

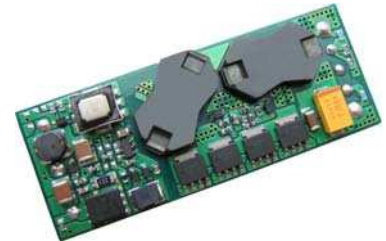
ISOLATED DC/DC CONVERTERS

48 Vdc Input 5 Vdc /15 A Output

bel
POWER PRODUCTS

0RCY-75T RoHS Compliant PRELIMINARY Rev.A

- Isolated
- Fixed Frequency (300 kHz)
- High Efficiency
- High Power Density
- Over Temperature Protection
- Remote On/Off
- Basic Insulation
- UL60950-1 Recognized (UL/cUL)
- Output Over Voltage ShutDown
- Input Under/Over Voltage Lockout
- SCP/OCV
- Low Cost
- Positive/Negative Remote Sense
- Output Voltage Trim
- Remote On/Off Logic (Option)
- Pin Length (Option)



Description

The 0RCY-75T05x are isolated dc/dc converters that operate from a nominal 48 Vdc source. These units will provide up to 75 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 eighth brick package.

Part Selection

| Output Voltage | Input Voltage | Max. Output Current | Max. Output Power | Typical Efficiency | Model Number Active High | Model Number Active Low |
|----------------|---------------|---------------------|-------------------|--------------------|--------------------------|-------------------------|
| 5 V | 36 V - 75 V | 15 A | 75 W | 92% | 0RCY-75T050 | 0RCY-75T05L |

- Notes:**
1. Change the last character to "M" to indicate 0.18" pin length and active low.
 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 | |
| Remote On/Off (Active Low) | -0.3 V | - | 18 V | |
| I/O Isolation Voltage | - | - | 2000 V | |
| Ambient Temperature | -40 °C | - | 85 °C | |
| Storage Temperature | -55 °C | - | 125 °C | |

Input Specifications

| Parameter | Min | Typ | Max | Notes |
|---|------|-----------------------|-----------------------|---|
| Input Voltage | 36 V | 48 V | 75 V | |
| Input Current (no load) | - | 65 mA | 90 mA | |
| Input Current (full load) | - | - | 2.3 A | |
| Remote Off Input Current | - | 6 mA | 12 mA | |
| Input Reflected Ripple Current (pk-pk) | - | 12 mA | 24 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) | - | 2 mA | 4 mA | |
| I ² t Inrush Current Transient | - | 0.01 A ² s | 0.02 A ² s | |
| Turn-on Voltage Threshold | 32 V | 34 V | 35 V | |
| Turn-off Voltage Threshold | 30 V | 32 V | 33 V | |

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

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Output Specifications

| Parameter | Min | Typ | Max | Notes | |
|---|---------------|---------------------|--------------------|--|---|
| Output Voltage Set Point | 4.925 V | 5.000 V | 5.075 V | V _{in} =48 V, I _o =50% load | |
| Line Regulation | - | ±2 mV | ±5 mV | | |
| Load Regulation | - | ±8 mV | ±16 mV | | |
| Regulation Over Temperature (-40 °C to 85 °C) | - | ±50 mV | ±75 mV | | |
| Output Current Range | 0 A | - | 15 A | | |
| Output DC Current Limit | 17 A | 20 A | 24 A | | |
| Short Circuit Surge Transient | - | 3 A ² s | 5 A ² s | | |
| Ripple and Noise (rms) | - | 25 mV | 50 mV | 0 - 20 MHz BW, with 1 uF ceramic capacitor and a 10uF Tantalum capacitor at the output | |
| Ripple and Noise (pk-pk) | - | 80 mV | 120 mV | | |
| Turn on Time | - | - | 30 mS | | |
| Overshoot at Turn on | - | 0% | 5% | | |
| Output Capacitance | 0 uF | - | 10000 uF | | |
| Transient Response | | | | | |
| ΔV25% ~ 50% Max Load | Overshoot | V _O =5 V | - | 200 mV | di/dt=0.1A/us, V _{in} =48Vdc, T _a =25°C, with a 1uF ceramic capacitor and a 10uF tantalum capacitor at the output |
| | Settling Time | | - | 200 uS | |
| ΔV 50% ~ 25% Max Load | Overshoot | | - | 200 mV | |
| | Settling Time | | - | 200 uS | |

