### Low Cost MMIC Mixer 2.1 - 2.7 GHz

#### 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.

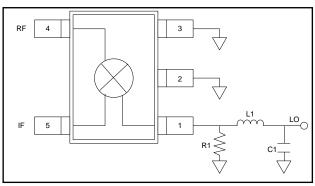
M/A-COM's MD54-0007 is fabricated using a mature 0.5 micron gate length GaAs MESFET process. The process features full passivation for increased performance and reliability.

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

Ordering Information<sup>1</sup>

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 ΚΩ        |
| 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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Rev. V4





## Low Cost MMIC Mixer 2.1 - 2.7 GHz

Rev. V4

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

| -               |  | -                       |        |                         |     |
|-----------------|--|-------------------------|--------|-------------------------|-----|
| Parameter       | Test Conditions  | Units                   | Min    | Тур                     | Max |
| Conversion Loss | _  | dB                      | —      | 8.0                     | 9.0 |
| Isolation       | LO to RF<br>LO to IF<br>RF to IF                                 | dB<br>dB<br>dB          | 15<br> | 25<br>18<br>18          |     |
| VSWR            | RF Port<br>LO Port<br>IF Port                                    | Ratio<br>Ratio<br>Ratio |        | 2.0:1<br>2.0:1<br>2.0:1 |     |
| P1dB            | _  | dBm                     | _      | 18                      | _   |
| Two-Tone IMR    | Two Tones at 0 dBm each, Tone spacing = 300 KHz,<br>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 Ratings <sup>5</sup>

| Parameter                   | Absolute Maximum |  |  |
|-----------------------------|------------------|--|--|
| RF Input Power 6            | +27 dBm          |  |  |
| LO Drive Power <sup>6</sup> | +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  $(T_A) = +25^{\circ}C$ 

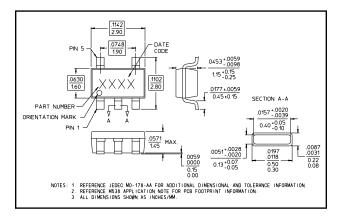
## **Handling Procedures**

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.

#### SOT-25



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