MMIC Medium Level Mixer
800 - 1000 MHz

MD54-0004

V2.00

Features

- Low Conversion Loss
- +21 dBm 1 dB Compression
- LO Drive Level: +11 to +23 dBm
- DC - 100 MHz IF Bandwidth
- Low Cost Plastic SOIC Package

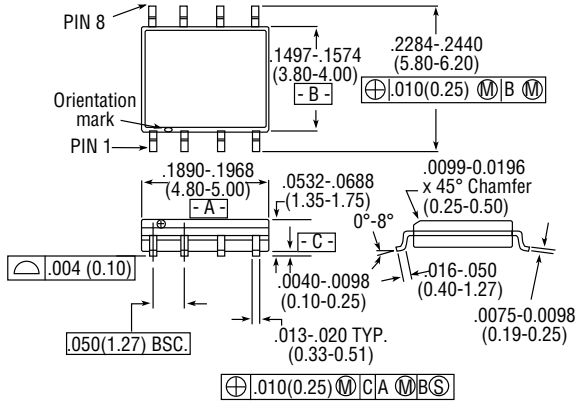
Description

M/A-COM's MD54-0004 is a passive mixer that achieves the performance of a double balanced diode mixer in a low cost surface mount plastic SOIC 8-lead package. The MD54-0004 is ideally suited for use where high level RF signals and very wide dynamic range are required. Typical applications include frequency up/down conversion, modulation, demodulation in systems such as cellular receivers and transmitters, and 900 MHz ISM band applications.

The MD54-0004 uses FETs as mixing elements to achieve very wide dynamic range in a low cost plastic package. The mixer operates with LO drive levels of +11 dBm to +25 dBm. DC bias is not required.

M/A-COM's MD54-0004 is fabricated using a mature 1-micron GaAs process. The process features full IC passivation for increased performance and reliability.

SO-8



8- Lead SOP outline dimensions
Narrow body .150
(All dimensions per JEDEC No. MS-012-AA, Issue C)
Dimensions in ( ) are in mm.

Unless Otherwise Noted: .xxx = ± 0.010 (.xx = ± 0.25)
.xx = ± 0.02 (.x = ±0.5)

Ordering Information

Part Number	Description
MD54-0004	SOIC 8-Lead Plastic Package
MD54-0004TR	Forward Tape & Reel*
MD54-0004RTR	Reverse Tape & Reel*
MD54-0004SMB	Designer's Kit

* Standard reel size is 7 inches. If other reel size is required, consult factory for part number assignment.

Electrical Specifications

Test Conditions: RF = 900 MHz (-10 dBm), LO = 840 MHz (13 dBm), IF = 60 MHz, T_A = +25°C

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Conversion Loss		dB		7.5	9.5
Isolation	LO to RF	dB	25	38	
	LO to IF	dB		22	
	RF to IF	dB		12	
VSWR	LO Port			2.5:1	
	RF Port			2.0:1	
	IF Port			2.0:1	
Input 1 dB Compression	RF Freq. = 900 MHz, LO = +13 dBm	dBm		+21	
Two-Tone IM Ratio[1]	Two tones at -10 dBm each, Tone spacing = 100 kHz, IF = 60 MHz	dBc	45	60	

1. IMR vs RF drive level can be calculated by the formula: IMR = 45 - (1.5 x P_{IN}).

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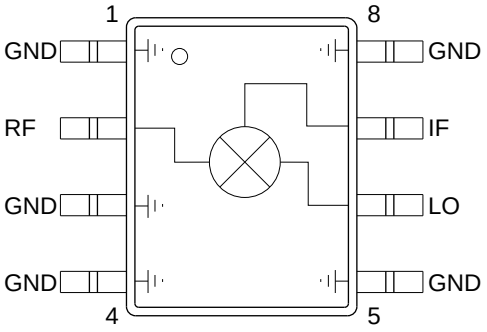
Absolute Maximum Ratings[1]

Parameter	Absolute Maximum
RF Input Power[2]	+22 dBm
LO Drive Power[2]	+23 dBm
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Total power for RF and LO ports should not exceed +23 dBm.

