

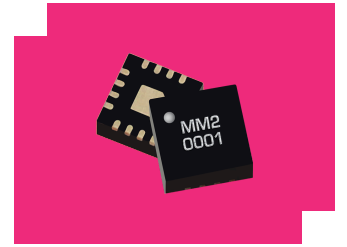
MM2-0843HPSM-1

GaAs MMIC Triple Balanced Mixer

DEVICE OVERVIEW

General Description

The MM2-0843HPSM-1 is a passive GaAs MMIC triple-balanced mixer designed with broadband operation from 8 to 43 GHz. It delivers low conversion loss, high linearity, and excellent port-to-port isolation. The device supports a wide LO input power range of +15 to +21 dBm (nominal +18 dBm), providing flexibility across system implementations. Packaged in a 3 x 3 mm QFN, the MM2-0843HPSM-1 enables compact, repeatable implementations in space-constrained RF assemblies. Evaluation boards are available.



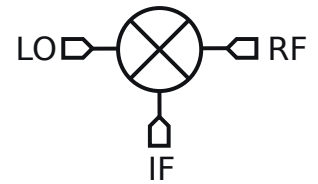
Features

- Broadband operation from 8 to 43 GHz
- Low Conversion Loss, 7 dB Typical
- High Input IP3, +24 dBm Typical
- High LO to RF Isolation, 40 dB Typical
- Small 3x3mm QFN Style Package

Applications

- Electronic Warfare
- Test and Measurement Equipment
- Radar and satellite communications

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MM2-0843HPSM-2	GaAs MMIC Triple Balanced Mixer	PSM	REACH RoHS	Released	EAR99
MM2-0843HPSM-1	GaAs MMIC Triple Balanced Mixer	PSM	REACH RoHS	Released	EAR99
EVB-MM2-0843HP	Evaluation Board, GaAs MMIC Mixer	EVB	RoHS REACH	Released	EAR99

Table Of Contents

- **Device Overview**
 - General Description
 - Features
 - Applications
 - Functional Block Diagram
- **Port Configuration and Functions**
 - Port Diagram
 - Port Functions
- **Revision History**
- **Specifications**
 - Absolute Maximum Ratings
 - Package Information
 - Recommended Operating Conditions
 - Electrical Specifications
 - Typical Performance
 - Spur Tables
- **Mechanical Data**
 - Outline Drawing
- **Footprint Image**
- **Evaluation Board**
 - Evaluation Board Outline Drawing

Revision History

Revision Code	Revision Date	Comment
-	2026-05-28	Initial Release

Port Configuration and Functions

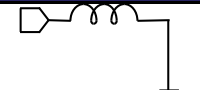
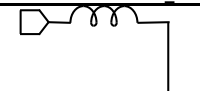
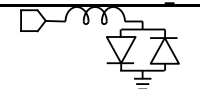
Port Diagram

A top-down x-ray view of the package is shown below.

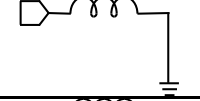
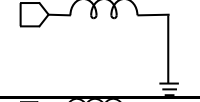



Port Functions

Configuration A

Port	Function	Description	DC Equivalent Circuit
Pin 10	LO	Pin 10 is DC short and AC matched to 50 Ω from 8 to 43 GHz. Blocking capacitor is optional.	
Pin 3	RF	Pin 3 is DC short and AC matched to 50 Ω from 8 to 43 GHz. Blocking capacitor is optional.	
Pin 6	IF	Pin 6 is DC coupled to the diodes. Blocking capacitor is optional.	

Configuration B

Port	Function	Description	DC Equivalent Circuit
Pin 10	RF	Pin 10 is DC short and AC matched to 50 Ω from 8 to 43 GHz. Blocking capacitor is optional.	
Pin 3	LO	Pin 3 is DC short and AC matched to 50 Ω from 8 to 43 GHz. Blocking capacitor is optional.	
Pin 6	IF	Pin 6 is DC coupled to the diodes. Blocking capacitor is optional.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Pin 10 DC Current	24	mA
Pin 3 DC Current	21	mA
Pin 6 DC Current	15	mA

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	3 x 3 mm
Moisture Sensitivity Level	-	MSL 1

