

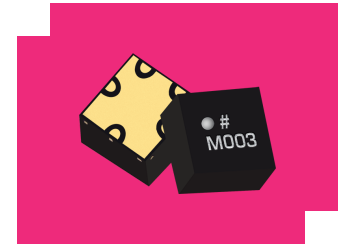
# MM1-1886HCSP2

## GaAs MMIC Chip Scale Package Double Balanced Mixer

### DEVICE OVERVIEW

#### General Description

The MM1-1886HCSP2 is a highly linear passive GaAs double balanced MMIC mixer suitable for both up and down-conversion applications. As with all Marki Microwave mixers, it features excellent conversion loss, isolation and spurious performance across a broad bandwidth and in a small form factor. The MM1-1886HCSP2 is available in a lead-free, RoHS compliant 2.5x2.5 mm chip scale surface mount package (CSP2) and is compatible with standard leaded and lead-free PCB reflow soldering processes.



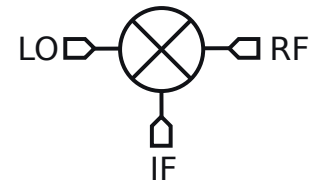
#### Features

- Compact 2.5x2.5 mm Chip Scale Package
- Broadband Performance
- Excellent Unit-to-Unit Repeatability
- RoHS Compliant

#### Applications

- mmWave Frequency Conversion
- Test and Measurement Equipment
- Fixed RF up converters

#### Functional Block Diagram



#### Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MM1-1886HCSP2	GaAs MMIC Chip Scale Package Double Balanced Mixer	CSP2	REACH RoHS	Released	EAR99
EVB-MM1-1886H	GaAs MMIC Chip Scale Package Double Balanced Mixer	EVB		Released	EAR99

## MM1-1886HCSP2

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#### Revision History

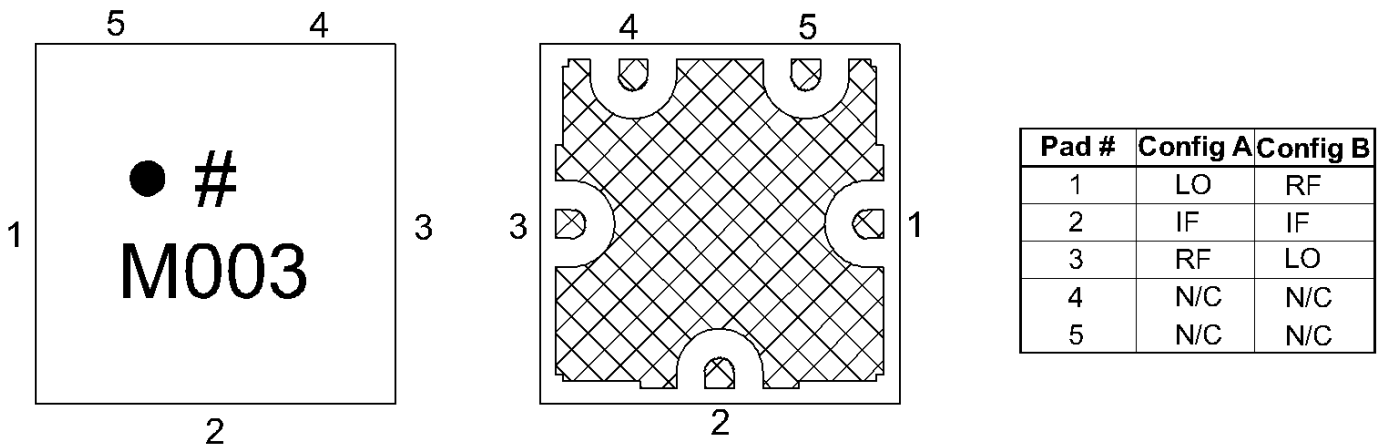
Revision Code	Revision Date	Comment
-	2024-08-15	Initial Release
A	2025-04-28	Updated Moisture Sensitivity from MSL3 to MSL1

## MM1-1886HCSP2

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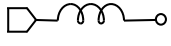

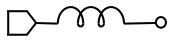
### Port Configuration and Functions

#### Port Diagram



### Port Functions

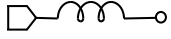
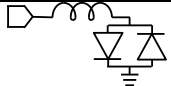
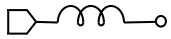
#### Configuration A

Port	Function	Description	DC Equivalent Circuit
Port 1	LO	Port 1 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	
Port 2	IF	Port 2 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 3	RF	Port 3 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	

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### GaAs MMIC Chip Scale Package Double Balanced Mixer

#### Configuration B

Port	Function	Description	DC Equivalent Circuit
Port 1	RF	Port 1 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	
Port 2	IF	Port 2 is DC coupled to the diodes. Blocking capacitor is optional.	
Port 3	LO	Port 3 is DC open and AC matched to 50 Ohms from 6 to 26.5 GHz. Blocking capacitor is optional.	

