

Low Cost MMIC Mixer

2.1 - 2.7 GHz

Rev. V4

Features

- MMDS and WLAN Applications
- Input Power @ 1 dB Compression: +18 dBm
- LO to RF Isolation: > 20 dB
- +13 LO Drive Level
- Does not require DC bias
- Ultra-Miniature SOT-25 Plastic Package

Description

M/A-COM's MD54-0007 is a passive mixer that achieves the performance of a double balanced diode mixer in an ultra-miniature SOT-25 package. The MD54-0007 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 and demodulation in receivers and transmitters for basestation and portable systems.

The MD54-0007 employs GaAs FETs as mixing elements to achieve very wide dynamic range in a low cost plastic package. The mixer operates with LO drive levels of +13 dBm to +18 dBm. The LO port may be externally tuned for operation in various frequency bands.

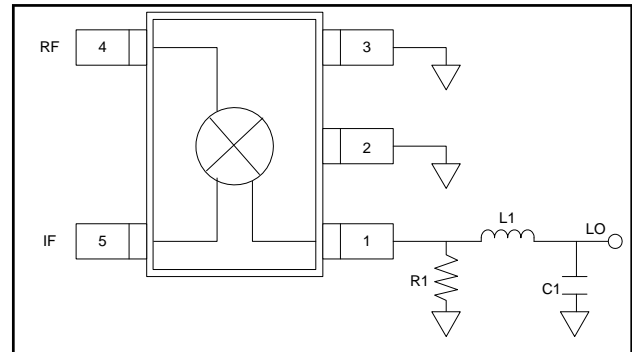
M/A-COM's MD54-0007 is fabricated using a mature 0.5 micron gate length GaAs MESFET process. The process features full passivation for increased performance and reliability.

Ordering Information ¹

Part Number	Package
MD54-0007TR	1000 piece reel
MD54-0007TR-3000	3000 piece reel
MD54-0007SMB	Sample Test Board

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Description
1	LO Port	LO Input
2	GND	Ground
3	GND	Ground
4	RF Port	RF Input
5	IF Port	IF Output

External Circuitry Parts List

Part	LO = 2278 MHz
R1	1.0 K Ω
L1	2.7 nH
C1	2.2 pF

2. All off-chip components are low-cost surface mount components obtainable from multiple sources (0.060 in. x 0.030 in. or 0.080 in. x 0.050 in.).

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Electrical Specifications: $T_A = 25^\circ\text{C}$, $Z_0 = 50\ \Omega$ ^{3,4}, RF Frequency: 2.1 - 2.7 GHz

Parameter	Test Conditions	Units	Min	Typ	Max
Conversion Loss	—	dB	—	8.0	9.0
Isolation	LO to RF	dB	15	25	—
	LO to IF	dB	—	18	—
	RF to IF	dB	—	18	—
VSWR	RF Port	Ratio	—	2.0:1	—
	LO Port	Ratio	—	2.0:1	—
	IF Port	Ratio	—	2.0:1	—
P1dB	—	dBm	—	18	—
Two-Tone IMR	Two Tones at 0 dBm each, Tone spacing = 300 KHz, IF = 150 MHz	dBc	45	50	—

3. RF signal is 2428 MHz at 0 dB, LO signal is 2278 MHz at +13 dBm and IF signal is 150 MHz unless otherwise specified.

4. With external LO port matching. See functional schematic.

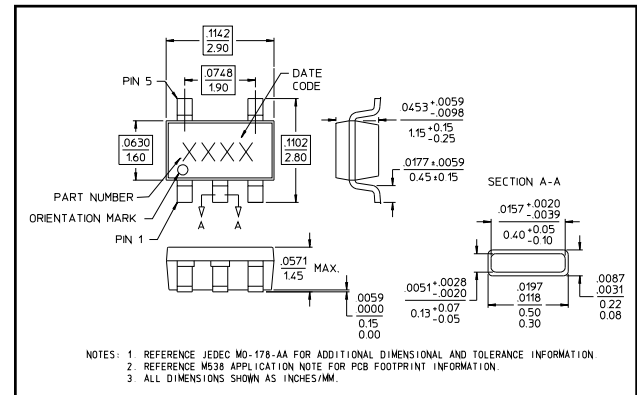
Absolute Maximum Ratings⁵

Parameter	Absolute Maximum
RF Input Power ⁶	+27 dBm
LO Drive Power ⁶	+27 dBm
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +150°C
Channel Temperature	+150°C

5. Exceeding any one or combination of these limits may cause permanent damage to this device.

6. Ambient Temperature (T_A) = +25°C

SOT-25



Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.