

## Termination Insensitive Mixer, 1 MHz - 3.5 GHz

Rev. V5

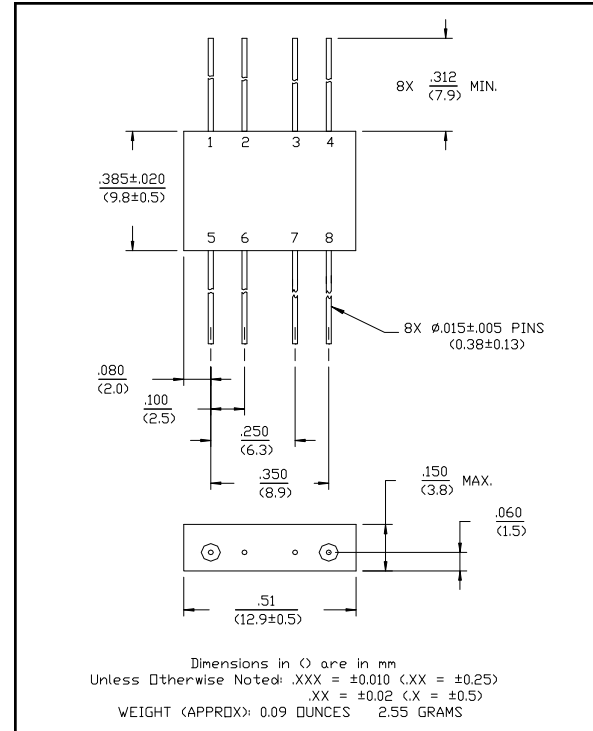
### Features

- 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°C, Derated to 85°C @ 3.2 mW/°C
- LO Power: +24 dBm Max.
- MIL-STD-883 Screening Available

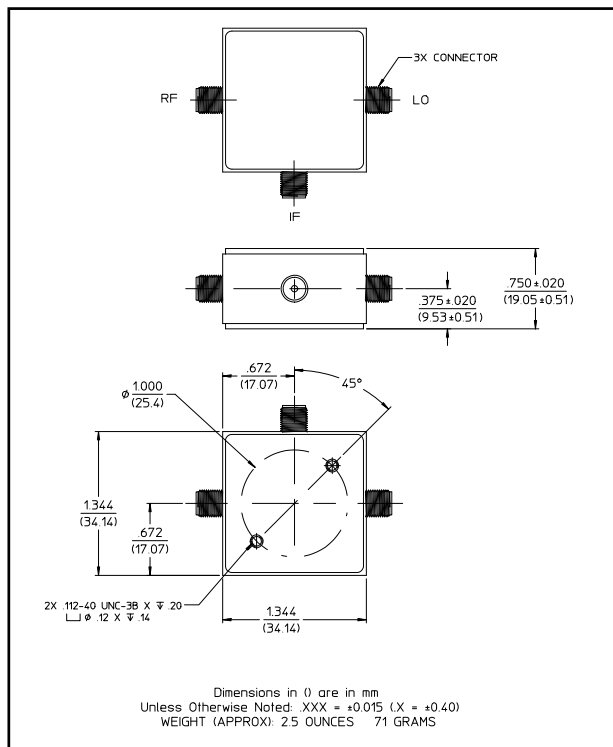
### Description

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.

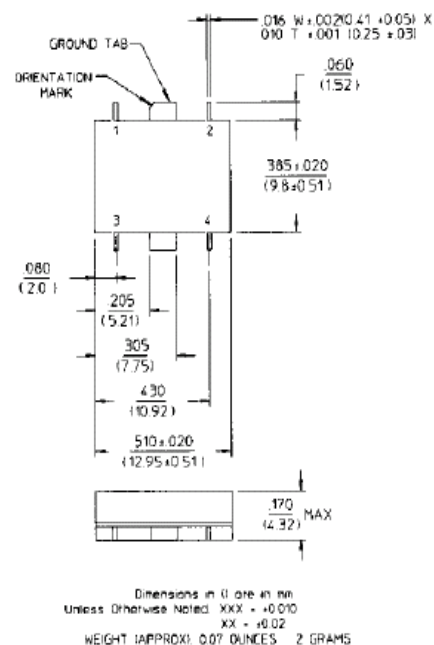
### FP-2 (MD-169)