## MM1-1886HCSP2

### GaAs MMIC Chip Scale Package Double Balanced Mixer

## Specifications

### Absolute Maximum Ratings

Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C. All bare die are 100% DC tested and visually inspected.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Port 5 DC Current	15	mA
RF Power Handling (RF+LO), 100°C	21	dBm
RF Power Handling (RF+LO), 25°C	28	dBm

### Package Information

Parameter	Details	Rating
Dimensions	-	2.50 x 2.50 mm
Moisture Sensitivity Level	-	MSL 1

### Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
LO Input Power	13	15	24	dBm

## MM1-1886HCSP2

### GaAs MMIC Chip Scale Package Double Balanced Mixer

#### Electrical Specifications

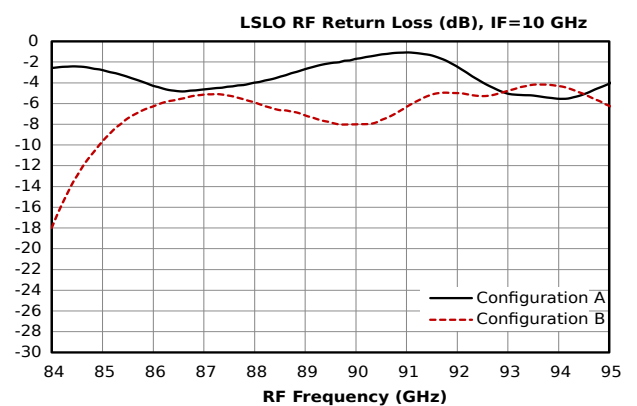
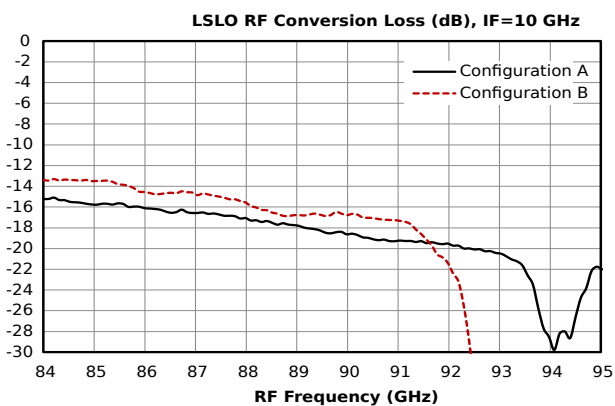
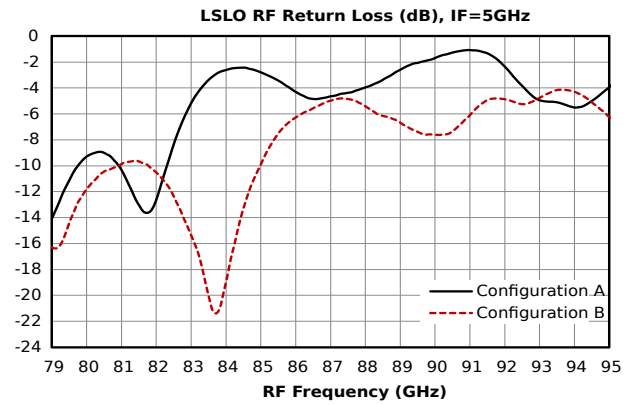
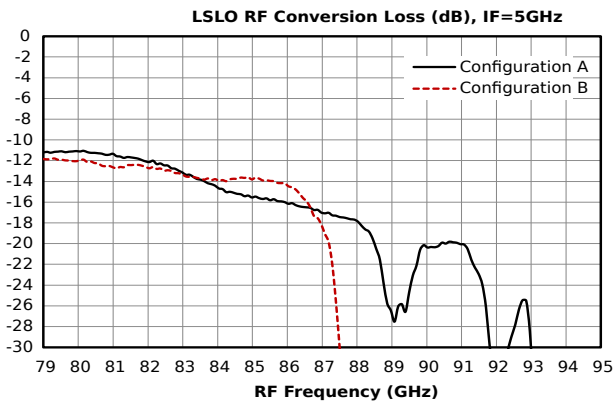
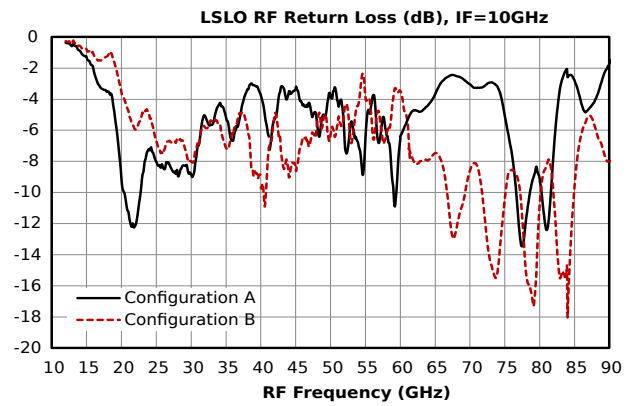
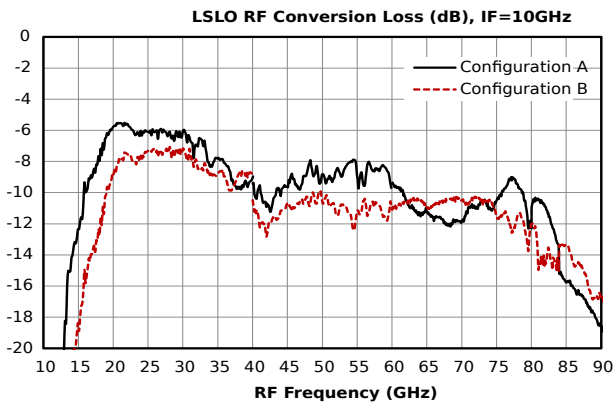
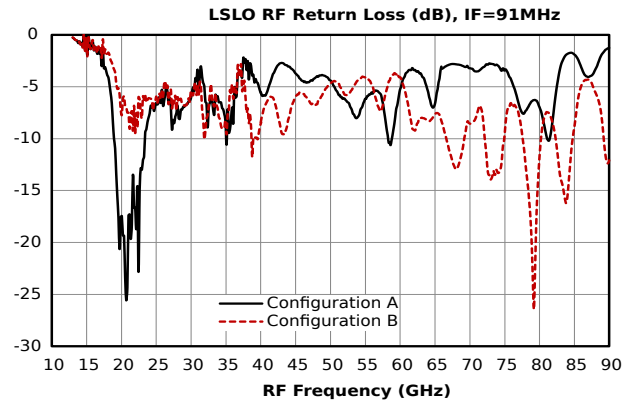
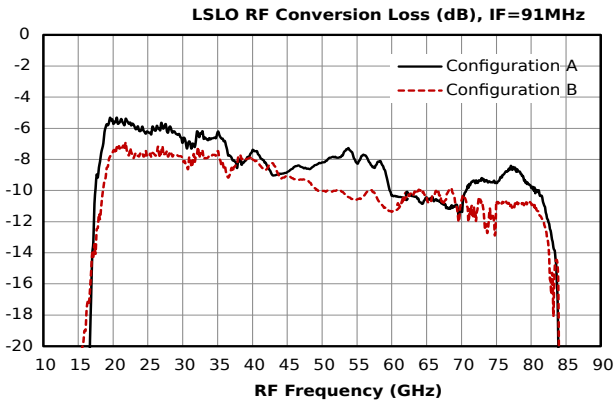
Specifications guaranteed from -55 to +100°C, measured in a 50Ω system. Typical data shown is for a down conversion application with a +15dBm sine wave LO input.

Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
Conversion Loss	-	RF/LO=18-80GHz IF=91MHz	-	9	-	dB
Conversion Loss	-	RF/LO=80-86GHz IF=5GHz	-	14	-	dB
IF Frequency Range	-	-	0	-	27	GHz
Input IP3	-	LO=18-67GHz RF=17-67GHz IF=DC-27GHz LO drive level=+15dBm Configuration A	-	20	-	dBm
LO Frequency Range	-	-	18	-	86	GHz
LO-IF Isolation	-	LO=18-67GHz RF=17-67GHz IF=DC-27GHz LO drive level=+15dBm Configuration A	-	30	-	dB
LO-RF Isolation	-	LO=18-67GHz RF=17-67GHz IF=DC-27GHz LO drive level=+15dBm Configuration A	-	40	-	dB
RF Frequency Range	-	-	18	-	86	GHz
RF-IF Isolation	-	LO=18-67GHz RF=17-67GHz IF=DC-27GHz LO drive level=+15dBm Configuration A	-	40	-	dB

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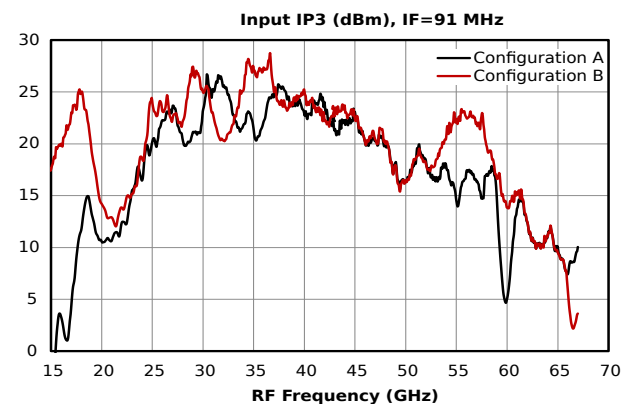
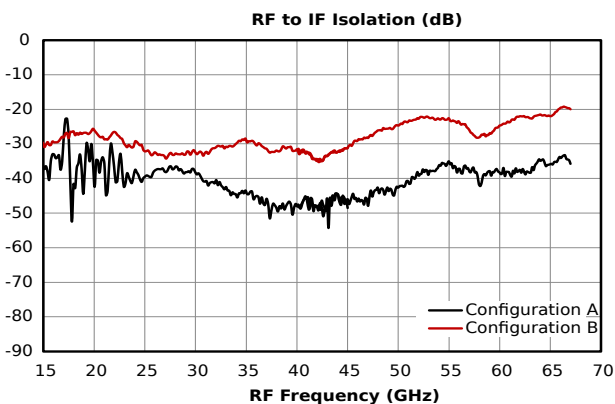
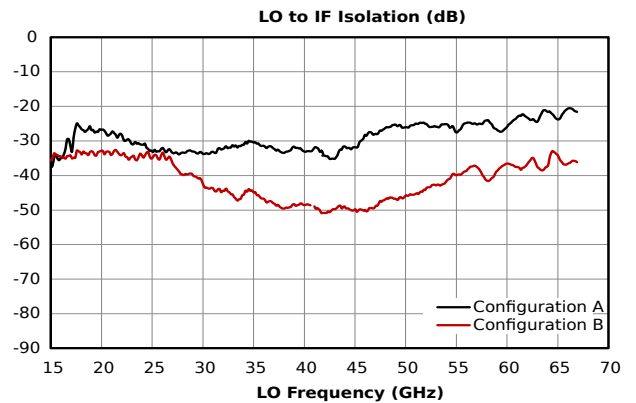
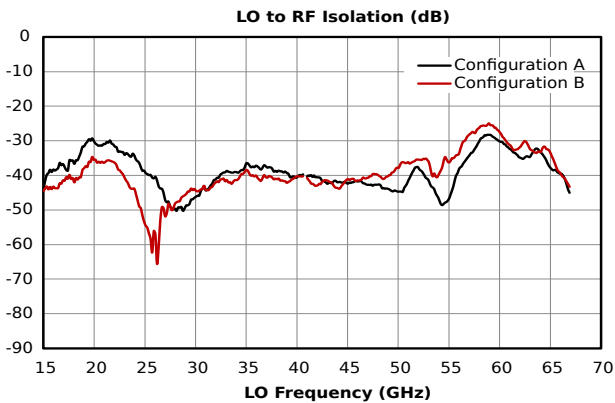
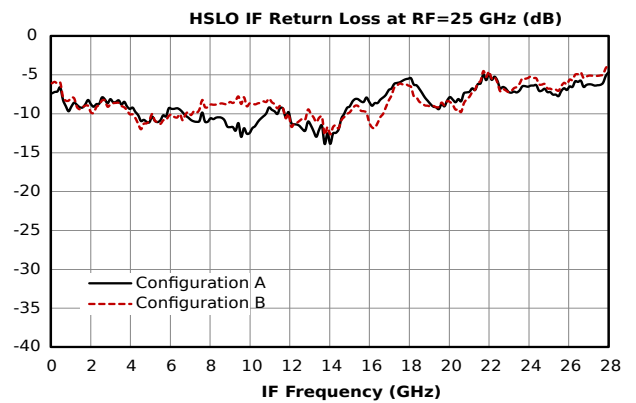
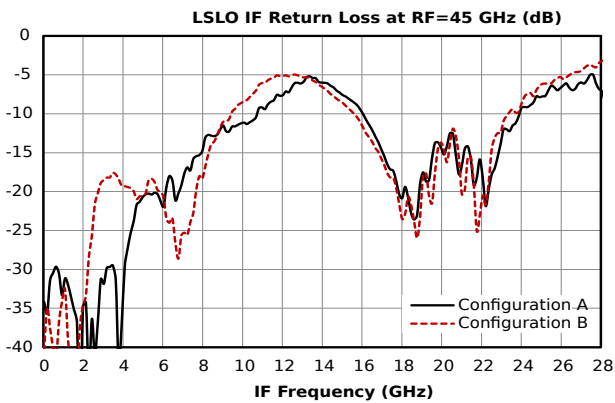
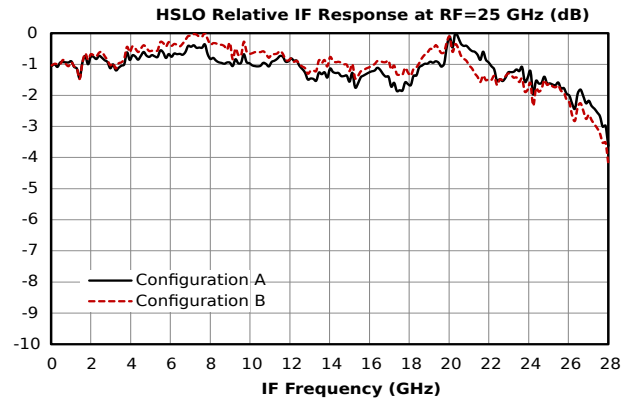
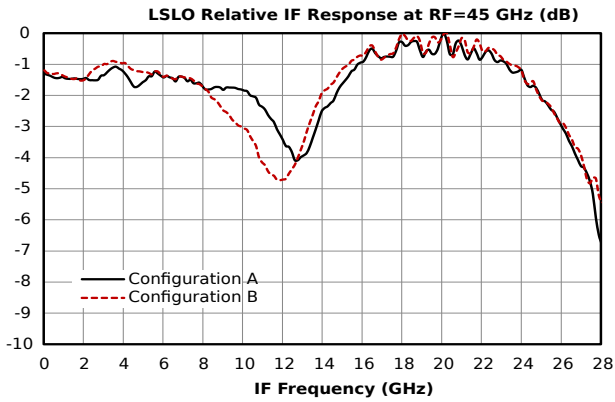
## GaAs MMIC Chip Scale Package Double Balanced Mixer

