

## 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-40TRGx RoHS Compliant PRELIMINARY Rev.A**

- 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-40TRGx 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             |

- 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     |       |
| 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       | -   | 3900 pF | -       |  |
| Output Voltage Trim Range   | 65 Vac                                      | -       | 95 Vac  |  |
| Over Temperature Protection | -   | 125 °C  | -       |  |
| MTBF                        | TBD   |         |         | Calculated Per Bell Core SR-332 (Io = Nominal; Ta = 25 °C) |
| Dimensions                  | 2.28 x 2.40 x 0.50<br>57.91 x 60.96 x 12.70 |         |         |  |
|                             | Inches                                      |         |         |  |
|                             | millimeters                                 |         |         |  |
| 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)  | 36 V | -   | 75 V | The CNT pin open, Unit on.  |
| Signal Low (Unit Off)  |      |     |      |                             |
| Signal High (Unit Off) | 36 V | -   | 75 V | The CNT pin open, Unit off. |
| Signal Low (Unit On)   |      |     |      |                             |
| Current Source/Sink    | 0 mA | -   | 2 mA |                             |

## ISOLATED DC/AC CONVERTER

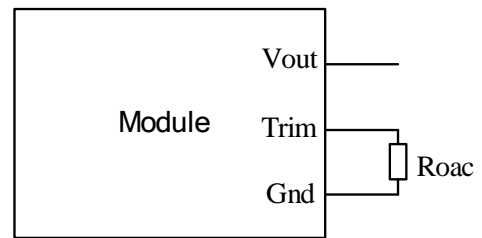
36 Vdc - 75 Vdc Input, 65 Vac - 95 Vac 17.5, 20, 25, 50 Hz/40 W Output



### Output Trim Equations

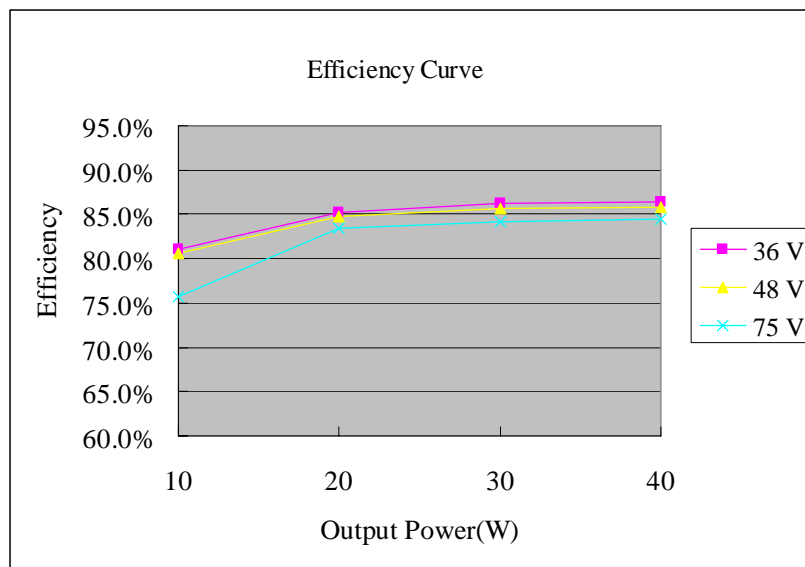
Equations for calculating the trim resistor is shown below. The Roac resistor should be connected between the Trim pin and Gnd pin.

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



|          | 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



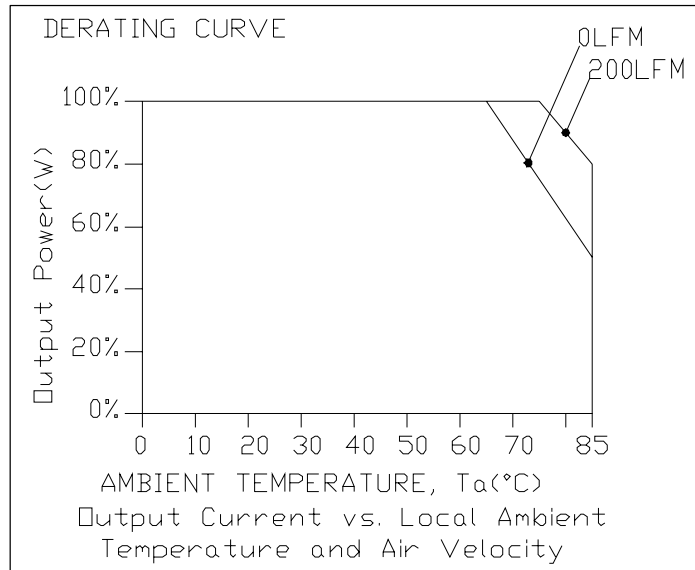
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### Thermal Derating Curve