Recommended Operating Conditions

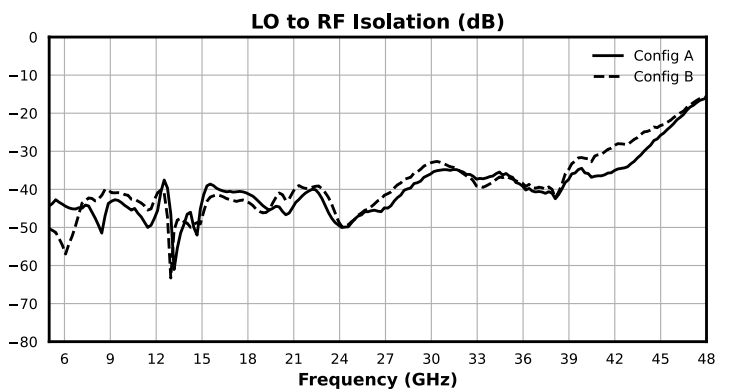
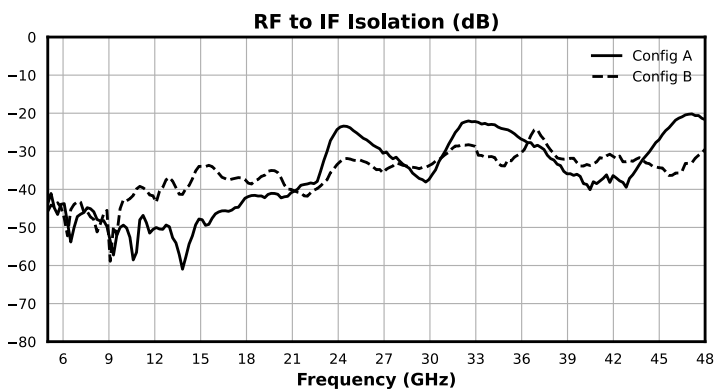
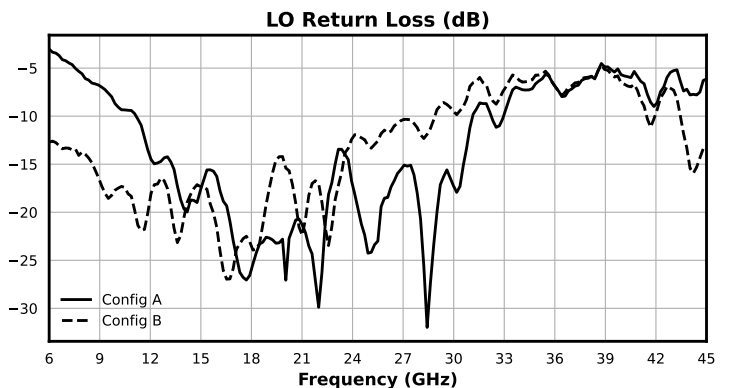
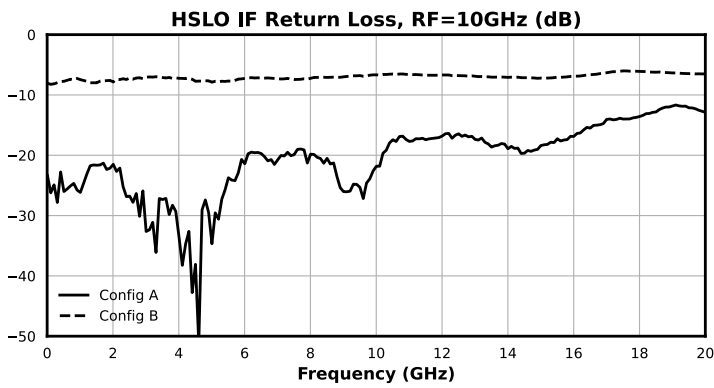
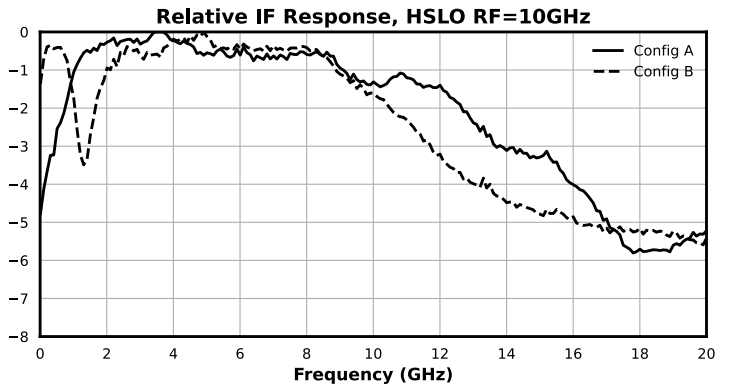
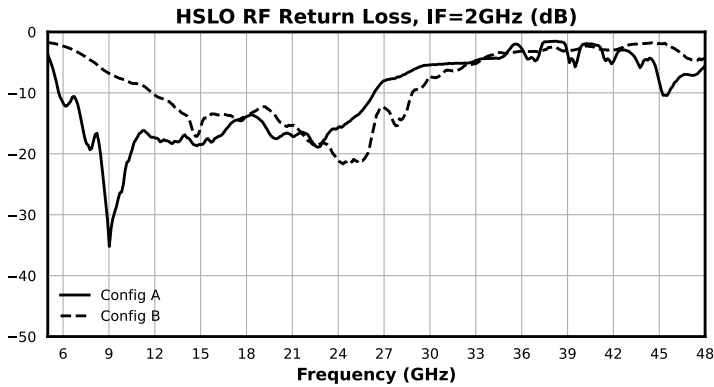
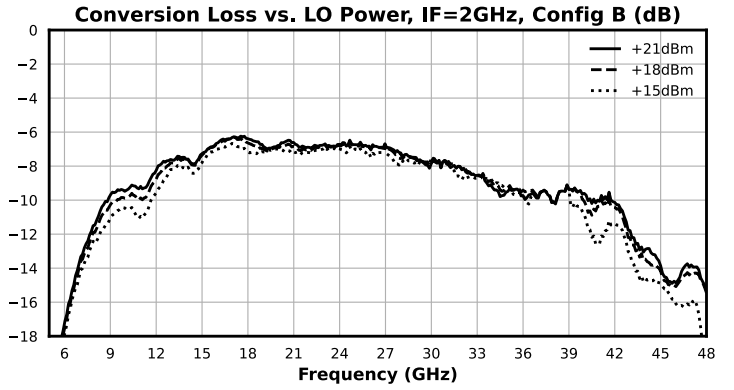
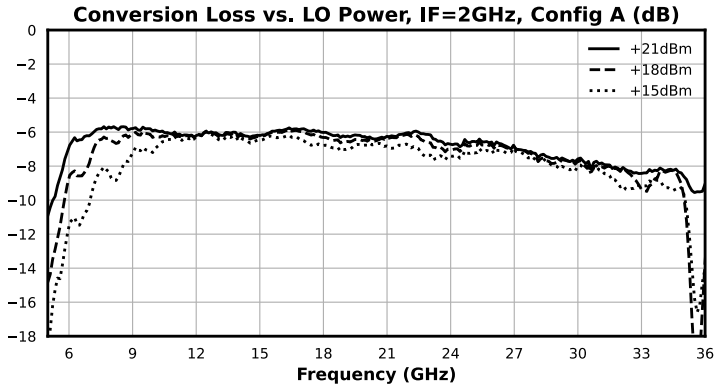
Parameter	Min	Nominal	Max	Unit
LO Input Power	15	18	21	dBm