### Typical Performance



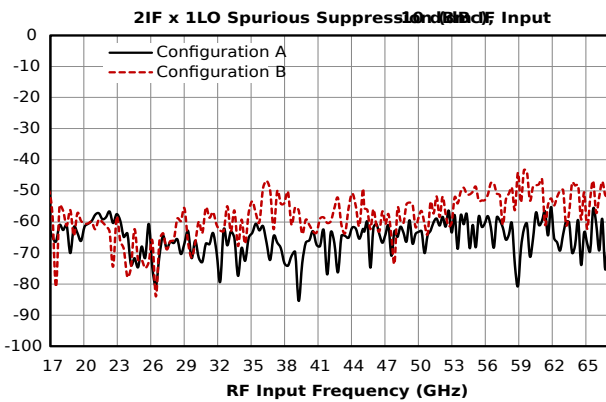
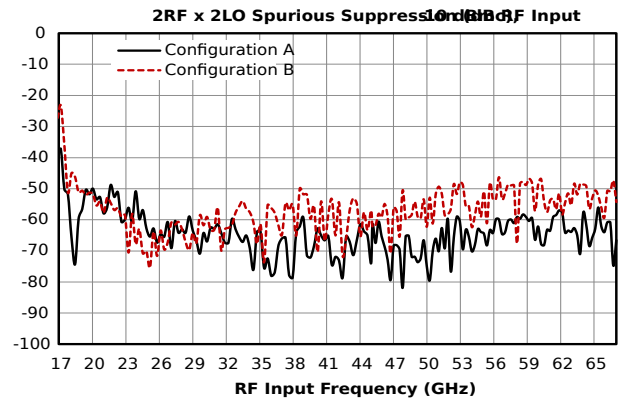
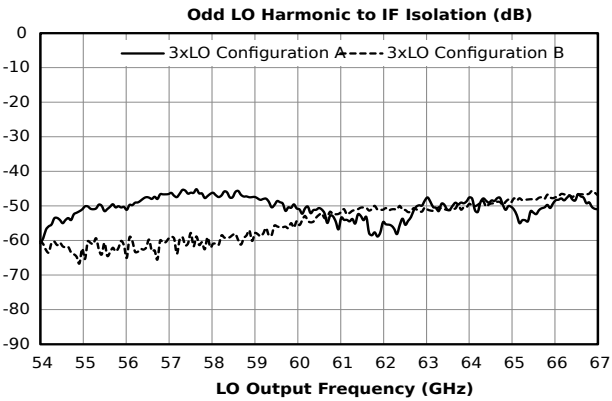
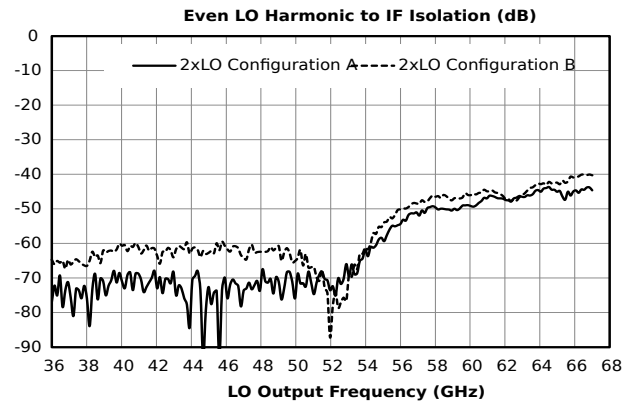
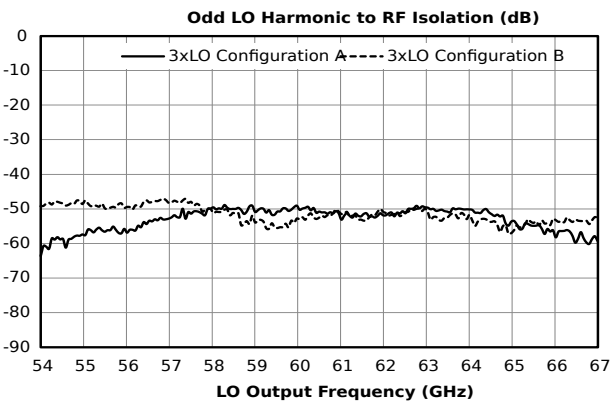
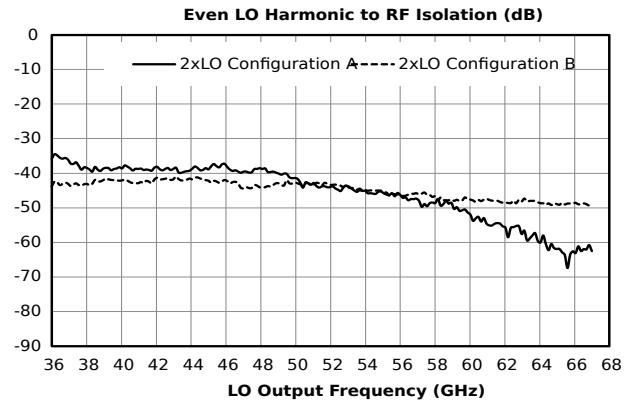
