

MH205A

High Linearity Cellular-Band MMIC Mixer *Product Information*



Product Features

- +35 dBm IIP3
- RF: 800 – 915 MHz
- LO: 700 – 845 MHz
- IF: 70 – 120 MHz
- +17 dBm Drive Level
- Lead-free/Green SOIC8 package
- No External Bias Required

Applications

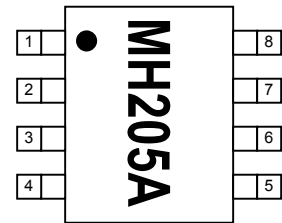
- 2.5G and 3G GSM/CDMA/wCDMA Mobile Infrastructure

Product Description

The MH205A is a passive GaAs MESFET mixer that provides high dynamic range performance in a low-cost lead-free/green/RoHS-compliant SOIC-8 package. WJ's MH205A uses patented techniques to realize +35 dBm Input IP3 at an LO drive level of +17 dBm and can be used for upconverting or downconverting low-side LO applications. 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 GSM/CDMA/wCDMA mobile infrastructure in the cellular frequency band.

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 ⁽¹⁾

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*	High Dynamic Range Cellular-band MMIC Mixer (lead-tin SOIC-8 package)
MH205A-G	High Dynamic Range Cellular-band MMIC Mixer (lead-free/green/RoHS-compliant SOIC-8 package)
MH205A-PCB	Fully-Assembled Mixer Application Board

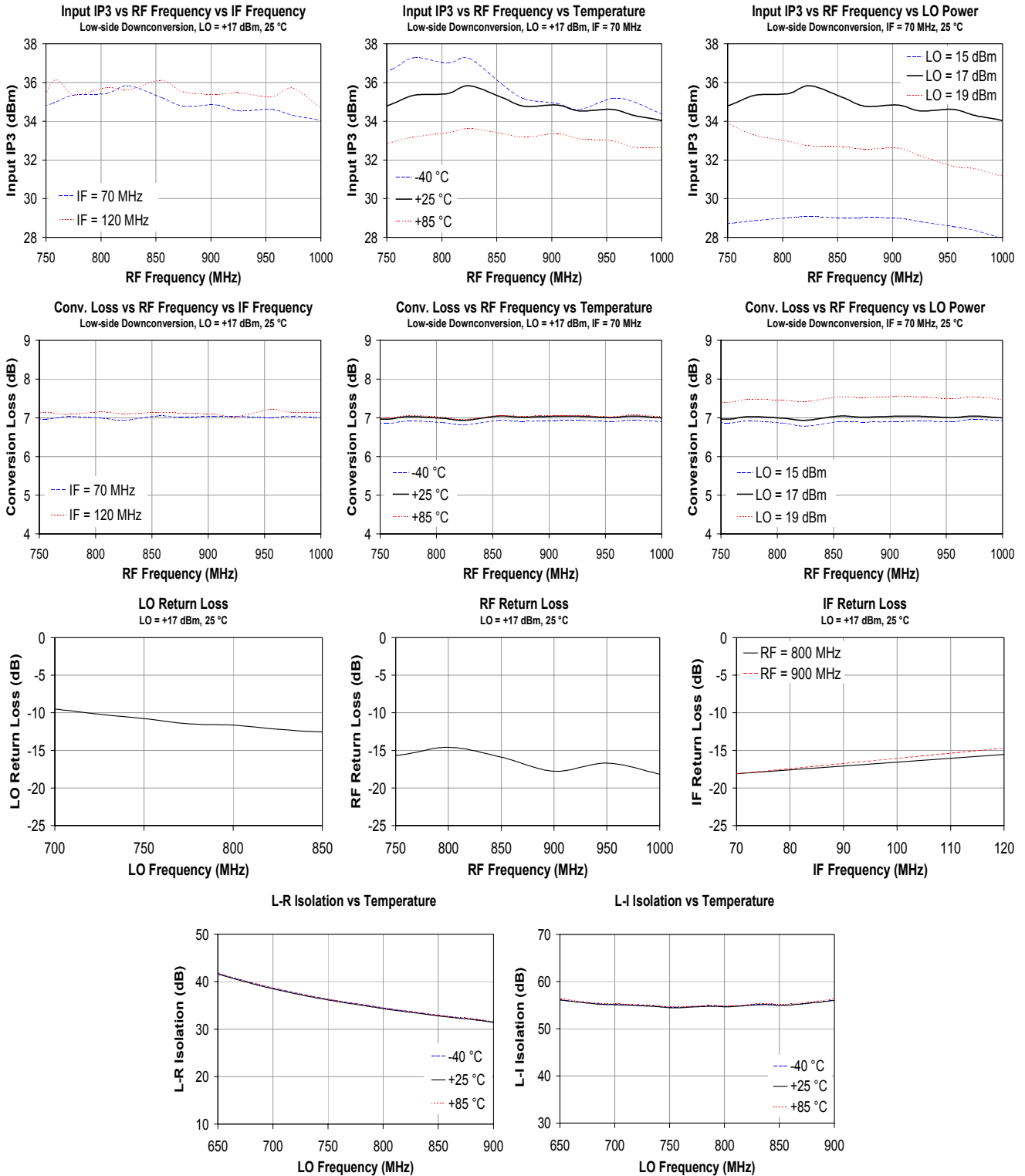
* This package is being phased out in favor of the green package type which is backward compatible for existing designs.