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

General Specifications

| Parameter | Min | Typ | Max | Notes |
|---|---|---------|---------|--|
| Efficiency | 89% | 92% | - | V _{in} =48 V, full load |
| Switching Frequency | 270 KHz | 300 KHz | 330 kHz | |
| Isolation Capacitance | - | 1500 pF | - | |
| Output Voltage Trim Range | 80% | - | 110% | The total voltage increased by trim and remote sense should not exceed 10%V _o |
| Remote Sense Compensation | - | - | 10% | |
| Over Temperature Protection | - | 125 °C | - | |
| Over Voltage Protection | - | 130% | - | V _{in} =48V, full load, in hiccup mode. |
| MTBF | - | TBD | - | Calculated Per Bell Core SR-332 (V _{in} =48 V, V _o =5 V, I _o =12 A, T _a = 25 °C) |
| Dimensions Inches (L × W × H) Millimeters (L × W × H) | 2.30 x 0.896 x 0.395 58.42 x 22.76 x 10.03 | | | |
| Weight | - | 27 g | - | |

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

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Control Specifications

| Parameter | Min | Typ | Max | Notes | |
|------------------------|-------------|--------|-----|---------|--|
| Remote On/Off | | | | | |
| Signal Low (Unit On) | Active Low | -0.3 V | - | 0.8 V | 0RCY-75T05L. The remote on/off pin open, Unit off. |
| Signal High (Unit Off) | | 2.4 V | - | | |
| Signal Low (Unit Off) | Active High | -0.3 V | - | 0.8 V | 0RCY-75T050. The remote on/off pin open, Unit on. |
| Signal High (Unit On) | | 2.4 V | - | | |
| Current Sink | | 0 mA | - | 0.75 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 Ground pin. The Trim Up resistor should be connected between the Trim pin and the Vout. Only one of the resistors should be used for any given application.

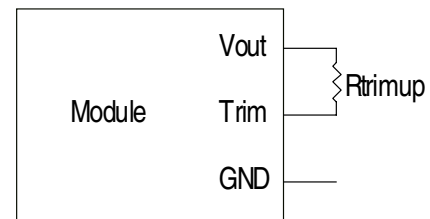
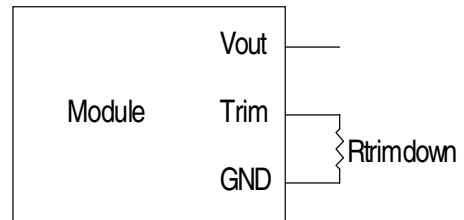
$$R_{trimdown} = \frac{511}{|\delta|} - 10.22 [k\Omega]$$

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

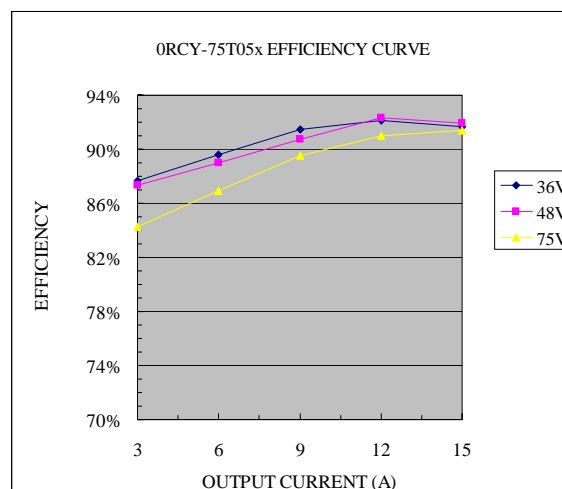
Note:

$$\delta = \frac{(V_o_{req} - V_o)}{V_o} \times 100 [\%]$$

V_o_{req} = Desired(trimmed) output voltage[V]



Efficiency Data



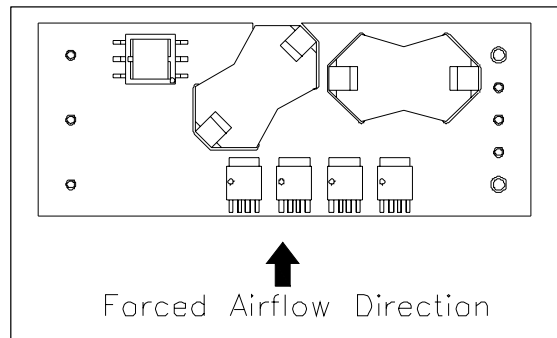
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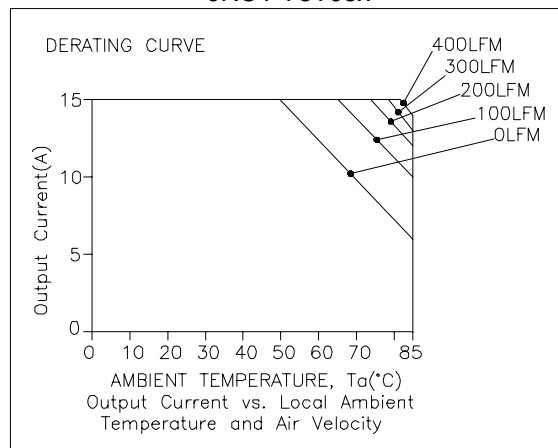


