



# MH205A

## High Linearity Cellular-Band MMIC Mixer

The Communications Edge™

Product Information

### Product Features

- +35 dBm IIP3
- RF: 800 – 915 MHz
- LO: 700 – 845 MHz
- IF: 70 – 120 MHz
- +17 dBm Drive Level
- Low Cost SOIC-8 Package
- No External Bias Required

### Applications

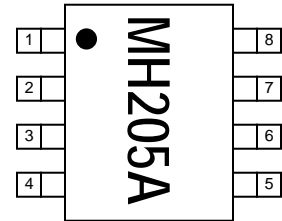
- Mobile Infrastructure

### Product Description

The MH205A is a passive GaAs MESFET mixer that provides high dynamic range performance in a low cost SOIC-8 package. WJ's MH205A uses patented techniques to realize +35 dBm Input IP3 at an LO drive level of +17 dBm when used in a simple application circuit as an upconverting or downconverting high-side LO configuration. This single monolithic integrated circuit does not require any external baluns or bias elements.

Typical applications include frequency up/down conversion, modulation and demodulation for receivers and transmitters used in 2.5G and 3G systems using the cellular and GSM frequency bands.

### Functional Diagram



Function	Pin No.
LO	2
IF & RF*	7
GND	1, 3, 4, 6, 8
N/C or GND	5

\* External components (inductors & capacitors) are required to diplex the signal

### Specifications <sup>(1)</sup>

Parameters	Units	Min	Typ	Max	Comments
RF Frequency Range	MHz		800 – 915		
LO Frequency Range	MHz		700 – 845		
IF Frequency Range	MHz		70 – 120		
SSB Conversion Loss	dB		7	9.5	
Noise Figure	dB		7.5		See note 2
Input IP3	dBm	+28	+35		See note 3
Input P1dB	dBm		+18		
LO – RF Isolation	dB	30	37		
LO – IF Isolation	dB	47	55		
RF – IF Isolation	dB		15		
Return Loss: RF Port	dB		15		See note 4
Return Loss: IF Port	dB		16		See note 4
Return Loss: LO Port	dB		11		
LO Drive Level	dBm		+17		

Test conditions unless otherwise noted:

1. Performance is with the use of an application specific circuit (shown on page 3) with a high-side LO at +17 dBm in a downconverting application at 25° C.
2. Assumes LO injection noise is filtered at the thermal noise floor, -174 dBm/Hz, at the RF, IF, and Image frequencies.
3. IIP3 is measured with  $\Delta f = 1$  MHz with  $RF_{in} = 0$  dBm / tone.
4. The return loss is measured after the diplexer which splits the RF and IF signals from the mixer. Details of the 4-element diplexing circuit are shown on page 3.

### Absolute Maximum Rating

Parameter	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-65 to +100 °C
LO Power	+21 dBm
Input IF / RF Power	+20 dBm

Operation of this device above any of these parameters may cause permanent damage.