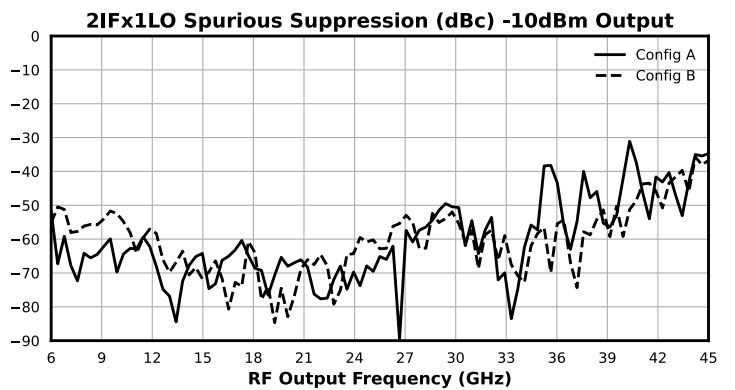
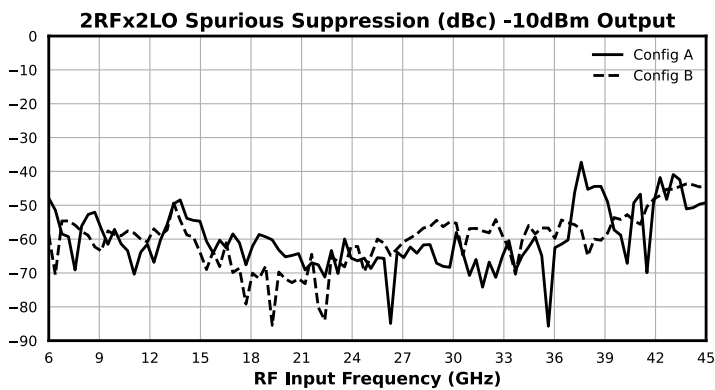
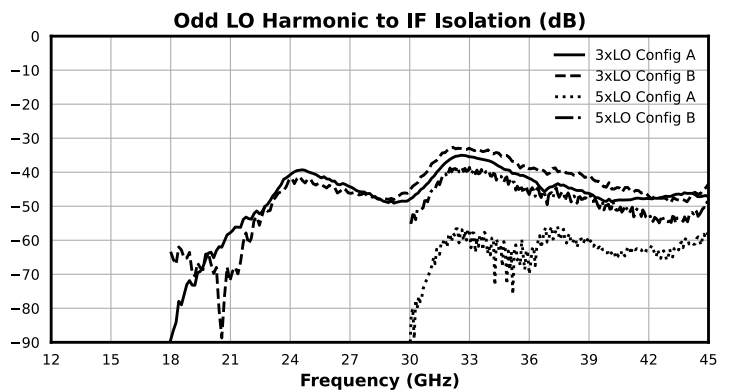
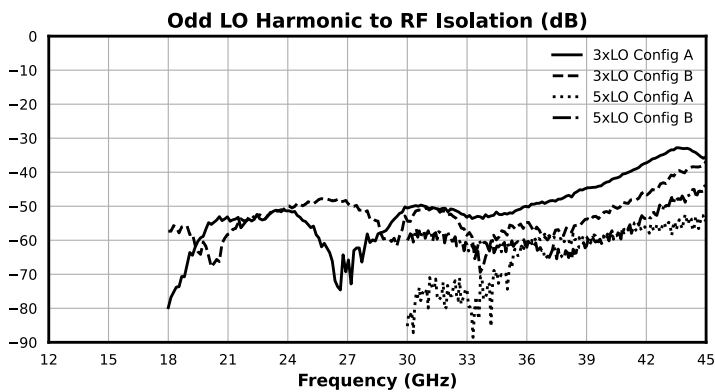
