



MMIC Medium Level Mixer

1700 - 2000 MHz

MD54-0003

V2.00

Features

- Low Conversion Loss
- +21 dBm Input Power @ 1 dB Compression
- Typical Two-Tone IM Ratio of ≥ 50 dBc
- LO Drive Level: +11 to +23 dBm
- DC - 200 MHz IF Bandwidth
- Low Cost Plastic SOIC Package

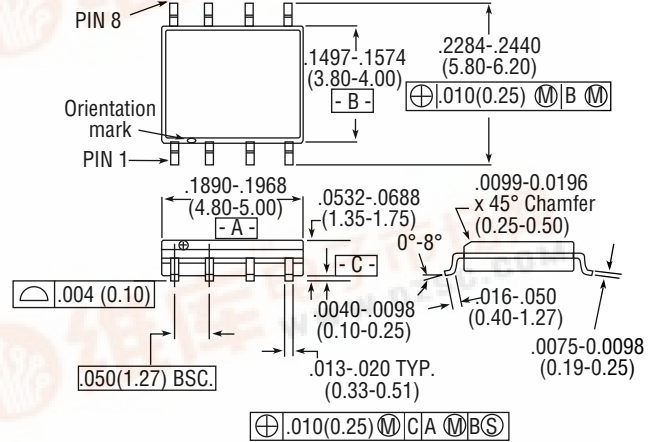
Description

M/A-COM's MD54-0003 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 MD54-0003 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 base station receivers and transmitters for DCS1800, PCS and PHS applications.

The MD54-0003 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 +23 dBm. No DC bias is required.

M/A-COM's MD54-0003 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
MD54-0003	SOIC 8-Lead Plastic Package
MD54-0003TR	Forward Tape & Reel*
MD54-0003RTR	Reverse Tape & Reel*
MD54-0003SMB	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 = 1850 MHz (-10 dBm), LO = 1710 MHz (13 dBm), IF = 140 MHz, $T_A = +25^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Conversion Loss		dB		8.5	9.5
Isolation	LO to RF	dB	20	27	
	LO to IF	dB		12	
	RF to IF	dB		10	
VSWR	LO Port			2.5:1	
	RF Port			2.0:1	
	IF Port			2.0:1	
Input 1 dB Compression	RF Freq. = 1800 MHz, LO = +13 dBm	dBm		+21	
Two-Tone IM Ratio ¹	Two tones at -10 dBm each, Tone spacing = 100 kHz, IF = 140 MHz	dBc	50	65	

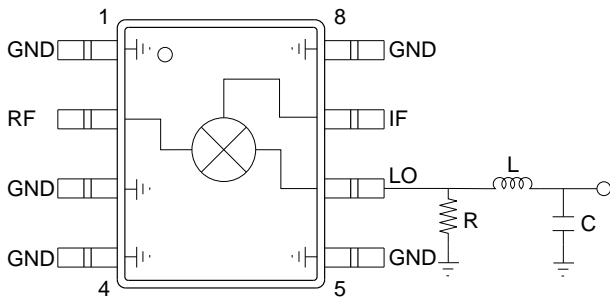
¹ IMR vs RF drive level can be calculated by the formula: $\text{IMR} = 50 - (1.5 \times P_{IN})$

Absolute Maximum Ratings¹

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 Diagram³



3. External matching network on LO Port:
R = 330 ohms, L = 3 nH, C = 3.3 pF

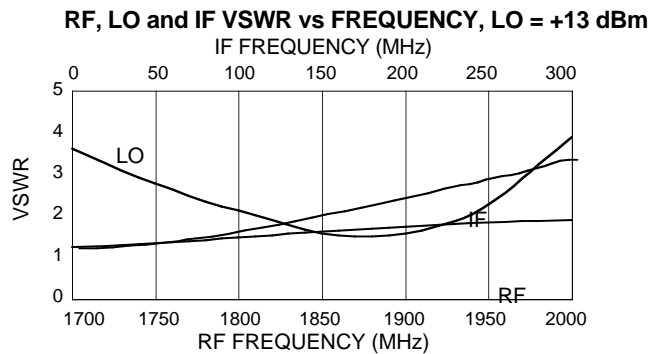
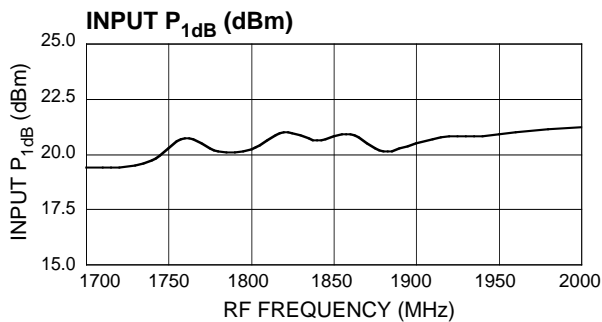
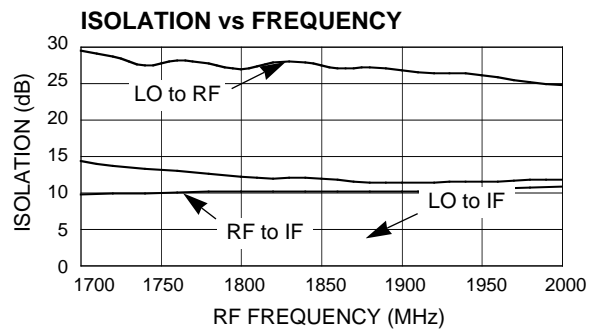
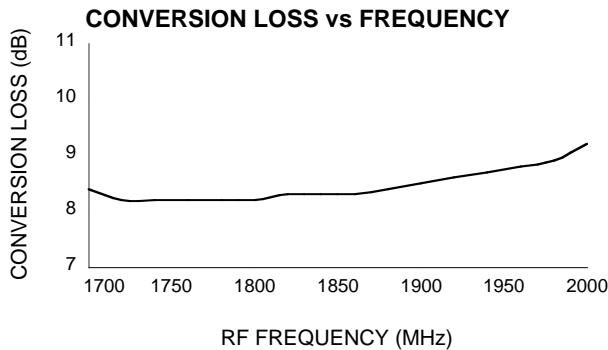
Spurious Table

HARMONIC OF LO (n)	Harmonic of RF (m)				
	17	48.2	62.3	71.7	73.4
4x	6.9	47.2	61.1	61.7	63.4
	10.3	28.9	63.0	71.3	70.6
3x	0.3	28.9	61.3	63.5	61.6
	-8.8	25.7	52.1	71.5	72.1
2x	-18.8	25.9	61.3	61.5	62.1
	-13.1	0	67.5	71.3	72.6
1x	-23.1	0	61.1	61.9	62.6
	X	2.1	56.8	72.3	69.3
0x	X	2.1	61.7	62.3	59.8
	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 = 1850 MHz
 LO Frequency = 1710 MHz

Typical Performance



Specifications Subject to Change Without Notice.