC

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