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



### Frequency Setting

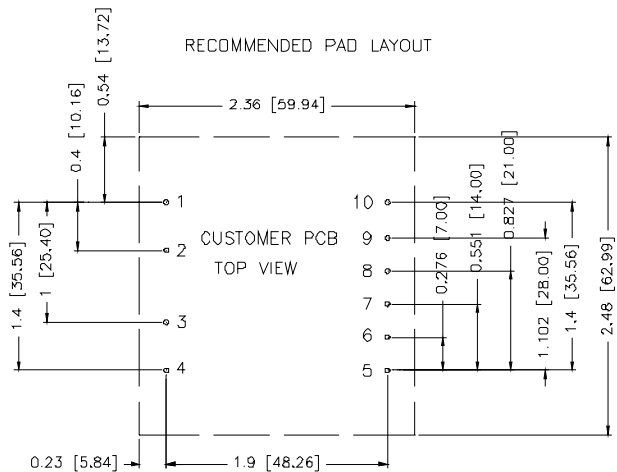
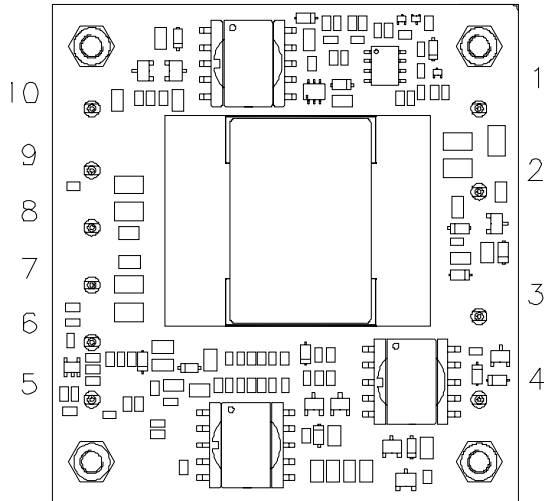
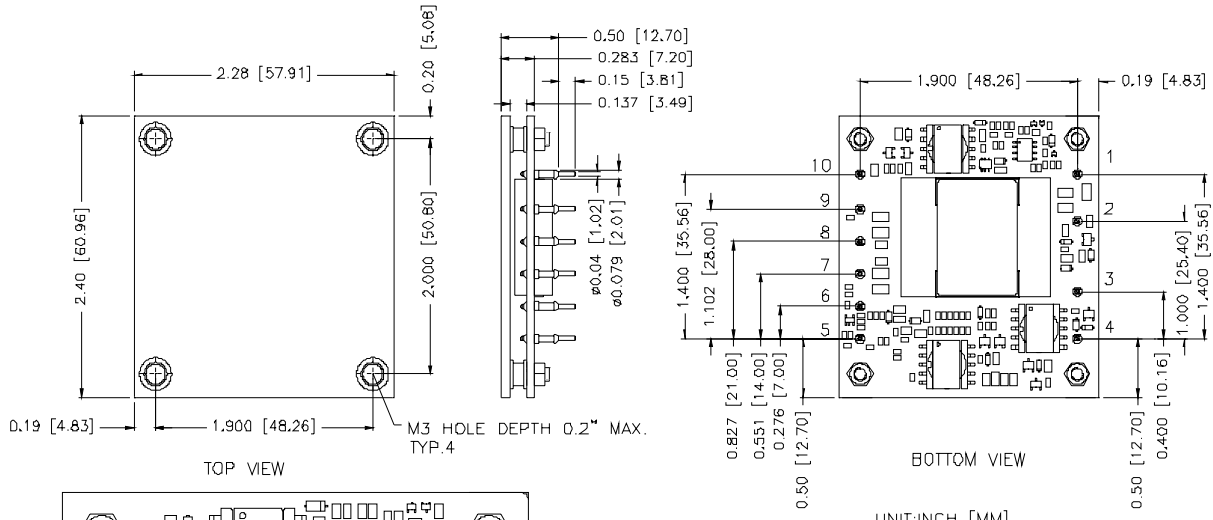
| Output Frequency (Hz) | OPTF1 | OPTF2 | OPTF1 and OPTF2:<br>0: Connected to GND<br>1: Open |
|-----------------------|-------|-------|--|
| 17.5                  | 0     | 0     |  |
| 20                    | 0     | 1     |  |
| 25                    | 1     | 0     |  |
| 50                    | 1     | 1     |  |

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## Mechanical Outline



∅0.047 PAD HOLE SIZE,  
∅0.08 min PAD SIZE, BOTH SIDE.

## 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(-)   |     |          |     |          |

## 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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