

## Silicon Double Balanced HMIC Mixer 850 - 1050 MHz

Rev. V3

### Features

- + 35 dBm Typical Input IP3
- 8.3 dB Typical Conversion Loss
- + 15 to + 19 dBm LO Drive
- Fully Balanced Passive Mixer
- NO External Matching Required
- Low Cost Miniature Plastic MLP Package
- RoHS\* Compliant with 260 °C. Reflow Capability
- 100% MATTE Tin Plating

### Description and Applications

MA4EXP950H1-1277T is a silicon monolithic 850-1050 MHz, high barrier, double balanced mixer in a low cost, miniature surface mount FQFP-N 3mm Square, 16 lead plastic package. The die uses M/A-COM's unique HMIC silicon/glass process to realize low loss passive elements while retaining the advantages of high barrier silicon schottky barrier diodes to produce a compact device.

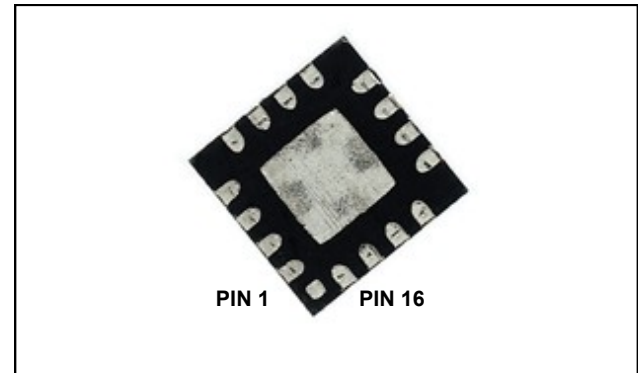
These mixers are well suited for GSM and CDMA cellular basestation infrastructure applications where small size and high performance is required. Typical applications include frequency conversion, modulation, and demodulation in wireless receivers and transmitters.

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

Parameter	Maximum Ratings
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C
Incident LO Power	+20 dBm C.W.
Incident RF Power	+20 dBm C.W.
Soldering Temperature	+260 °C

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

### MLP 3mm Package (Circuit Side View)



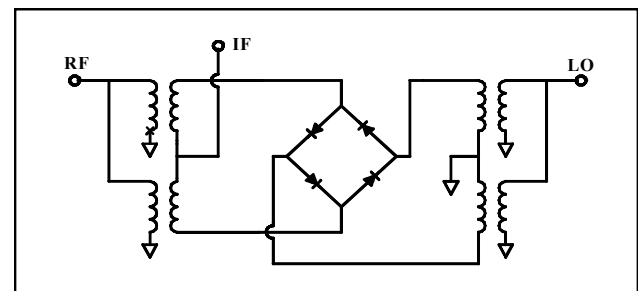
### PIN Configuration

PIN	Function	PIN	Function
1	N/C	9	N/C
2	N/C	10	RF
3	LO	11	N/C
4	N/C	12	N/C
5	N/C	13	N/C
6	N/C	14	IF
7	N/C	15	N/C
8	N/C	16	N/C

### Ordering Information

Part Number	Package
MA4EXP950H1-1277T	Tape and Reel
MAMX-090950-000SMB	Sample Test Boards