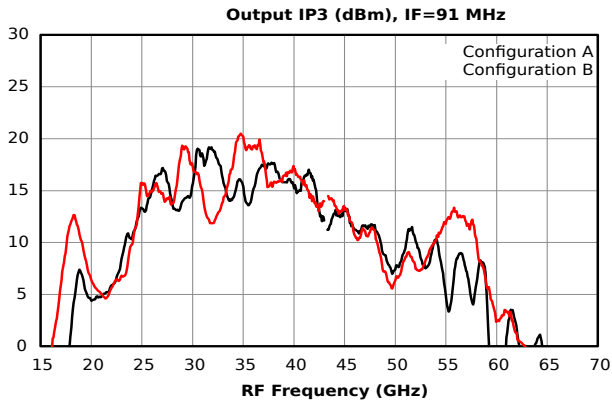
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## GaAs MMIC Chip Scale Package Double Balanced Mixer



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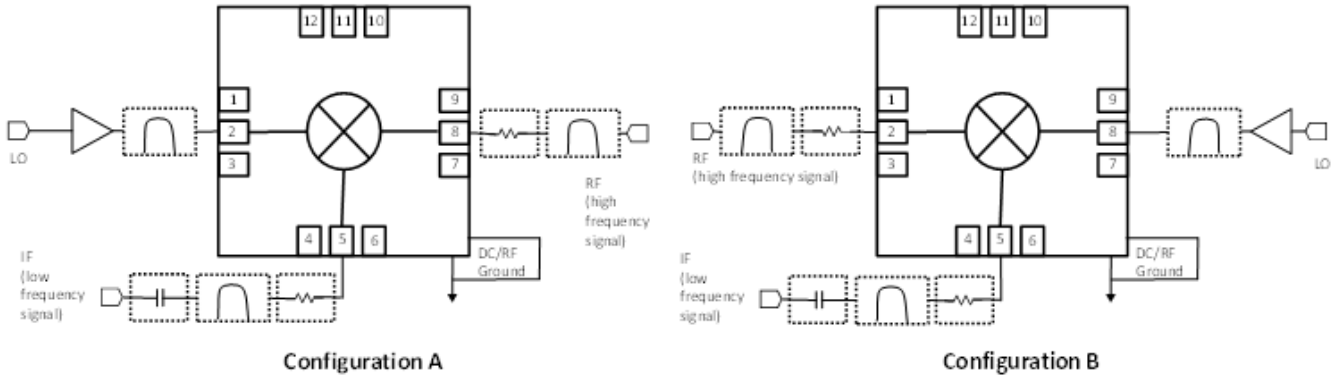
## GaAs MMIC Chip Scale Package Double Balanced Mixer



