MD- / MDC- / MDS-169

Termination Insensitive Mixer, 1 MHz - 3.5 GHz

Rev. V5

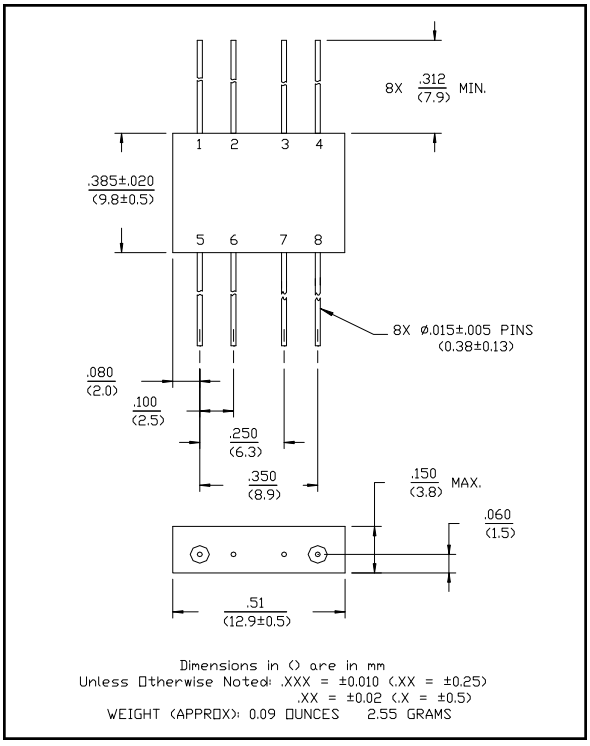
Features

- 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

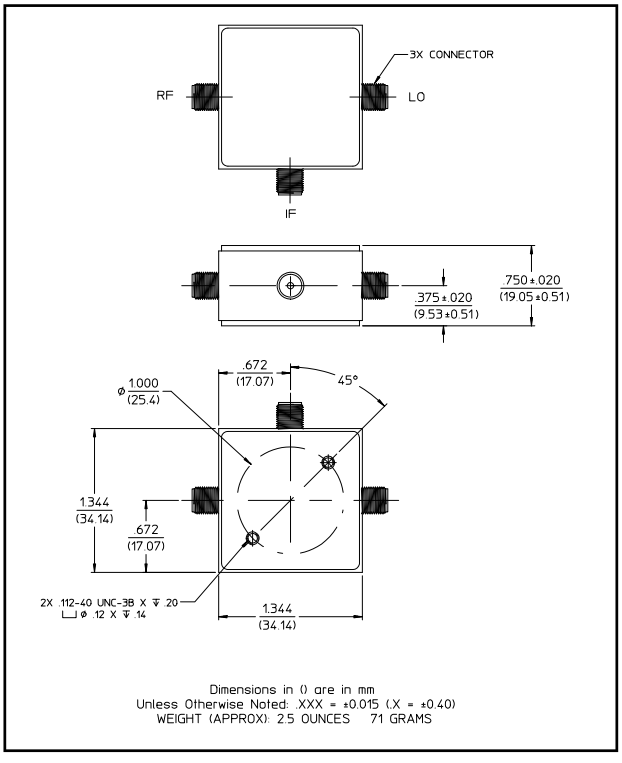
Description

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.

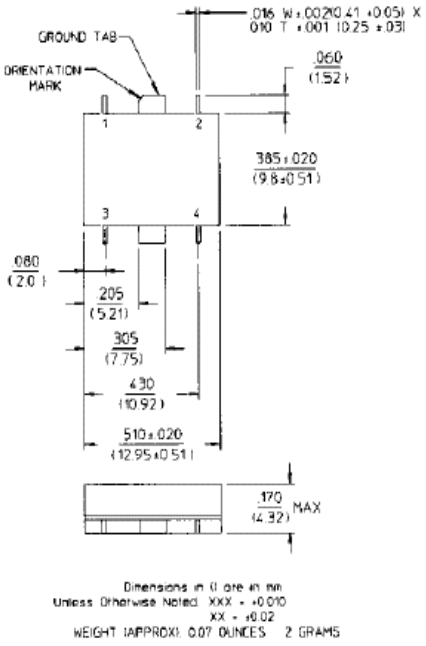
FP-2 (MD-169)



C-7 (MDC-169)



SF-1 (MDS-169)



• **North America** Tel: 800.366.2266 • **Europe** Tel: +353.21.244.6400
• **India** Tel: +91.80.4155721 • **China** Tel: +86.21.2407.1588
Visit www.macomtech.com for additional data sheets and product information.

