

**Silicon Double Balanced HMIC  
Mixer 700—1200 MHz**

**MA4EX950L1-1225T  
V1**

**Features**

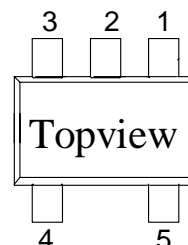
- SOT-25 Low Cost Miniature Plastic Package
- 6.5 dB Typical Conversion Loss
- +3 to +7 dBm LO Drive
- HMIC™ Patented Process
- Silicon Low Barrier Schottky Barrier Diodes
- DC - 400 MHz IF Bandwidth
- **Lead Free ( RoHS Compliant ) with 260 °C Reflow Capability**
- 100 % Matte Tin Plating

**Description and Applications**

M/A-COM's MA4EX950L1-1225T is a 700-1200 MHz silicon monolithic double balanced mixer in a low cost miniature surface mount SOT-25 package. The die uses M/A-COM's unique HMIC silicon/glass process to realize low loss passive elements while retaining the advantages of medium barrier silicon Schottky barrier 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 in wireless receivers and transmitters.

**SOT-25 Package Outline  
(Topview)**



**PIN Configuration**

| PIN | Function | PIN | Function |
|-----|----------|-----|----------|
| 1   | RF       | 4   | GND      |
| 2   | GND      | 5   | IF       |
| 3   | LO       | -   | -        |

**Ordering Information**

| Part Number      | Package       |
|------------------|---------------|
| MA4EX950L1-1225T | Tape and Reel |

**Electrical Specifications @ +25 °C**

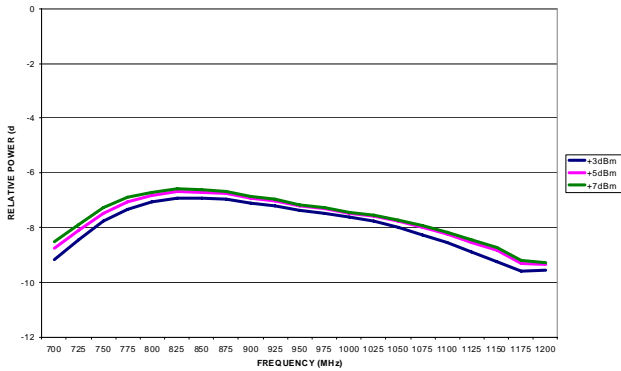
| Parameter              | Frequency Range        | Test Conditions                                      | Units | Min.        | Typ.           | Max.        |
|------------------------|------------------------|--|-------|-------------|----------------|-------------|
| Conversion Loss        | 850 MHz<br>0.7—1.2 GHz | LO Drive = +3 -> + 7dBm<br>RF = -10 dBm, IF = 60 MHz | dB    |             | 7.0<br>8.0     | 7.5<br>10.5 |
| L - R Isolation        | 850 MHz<br>0.7—1.2 GHz | LO Drive = +5 dBm<br>RF Level = -10 dBm              | dB    |             | 28.0<br>25.0   |             |
| L - I Isolation        | 850 MHz<br>0.7—1.2 GHz | LO Drive = +5 dBm<br>RF Level = -10 dBm              | dB    |             | 27.0<br>26.0   |             |
| R - I Isolation        | 850 MHz<br>0.7—1.2 GHz | LO Drive = +5 dBm<br>RF Level = -10 dBm              | dB    |             | 28.0<br>24.0   |             |
| LO VSWR                | 850 MHz<br>0.7—1.2 GHz | LO Drive = +5 dBm<br>RF Level = -10 dBm              |       |             | 2.4:1<br>2.8:1 | -<br>-      |
| RF VSWR                | 850 MHz<br>0.7—1.2 GHz | LO Drive = +15 dBm<br>RF Level = -10 dBm             |       |             | 1.3:1<br>2.7:1 | -<br>-      |
| IF VSWR                | DC - 400 MHz           | LO Drive = +5 dBm<br>RF Level = -10 dBm              |       |             | 1.4:1          | -           |
| Input IP3              | 850 MHz<br>0.7—1.2 GHz | LO Drive = +3 -> + 7dBm<br>RF = -10 dBm, IF = 60 MHz | dBm   | 11.0<br>9.0 | 13.2<br>14.0   |             |
| Input 1 dB Compression | 850 MHz<br>0.7—1.2 GHz | LO Drive = +3 -> + 7dBm<br>RF = -10 dBm, IF = 60 MHz | dBm   |             | 0<br>+1.5      |             |
| IF 1 dB Bandwidth      | DC - 400 MHz           | LO = 4650 MHz @ +5 dBm                               | MHz   | 0           |                | 400.0       |