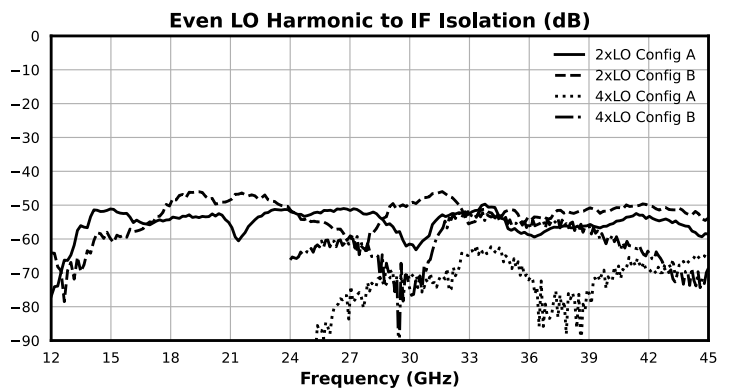
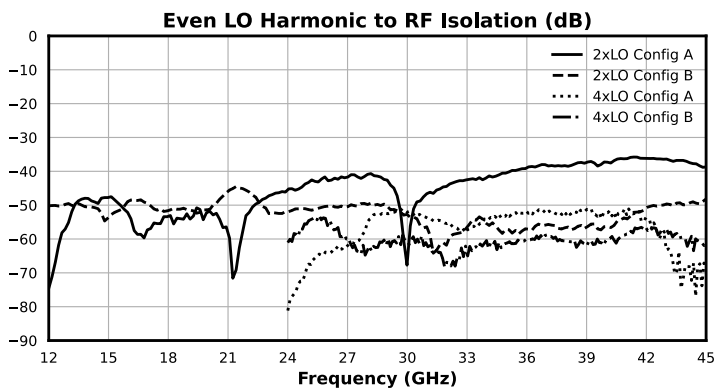
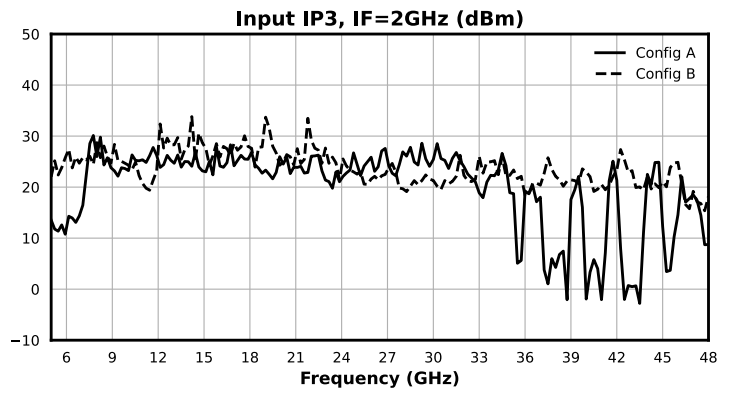
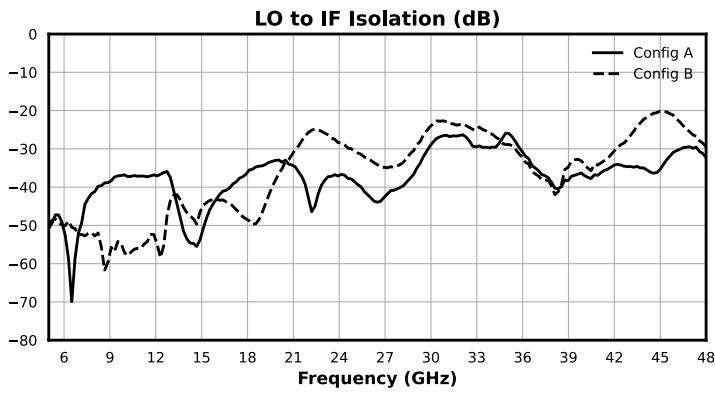
Electrical Specifications

