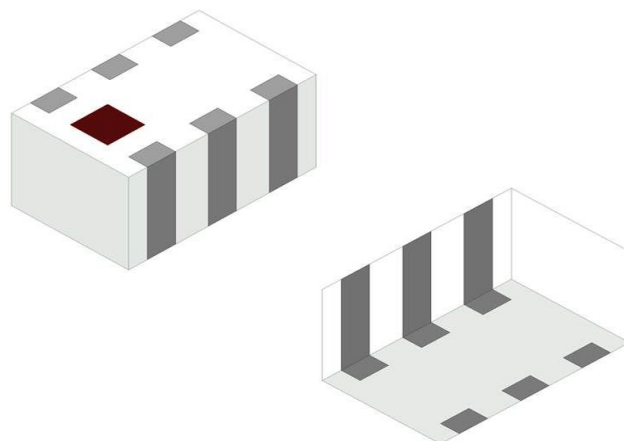




## 2.4 GHz RF 1:2 Balun

- 2400 - 2500MHz, 50:100 (1:2) Impedance Ratio
- Wireless communication systems including: WiFi, Bluetooth, Zigbee, Thread
- SMD, EIA 0805
- RoHS compliant



### General Specifications<sup>1 2</sup>

| Passband Frequency (MHz)          | 2400 – 2500  |
|-----------------------------------|--------------|
| Unbalanced Impedance ( $\Omega$ ) | 50           |
| Balanced Impedance ( $\Omega$ )   | 100          |
| Insertion Loss (dB)               | 1.0 Max.     |
| Return Loss (dB)                  | 9.5 Min.     |
| Phase Difference (degree)         | $180 \pm 10$ |
| Amplitude Difference (dB)         | 2 Max.       |

### Maximum Ratings

|                                                                         |                                                                |
|-------------------------------------------------------------------------|----------------------------------------------------------------|
| Power Capacity (W)                                                      | 2 Max. (CW)                                                    |
| Operating Temperature ( $^{\circ}\text{C}$ )                            | -40 to +85                                                     |
| Recommended Storage Conditions post-installation ( $^{\circ}\text{C}$ ) | -40 to +85                                                     |
| Recommended Storage Conditions and Period for Unused T&R Product        | 45% - 75% RH<br>+5 to +35 $^{\circ}\text{C}$<br>18 Months Max. |

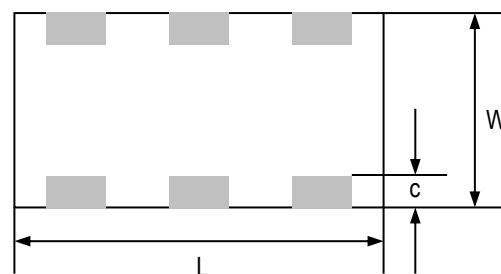
<sup>1</sup> Typical value represents average measurement at 25 $^{\circ}\text{C}$ . Min./Max. values represent measurements over specified operating temperature.

<sup>2</sup> General specifications measured on Johanson's evaluation board P/N 2450BL15B0100001CE1.

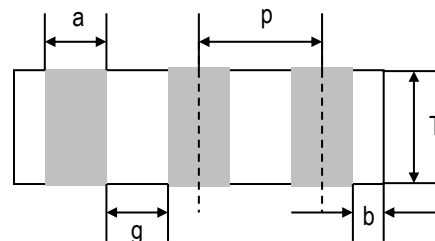
## Mechanical Dimensions

|          | Inches |   |               | Millimeters |   |           |
|----------|--------|---|---------------|-------------|---|-----------|
| <b>L</b> | 0.079  | ± | 0.004         | 2.00        | ± | 0.10      |
| <b>W</b> | 0.049  | ± | 0.004         | 1.25        | ± | 0.10      |
| <b>T</b> | 0.037  | ± | 0.004         | 0.95        | ± | 0.10      |
| <b>a</b> | 0.012  | ± | 0.004         | 0.30        | ± | 0.10      |
| <b>b</b> | 0.008  | ± | 0.004         | 0.20        | ± | 0.10      |
| <b>c</b> | 0.012  | ± | +0.004/-0.008 | 0.30        | ± | +0.1/-0.2 |
| <b>g</b> | 0.014  | ± | 0.004         | 0.35        | ± | 0.10      |
| <b>p</b> | 0.026  | ± | 0.002         | 0.65        | ± | 0.05      |