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



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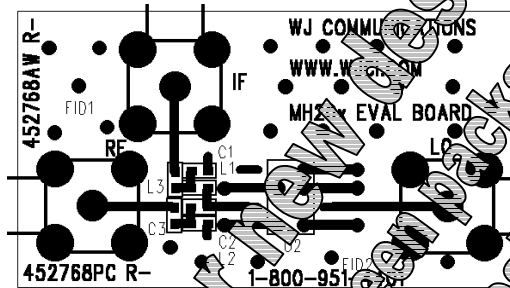
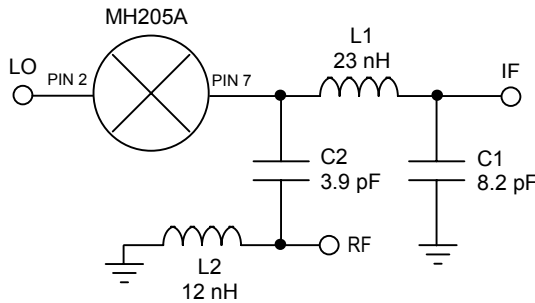
Product Information



MH205A (Tin-Lead SOIC-8 Package) Mechanical Information

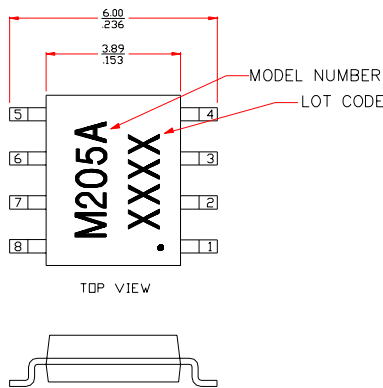
This package may contain lead-bearing materials. The plating material on the leads is SnPb.

Application Circuit (MH205A-PCB)



Circuit Board Material: 1.6mm (1/16") FR-4, 4-layer, .062" thickness
 All passive components are 0402 size
 All other pins on mixer are grounded.

Outline Drawing



Product Marking

The component can be marked with an "M205A" designator followed by an alphanumeric 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



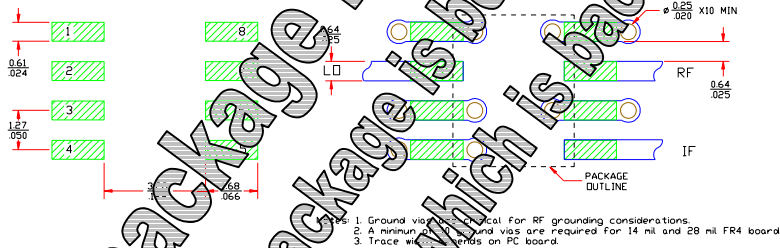
Caution! ESD sensitive device.