Specifications guaranteed from -55 to +100°C, measured in a 50Ω system. Specifications are shown for Configurations A (B). RF testing is performed on a sample basis to verify conformance to datasheet guaranteed specifications. Consult factory for more information.

Parameter	Port Configuration	Test Conditions	Min	Typ	Max	Unit
Conversion Loss	A	RF=8-43GHz LO=10-45GHz IF=2GHz LO Drive Level=+18dBm	-	7	-	dB
Input IP3	A	RF=8-43GHz LO=10-45GHz IF=2GHz LO Drive Level=+18dBm	-	24	-	dBm
Input P1dB	A	RF=8GHz LO=10GHz IF=2GHz LO Drive Level=+18dBm	-	12.5	-	dBm
Conversion Loss	B	RF=8-43GHz LO=10-45GHz IF=2GHz LO Drive Level=+18dBm	-	8	-	dB
Input IP3	B	RF=8-43GHz LO=10-45GHz IF=2GHz LO Drive Level=+18dBm	-	25	-	dBm
Input P1dB	B	RF=8GHz LO=10GHz IF=2GHz LO Drive Level=+18dBm	-	15.5	-	dBm
RF-IF Isolation	-	-	-	35	-	dB
LO-RF Isolation	-	-	-	40	-	dB
LO-IF Isolation	-	-	-	35	-	dB
RF Frequency Range	-	-	8	-	43	GHz
LO Frequency Range	-	-	6	-	45	GHz
IF Frequency Range	-	-	1	-	14	GHz

Typical Performance





Spur Table

Downconversion Spurious Suppression

Spurious data was taken by selecting RF and LO frequencies ($\pm mLO \pm nRF$) within the band of 10 to 20 GHz for RO/LF, which create a 2 GHz IF spurious output. The mixer is swept across the spurious band and the mean is calculated. The numbers shown in the table below are for a -10 dBm RF input. Spurious suppression is scaled for different RF power levels by $(n-1)$, where “n” is the RF spur order. For example, the 2RFx2LO spur is 62 dBc for the A configuration for a -10 dBm input, so a -20 dBm RF input creates a spur that is $(2-1) \times (-10 \text{ dB})$ dB lower, or 72dBc.