Electrical Specifications[1]: T_A = -55°C to +85°C

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Frequency Range	RF, LO Ports IF Port	0.001 - 3.5 5 - 1500	GHz MHz	— —	— —	— —
Conversion Loss		5 - 1000 MHz[2] 5 - 3000 MHz[3] 1 - 3500 MHz	dB dB dB	— — —	— — —	7 8 10
Isolation	LO to RF	5 - 1000 MHz 1 - 3500 MHz	dB dB	30 20	— —	— —
	LO to IF	5 - 1000 MHz 1 - 3500 MHz	dB dB	30 20	— —	— —
	RF to IF	10 - 500 MHz 1 - 3000 MHz 1 - 3500 MHz	dB dB dB	30 20 18	— — —	— — —
RF Input	1 dB Compression 1 dB Desensitization	— —	dBm dBm	— —	+7 +5	— —
SSB Noise Figure	Within 1 dB of Conversion Loss Max	—	—	—	—	—
Typical Two-Tone IM Ratio	Pin = –10 dBm per tone IF = 60 MHz	10 MHz 500 MHz 3000 MHz	dB dB dB	— — —	55 58 56	— — —
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 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°C to +85°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 IF @ 60 MHz	5 - 1000 MHz 1000 - 3000 MHz 1 - 3500 MHz	dB dB dB	— — —	6.5 7.5 8.0	7.0 9.0 10.0
Isolation	LO to RF	5 - 1000 MHz 1 - 3500 MHz	dB dB	30 20	35 25	— —
	LO to IF	5 - 1000 MHz 1 - 3500 MHz	dB dB	30 20	35 25	— —
	RF to IF	10 - 500 MHz 1 - 3000 MHz 1 - 3500 MHz	dB dB dB	30 20 18	35 25 23	— — —

Termination Insensitive Mixer,
1 MHz - 3.5 GHz

Rev. V5

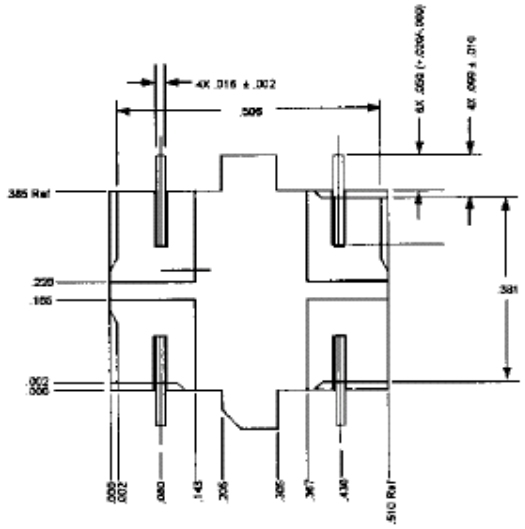
Pin Configuration (MD-169)

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

Pin Configuration (MDS-169)

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

Bottom View of SF-1



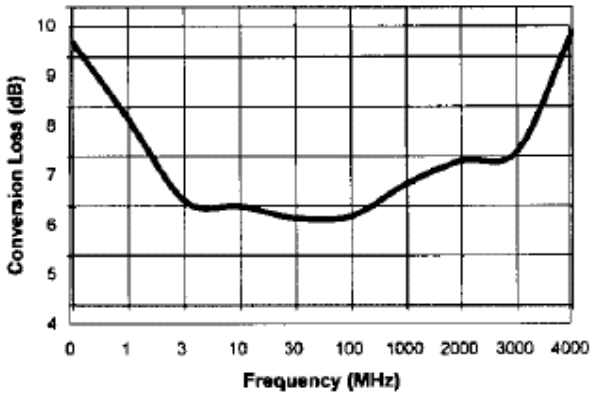
Absolute Maximum Ratings (MDS-169) [4]

