



# MH102

High Dynamic Range MMIC Mixer

The Communications Edge™

Product Information

## Product Features

- +32 dBm Input IP3
- No External Matching Elements Required
- RF 1900-2200 MHz
- IF 150-300 MHz
- Low Cost SOIC-8 Package
- UMTS Up/Down Converter
- 1930-1990 MHz Up Converter

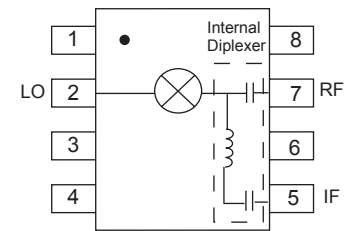
## Product Description

The MH102 is a passive GaAs MESFET mixer that provides high dynamic range performance in a low cost SOIC-8 package. WJ's MH102 uses patented techniques to realize greater than +30 dBm Input IP3 at an LO drive level of +17 dBm.

This single monolithic integrated circuit does not require any external baluns, bias, matching, or decoupling elements. The on-chip diplexer affords good matching on the RF and IF ports.

Typical applications include frequency up/down conversion, modulation and demodulation for receivers and transmitters used in 3G UMTS systems.

## Functional Diagram



Function	Pin No.
RF	7
LO	2
IF	5
Ground	1,3,4,6,8

## Specifications

Parameter	Units	Minimum	Typical	Maximum	Condition
Frequency Range:					
RF	MHz	1900		2200	
LO	MHz	1600		2050	
IF	MHz	150		300	
SSB Conversion Loss	dB		9.0	10.5	
Noise Figure	dB		9.5		
Input IP3	dBm	+28	+32		
Input P1dB	dBm		+16		
Isolation:					
L-R	dB	21	27		
L-I	dB	27	35		
R-I	dB	12	18		
Return Loss:					
RF Port	dB		15		
LO Port	dB		12		
IF Port	dB		20		
LO Drive Level	dBm		+17		

Test conditions unless otherwise noted: RF / IF = 1900 / 300, 2200 / 150, and 2200 / 300 MHz with a low-side LO at +17 dBm in a downconverting application at 25°C. Input IP3 was measured with two tones with an input power of +2 dBm/tone separated by 10 MHz.

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

Parameter	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-65 to +100°C
Maximum Input LO Power <sup>2</sup>	+21 dBm

1. Operation of this device above any of these parameters may cause permanent damage.
2. Total sum of LO port and RF port power should not to exceed +23 dBm.

