

MMIC Medium Level Mixer 800 - 1000 MHz

Rev. V3

Features

- Low Conversion Loss
- 1 dB Compression: +21 dBm
- LO Drive Level: +11 to +23 dBm
- DC - 100 MHz IF Bandwidth
- Lead-Free SOIC-8 Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible
- RoHS* Compliant Version of MD54-0004

Description

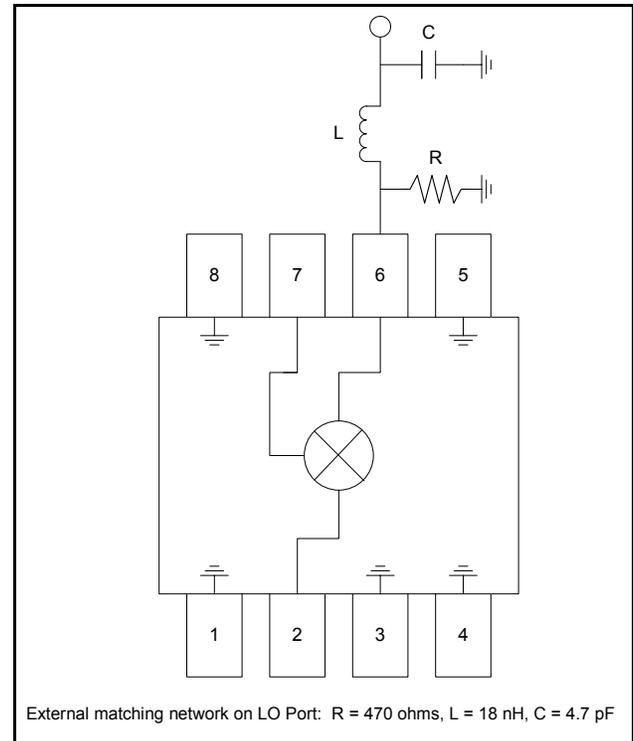
M/A-COM's MAMXSS0011 is a passive mixer that achieves the performance of a double balanced diode mixer in a lead-free surface mount plastic SOIC-8 package. The MAMXSS0011 is ideally suited for use where high level RF signals and very wide dynamic range are required.

Typical applications include frequency up/down conversion, modulation, demodulation in systems such as cellular receivers and transmitters and 900 MHz ISM band applications.

The MAMXSS0011 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. DC bias is not required.

M/A-COM's MAMXSS0011 is fabricated using a mature 1-micron GaAs process. The process features full IC passivation for increased performance and reliability.

Functional Diagram



Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|----------|
| 1 | Ground | 5 | Ground |
| 2 | RF Port | 6 | LO Port |
| 3 | Ground | 7 | IF Port |
| 4 | Ground | 8 | Ground |

Ordering Information ¹

| Part Number | Package |
|---------------|-----------------|
| MAMXSS0011 | Bulk Packaging |
| MAMXSS0011TR | 1000 piece reel |
| MAMXSS0011SMB | Designer's Kit |

1. Reference Application Note M513 for reel size information.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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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 | — | 38 | — |
| | LO to IF | dB | — | 22 | — |
| | RF to IF | dB | — | 12 | — |
| VSWR | LO Port | Ratio | — | 2.5:1 | — |
| | RF Port | Ratio | — | 2.0:1 | — |
| | IF Port | Ratio | — | 2.0:1 | — |
| Input 1 dB Compression | RF Freq. = 900 MHz, LO = +13 dBm | dBm | — | +21 | — |
| Two-Tone IM Ratio ² | Two tones at -10 dBm each, Tone spacing 100 kHz, IF = 60 MHz | dBc | 45 | 60 | — |

2. IMR vs RF drive level can be calculated by the formula: $IMR = 45 - (1.5 \times P_{IN})$

Absolute Maximum Ratings^{3,4}

| Parameter | Absolute Maximum |
|-----------------------------|------------------|
| RF Input Power ⁵ | +22 dBm |
| LO Drive Power ⁵ | +23 dBm |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.
- Total combined power for RF and LO ports should not exceed +23 dBm.

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.

Spurious Table

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

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.

