

## ISOLATED DC/AC CONVERTER

36 Vdc - 75 Vdc Input, 65 Vac - 95 Vac 17.5, 20, 25, 50 Hz/40 W Output

**bel**  
POWER PRODUCTS

**0RHB-40TRxx RoHS Compliant Rev.C**

- Isolated
- High Efficiency
- Basic Insulation
- Low Cost
- Low THD Sine Wave Output
- Excellent Thermal Performance
- External Output Voltage Control 65 Vrms - 95 Vrms
- External Digital Frequency Selection 17.5 Hz, 20 Hz, 25 Hz and 50 Hz
- Overload Protection with Advanced Output Power Control
- Fixed Switching Frequency (110 kHz)
- Output Short Circuit Protection
- Input Under/Over Voltage Protection
- Over Temperature Protection
- CNT On/Off Logic



### Description

The 0RHB-40TRxx is an isolated dc/ac ring generator that operates from a nominal 48 Vdc source. This unit provides up to 40 W output power. It is designed to be highly efficient and low cost in a half-brick package.

### Part Selection

Output Voltage	Input Voltage	Max. Output Power	Typical Efficiency	Model Number Active High	Model Number Active Low
65 Vac - 95 Vac	36 Vdc - 75 Vdc	40 W	85%	0RHB-40TRG0	0RHB-40TRGL
65 Vac - 95 Vac	36 Vdc - 75 Vdc	40 W	85%	0RHB-40TRH0	0RHB-40TRHL

- Notes:** 1. 0RHB-40TRGx indicates application 1, 0RHB-40TRHx indicates application 2, details please see page 5.  
2. Add "G" suffix at the end of the model number to indicate Tray Packaging.  
3. 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	
I/O Isolation Voltage	-	-	1500 Vac	
Ambient Temperature	-40 °C	-	85 °C	
Storage Temperature	-50 °C	-	115 °C	

### Input Specifications

Parameter	Min	Typ	Max	Notes
Input Voltage	36 V	48 V	75 V	
Input Current (full load)	-	-	1.5 A	
Input Current (no load)	-	-	60 mA	
Input Reflected Ripple Current (pk-pk)	-	-	150 mA	Tested with simulated source impedance of 10 uH, 5 Hz to 20 MHz; use a 100 uF /100 V electrolytic capacitor with ESR = 1 ohm max at 200 kHz at 25 °C.
Turn-on Voltage Threshold	-	33 V	-	
Under Voltage Threshold	-	-	32 V	
Over Voltage Threshold	-	-	90 V	

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

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### Output Specifications

Parameter	Min	Typ	Max	Notes
Output Voltage Set Point	92 V	95 V	98 V	Vin=48 V, Io=50% load. Trim pin is connected to GND.
Output Frequency	f-1.0 Hz	f Hz	f+1.0 Hz	
Load Regulation	-	1%Vo	2%Vo	
Line Regulation	-	0.5%Vo	1%Vo	
Regulation Over Temperature (-40deg.C - 85deg.C)	-	-	0.05%Vo/C	
Voltage Accuracy	-	3%Vo	5%Vo	
Frequency Accuracy	-	-	3%Vo	
THD	-	-	5%	
Output Current Range(95 Vac)	0 mA	-	420 mA	
Output Power Limit	-	50 W	-	Hiccup mode
Turn on Time	-	-	1000 mS	

**Note:** All specifications are typical at nominal input, full load at 25 °C unless noted.

### General Specifications

Parameter	Min	Typ	Max	Notes
Efficiency	83%	85%	-	Vin=48 V, full load, Ta=25°C
Switching Frequency	100 kHz	110 kHz	120 kHz	
Isolation capacitance	-	1500 pF	-	
Output Voltage Trim Range	65 Vac	-	95 Vac	
Over Temperature Protection	-	125 °C	-	
MTBF	2,062,694 hours			Calculated Per Bell Core SR-332 (Io = 80%load; Ta = 25 °C)
Dimensions	Inches millimeters			2.28 x 2.40 x 0.50 57.91 x 60.96 x 12.70
Weight	-	66 g	-	