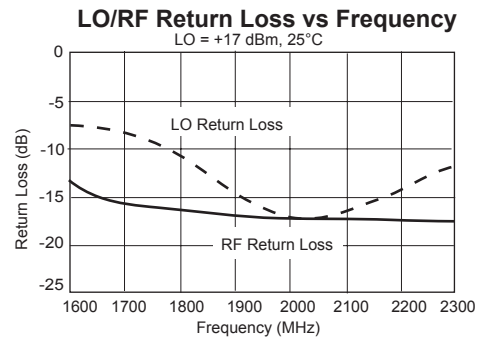
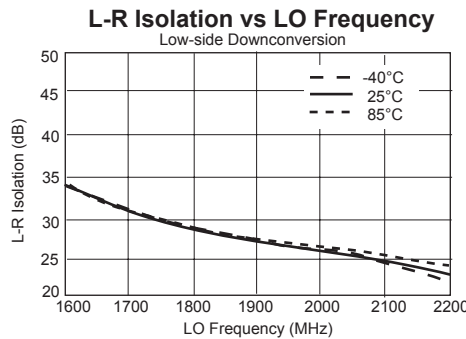
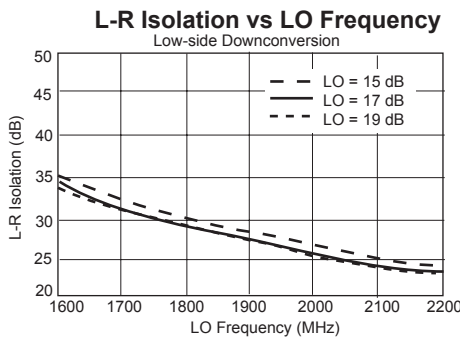
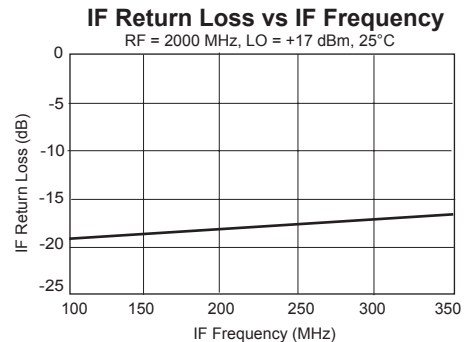
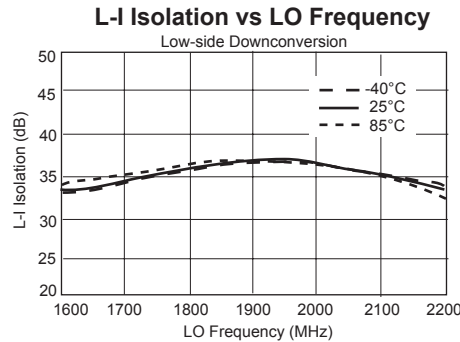
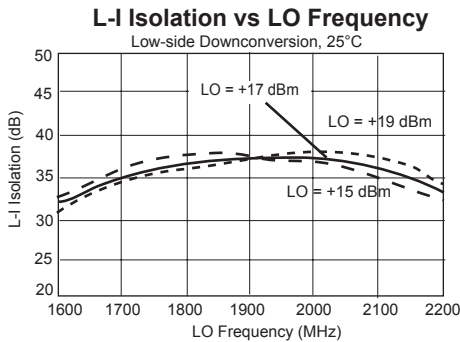
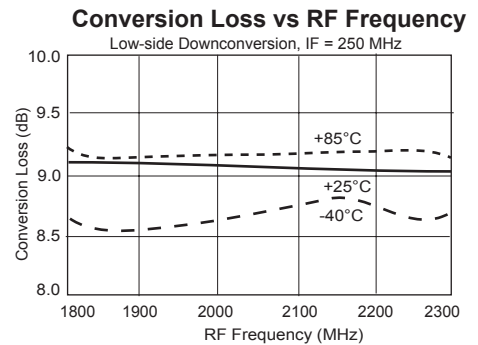
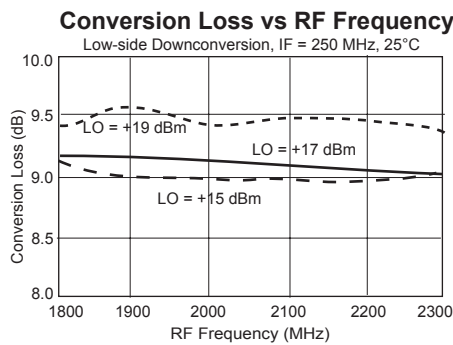
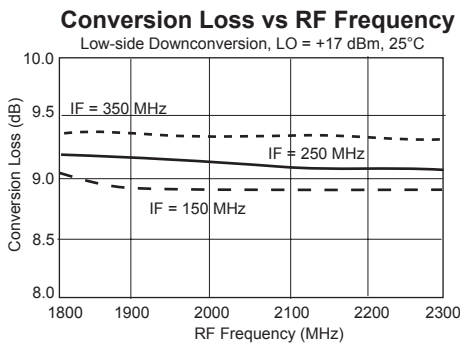
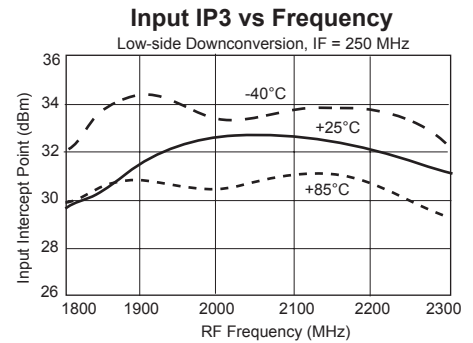
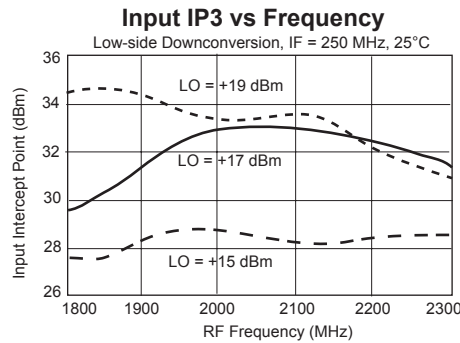
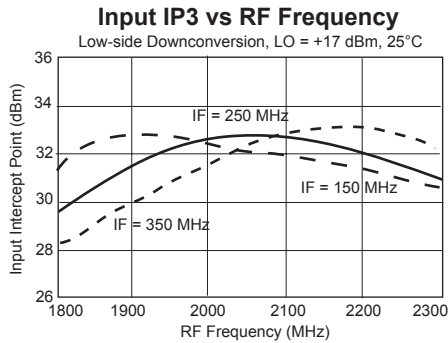
## Ordering Information

Part No.	Description
MH102	High Dynamic Range MMIC Mixer (Available in tape and reel)
MH102-PCB	Fully Assembled Application Circuit

Specifications and information are subject to change without notice.