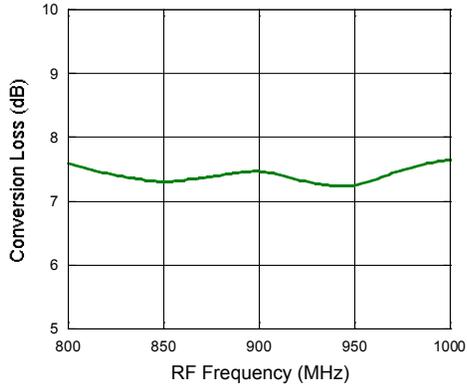
$|mF_{RF} - nF_{LO}|$, RF = -5 dBm
 $|mF_{RF} - nF_{LO}|$, RF = -15 dBm
 RF Frequency = 900 MHz
 LO Frequency = 840 MHz

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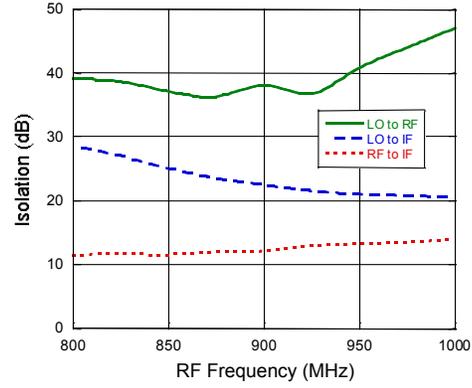
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Typical Performance Curves

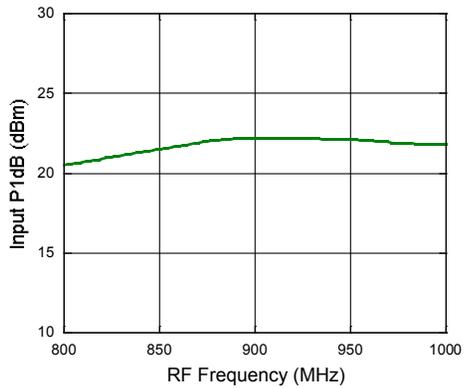
Conversion Loss



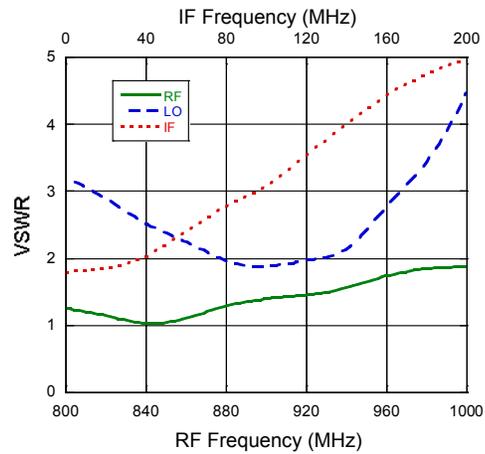
Isolation



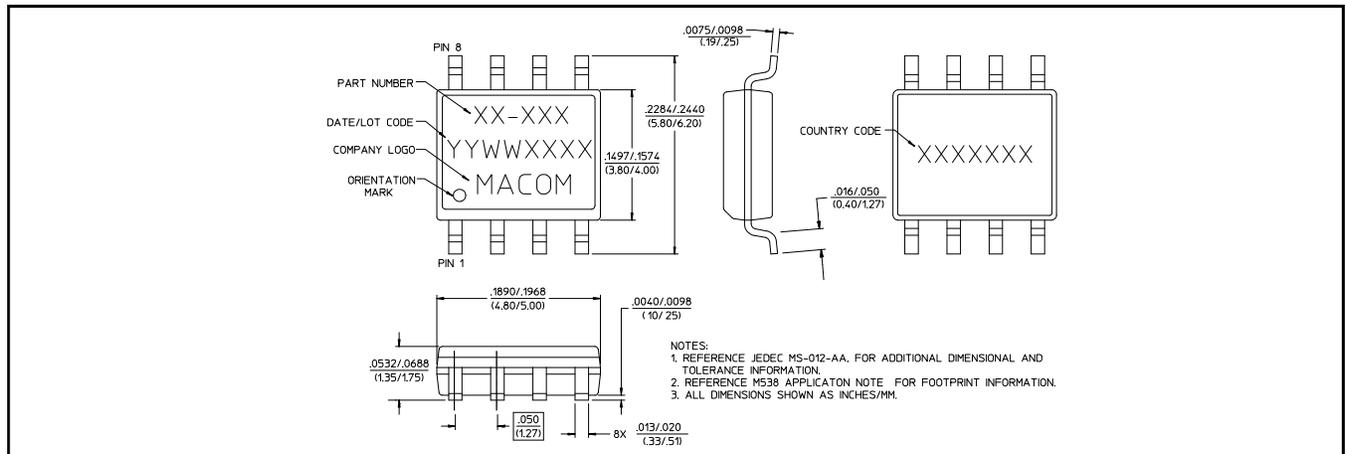
Input P1dB



RF, LO and IF VSWR



Lead-Free SOIC-8†



† Reference Application Note M538 for lead-free solder reflow recommendations.

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