MAMXSS0011

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

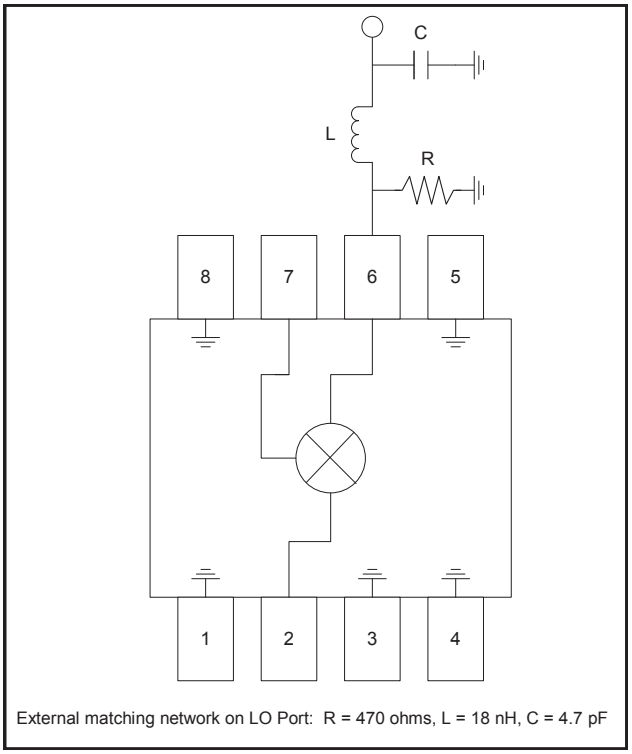
M/A-COM's MAMXSS0011 is a passive mixer that achieves the performance of a double balanced diode mixer in a lead-free surface mount plastic SOIC-8 package. The MAMXSS0011 is ideally suited for use where high level RF signals and very wide dynamic range are required.

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



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

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 LO to IF RF to IF	dB dB dB	— — —	38 22 12	— — —
VSWR	LO Port RF Port IF Port	Ratio Ratio Ratio	— — —	2.5:1 2.0:1 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 x 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

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.
5. 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

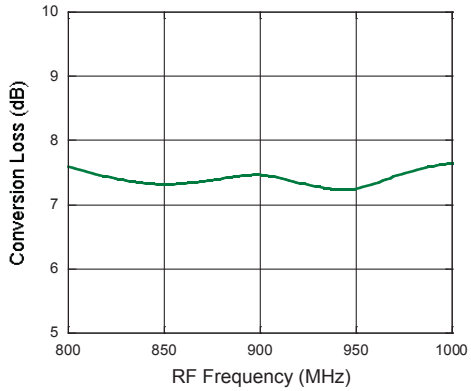
Harmonic of LO						
	4x	8.9 -1.1	40.1 39.9	70.1 61.6	69.9 63.9	73.4 64.4
	3x	2.2 -7.7	34.2 34.1	59.8 63.8	67.3 64.5	73 63
	2x	2.9 -7.1	23.7 23.8	72.8 64.7	72.9 63.3	71.9 61.9
	1x	-2.2 -12.2	0 0	61.4 63.3	71.3 61.8	71.1 61.9
	0x	X X	4.7 4.8	65.1 61.3	71.5 61.9	72.1 62.3
		0x	**1x**	**2x**	**3x**	**4x**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

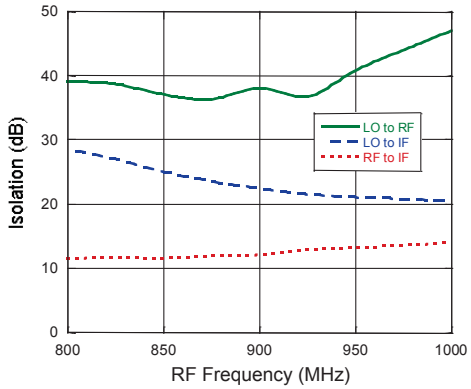
$|mF_{RF} - nF_{LO}|$, RF = -5 dBm
$|mF_{RF} - nF_{LO}|$, RF = -15 dBm
RF Frequency = 900 MHz
LO Frequency = 840 MHz

Typical Performance Curves

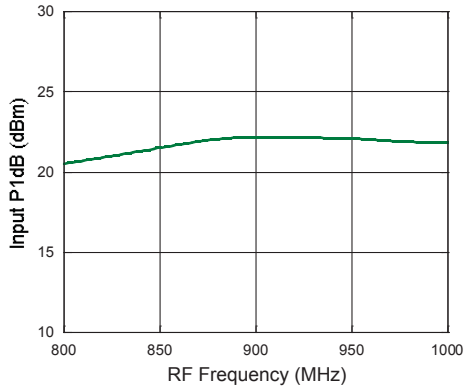
Conversion Loss



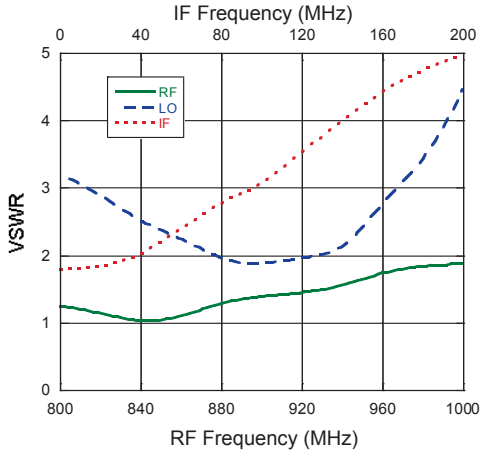
Isolation



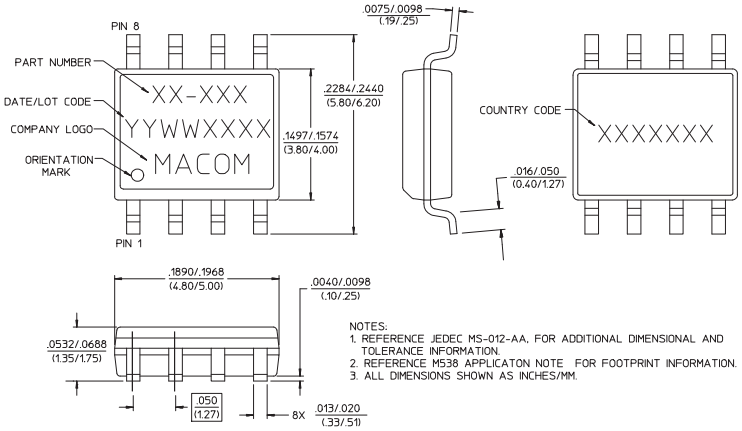
Input P1dB



RF, LO and IF VSWR



Lead-Free SOIC-8†



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