### Ordering Information

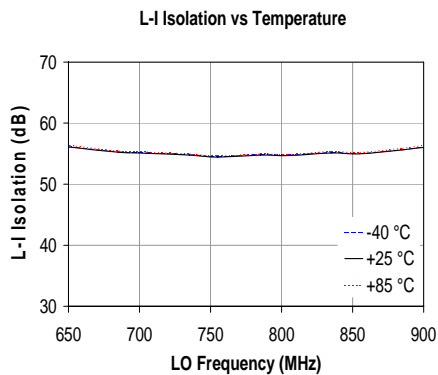
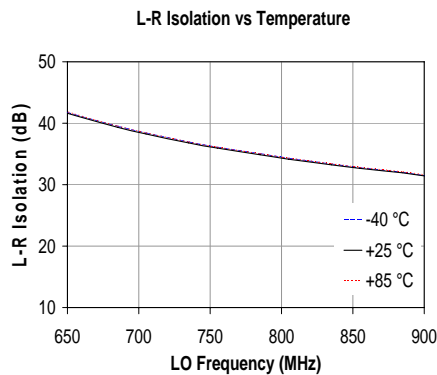
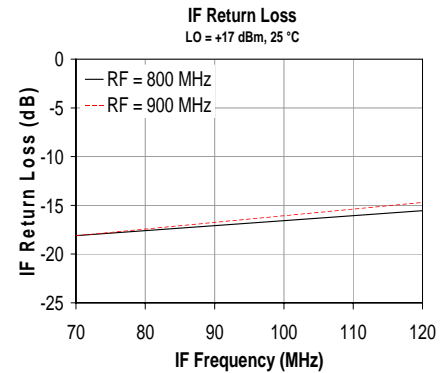
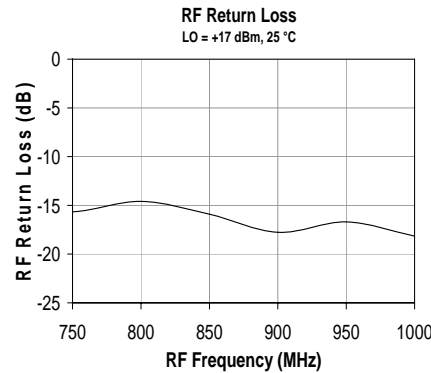
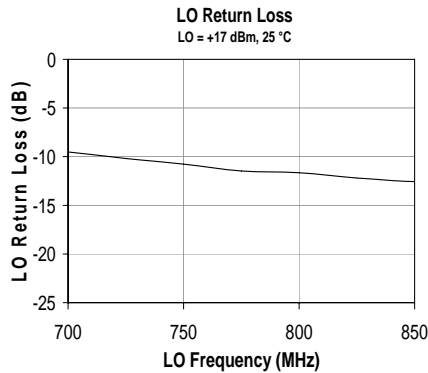
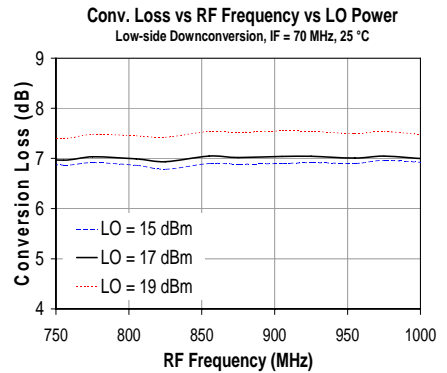
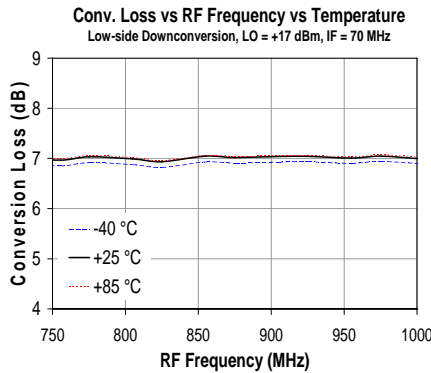
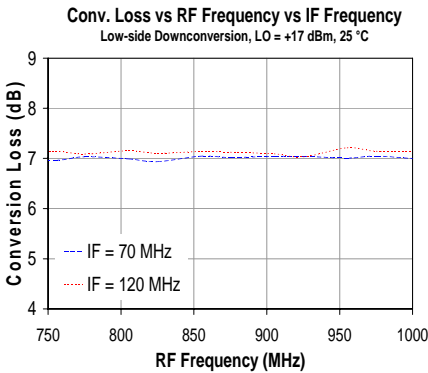
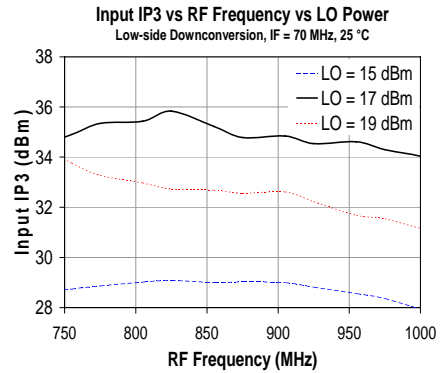
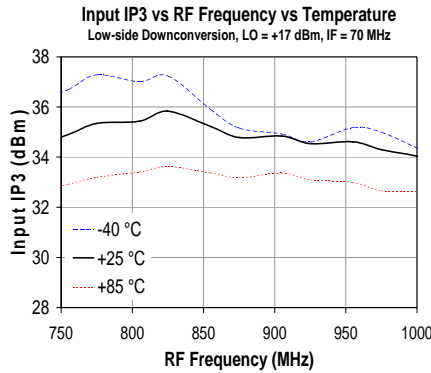
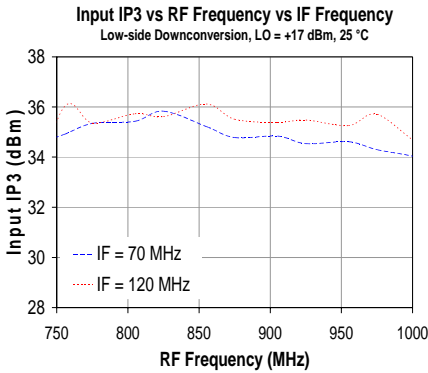
Part No.	Description
MH205A	Cellular-band MMIC Mixer
MH205A-PCB	Fully-Assembled Mixer Application Board