Bottom view



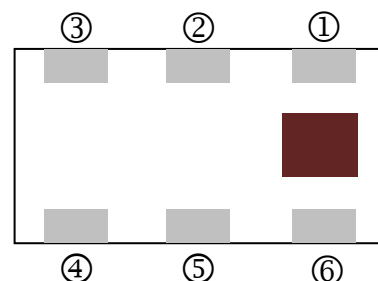
Side view



## Terminal Configuration<sup>3</sup>

| Pin Number | Function                  |
|------------|---------------------------|
| 1          | Unbalanced Port (IN)      |
| 2          | GND or (DC feed + RF GND) |
| 3          | Balanced Port (OUT1)      |
| 4          | Balanced Port (OUT2)      |
| 5          | GND                       |
| 6          | NC                        |

Top view

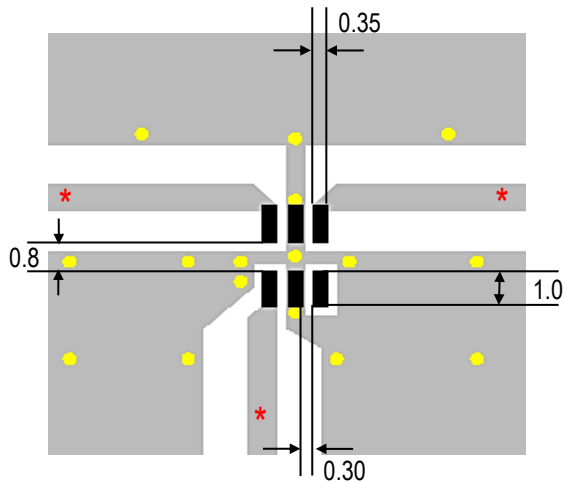


<sup>3</sup> The termination type is Nickel Tin. Go to: <https://www.johansontechnology.com/tech-notes/typical-soldering-profile-ipc> for Typical Soldering Profile.

## Recommended PCB Layout

Note: Mount device with colored mark facing up.

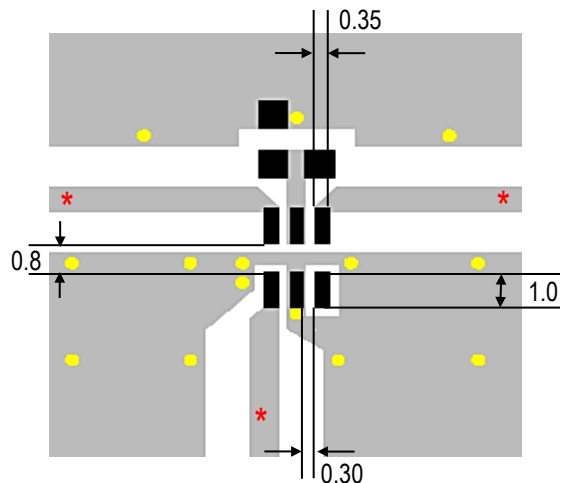
### Without DC feed



Units: mm

-  Solder Resist
-  Land
-  Through-hole ( $\phi 0.3$ )

### With DC feed\*\*



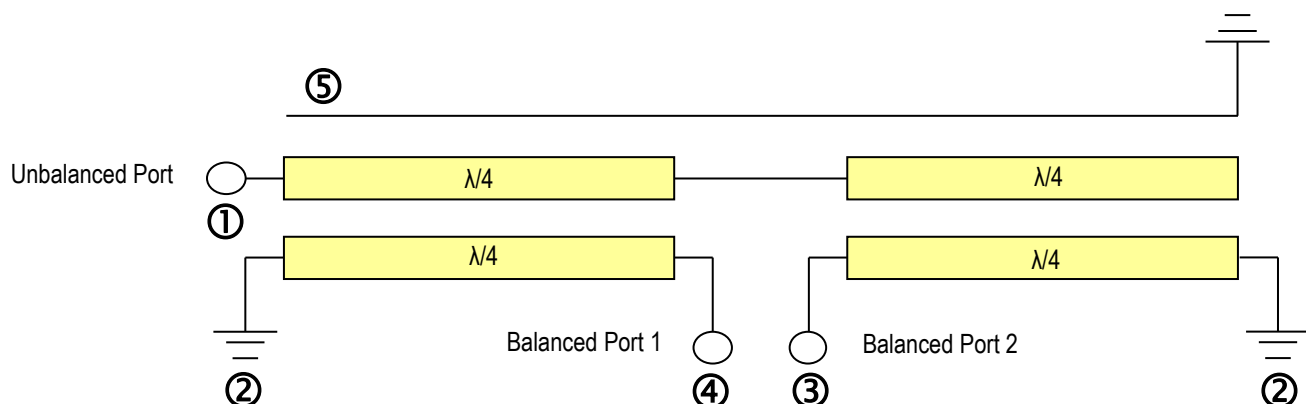
-  Solder Resist
-  Land
-  Through-hole ( $\phi 0.3$ )

\*Transmission line width should be designed to match 50 $\Omega$  characteristic impedance, depending on PCB material and thickness.