Typical Downconversion Spurious Suppression (dBc): Configuration A (Configuration B), Sine Wave LO

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xRF	-32 (-32)	Reference	-43 (-32)	-22 (-20)	-37 (-33)	-39 (-22)
2xRF	-71 (-76)	-59 (-69)	-72 (-72)	-67 (-69)	-75 (-77)	-75 (-79)
3xRF	-89 (-84)	-81 (-87)	-93 (-93)	-89 (-90)	-95 (-91)	-89 (-90)
4xRF	-96 (-95)	-98 (-100)	-106 (-102)	-104 (-104)	-106 (-104)	-102 (-97)
5xRF	-105 (-107)	-109 (-112)	-113 (-111)	-117 (-112)	-116 (-112)	-115 (-113)

Upconversion Spurious Suppression

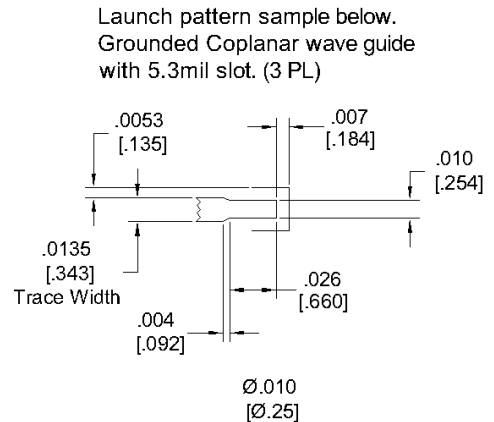
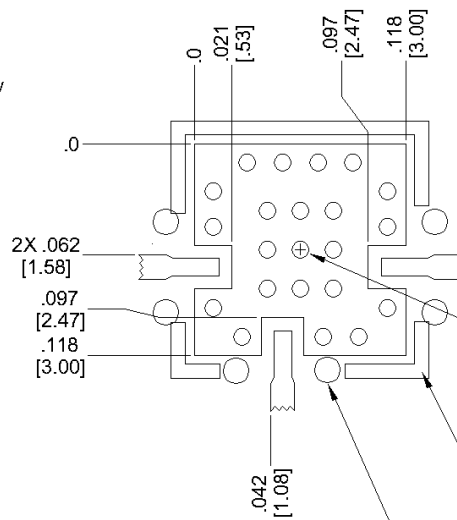
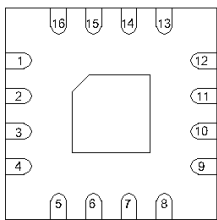
Spurious data is taken by mixing a 2 GHz IF with LO frequencies ($\pm mLO \pm nIF$), which creates an RF within the 10 to 20 GHz RF band. The mixer is swept across the spurious output band and the mean is calculated. The numbers shown in the table below are for a -10 dBm IF input. Spurious suppression is scaled for different IF input power levels by (n-1), where “n” is the IF spur order. For example, the 2IFx1LO spur is typically 73 dBc for the A configuration for a -10 dBm input, so a -20 dBm IF input creates a spur that is (2-1) x (-10 dB) dB lower, or 83 dBc.

Typical Upconversion Spurious Suppression (dBc): Configuration A (Configuration B), Sine Wave LO

-10 dBm IF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
1xIF	-31 (-32)	Reference	-41 (-33)	-24 (-19)	-37 (-34)	-34 (-22)
2xIF	-85 (-85)	-83 (-79)	-83 (-85)	-85 (-82)	-85 (-73)	-86 (-84)
3xIF	-93 (-88)	-93 (-91)	-93 (-94)	-95 (-94)	-97 (-93)	-93 (-92)
4xIF	-105 (-103)	-105 (-103)	-104 (-99)	-104 (-101)	-105 (-99)	-101 (-103)
5xIF	-112 (-111)	-105 (-105)	-115 (-111)	-117 (-114)	-116 (-112)	-114 (-112)

