MABA-011103

Auto Transformer 1:1.77
40 - 1215 MHz

Features
- 1:1.77 Impedance
- Surface Mount Package
- Excellent Temperature Stability
- Available on Tape and Reel
- 260° Reflow Compatible
- RoHS Compliant and Pb Free
- Suitable for all CATV, Broadband and FTTX applications

Description
The MABA-011103 is a 1:1.77 auto transformer. This transformer is ideally suited for CATV broadband applications.

Functional Schematic

Pin Configuration

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>Not Connected (ground)</td>
</tr>
<tr>
<td>3</td>
<td>Secondary Dot</td>
</tr>
<tr>
<td>4</td>
<td>Primary Dot</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
</tbody>
</table>

3. MACOM recommends connecting unused package pins to ground.

Electrical Specifications: Freq = 40 - 1215 MHz, $T_A = 25^\circ C$, $Z_0 = 75 \, \Omega$, $P_{IN} = 0 \, dBm$

<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>Impedance Ratio</td>
<td>-</td>
<td>-</td>
<td>1:1.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion Loss (Pin 4 - Pin 3)</td>
<td>40 - 150 MHz</td>
<td>dB</td>
<td>2.4</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>150 - 750 MHz</td>
<td></td>
<td>2.8</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>750 - 1215 MHz</td>
<td></td>
<td>2.6</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>Input Return Loss (Pin 4)</td>
<td>40 - 1215 MHz</td>
<td>dB</td>
<td>9</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Output Return Loss (Pin 3)</td>
<td>40 - 1215 MHz</td>
<td>dB</td>
<td>13</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MABA-011103</td>
<td>Tape &amp; Reel</td>
</tr>
<tr>
<td>MABA-011103-TB</td>
<td>Customer Sample Board</td>
</tr>
</tbody>
</table>

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

Recommended Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Power</td>
<td>2 W</td>
</tr>
<tr>
<td>DC Current</td>
<td>200 mA</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40°C to +85°C</td>
</tr>
</tbody>
</table>

4. Exceeding anyone or combination of these limits may cause permanent damage to this device.
5. MACOM does not recommend sustained operation near these survivability limits.
6. Specified at +25°C only.
Typical Performance Curves\textsuperscript{7}: $T_A = 25^\circ C$, $Z_0 = 75 \ \Omega$, $P_{IN} = 0$ dBm

\textbf{Insertion Loss (pin 3)}

\begin{center}
\begin{tikzpicture}[scale=0.8]
\begin{axis}[
    xlabel={Frequency (MHz)},
    ylabel={(dB)},
    xmin=0, xmax=1500,
    ymin=-3.5, ymax=-1.5,
    xtick={0,250,500,750,1000,1250,1500},
    ytick={-3.5,-3,-2.5,-2,-1.5,-1,0},
    grid=both,
    grid style={line width=0.2pt, draw=gray!30},
    minor tick num=5,
    legend style={at={(0.5,0.95)},anchor=north},
    every axis plot/.append style={ultra thick},
]
\addplot[green!50!black,mark=none] coordinates {
(0,0.75)(250,-0.25)(500,-0.5)(750,-0.75)(1000,-0.9)(1250,-1.1)(1500,-1.35)
};
\end{axis}
\end{tikzpicture}
\end{center}

\textbf{Input Return Loss (pin 4)}

\begin{center}
\begin{tikzpicture}[scale=0.8]
\begin{axis}[
    xlabel={Frequency (MHz)},
    ylabel={(dB)},
    xmin=0, xmax=1500,
    ymin=-25, ymax=-5,
    xtick={0,250,500,750,1000,1250,1500},
    ytick={-25,-20,-15,-10,-5,0},
    grid=both,
    grid style={line width=0.2pt, draw=gray!30},
    minor tick num=5,
    legend style={at={(0.5,0.95)},anchor=north},
    every axis plot/.append style={ultra thick},
]
\addplot[green!50!black,mark=none] coordinates {
(0,-10)(250,-10)(500,-10)(750,-10)(1000,-10)(1250,-10)(1500,-10)
};
\end{axis}
\end{tikzpicture}
\end{center}

\textbf{Output Return Loss (pin 3)}

\begin{center}
\begin{tikzpicture}[scale=0.8]
\begin{axis}[
    xlabel={Frequency (MHz)},
    ylabel={(dB)},
    xmin=0, xmax=1500,
    ymin=-25, ymax=0,
    xtick={0,250,500,750,1000,1250,1500},
    ytick={-25,-20,-15,-10,-5,0},
    grid=both,
    grid style={line width=0.2pt, draw=gray!30},
    minor tick num=5,
    legend style={at={(0.5,0.95)},anchor=north},
    every axis plot/.append style={ultra thick},
]
\addplot[green!50!black,mark=none] coordinates {
(0,-25)(250,-20)(500,-15)(750,-10)(1000,-5)(1250,0)(1500,0)
};
\end{axis}
\end{tikzpicture}
\end{center}

\textsuperscript{7} Full temperature plots available on request.
Outline Drawing\textsuperscript{8,9,10,11}

PCB Layout\textsuperscript{12}

8. Dimensions in mm.
9. Tolerance: ±0.2 mm unless otherwise noted.
10. Model number and lot code are printed on the reel.

12. Recommended PCB layout shown above uses 1.6 mm FR4, Grounded coplanar wave guide, transmission line width 0.70 mm and gap 0.57 mm.

Application Schematic

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>Orientation</td>
<td>-</td>
<td>F5</td>
</tr>
</tbody>
</table>

Reference Application Note ANI-019 for orientation
MACOM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with MACOM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.