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

### Control Specifications

Parameter	Min	Typ	Max	Notes	
<b>CNT On/Off</b>					
Signal High (Unit On)	Active High	36 V	-	75 V	The CNT pin open, Unit on.
Signal Low (Unit Off)		-0.7 V	-		
Signal High (Unit Off)	Active Low	36 V	-	75 V	The CNT pin open, Unit off.
Signal Low (Unit On)		-0.7 V	-		
Current Source/Sink		0 mA	-	2 mA	

## ISOLATED DC/AC CONVERTER

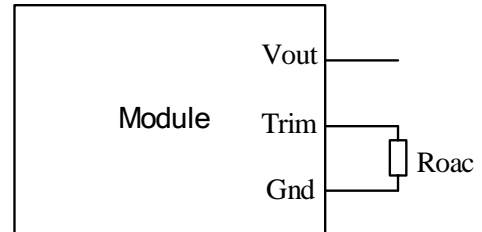
36 Vdc - 75 Vdc Input, 65 Vac - 95 Vac 17.5, 20, 25, 50 Hz/40 W Output



### Output Trim Equations

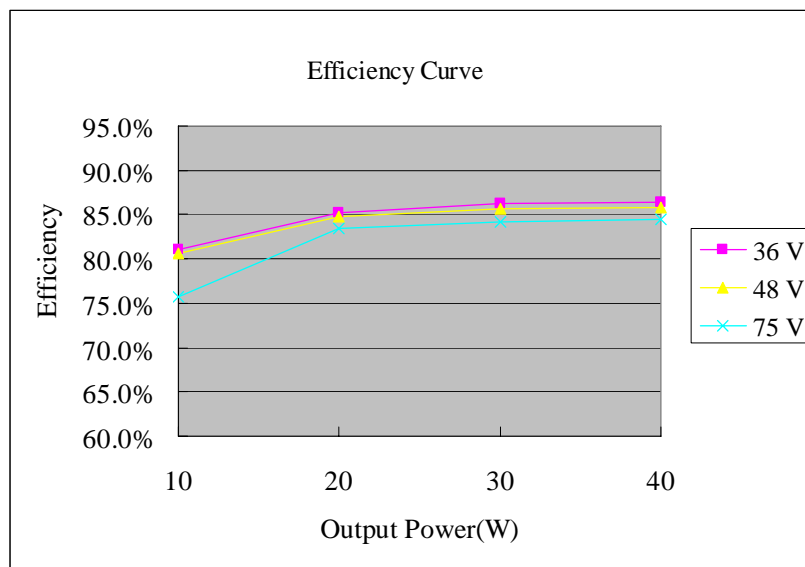
Equations for calculating the trim resistor is shown below. The Roac resistor should be connected between the Trim pin and Gnd pin.

$$R_{oac} = \frac{1292 / 23}{V_o - 1292 / 23} \times 4.7 - 6.8(K\Omega)$$



	56 V	65 V	70 V	75 V	80 V	85 V	90 V	95 V
Roac(kΩ)	Open	23.113	12.296	7.224	4.281	2.359	1.005	0

### Efficiency Data



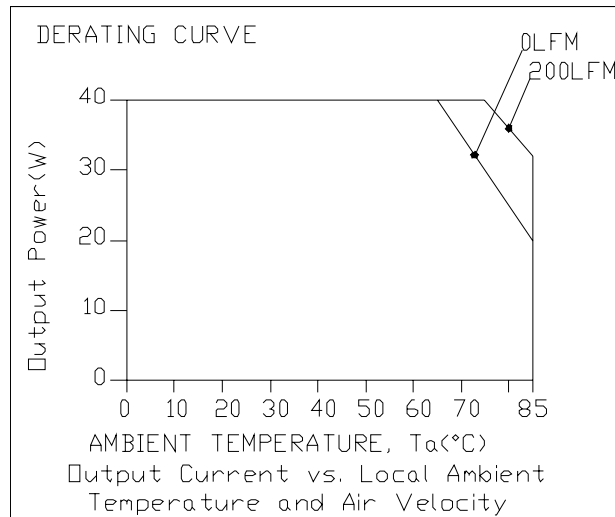
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### Thermal Derating Curves

With maximum junction temperature of semiconductors derated to 120 degree C.