## Performance Charts



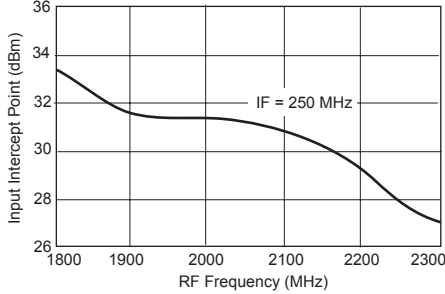
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## Performance Charts

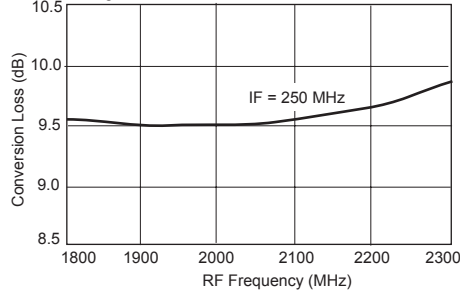
### Input IP3 vs RF Frequency

Low-side Downconversion, LO = +17 dBm, 25°C



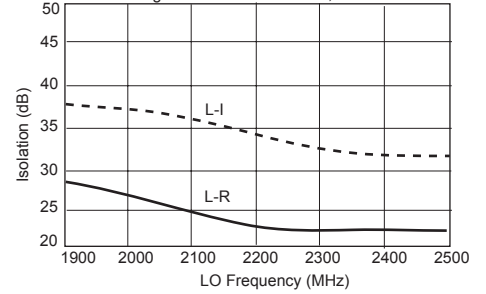
### Conversion Loss vs RF Frequency

High-side Downconversion, LO = +17 dBm, 25°C



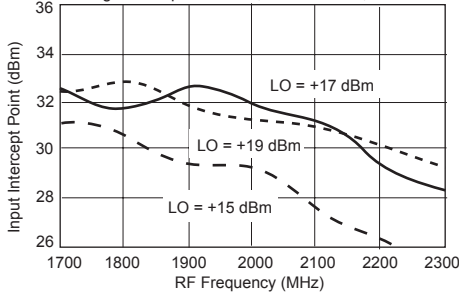
### Isolation vs LO Frequency

High-side Downconversion, 25°C



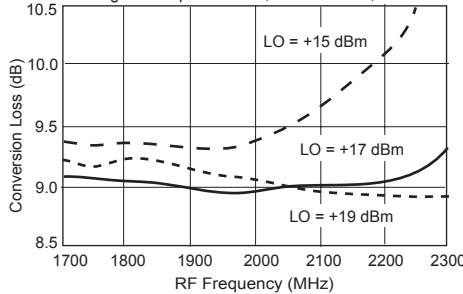
### Input IP3 vs RF Frequency

High-side Upconversion, IF = 250 MHz, 25°C



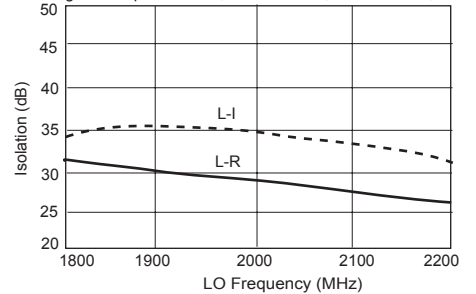
### Conversion Loss vs RF Frequency

High-side Upconversion, IF = 250 MHz, 25°C



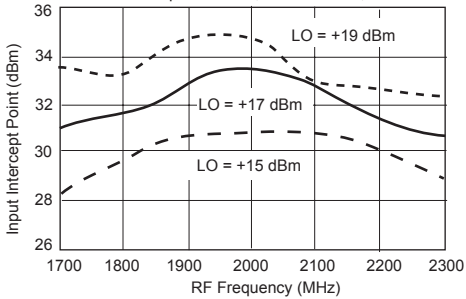
### Isolation vs LO Frequency

High-side Upconversion, IF = 250 MHz, LO = 17 dBm, 25°C



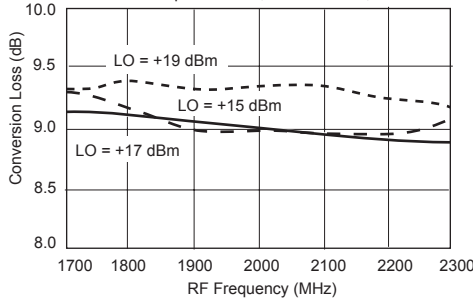
### Input IP3 vs RF Frequency

Low-side Upconversion, IF = 250 MHz, 25°C



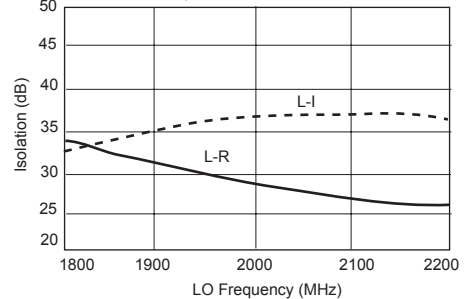
### Conversion Loss vs RF Frequency

Low-side Upconversion, IF = 250 MHz, 25°C