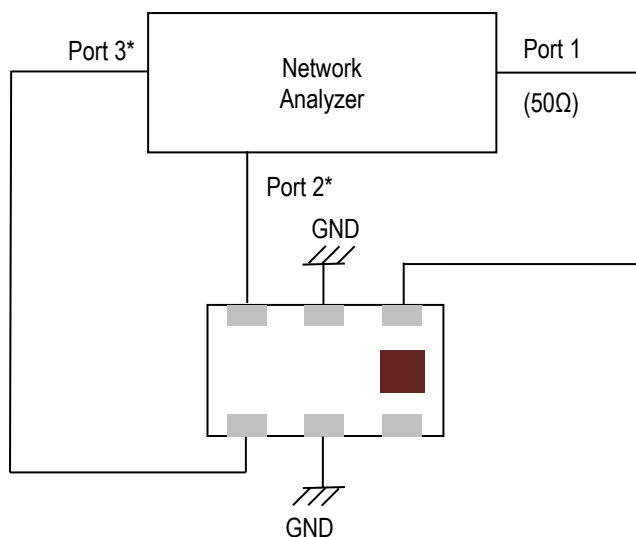
\*\*Bypass capacitor should be connected when feeding DC power.

If you would like the full reference design package or have any questions,  
contact our application engineers at <https://www.johansontechnology.com/ask-a-question>

## Equivalent Internal Circuit<sup>4 5 6</sup>



## Measuring Diagram



Port 1: Unbalanced Port

Ports 2 and 3: Balanced Port

Insertion Loss =  $S_{ds21}$

Return Loss =  $S_{ss11}$

Amplitude balance =  $\text{dB}(S(2,1)/S(3,1))$

Phase balance =  $\text{Phase}(S(2,1)/S(3,1))$

\*Impedance for ports 2 and 3 = Balanced Impedance/2

<sup>4</sup> Pin3 and Pin4 are DC connected to Pin2 (GND or DC feed) in the device but not DC connected to Pin5 (GND). Therefore, by-pass capacitors should be connected when feeding DC power from Pin2.

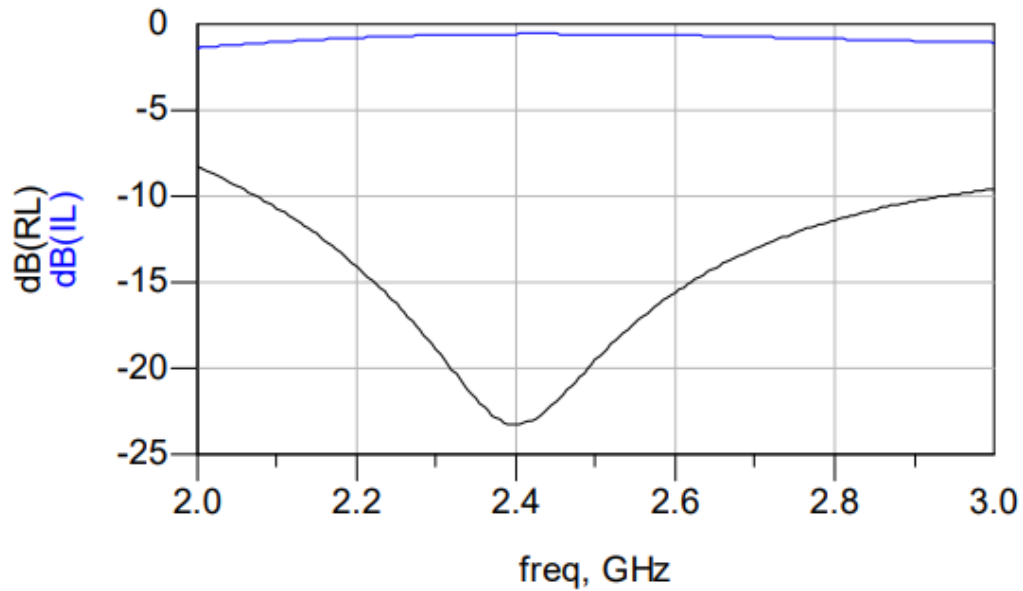
<sup>5</sup> Unbalanced port does not have a direct current path to GND.