Thermal Derating Curves

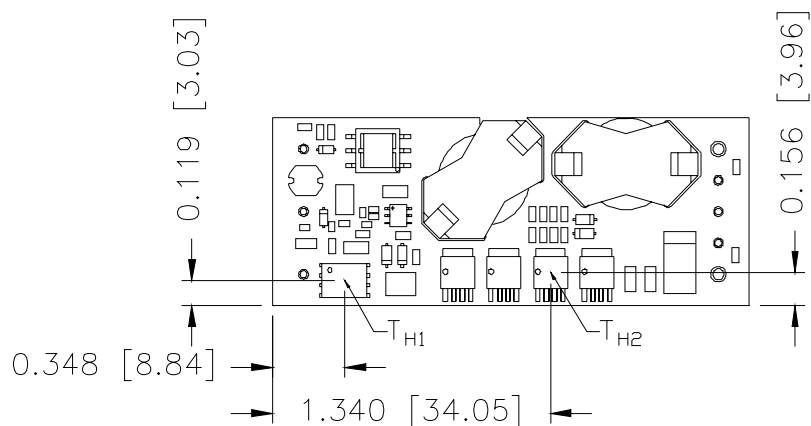
Vin=48V, with maximum junction temperature of semiconductors derated to 120 degree C.



0RCY-75T05x



Thermal Reference



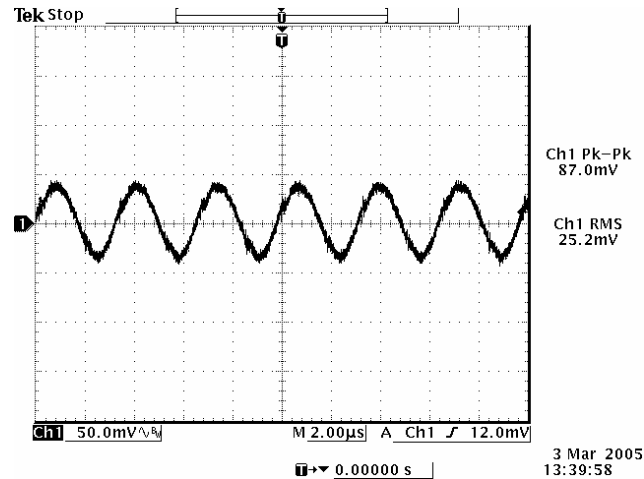
Note: T_{H1} and T_{H2} are hot spots which should not exceed 118 degree C

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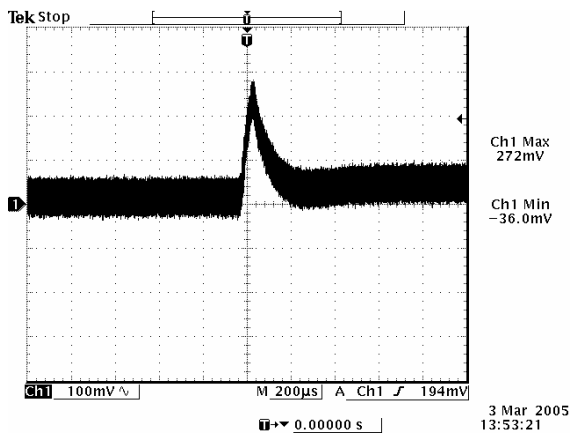


Ripple and Noise Waveform

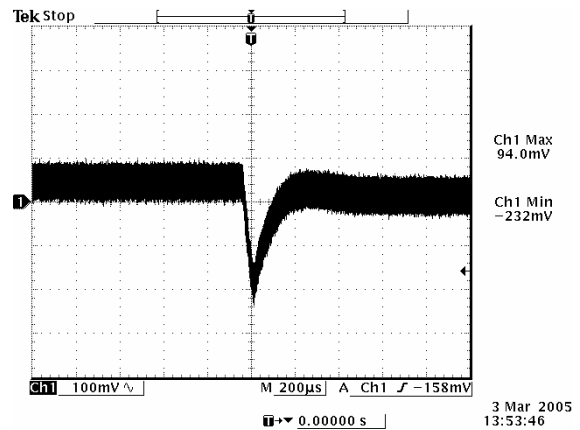


Note: Ripple and noise at full load, 48 Vdc input, 5.0 Vdc/15 A output, with a 1µF ceramic cap and a 10 µF Tantalum cap at output, $T_a=25$ deg C.