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

### Frequency Setting

Output Frequency (Hz)	OPTF1	OPTF2	OPTF1 and OPTF2: 0: Connected to GND 1: Open
17.5	0	0	
20	0	1	
25	1	0	
50	1	1	

# ISOLATED DC/AC CONVERTER

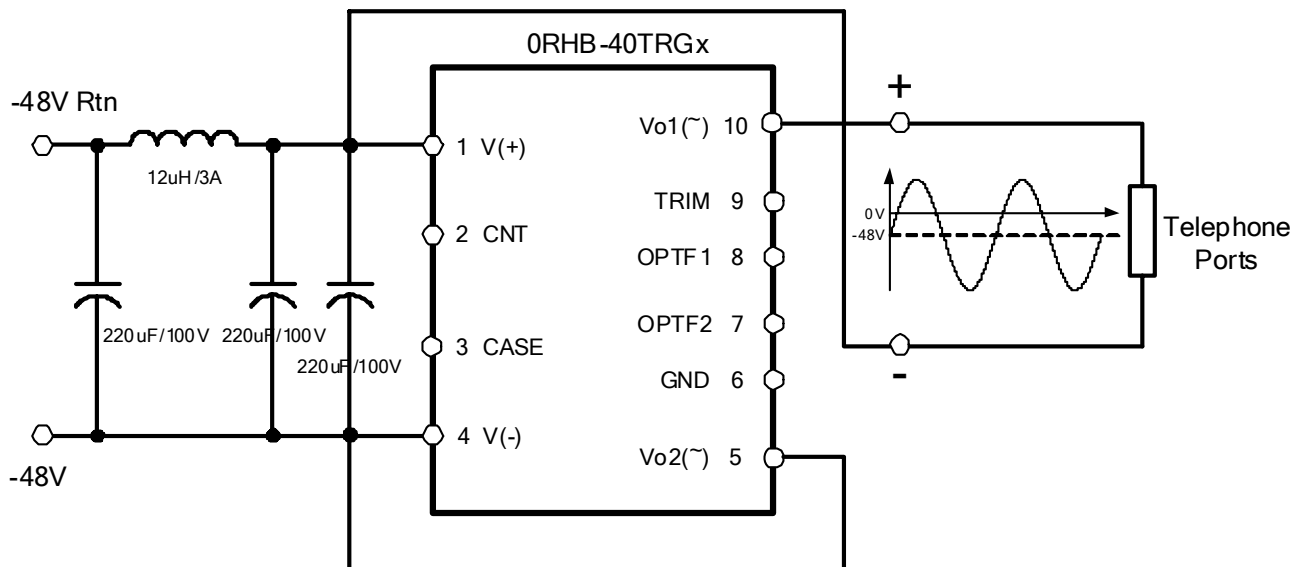
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## Typical Application