<sup>6</sup> Use an RF capacitor to RF GND when using DC-Feed option. Contact us for best cap value for this.

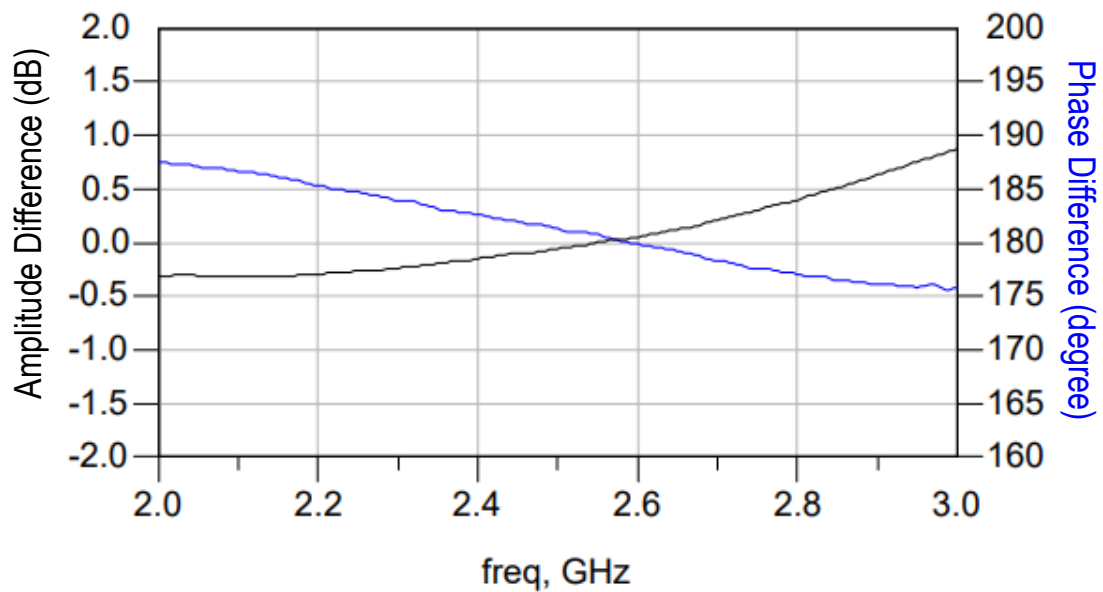


**RF Measurement (T=25°C)**

Insertion Loss, Return Loss



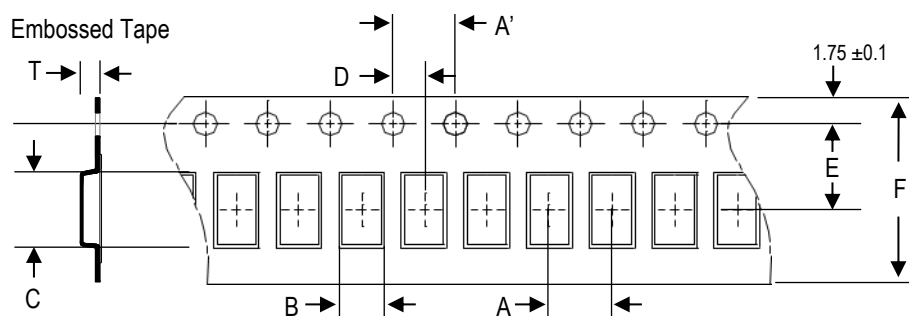
Phase Difference, Amplitude Difference



S-parameter and layout files available upon request. Please contact us at <https://www.johansontechnology.com/ask-a-question>

