Features

- Low VSWR
- Conversion Loss: 6 dB Typical Midband
- LO-RF Isolation: 35 dB Typical Midband
- Conversion Loss Flatness: 1.5 dB Typical
- Impedance: 50 Ohms Nominal
- Maximum Input Power: 300 mW max. @ 25°C, Derated linearly to 85°C @ 3.2 mW/°C
- IF Port Current: 50 mA Max.
- MIL-STD-883 Screening Available

Description

Transformers convert the LO and RF paths to balanced lines connecting to a low barrier, Schottky diode ring quad. These transformers help provide excellent isolation between ports. Conversion Loss is low. The direct connection of the IF port to the diode quad allows these mixers to be used as phase detectors and bi-phase modulators. Advanced transformer design yields improved VSWR.
TerminationInsensitiveMixer, 5MHz-1500MHz

Electrical Specifications\(^{1}\): \(T_A = -55^\circ C\) to +85°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Frequency</th>
<th>Units</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>RF, LO Ports, IF Port</td>
<td>5 - 1500 MHz</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DC - 1000 MHz</td>
<td>MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion Loss</td>
<td>LO to RF</td>
<td>5 – 1500 MHz</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 – 1000 MHz</td>
<td>dB</td>
<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 – 600 MHz</td>
<td>dB</td>
<td></td>
<td>30</td>
<td></td>
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<tr>
<td>Isolation</td>
<td>LO to IF</td>
<td>5 – 1500 MHz</td>
<td>dB</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 – 1000 MHz</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RF to IF</td>
<td>5 – 1500 MHz</td>
<td>dB</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 – 1000 MHz</td>
<td>dB</td>
<td></td>
<td>18</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 – 600 MHz</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>DC Polarity</td>
<td>Negative</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>DC Offset</td>
<td></td>
<td></td>
<td>mV</td>
<td></td>
<td></td>
<td>&lt;1</td>
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<tr>
<td>RF Input</td>
<td>1 dB Compression</td>
<td>dBm</td>
<td></td>
<td></td>
<td></td>
<td>+1</td>
</tr>
<tr>
<td></td>
<td>1 dB Desensitization</td>
<td>dBm</td>
<td></td>
<td></td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>SSB Noise Figure</td>
<td>Within 1 dB of Conversion Loss Max.</td>
<td></td>
<td>dBm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Two Tone IM Ratio</td>
<td>With –10 dBm input, each input 60 MHz and 70 MHz IF</td>
<td>dBm</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>300 MHz</td>
<td>dBm</td>
<td></td>
<td></td>
<td></td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>1000 MHz</td>
<td>dBm</td>
<td></td>
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</tr>
</tbody>
</table>

1. All specifications apply when operated at +7 dBm available LO power with 50 Ohm source and load impedance.
2. For MDC-158 add 1.0 dB to conversion loss.

Pin Configuration (MD-158)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
<th>Pin No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>5</td>
<td>LO</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>6</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>IF</td>
<td>8</td>
<td>RF</td>
</tr>
</tbody>
</table>

Pin Configuration (MDS-158)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
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</tr>
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<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>3</td>
<td>LO</td>
</tr>
<tr>
<td>2</td>
<td>IF</td>
<td>4</td>
<td>RF</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings (MDS-158)\(^{4}\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Input Power(^{3})</td>
<td>300 mW</td>
</tr>
<tr>
<td>Total Power</td>
<td>350 mW Derated at 85°C @ 3.2 mW/°C</td>
</tr>
<tr>
<td>LO Power</td>
<td>+24 dBm</td>
</tr>
</tbody>
</table>

4. Operation of this device above any one of these parameters may cause permanent damage.
5. Ambient Temperature (\(T_A\)) = +25°C
Termination Insensitive Mixer,
5 MHz - 1500 MHz

Bottom View of SF-1

Typical Performance Curves

Conversion Loss

IF Port Response

Isolation

Conversion Loss vs. LO Power (RF @ 1000 MHz—10 dBm, IF = 50 MHz)

VSWR
### Termination Insensitive Mixer,
5 MHz - 1500 MHz

<table>
<thead>
<tr>
<th>Rev. V5</th>
</tr>
</thead>
</table>

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