Functional Diagram[3]



3. External matching network on LO Port:
   R = 470 ohms, L = 18 nH, C = 4.7 pF

Spurious Table

HARMONIC OF LO (n)	HARMONIC OF RF (m)				
	8.9	40.1	70.1	69.9	73.4
4x	-1.1	39.9	61.6	63.9	64.4
	2.2	34.2	59.8	67.3	73
3x	-7.7	34.1	63.8	64.5	63
	2.9	23.7	72.8	72.9	71.9
2x	-7.1	23.8	64.7	63.3	61.9
	-2.2	0	61.4	71.3	71.1
1x	-12.2	0	63.3	61.8	61.9
	X	4.7	65.1	71.5	72.1
0x	X	4.8	61.3	61.9	62.3
	0x	1x	2x	3x	4x

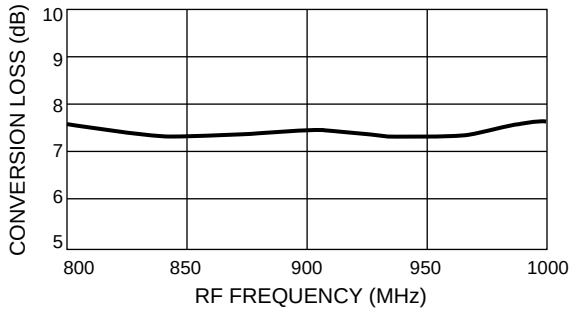
The spurious table shows the spurious signals resulting from the mixing of the RF and LO input signals, assuming down conversion. Mixing products are indicated by the number of dB below the conversion loss. The lower frequency mixing term is shown for two different RF input levels. The top number is for an RF input power of -5 dBm, the lower number is for -15 dBm.

$|mF_{RF} - nF_{LO}|$, RF = -5 dBm
$|mF_{RF} - nF_{LO}|$, RF = -15 dBm

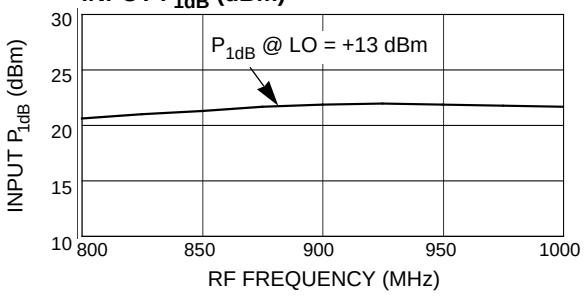
RF Frequency = 900 MHz
LO Frequency = 840 MHz

Typical Performance

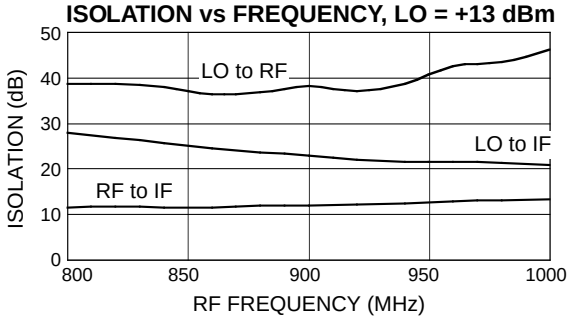
CONVERSION LOSS vs FREQUENCY



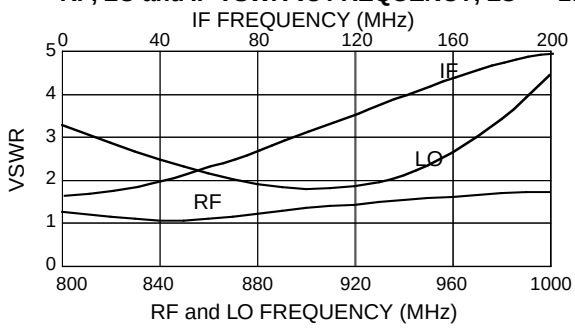
INPUT P_{1dB} (dBm)



ISOLATION vs FREQUENCY, LO = +13 dBm



RF, LO and IF VSWR vs FREQUENCY, LO = +13 dBm



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