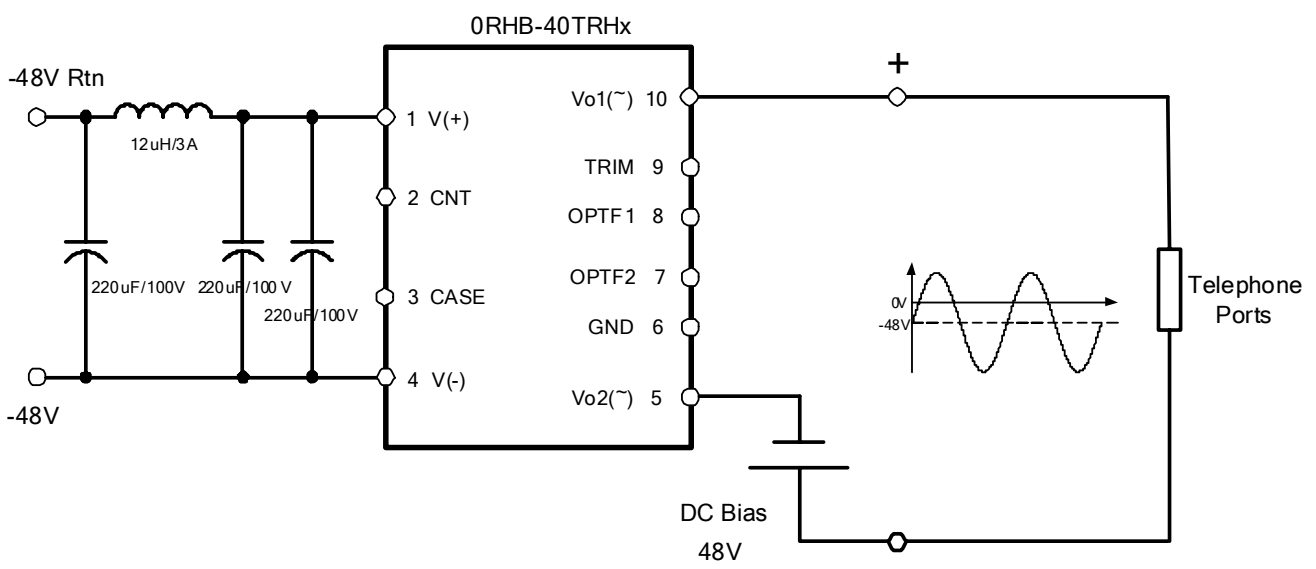
### Typical Application 1 (0RHB-40TRGx)

Output AC is superimposed on DC bias – A single DC power supply is used for the Ring Generator feeding and for the output biasing.



### Typical Application 2 (0RHB-40TRHx)

Output AC is superimposed on DC bias – Two DC power supplies are used, one for the Ring Generator feeding and another for the output biasing.