Specifications and information are subject to change without notice



## Typical Downconversion Performance Plots

Performance using the MH205A with the 4-element diplexer shown on page 3





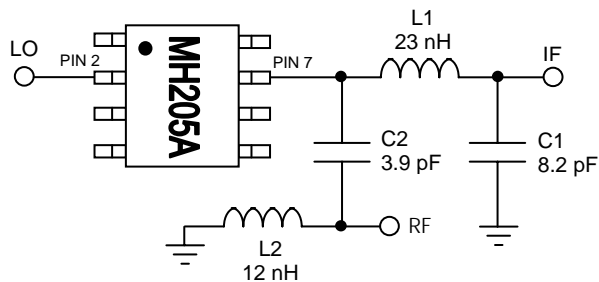
# MH205A

High Linearity Cellular-Band MMIC Mixer

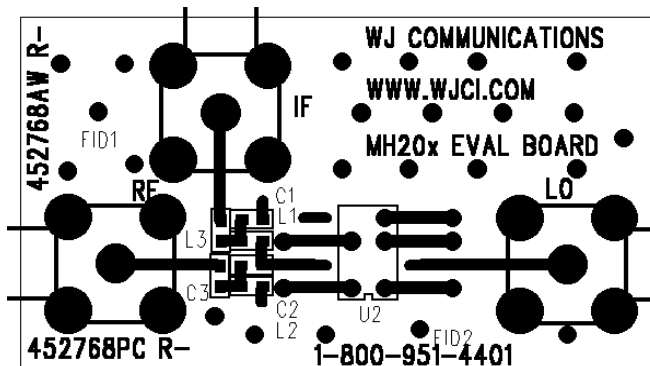
The Communications Edge™

Product Information

## Application Circuit (MH205A-PCB)

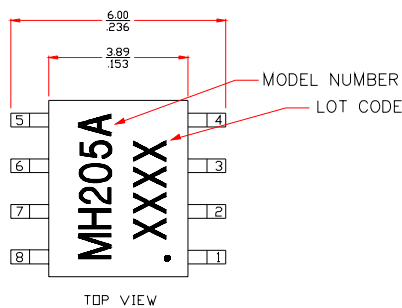


All inductors are of size 0402 (Coilcraft 0402CS series).  
 All capacitors are of size 0402 (AVX 0402 Series).  
 All other pins on mixer are grounded.

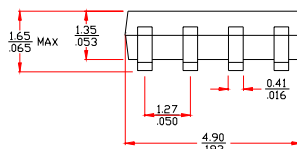
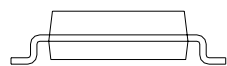


Circuit Board Material: .014" FR-4, 4 layers, .062" total thickness

## Outline Drawing



mm  
inch



## Product Marking

The component will be marked with an "MH205A" designator followed by a four- or five-digit alpha-numeric lot code on the top surface of the package.

Tape and reel specifications for this part are located on the website in the "Application Notes" section.

## ESD / MSL Information



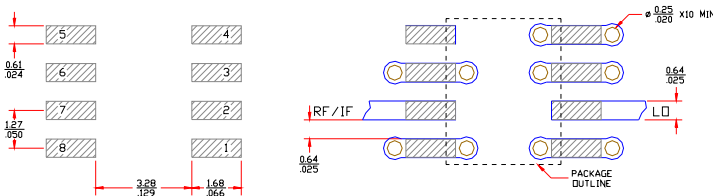
Caution! ESD sensitive device.

ESD Classification: Class 1B  
 Value: Passes  $\geq 500$  V to  $<1000$  V  
 Test: Human Body Model (HBM)  
 Standard: JEDEC Standard JESD22-A114

ESD Classification: Class III  
 Value: Passes  $\geq 500$  V to  $<1000$  V  
 Test: Charged Device Model (CDM)  
 Standard: JEDEC Standard JESD22-C101

MSL Rating: Level 3 at  $+235$  °C convection reflow  
 Standard: JEDEC Standard J-STD-020B

## Mounting Configuration / Land Pattern



Notes: 1. Ground vias are critical for thermal and RF grounding considerations.  
 2. A minimum of 10 ground vias are required for 14 mil and 28 mil FR4 board.  
 3. If your PCB design rules allow, ground vias should be placed under the land pattern for better RF and thermal performance. Otherwise ground vias should be placed as close to land pattern as possible.  
 4. Trace width depends on PCB board.

## Functional Pin Layout

Pin	Function
1	Ground
2	LO Port
3	Ground
4	Ground
5	No Connect / Ground
6	Ground
7	RF / IF Port*
8	Ground

\* External components (inductors & capacitors) are required to duplex the signal

Specifications and information are subject to change without notice