Broadband Frequency Doubler
10 - 4800 MHZ Output
Rev. V5

Features
- Operates Over Full AMPS/PCN PCS/PHS Bands
- Low Conversion Loss
- Two Hermetic Package Options
- Typical Midband VSWR 1.5:1
- High Fundamental and Third Order Suppression

Description
The FM-107, FM-108 and FMS-109 are broadband RF frequency doublers. These devices are available in three hermetic packages and offer excellent frequency multiplication performance, flat conversion loss and high spurious signal rejection.

The FM-107, FM-108 and FMS-109 offer affordable solutions to system applications where frequency multiplication is required.

For further information and support please visit: https://www.macom.com/support
## Broadband Frequency Doubler

**10 - 4800 MHZ Output**

**FM-107 / FM-108 / FMS-109**

**Electrical Specifications:** $T_A = 25^\circ C$, Input Frequency: 5-2400 MHz, Output Frequency: 10-4800 MHz, Input Power: +10 dBm

<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>Conversion Loss</td>
<td>Input: +10 dBm</td>
<td>5-750 MHz</td>
<td>dB</td>
<td>11</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>750-1000 MHz</td>
<td>dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000-2400 MHz</td>
<td>dB</td>
<td>30</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15-1500 MHz</td>
<td>dB</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1500-3000 MHz</td>
<td>dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3000-7200 MHz</td>
<td>dB</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F1 Suppression</td>
<td>Input: +10 dBm</td>
<td>5-750 MHz</td>
<td>dB</td>
<td>30</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>750-1000 MHz</td>
<td>dB</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000-2400 MHz</td>
<td>dB</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15-1500 MHz</td>
<td>dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1500-3000 MHz</td>
<td>dB</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>3000-7200 MHz</td>
<td>dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VSWR</td>
<td>Input: +10 dBm</td>
<td></td>
<td>Ratio</td>
<td>1.5:1</td>
<td>2.0:1</td>
<td></td>
</tr>
<tr>
<td>Loss as Quadrupler</td>
<td>Input: +10 dBm</td>
<td></td>
<td>dB</td>
<td>27</td>
<td></td>
<td></td>
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### Pin Configuration (FM-107)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
<th>Pin No.</th>
<th>Function</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>5</td>
<td>GND</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>RF IN</td>
<td>8</td>
<td>RF OUT</td>
</tr>
</tbody>
</table>

### Pin Configuration (FM-108)

<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>RF IN</td>
<td>3</td>
<td>RF OUT</td>
</tr>
<tr>
<td>2</td>
<td>N/C</td>
<td>4</td>
<td>GND</td>
</tr>
</tbody>
</table>

### Pin Configuration (FMS-109)

<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>3</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>RF OUT</td>
<td>4</td>
<td>RF IN</td>
</tr>
</tbody>
</table>

### Absolute Maximum Ratings

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Ambient Temperature ($T_A$) = +25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Input Power $^2$</td>
<td>300 mW Max.</td>
</tr>
<tr>
<td>Total Power</td>
<td>300 mW Max. Derated to 85°C @ 3.2 mW/°C</td>
</tr>
</tbody>
</table>

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM-107-PIN</td>
<td>Hermetic Flatpack Package (FP-2)</td>
</tr>
<tr>
<td>FM-108-PIN</td>
<td>Hermetic Package (TO-8-1)</td>
</tr>
<tr>
<td>FMS-109-PIN</td>
<td>Hermetic Surface Mount package (SF-1)</td>
</tr>
</tbody>
</table>
Typical Performance Curves

**Conversion Loss vs. Input Freq.**

![Conversion Loss vs. Input Freq. Graph]

**Spurious Response: F3 Suppression**

![Spurious Response: F3 Suppression Graph]

**Spurious Response: F1 Suppression**

![Spurious Response: F1 Suppression Graph]

**Loss as a Quadrupler**

![Loss as a Quadrupler Graph]