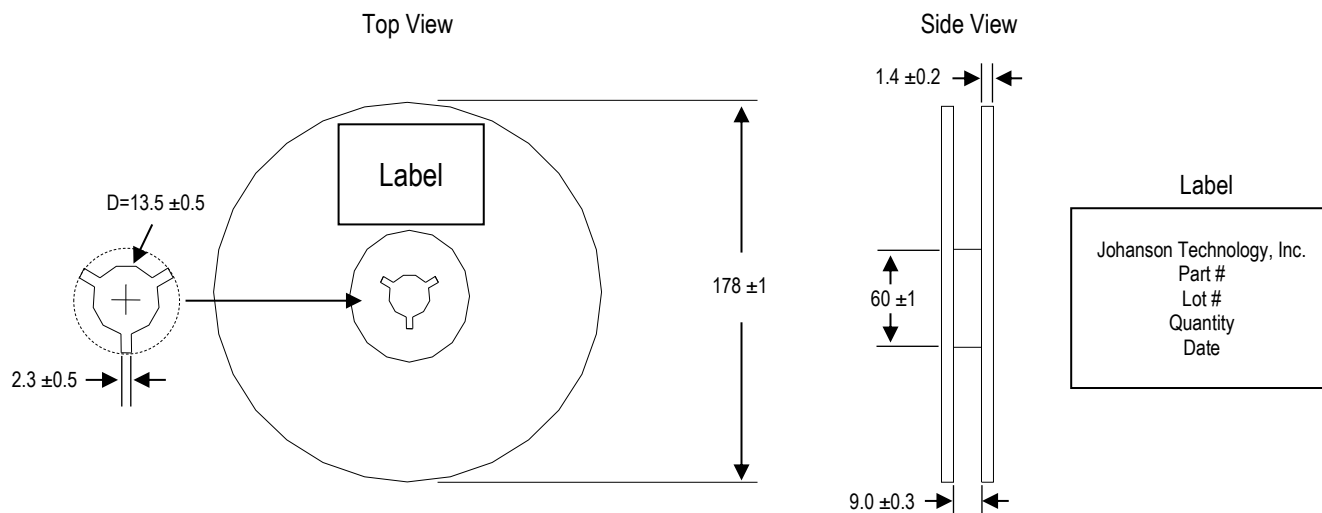
## Tape and Reel Specifications (Units in mm)

### Tape Dimensions

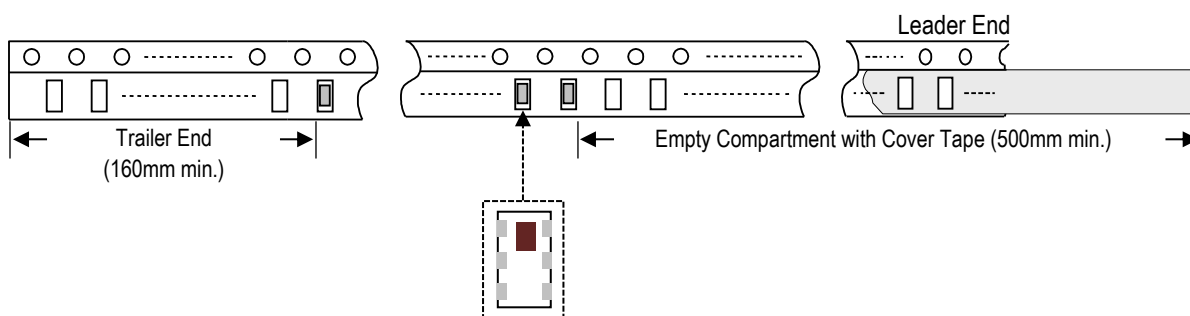


| A        | A'       | B          | C          | D         | E        | F        | T          | Quantity/reel | Tape material      |
|----------|----------|------------|------------|-----------|----------|----------|------------|---------------|--------------------|
| 4.0 ±0.1 | 4.0 ±0.1 | 1.35 ±0.05 | 2.15 ±0.05 | 2.0 ±0.05 | 3.5 ±0.1 | 8.0 ±0.1 | 1.08 ±0.05 | 4,000 pcs.    | Plastic (Embossed) |

### Reel Dimensions



### Leader and Trailer Dimensions



## Orderable Part Numbers

| Packaging Style                       | Part Number                              | Termination |
|---------------------------------------|------------------------------------------|-------------|
| Bulk (loose pcs.)                     | 2450BL15B0100001B                        | Nickel Tin  |
| T & R (7" Reel Embossed Tape)         | 2450BL15B0100001E (Qty: 4,000 pcs./reel) |             |
| Evaluation Board with 3 SMA Connector | 2450BL15B0100001CE1                      |             |

## Important Links

[2450BL15B0100001E Product Page](#)

[More RF Baluns](#)

[Antenna Tuning, Optimization, and Validation Services](#)

[Soldering Information](#)

[MSL Information](#)

[Packaging Information](#)

[Recommended Storage Condition and Max Shelf Life](#)

[RoHS Compliance](#)

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