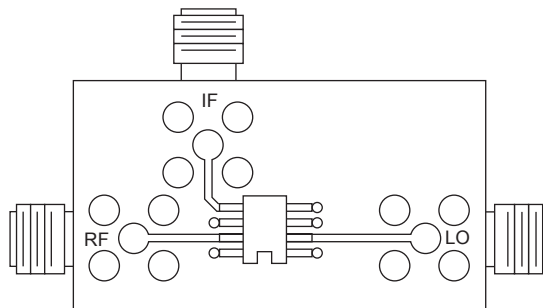


### Isolation vs LO Frequency

Low-side Upconversion, IF = 250 MHz, 25°C



## Application Circuit



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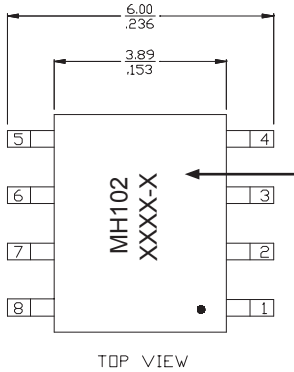
# MH102

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Product Information

## Outline Drawing



'MH102' = Part Designation  
'XXXX-X' = Lot Code

mm  
inch

## MSL / ESD Rating

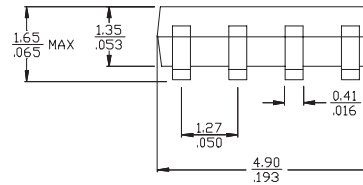


Caution! ESD sensitive device.

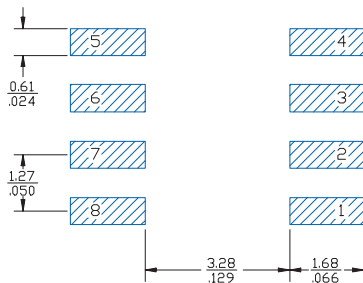
ESD Rating: Class 0  
Value: Passes between 150V and 200V  
Test: Human Body Model (HBM)  
Standard: JEDEC Standard JESD22-A114

ESD Rating: Class II  
Value: Passes between 250V and 500  
Test: Charged Device Model (CDM)  
Standard: JEDEC Standard JESD22-C101

MSL Rating: Level 3  
Standard: JEDEC Standard J-STD-020A

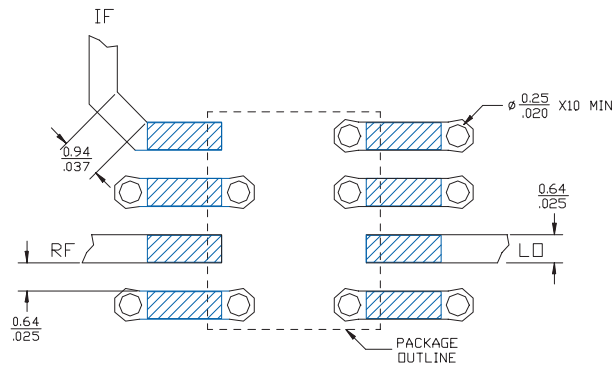


## Land Pattern



FUNCTION	PIN NO.
GROUND	1
LO	2
GROUND	3-4
IF	5
GROUND	6
RF	7
GROUND	8

## Mounting Configuration



- 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 PC board.

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