## MM1-1886HCSP2

### GaAs MMIC Chip Scale Package Double Balanced Mixer

#### Application Circuit



## Application Circuit Description

### Ports Operation

**IF Port** – Used as input on an upconversion, output on downconversion, or LO port in a band shifting application. Signals should be connected by 50 ohm microstrip or coplanar traces to well matched broadband 50 ohm sources and loads. Blocking capacitor is recommended if DC voltage is present on the line.

**RF Port** – Used as input on a downconversion, output on upconversion, or output in a band shifting application. Signals should be connected by 50 ohm microstrip or coplanar traces to well matched broadband 50 ohm sources and loads.

**Filtering and Matching**- Filtering is generally desired for spurious and image removal on the output port of the mixer. Reflective filters can cause out of band signals to reflect back into the mixer and cause conversion loss ripple, erroneous spurs, and other undesired behaviors. To eliminate these problems it is recommend that the filters be placed as close to the output port as possible. If undesired behavior is still observed, a diplexer with one port terminated or a 1-3 dB attenuator may reduce this problem.

**RF Ground** – The ground paddle of the QFN should be connected to a low noise RF ground with very low electrical resistance for high frequency operation.

**LO Port** – The noise floor of the LO input signal should be less than the value of the noise floor plus isolation of the mixer, or a filter is recommended to prevent reduction in dynamic range. An LO amplifier is required if the LO power is below the recommended drive level. It is important to use an amplifier with a broadband 50 ohm match such that it does not reflect spurious signals back into the mixer or other system circuitry.

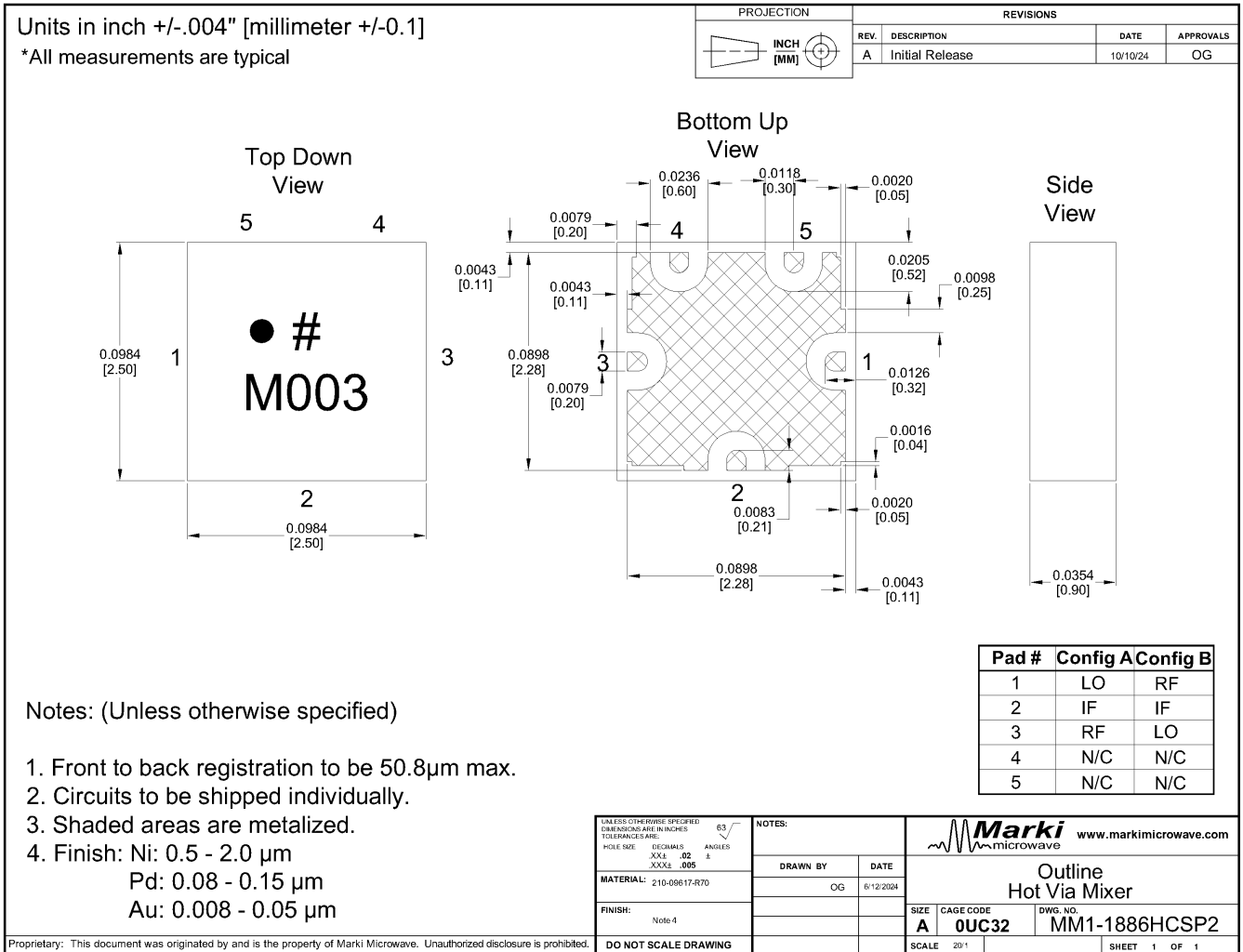
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### Mechanical Data