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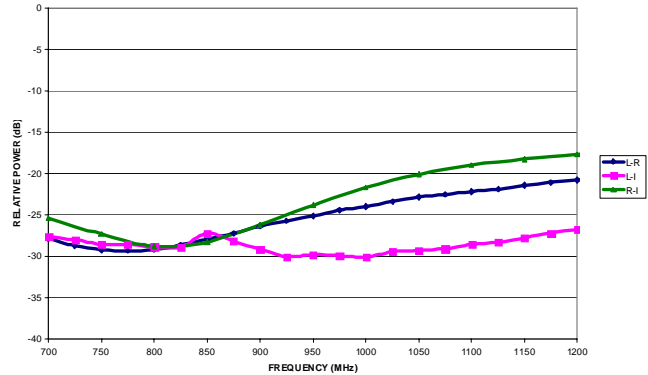
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**Typical Performance Curves (LO Drive = +10 dBm, RF = -10 dBm, IF = 60 MHz)**

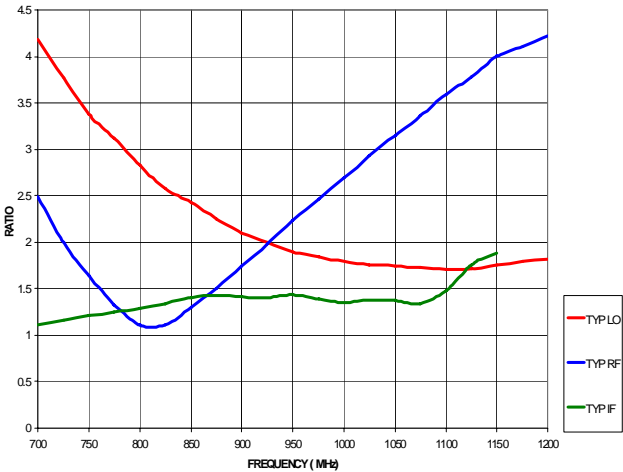
**Conversion Loss**



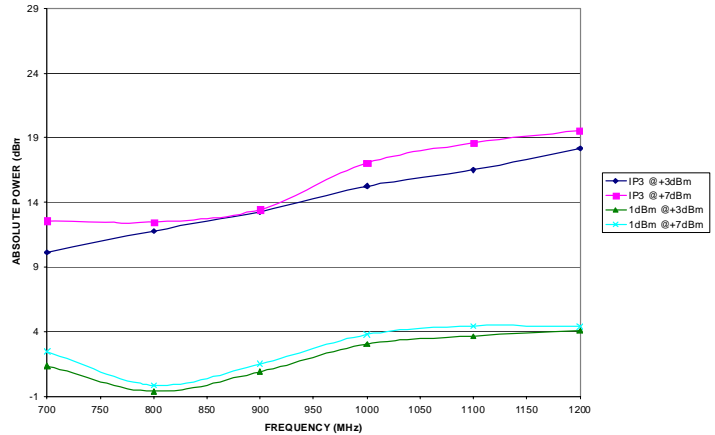
**Isolation**



**Typical LO, RF and IF VSWR**



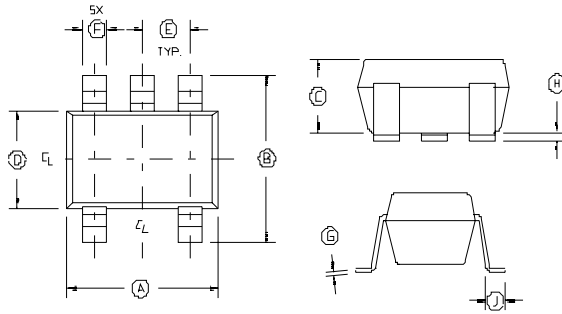
**Third Order Intercept and Input 1 dB Compression Power**



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**Case Style  
SOT-25**



**SOT-25**

| Dim | Inches     |        | Millimeters |      |
|-----|------------|--------|-------------|------|
|     | Min.       | Max.   | Min.        | Max. |
| A   | .1103      | .1181  | 2.80        | 3.10 |
| B   | .1023      | .1181  | 2.6         | 3.00 |
| C   | 0.0355     | .0512  | 0.9         | 1.30 |
| D   | 0.0591     | 0.669  | 1.5         | 1.70 |
| E   | .0374 REF. |        | .095 REF.   |      |
| F   | .0138      | .0197  | .35         | .50  |
| G   | .0031      | 0.0079 | .08         | 0.2  |
| H   | .0002      | .0059  | .05         | .15  |
| J   | 0.138      | 0.216  | .35         | .55  |

1. Dimensions do not include mold flash, protrusion or gate burrs which shall not exceed 0.0098 in (.25mm) per side.
2. Lead Coplanarity is 0.003 (0.08) max.

**Absolute Maximum Ratings<sup>1</sup>**

| Parameter             | Maximum Ratings        |
|-----------------------|------------------------|
| Operating Temperature | -65 °C to +125 °C      |
| Storage Temperature   | -65 °C to +150 °C      |
| Incident LO Power     | +20 dBm                |
| Incident RF Power     | +20 dBm                |
| Mounting Temperature  | +235 °C for 10 seconds |
| Soldering Temperature | +260 °C max.           |

1. Exceeding these limits may cause permanent damage.  
\* Please refer to application note M538 for surface mounting instructions.

**Schematic**