### C-7 (MDC-169)



### SF-1 (MDS-169)



## Termination Insensitive Mixer, 1 MHz - 3.5 GHz

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### Electrical Specifications<sup>1</sup>: $T_A = -55^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

| Parameter                                         | Test Conditions                          | Frequency                                                              | Units          | Min            | Typ            | Max          |
|---------------------------------------------------|------------------------------------------|------------------------------------------------------------------------|----------------|----------------|----------------|--------------|
| Frequency Range                                   | RF, LO Ports<br>IF Port                  | 0.001 - 3.5<br>5 - 1500                                                | GHz<br>MHz     | —<br>—         | —<br>—         | —<br>—       |
| Conversion Loss                                   |                                          | 5 - 1000 MHz <sup>2</sup><br>5 - 3000 MHz <sup>3</sup><br>1 - 3500 MHz | dB<br>dB<br>dB | —<br>—<br>—    | —<br>—<br>—    | 7<br>8<br>10 |
| Isolation                                         | LO to RF                                 | 5 - 1000 MHz<br>1 - 3500 MHz                                           | dB<br>dB       | 30<br>20       | —<br>—         | —<br>—       |
|                                                   | LO to IF                                 | 5 - 1000 MHz<br>1 - 3500 MHz                                           | dB<br>dB       | 30<br>20       | —<br>—         | —<br>—       |
|                                                   | RF to IF                                 | 10 - 500 MHz<br>1 - 3000 MHz<br>1 - 3500 MHz                           | dB<br>dB<br>dB | 30<br>20<br>18 | —<br>—<br>—    | —<br>—<br>—  |
| RF Input                                          | 1 dB Compression<br>1 dB Desensitization | —<br>—                                                                 | dBm<br>dBm     | —<br>—         | +7<br>+5       | —<br>—       |
| SSB Noise Figure                                  | Within 1 dB of Conversion Loss<br>Max    | —                                                                      | —              | —              | —              | —            |
| Typical Two-Tone IM<br>Ratio                      | Pin = -10 dBm per tone<br>IF = 60 MHz    | 10 MHz<br>500 MHz<br>3000 MHz                                          | dB<br>dB<br>dB | —<br>—<br>—    | 55<br>58<br>56 | —<br>—<br>—  |
| 3rd Order<br>Intermodulation Ratio<br>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 MHz and RF of -10 dBm or less.
3. For MDC-169, add 1.0 dB to conversion loss.

### Electrical Specifications (MDS-169): $T_A = -55^{\circ}\text{C}$ to $+85^{\circ}\text{C}$

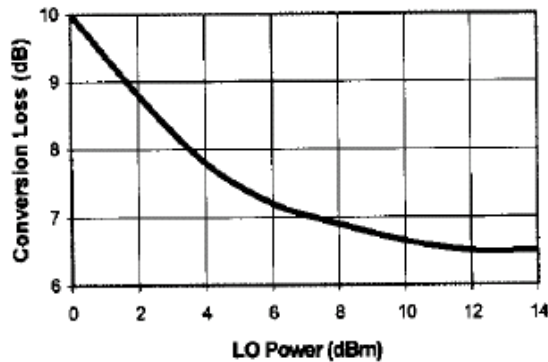
Frequency: RF, LO Ports = 1 - 3500 MHz, IF Port = 5-1500 MHz

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

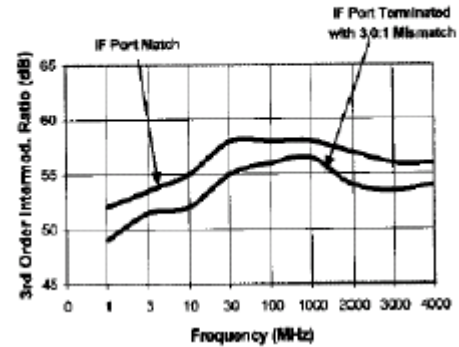


## Typical Performance Curves

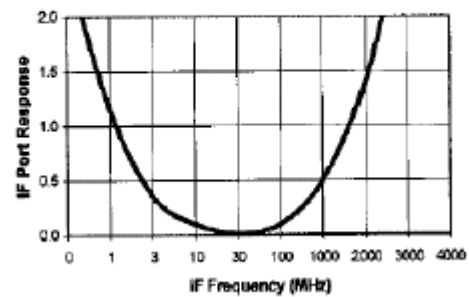
**Conversion Loss vs. LO Power - RF  
@ 2000 MHz -10 dBm, IF @ 60 MHz**



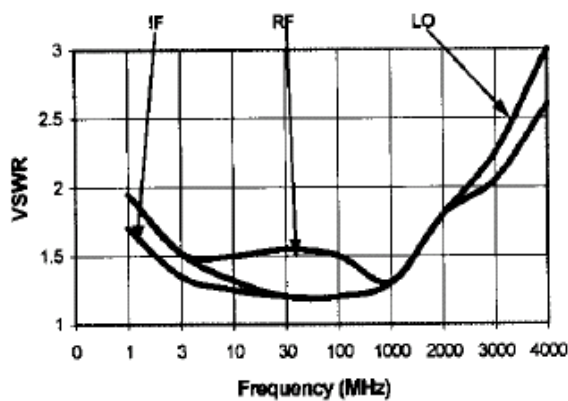
**3rd Order IM Ratio - LO @ +10 dBm,**



**IF Port Response**



**VSWR**



## Ordering Information

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