### Outline Drawing

Download : [Outline 2D Drawing](#) | [Outline 3D Drawing](#) | [Outline 3D STP](#)

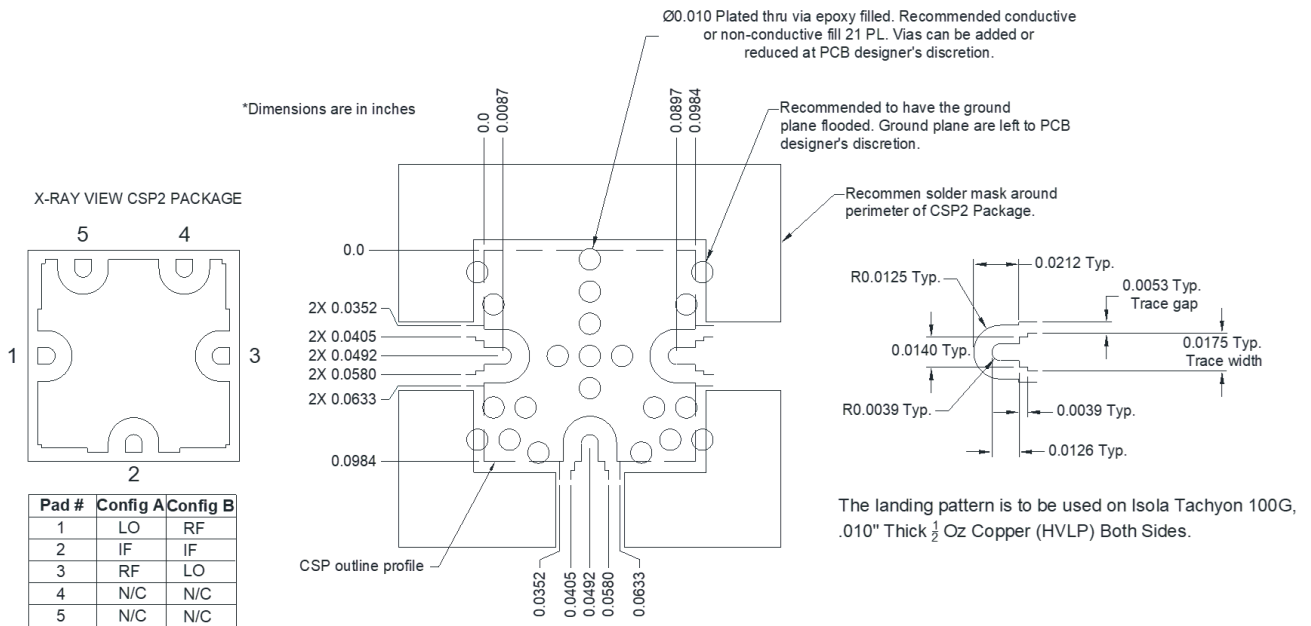


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## GaAs MMIC Chip Scale Package Double Balanced Mixer

### Footprint Image

Download : [Footprint Drawing](#)



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