### Mixer Schematic



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

## Silicon Double Balanced HMIC Mixer 850 - 1050 MHz

Rev. V3

### Electrical Specifications $T_A = 25\text{ }^\circ\text{C}$

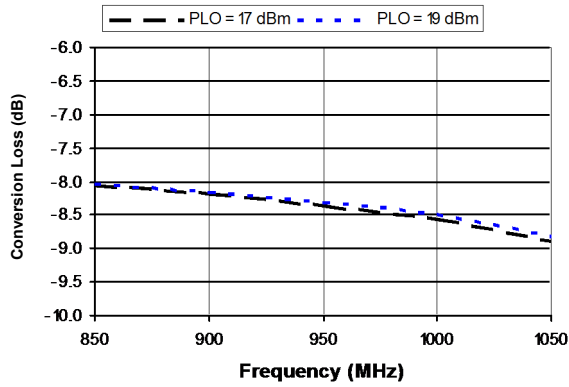
Parameter	Frequency Range	Test Conditions	Units	Min.	Avg.	Max.
Conversion Loss	850 MHz 850-1050 MHz	LO Drive = +19 dBm RF = -10 dBm, IF = 60 MHz	dB	- -	8.1 8.3	9.5 9.5
L - R Isolation	850 MHz 850-1050 MHz	LO Drive = +17 dBm RF Level = -10 dBm	dB	- -	58.0 55.0	- -
L - I Isolation	850 MHz 850-1050 MHz	LO Drive = +17 dBm RF Level = -10 dBm	dB	- -	49.0 44.0	- -
R - I Isolation	850 MHz 850-1050 MHz	LO Drive = +17 dBm RF Level = -10 dBm	dB	- -	30.0 28.0	- -
RF VSWR	850 MHz 850-1050 MHz	LO Drive = +17 dBm RF Level = -10 dBm	Ratio	- -	1.50:1 2.20:1	- -
IF VSWR	DC - 500 MHz	LO Drive = +17 dBm RF Level = -10 dBm	Ratio	- -	1.70:1	-
LO VSWR	850 MHz 850-1050 MHz	LO Drive = +17 dBm RF Level = -10 dBm	Ratio	- -	2.1:1 1.7:1	
Input IP3	850 MHz 850-1050 MHz	LO Drive = +19 dBm RF = -10 dBm, IF = 60 MHz	dBm	- -	32.0 33.0	- -
Input 1 dB Compression	850 MHz 850-1050 MHz	LO Drive = +17 dBm IF = 60 MHz	dBm	- -	12.1 12.7	- -
IF1 dB Bandwidth	DC-200 MHz	LO = 850 MHz @ +17dBm	MHz	0	-	200

## Silicon Double Balanced HMIC Mixer 850 - 1050 MHz

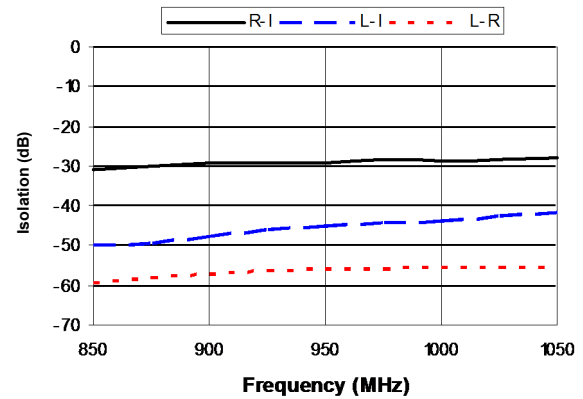
Rev. V3

Typical Performance Curves (LO Drive = +17 dBm, RF = -10 dBm, IF = 60 MHz)

