

## Features

- Low Cost Miniature Plastic Package
- 6.4 dB Conversion Loss
- +3 to +7 dBm LO Drive
- HMIC Process
- No External Matching Required
- Silicon Medium Barrier Schottky Diodes
- Double Balanced Passive Mixer
- RoHS\* Compliant and 260°C Reflow Compatible

## Description

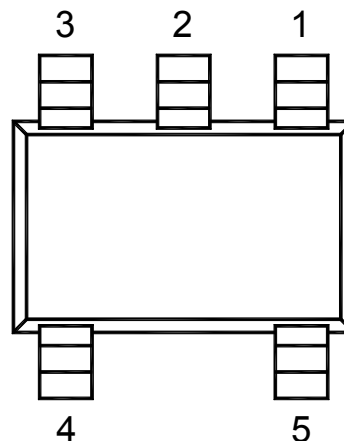
The MA4EX600L1-1225T is a silicon monolithic 4.2 - 6.0 GHz, medium barrier, double balanced mixer in a low cost miniature surface mount SOT-25 package. The die uses MACOM's unique HMIC silicon/glass process to achieve low loss passive elements while retaining the advantages of medium barrier silicon Schottky diodes.

These mixers are well suited for high volume wireless and cellular applications where small size and repeatability are required. Typical applications include frequency conversion, modulation, and demodulation for receivers and transmitters in both portable cellular and base station applications.

## Ordering Information

Part Number	Package
MA4EX600L1-1225T	Tape and Reel

## Package Outline



## Pin Configuration

Pin No.	Function
1	RF
2	Ground
3	LO
4	Ground
5	IF

\* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

**Electrical Specifications:  $T_A = +25^\circ\text{C}$ , LO = +5 dBm, RF = -10 dBm, IF = 60 MHz**

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Conversion Loss	5.0 GHz 4.2 - 6.0 GHz	dB	—	6.4 6.8	8.0 9.5
L - R Isolation	5.0 GHz 4.2 - 6.0 GHz	dB	—	26.0 25.0	—
L - I Isolation	5.0 GHz 4.2 - 6.0 GHz	dB	—	24.0 23.0	—
R - I Isolation	5.0 GHz 4.2 - 6.0 GHz	dB	—	13.0 15.0	—
LO VSWR	5.0 GHz 4.2 - 6.0 GHz	dB	—	1.18:1 1.67:1	—
RF VSWR	5.0 GHz 4.2 - 6.0 GHz	dB	—	1.87:1 1.89:1	—
IF VSWR	DC - 400 MHz	dB	—	1.55:1	—
Input IP3	5.0 GHz 4.2 - 6.0 GHz	dBm	—	5.7 7.6	—
Input P1dB	5.0 GHz 4.2 - 6.0 GHz	dBm	—	0.3 0.8	—
IF 1 dB Bandwidth	LO = 5.0 GHz @ +5 dBm	MHz	0	—	2000

## Absolute Maximum Ratings<sup>1,2</sup>

Parameter	Absolute Maximum
Incident Power LO RF	20 dBm 20 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.
- MACOM does not recommend sustained operation near these survivability limits.

## Handling Procedures

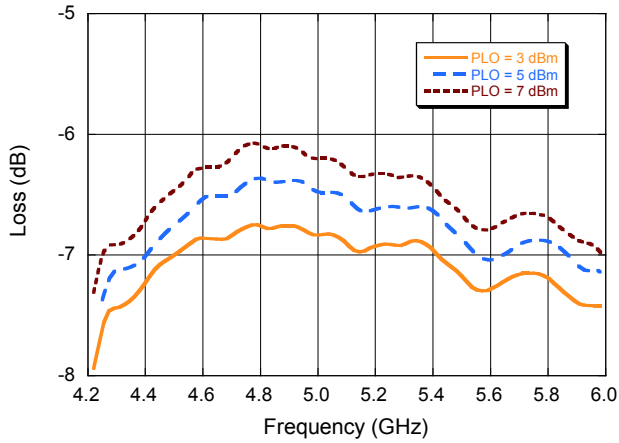
Please observe the following precautions to avoid damage:

## Static Sensitivity

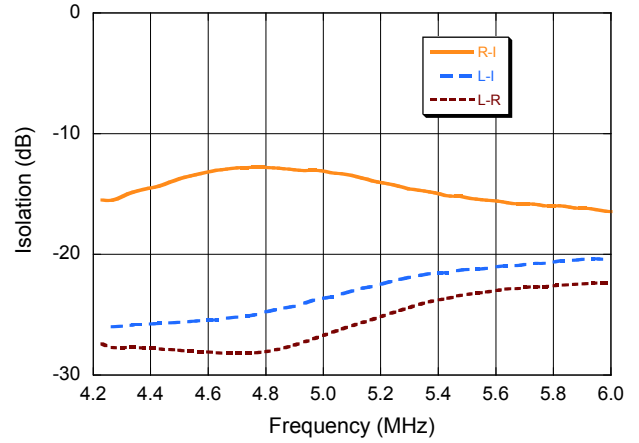
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