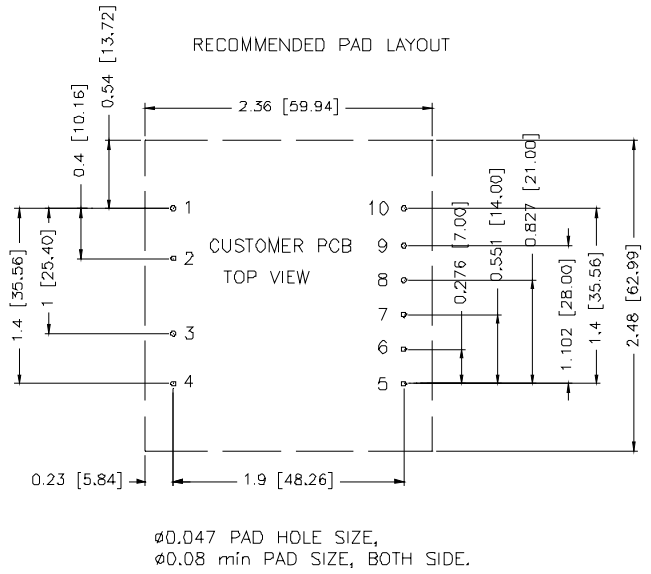
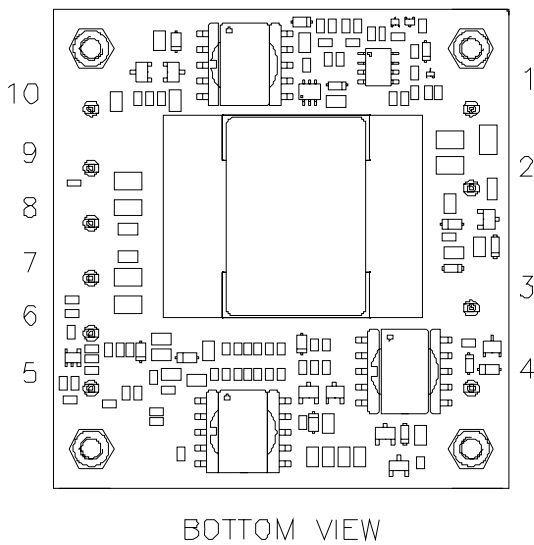
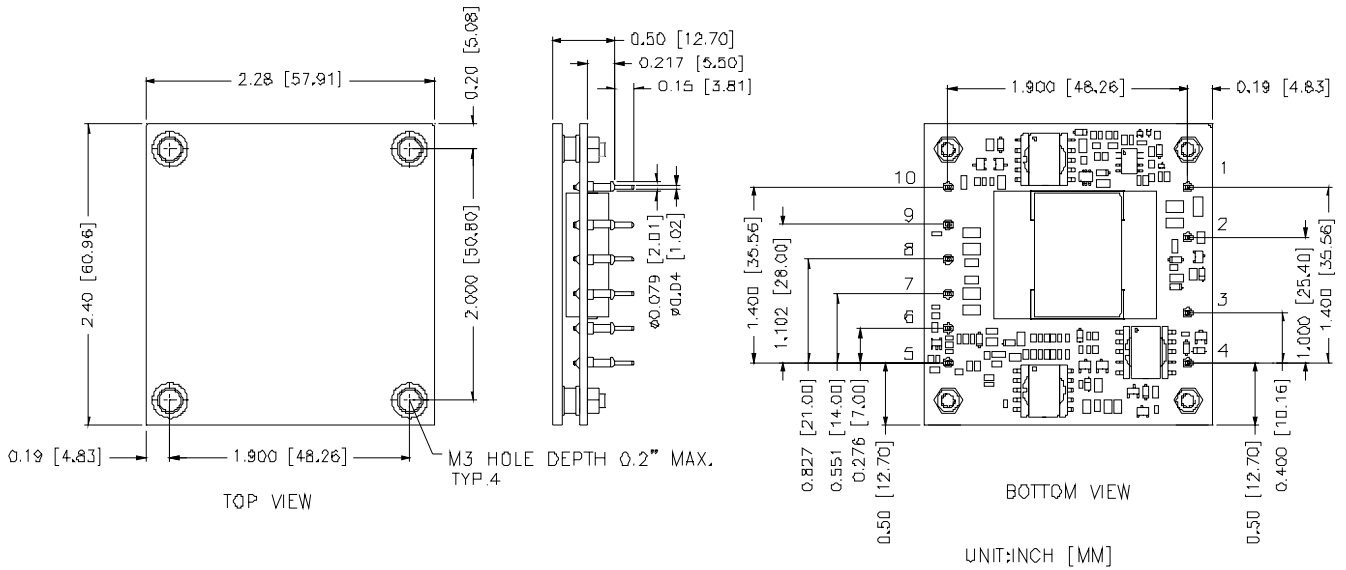


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## Mechanical Outline



## Pin Connections

pin	function	pin	function	pin	function
1	Vin(+)	5	Vo2(~)	8	OPTF1
2	CNT	6	GND	9	Trim
3	Case	7	OPTF2	10	Vo1(~)
4	Vin(-)				

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### INSTALLATION INSTRUCTION

- 1) The DC-AC Converter can be operated at an ambient temperature up to 85°C maximum.
- 2) The DC-AC Converter is a built-in component. During installation into certain equipment the relevant requirements of EN 60950-1:2001 + A11 and IEC 60950-1:2001 shall be maintained.
- 3) The creepage distances, clearances and thickness of insulation between unearthed hazardous voltage input and hazardous voltage output circuits have complied with basic insulation requirements according to EN 60950-1:2001 + A11 and IEC 60950-1:2001.
- 4) The output ratings as shown on the label must not be exceeded.
- 5) The equipment is to be supplied from a DC source which is separated from AC mains by double or reinforced insulation, or by basic insulation and suitable earthing providing equivalent protection.
- 6) The equipment is intended to be installed into a class I or class II system, when installed into class I system, protective earth has to be reliably identified and suitable external protection devices have to be provided in the final system.
- 7) The equipment shall be installed with an external forced air-cooling according to installation instruction accompanied with the unit. The airflow direction is towards the side of the equipment.

#### RoHS Compliance

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



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