Double-Balanced Mixer

Features
- LO 10 TO 1600 MHz
- RF 10 TO 1500 MHz
- IF 0 TO 600 MHz
- LO DRIVE: +20 dBm (NOMINAL)
- HIGH INTERCEPT POINT: +30 dBm TYP. (UPCONV.)
  +24 dBm TYP. (DOWNCONV.)

Description
The M9H is a double balanced mixer, designed for use in military, commercial, and test equipment applications. The design utilizes Schottky ring quad diodes and broadband ferrite baluns to attain excellent performance. This mixer can also be used as a phase detector and/or bi-phase modulator since the IF port is DC coupled to the diodes. Environmental screening is available to MIL-STD-883, MIL-STD-202, or MIL-DTL-28837, consult factory.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>M9H</td>
<td>TO-8</td>
</tr>
<tr>
<td>M9HC</td>
<td>SMA Connectorized</td>
</tr>
</tbody>
</table>

Electrical Specifications:  \( Z_0 = 50\Omega \) \( \text{Lo} = +20 \text{ dBm} \) (Downconverter Application only)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Units</th>
<th>Typical</th>
<th>Guaranteed</th>
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</thead>
</table>
| SSB Conversion Loss & SSB Noise Figure (max)   | \( f_R = 0.02 \text{ to } 0.4 \text{ GHz}, f_L = 0.01 \text{ to } 0.6 \text{ GHz}, f_{I} = 0.002 \text{ to } 0.2 \text{ GHz} \)  
  \( f_R = 0.01 \text{ to } 1.5 \text{ GHz}, f_L = 0.01 \text{ to } 1.6 \text{ GHz}, f_{I} = 0.001 \text{ to } 0.6 \text{ GHz} \)  
  \( f_R = 0.002 \text{ to } 0.2 \text{ GHz}, f_L = 0.001 \text{ to } 0.6 \text{ GHz} \)  | dB     | 7.0    | 8.0      | 8.3       |
| Isolation, L to R (min)                        | \( f_L = 0.01 \text{ to } 0.4 \text{ GHz} \)  
  \( f_L = 0.4 \text{ to } 1 \text{ GHz} \)  
  \( f_L = 1 \text{ to } 1.5 \text{ GHz} \)  | dB     | 35     | 28       | 27        |
| Isolation, L to I (min)                        | \( f_L = 0.01 \text{ to } 0.4 \text{ GHz} \)  
  \( f_L = 0.4 \text{ to } 1 \text{ GHz} \)  
  \( f_L = 1 \text{ to } 1.5 \text{ GHz} \)  | dB     | 40     | 28       | 27        |
| Isolation, R to I (min)                        | \( f_L = 0.01 \text{ to } 1 \text{ GHz} \)  
  \( f_L = 1 \text{ to } 1.5 \text{ GHz} \)  | dB     | 20     | 22       | 20        |
| 1 dB Conversion Compression                    | \( f_L @ +20 \text{ dBm} \)  | dBm   | +15      |            |
| Input IP3                                       |                                                     | dBm   | +30      | +24       |
**Typical Performance Curves**

**Conversion Loss vs. LO Drive**

- **LO DRIVE (dBm)**: 0 to 20
- **CONVERSION LOSS (dB)**: 0 to 6
- **F_{RF} = 1000 MHz AT -10 dBm**
- **P_{LO} = 10 dBm**

**Upconversion Loss vs. Frequency**

- **IF FREQUENCY (MHz)**: 0 to 600
- **UP CONVERSION LOSS (dB)**: 0 to 10
- **F_{LO} = 100 MHz AT +20 dBm**
- **F_{RF} = F_{LO} * F_{IF}**
- **P_{LO} = -10 dBm**

**Conversion Loss vs. Frequency**

- **IF FREQUENCY (MHz)**: 0.2 to 10
- **CONVERSION LOSS (dB)**: 0 to 6
- **F_{RF} = 1082 MHz AT -20 dBm**
- **P_{LO} = -3 dBm**

**Isolation vs. Frequency**

- **IF FREQUENCY (MHz)**: 0 to 1600
- **ISOLATION (dB)**: 0 to 12
- **P_{LO} = -12 dBm**
- **F_{LO} = 1900 MHz AT -20 dBm**

**VSWR**

- **FREQUENCY (MHz)**: 0 to 1600
- **VSWR**: 1.0 to 2.0
- **F_{RF} = F_{IF} = -19 dBm**
- **P_{LO} = 15 dBm**
- **F_{LO} = 1900 MHz**
M9H / M9HC

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Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-54 °C to +100°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to +100°C</td>
</tr>
<tr>
<td>Peak Input Power</td>
<td>+23 dBm max @ +25°C dBm max @ +100°C</td>
</tr>
<tr>
<td>Peak Input Current</td>
<td>100 mA DC</td>
</tr>
</tbody>
</table>

Outline Drawing: TO-8

Outline Drawing: SMA Connectorized
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