**Typical Performance Curves: LO = +5 dBm, RF = -10 dBm, IF = 60 MHz**

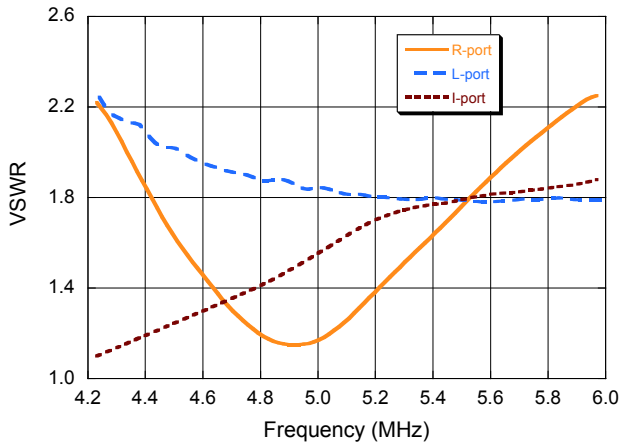
**Conversion Loss**



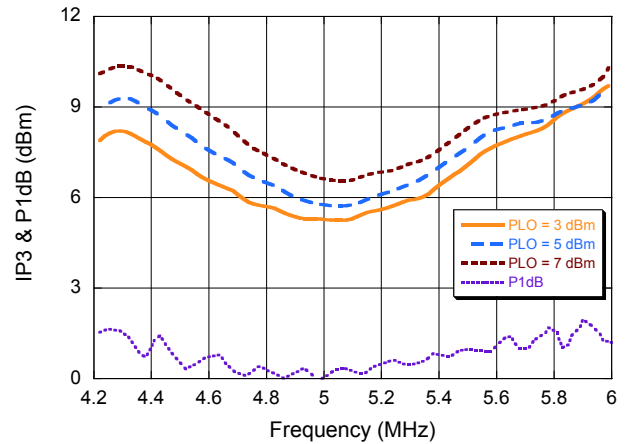
**Isolation**



**VSWR**



**Input IP3 & 1dB Compression Point**



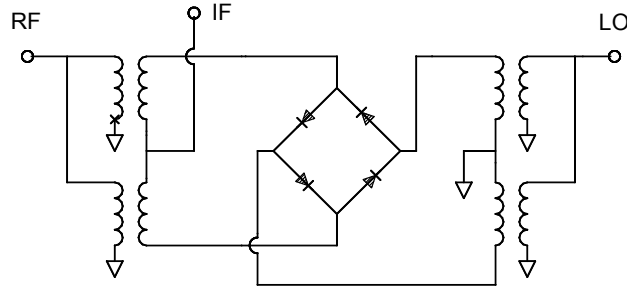
# MA4EX600L1-1225



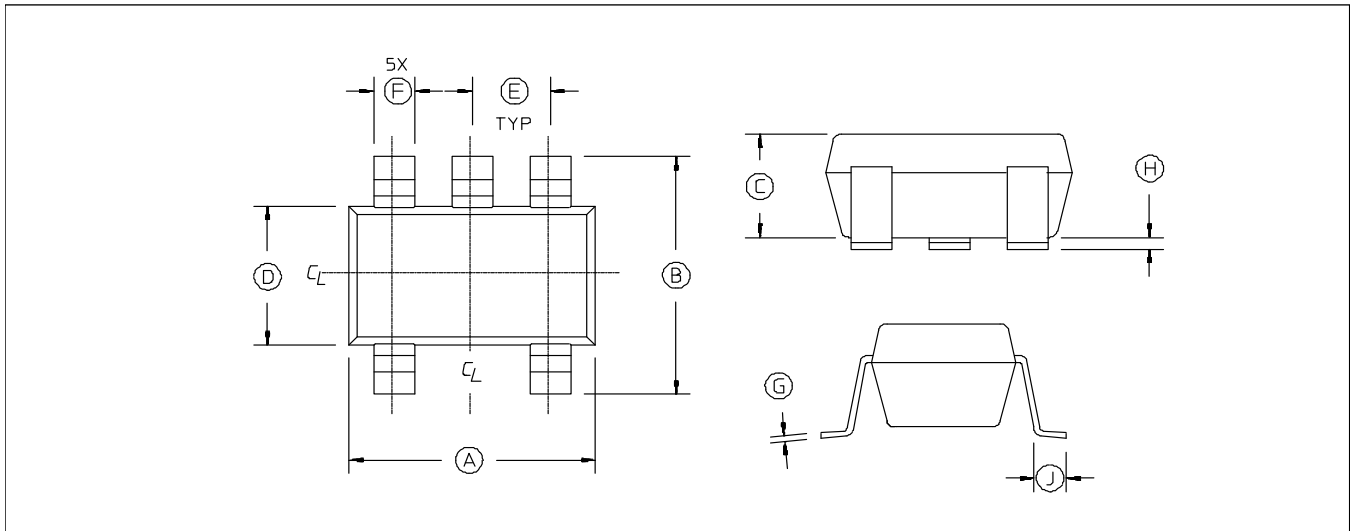
**Silicon Double Balanced HMIC™ Mixer**  
4.2 - 6.0 GHz

Rev. V3

## Schematic



## Lead-Free SOT-25†



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

DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.106	0.122	2.70	3.10
B	0.100	0.118	2.54	3.00
C	—	0.051	—	1.30
D	0.063 REF.		1.60 REF.	
E	0.032	0.043	0.80	1.10
F	0.014	0.020	0.35	0.50
G	0.003	—	0.08	—
H	0.000	0.006	0.00	0.15
J	0.018 REF.		0.45 REF.	

3. Lead Coplanarity should be 0.003 (0.08) maximum.

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