MABA-011064

4:1 Step down Flux Coupled Balun Transformer
5 – 300 MHz

Features
- 4:1 impedance
- Surface mount
- Available on tape and reel
- 260º reflow compatible
- RoHS compliant and Pb free
- Excellent temperature stability
- Suitable for all CATV, Broadband and FTTX applications

Description
MABA-011064 is a 4:1 flux coupled transformer. This transformer is ideally suited for DOCSIS 3.x upstream applications due to its high power and temperature performance.

Functional Schematic

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MABA-011064</td>
<td>Tape &amp; Reel</td>
</tr>
<tr>
<td>MABA-011064-TB</td>
<td>Customer Test Board</td>
</tr>
</tbody>
</table>

Pin Configuration

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary Dot (input)</td>
</tr>
<tr>
<td>2</td>
<td>Primary (ground)</td>
</tr>
<tr>
<td>3</td>
<td>Secondary (output2)</td>
</tr>
<tr>
<td>4</td>
<td>Center tap (ground)</td>
</tr>
<tr>
<td>5</td>
<td>Secondary Dot (output1)</td>
</tr>
</tbody>
</table>
### Electrical Specifications:  $T_A = 25^\circ C$, $Z_0 = 75 \, \Omega$, $P_{in} = 0\, dBm$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>-</td>
<td>MHz</td>
<td>5</td>
<td>-</td>
<td>300</td>
</tr>
<tr>
<td>Impedance</td>
<td>-</td>
<td>(\Omega)</td>
<td>-</td>
<td>75</td>
<td>-</td>
</tr>
<tr>
<td>Impedance Ratio</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4:1</td>
<td>-</td>
</tr>
<tr>
<td>Insertion Loss 1 (Pin1 - Pin5)</td>
<td>5 - 50 MHz, 50 - 150 MHz, 150 - 300 MHz</td>
<td>dB</td>
<td>-</td>
<td>0.4</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>-</td>
<td>0.9</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>-</td>
<td>2.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Insertion Loss 2 (Pin1 - Pin3)</td>
<td>5 - 50 MHz, 50 - 150 MHz, 150 - 300 MHz</td>
<td>dB</td>
<td>-</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>-</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>-</td>
<td>2.8</td>
<td>4.9</td>
</tr>
<tr>
<td>Amplitude Balance</td>
<td>5 - 50 MHz, 50 - 150 MHz, 150 - 300 MHz</td>
<td>dB</td>
<td>-</td>
<td>0.1</td>
<td>±0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>-</td>
<td>0.2</td>
<td>±0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>-</td>
<td>0.5</td>
<td>±1.6</td>
</tr>
<tr>
<td>Phase Balance (ref value 180°)</td>
<td>5 - 50 MHz, 50 - 150 MHz, 150 - 300 MHz</td>
<td>°</td>
<td>-</td>
<td>0.8</td>
<td>±3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>°</td>
<td>-</td>
<td>2.4</td>
<td>±7.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>°</td>
<td>-</td>
<td>3.5</td>
<td>±10.0</td>
</tr>
<tr>
<td>Input Return Loss (Pin1)</td>
<td>5 - 50 MHz, 50 - 150 MHz, 150 - 300 MHz</td>
<td>dB</td>
<td>14</td>
<td>21</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>7</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dB</td>
<td>3</td>
<td>7</td>
<td>-</td>
</tr>
</tbody>
</table>

### Recommended Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>mW</td>
<td>-</td>
<td>2000</td>
</tr>
<tr>
<td>DC Current</td>
<td>mA</td>
<td>-</td>
<td>1500</td>
</tr>
</tbody>
</table>

Operating Temperature Range: $^\circ C$ -40 +125

Full temperature plots available on request
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PCB Layout

Application Schematic
**Typical Performance Curves**

**Insertion Loss (pin1-5)**

```
   0.0
   -1.0
   -2.0
   -3.0
   -4.0
   -5.0
   -6.0
   -7.0
   -8.0
   -9.0
```

```
1 61 121 181 241 301 361 421 481 541 601
Frequency (MHz)
```

**Insertion Loss (pin1-3)**

```
   0.0
   -1.0
   -2.0
   -3.0
   -4.0
   -5.0
   -6.0
   -7.0
   -8.0
   -9.0
```

```
1 61 121 181 241 301 361 421 481 541 601
Frequency (MHz)
```

**Amplitude Balance**

```
   0.0
   1.0
   2.0
   3.0
```

```
1 61 121 181 241 301 361 421 481 541 601
Frequency (MHz)
```

**Phase Balance**

```
   -180
   -182
   -184
   -186
   -188
   -190
   -178
   -176
   -174
   -172
   -170
```

```
1 61 121 181 241 301 361 421 481 541 601
Frequency (MHz)
```

**Input Return Loss (pin1)**

```
   0
   5
   10
   15
   20
```

```
1 61 121 181 241 301 361 421 481 541 601
Frequency (MHz)
```

**Balanced Output Return Loss**

```
   0
   5
   10
   15
   20
```

```
1 61 121 181 241 301 361 421 481 541 601
Frequency (MHz)
```

**Electrical Specifications:**

\[ T_A = 25^\circ C, \ Z_0 = 75 \ \Omega, \ P_{in} = 0\text{dBm} \]
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5 – 300 MHz

Outline Drawing

Tape & Reel Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qty per reel</td>
<td>-</td>
<td>2000</td>
</tr>
<tr>
<td>Reel Size</td>
<td>mm</td>
<td>330</td>
</tr>
<tr>
<td>Tape Width</td>
<td>mm</td>
<td>12.00</td>
</tr>
<tr>
<td>Pitch</td>
<td>mm</td>
<td>8.00</td>
</tr>
<tr>
<td>Ao</td>
<td>mm</td>
<td>4.40</td>
</tr>
<tr>
<td>Bo</td>
<td>mm</td>
<td>4.00</td>
</tr>
<tr>
<td>Ko</td>
<td>mm</td>
<td>3.90</td>
</tr>
<tr>
<td>Orientation</td>
<td>-</td>
<td>F26</td>
</tr>
</tbody>
</table>

Reference Application Note ANI-019 for orientation

1. Dimensions in mm.
2. Tolerance: ±0.2mm unless otherwise noted.
3. Model number and lot code are printed on the reel.
4. Lead plating (CuSn6) Lead finish SAC-305.

Carrier Tape Orientation
4:1 Step down Flux Coupled Balun Transformer
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