## Features

- Intermodulation Ratio is Insensitive to Port Mismatches
- VSWR: <2.0:1 Typical Midband
- Isolation: 35 dB Typical Midband
- Impedance: 50 Ohms Nominal
- Maximum Input Power: 350 mW Max @ $25^{\circ} \mathrm{C}$, Derated to $85^{\circ} \mathrm{C} @ 3.2 \mathrm{~mW} /{ }^{\circ} \mathrm{C}$
- LO Power: +24 dBm Max.
- MIL-STD-883 Screening Available


## Description

The unique design of the termination insensitive mixer (TIM) enables it to apply high reverse voltage to diodes during their "off" phase, in the LO cycle. This allows for higher power level performance with minimum distortion. In addition the TIM has internal loads that provide a good match and also absorb mixer generated LO frequency terms. Combined, these features give the mixer its insensitivity to external mismatches, plus superior VSWR.

## C-7 (MDC-169)



FP-2 (MD-169)


## SF-1 (MDS-169)



- North America Tel: 800.366.2266 / Fax: 978.366.2266
- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298


## Electrical Specifications ${ }^{1}: \mathrm{T}_{\mathrm{A}}=-55^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$

| Parameter | Test Conditions | Frequency | Units | Min | Typ | Max |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Frequency Range | RF, LO Ports IF Port | $\begin{gathered} 0.001-3.5 \\ 5-1500 \end{gathered}$ | $\begin{aligned} & \mathrm{GHz} \\ & \mathrm{MHz} \end{aligned}$ | 二 | - | - |
| Conversion Loss |  | $\begin{aligned} & 5-1000 \mathrm{MHz}^{2} \\ & 5-3000 \mathrm{MHz}^{3} \\ & 1-3500 \mathrm{MHz} \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \end{aligned}$ | - | - | $\begin{gathered} \hline 7 \\ 8 \\ 10 \end{gathered}$ |
| Isolation | LO to RF | $\begin{aligned} & 5-1000 \mathrm{MHz} \\ & 1-3500 \mathrm{MHz} \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \end{aligned}$ | $\begin{aligned} & 30 \\ & 20 \end{aligned}$ | - | - |
|  | LO to IF | $\begin{aligned} & 5-1000 \mathrm{MHz} \\ & 1-3500 \mathrm{MHz} \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \end{aligned}$ | $\begin{aligned} & 30 \\ & 20 \end{aligned}$ | - | - |
|  | RF to IF | $\begin{aligned} & 10-500 \mathrm{MHz} \\ & 1-3000 \mathrm{MHz} \\ & 1-3500 \mathrm{MHz} \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \end{aligned}$ | $\begin{aligned} & 30 \\ & 20 \\ & 18 \end{aligned}$ | - | - |
| RF Input | 1 dB Compression 1 dB Desensitization | - | dBm <br> dBm |  | $\begin{aligned} & +7 \\ & +5 \end{aligned}$ | - |
| SSB Noise Figure | Within 1 dB of Conversion Loss Max | - | - | - | - | - |
| Typical Two-Tone IM Ratio | with a -10 dBm input, each tone 625 MHz and 35 MHz IF | $\begin{gathered} 10 \mathrm{MHz} \\ 500 \mathrm{MHz} \\ 3000 \mathrm{MHz} \end{gathered}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \end{aligned}$ | - | $\begin{aligned} & 55 \\ & 58 \\ & 56 \end{aligned}$ | - |
| 3rd Order Intermodulation Ratio Degradation | @ IF VSWR 3:1 | - | dB | - | 3 | - |

1. All specifications apply when operated at +10 dBm available LO power with 50 Ohm source and load impedance.
2. For IF Frequencies of $5-300 \mathrm{MHz}$ and RF of -10 dBm or less.
3. For MDC-169, add 1.0 dB to conversion loss.

Electrical Specifications (MDS-169): $\mathrm{T}_{\mathrm{A}}=-55^{\circ} \mathrm{C}$ to $+85^{\circ} \mathrm{C}$
Frequency: RF, LO Ports =1-3500 MHz, IF Port $=\mathbf{5 - 1 5 0 0} \mathbf{~ M H z}$

| Parameter | Test Conditions | Frequency | Units | Min | Typ | Max |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conversion Loss | LO @ +10 dBm | $5-1000 \mathrm{MHz}$ | dB | - | 6.5 | 7.0 |
|  | IF @ 60 MHz | $1000-3000 \mathrm{MHz}$ | dB | - | 7.5 | 9.0 |
|  |  | $1-3500 \mathrm{MHz}$ | dB | - | 8.0 | 10.0 |
| Isolation |  |  |  |  |  |  |
|  | LO to RF | $5-1000 \mathrm{MHz}$ | dB | 30 | 35 | - |
|  |  | $1-3500 \mathrm{MHz}$ | dB | 20 | 25 | - |
|  | LO to IF | $5-1000 \mathrm{MHz}$ | dB | 30 | 35 | - |
|  |  | $1-3500 \mathrm{MHz}$ | dB | 20 | 25 | - |
|  | RF to IF | $10-500 \mathrm{MHz}$ | dB | 30 | 35 | - |
|  |  | $1-3000 \mathrm{MHz}$ | dB | 20 | 25 | - |
|  |  | $1-3500 \mathrm{MHz}$ | dB | 18 | 23 | - |

Pin Configuration (MD-169)

| Pin No. | Function | Pin No. | Function |
| :---: | :---: | :---: | :---: |
| 1 | GND | 5 | LO |
| 2 | GND | 6 | GND |
| 3 | GND | 7 | GND |
| 4 | IF | 8 | RF |

## Bottom View of SF-1



## Typical Performance Curves

Conversion Loss - LO @ +10 dBm, IF @ 60 MHz


## Pin Configuration (MDS-169)

| Pin No. | Function | Pin No. | Function |
| :---: | :---: | :---: | :---: |
| 1 | GND | 3 | LO |
| 2 | IF | 4 | RF |

Absolute Maximum Ratings (MDS-169) ${ }^{4}$

| Parameter | Absolute Maximum |
| :---: | :---: |
| Max Input Power ${ }^{5}$ |  |
| Total Power | 350 mW Derated at $85^{\circ} \mathrm{C} @$ <br> $3.2 \mathrm{~mW} /{ }^{\circ} \mathrm{C}$ |
| LO Power | +24 dBm |

4. Operation of this device above any one of these parameters may cause permanent damage.
5. Ambient Temperature $\left(\mathrm{T}_{\mathrm{A}}\right)=+25^{\circ} \mathrm{C}$

## Isolation - Input $\mathbf{+ 1 0 d B m}$



- Europe Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298

Visit www.macom.com for additional data sheets and product information.

## Typical Performance Curves

Conversion Loss vs. LO Power - RF @ $2000 \mathrm{MHz}-10 \mathrm{dBm}, \mathrm{IF}$ @ 60 MHz

3rd Order IM Ratio - LO © ${ }^{(0)}$ +10 dBm,


IF Port Response


## Ordering Information

| Part Number | Package |
| :---: | :---: |
| MD-169 PIN | FP-2 |
| MDC-169 SMA | C-7 |
| MDS-169 | SF-1 |