Transient Response Waveforms



Vout=5.0 V 50% to 25% Load Transients



Vout=5.0 V 25% to 50% Load Transients

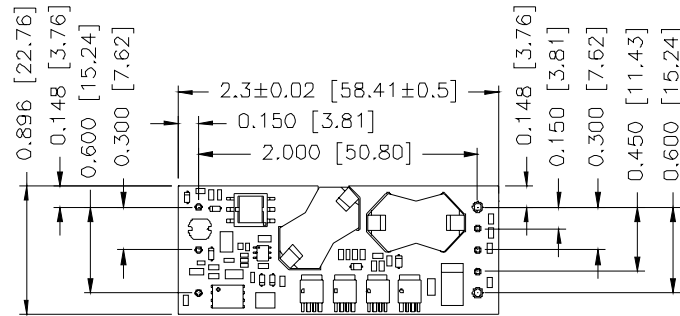
Note: Transients at $di/dt=0.1$ A/µS, external 10 µF tantalum Cap and 1 µF ceramic Cap at the output, and $T_a=25$ deg C.

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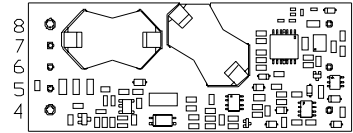
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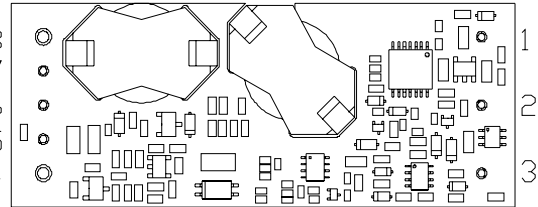
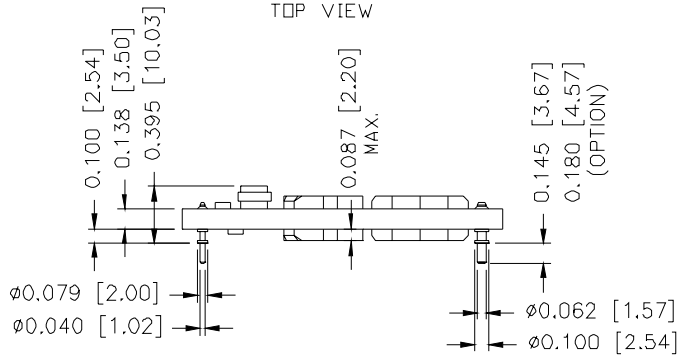
Mechanical Outline



TOP VIEW

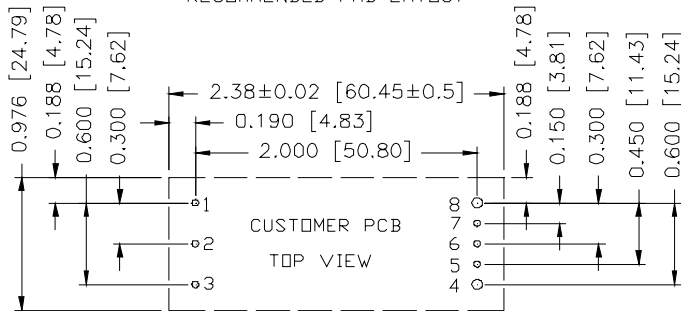


BOTTOM VIEW



BOTTOM VIEW

RECOMMENDED PAD LAYOUT



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

Pin Connections

| Pin | Function | Pin Dia |
|-----|----------|---------|
| 1 | Vin(+) | 0.040" |
| 2 | On/Off | 0.040" |
| 3 | Vin(-) | 0.040" |
| 4 | Vo(-) | 0.062" |
| 5 | Sense(-) | 0.040" |
| 6 | Trim | 0.040" |
| 7 | Sense(+) | 0.040" |
| 8 | Vo(+) | 0.062" |

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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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