Footprint Image

3mm QFN Sample Drawing X-Ray view



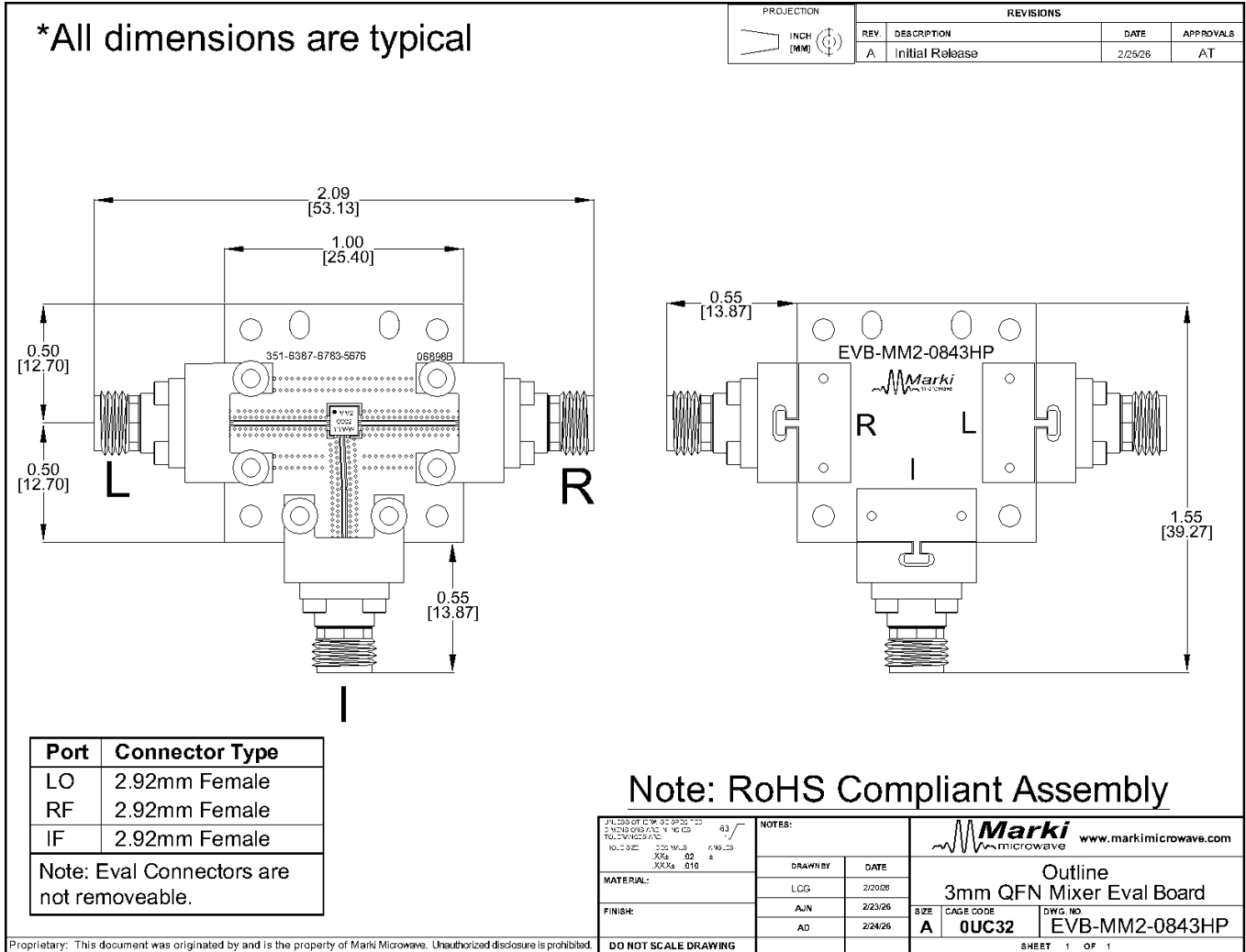
Plated thru via. Recommended conductive or non-conductive fill. Vias can be added or reduced at PCB designer's discretion.

Recommended to have solder mask around the perimeter of the QFN border for better reflow alignment. Thickness of solder mask is left to PCB designer's discretion.

Recommended to have the ground plane flooded. Ground plane are left to PCB designer's discretion.

The landing pattern is to be used on Material Rogers 4003 008" Thick, 1/2 Oz Cu both sides.

Evaluation Board - Outline Drawing



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