Parameter	Absolute Maximum
Max Input Power[5]	
Total Power	350 mW Derated at 85°C @ 3.2 mW/°C
LO Power	+24 dBm

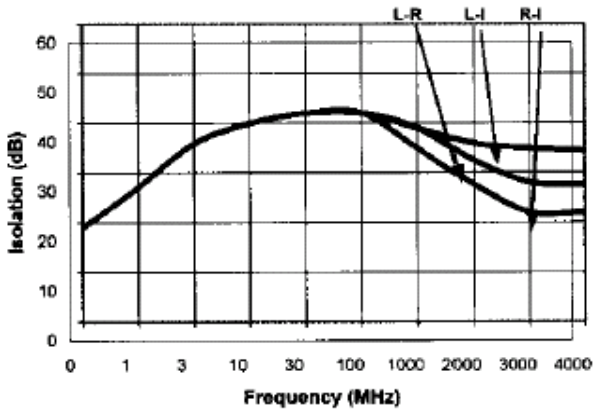
4. Operation of this device above any one of these parameters may cause permanent damage.
5. Ambient Temperature (T_A) = +25°C

Typical Performance Curves

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

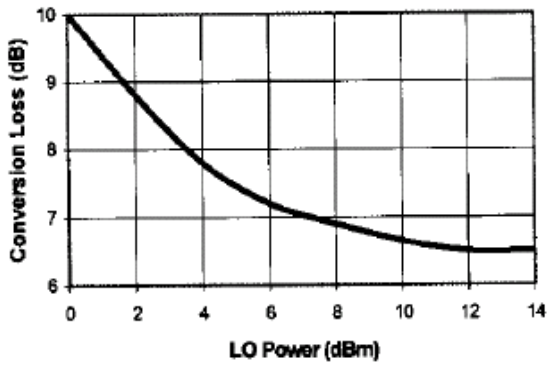


Isolation - Input +10 dBm

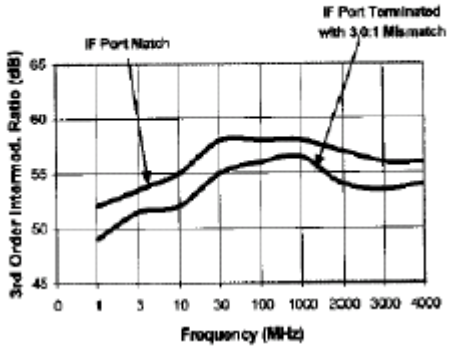


Typical Performance Curves

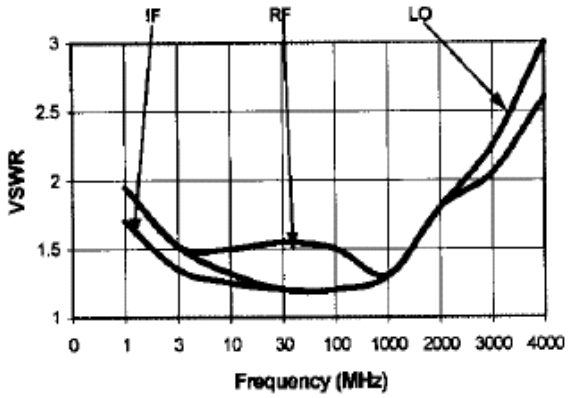
Conversion Loss vs. LO Power - RF @ 2000 MHz –10 dBm, IF @ 60 MHz



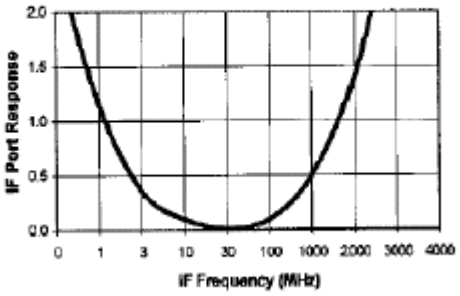
3rd Order IM Ratio - LO @ +10 dBm,



VSWR



IF Port Response



Ordering Information

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