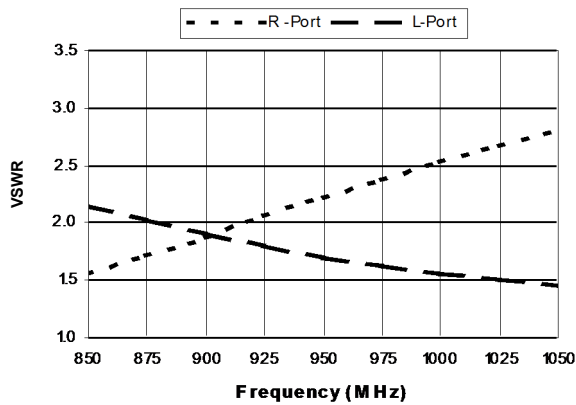
**Conversion Loss**



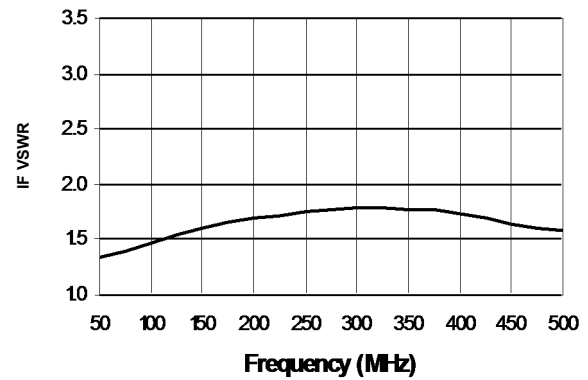
**Isolation**



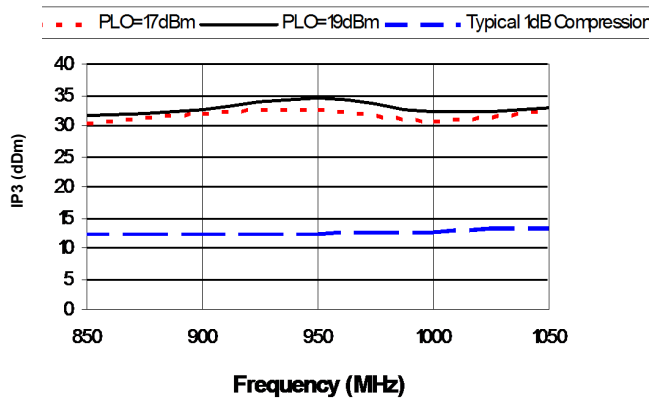
**RF VSWR**



**IF VSWR**



**Input IP3 and 1 dB Compression Point**



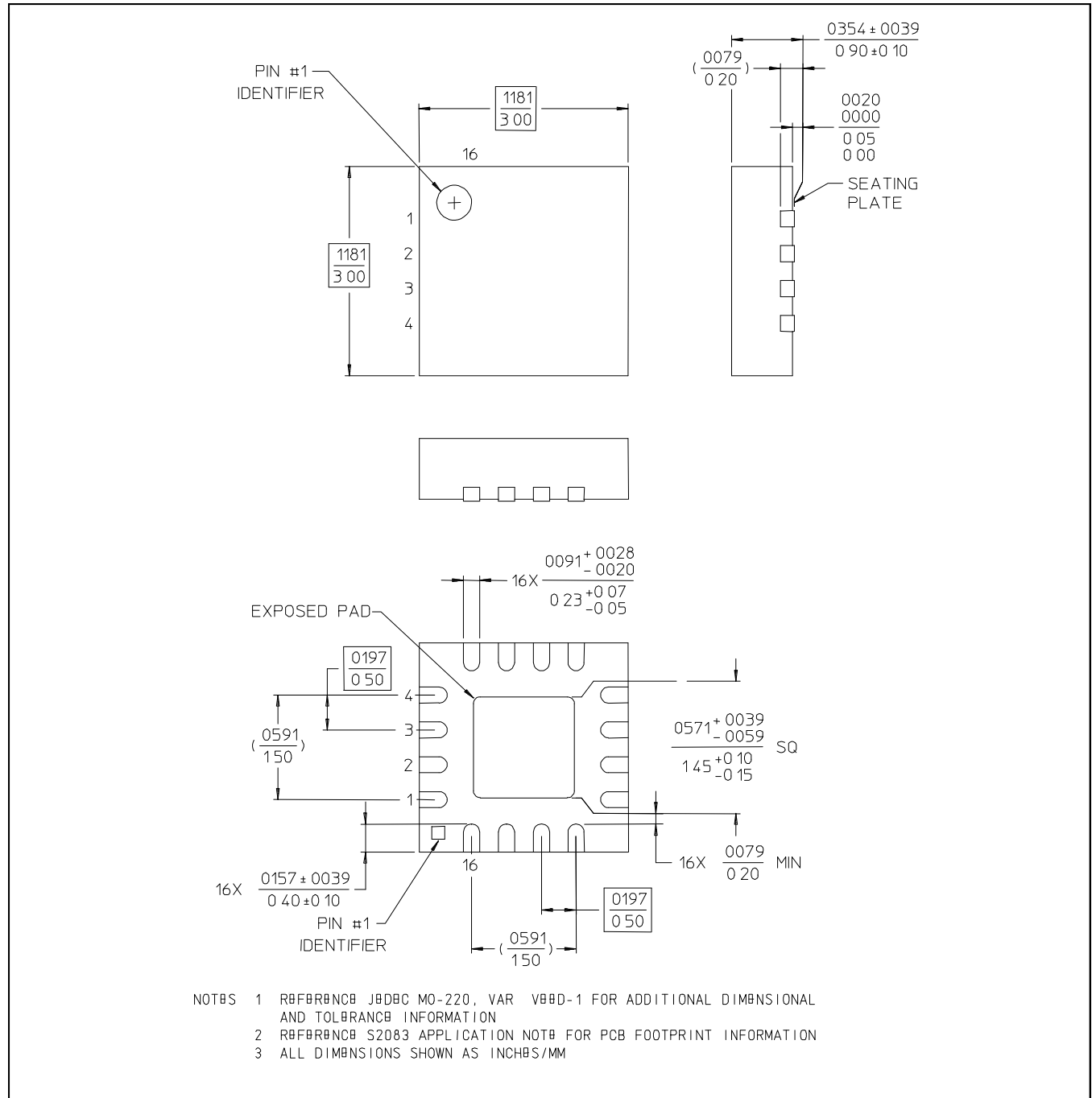
# MA4EXP950H1-1277T



**Silicon Double Balanced HMIC Mixer**  
**850 - 1050 MHz**

Rev. V3

## MA4EXP950H1-1277T Outline - 3mm FQFP-N 16 Lead Saw Singulated



M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.