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

ESD Classification: Class III
 Value: Passes /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 and System



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

MH205A

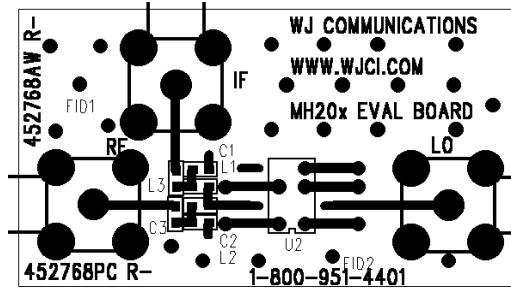
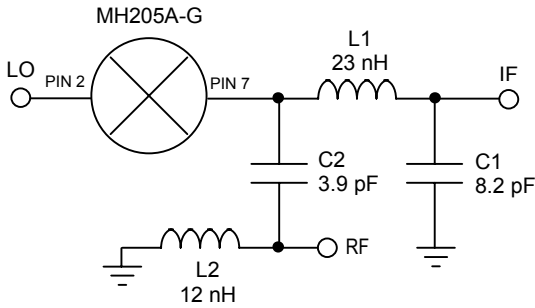
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MH205A-G (Lead-Free/Green SOIC-8 Package) Mechanical Information

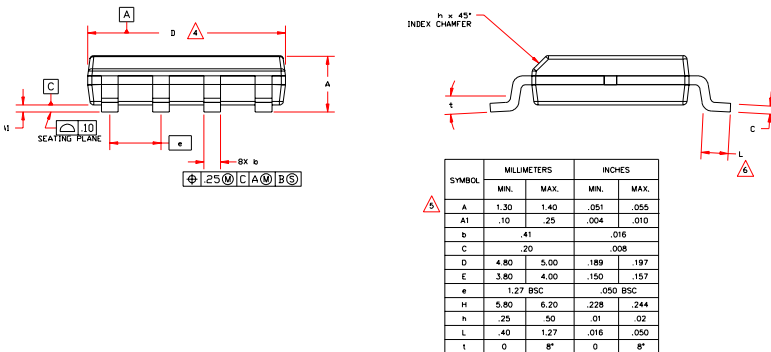
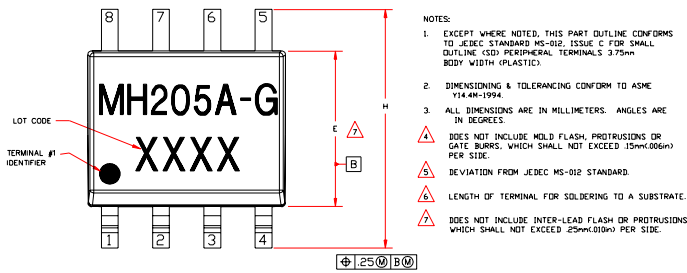
This package is lead-free/green/RoHS-compliant. The plating material on the leads is NiPdAu. It is compatible with both lead-free (maximum 260°C reflow temperature) and lead (maximum 245°C reflow temperature) soldering processes.

Application Circuit (MH205A-PCB)



Circuit Board Material: .014" FR-4, 4 layers, .062" total thickness
All passive components are 0402 size.
All other pins on mixer are grounded.

Outline Drawing



Product Marking

The component will be marked with an "MH205A-G" designator followed by an alphanumeric 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

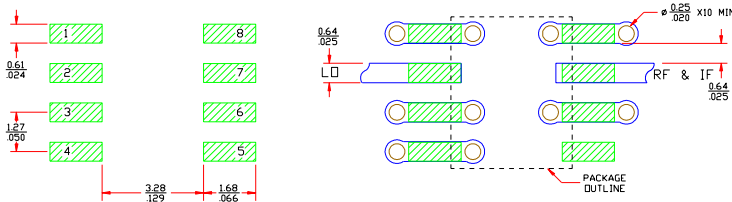


ESD Classification: Class 1B
Value: Passes /500V to <1000 V
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

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

MSL Rating: Level 2 at +260 °C convection reflow
Standard: JEDEC Standard J-STD-020B

Land Pattern / Mounting Configuration



Notes: 1. Ground vias are critical for RF grounding considerations.
2. A minimum of 10 ground vias are required for 14 mil and 28 mil FR4 board.
3. 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 diplex the signal

Specifications and information are subject to change without notice