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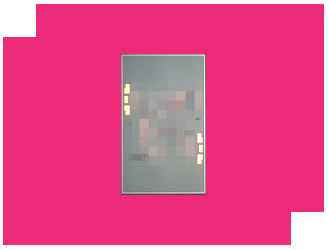
MMD-18100LCH

GaAs MMIC Millimeter Wave Doubler

DEVICE OVERVIEW

General Description

MMD-18100LCH is an MMIC millimeter wave 2x multiplier fabricated with GaAs Schottky diodes. MMD-18100LCH operates over a 9 to 50 GHz input frequency range or a doubled output frequency range of 18 to 100 GHz. MMD-18100LCH is also available as a connectorized coaxial module with 1.0 mm output connectors, offered as part number MMD-18100LM.



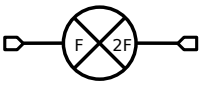
Features

- Low Conversion Loss, 12.5 dB Typical
- High Frequency Wideband Performance
- Low Input Power Requirement
- Connectorized Module Available

Applications

- mmWave frequency synthesis
- LO signal chain for mmWave mixers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MMD-18100LCH	GaAs MMIC Millimeter Wave Doubler	CH	REACH RoHS	Released	EAR99

Table Of Contents

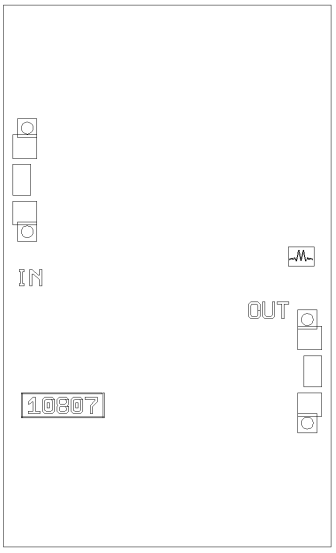
Revision History

Revision Code	Revision Date	Comment
-	2026-04-21	Initial Release

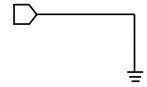
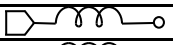
Port Configuration and Functions

Port Diagram

The MMD-18100L should only be used in the forward direction, with the input and output ports given in Port Functions.



Port Functions

Port	Function	Description	DC Equivalent Circuit
GND	Ground	CH package ground path is provided through the substrate and ground bond pads.	
Port 1	Input	Input 1x Frequency Port. Port 1 is DC blocked for the CH package.	
Port 2	Output	Input 2x Frequency Port. Port 2 is DC blocked for the CH package.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Power Handling, at any Port	27	dBm

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	2.28x1.38mm

Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the electrical specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Parameter	Min	Nominal	Max	Unit
Ambient Temperature	-55	25	100	°C
Input Power	3	9	15	dBm

Electrical Specifications

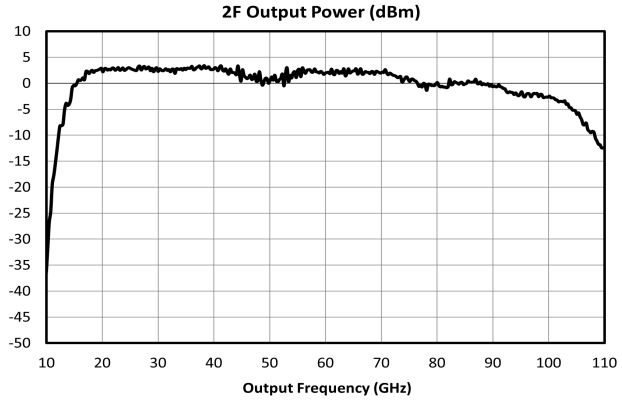
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized M package doubler used in the forward direction with a nominal +9 dBm sine wave input. Min and Max limits apply only to our connectorized units and are guaranteed at TA=+25°C. RF testing of our die is performed on a sample basis to verify conformance to datasheet guaranteed specifications.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Input Frequency Range	-	-	-	9	-	50	GHz
Output Frequency Range	-	-	-	18	-	100	GHz
Input Power	-	-	-	3	9	15	dBm
Conversion Loss	Second Harmonic Output	18	100	-	12.5	-	dB
Isolation, 1F [1]	Input = 9 – 50 GHz Output = 9 – 50 GHz	9	50	-	37	-	dB
Isolation, 3F [2]	Input = 9 – 33.3 GHz Output = 27 – 100 GHz	27	100	-	48	-	dB
Isolation, 4F [3]	Input = 9 – 25 GHz Output = 36 – 100 GHz	36	100	-	29	-	dB
Suppression, 1F [4]	Input = 9 – 50 GHz Output = 9 – 50 GHz	9	50	-	24	-	dBc
Suppression, 3F [5]	Input = 9 – 33.3 GHz Output = 27 – 100 GHz	27	100	-	33	-	dBc
Suppression, 4F [6]	Input = 9 – 25 GHz Output = 36 – 100 GHz	36	100	-	16	-	dBc

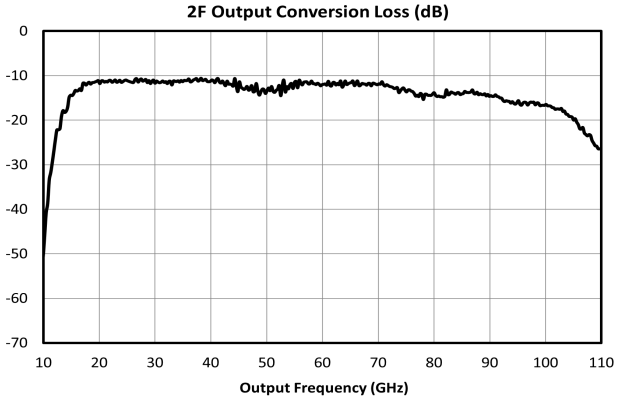
[1][2][3] Isolation is defined as the harmonic power relative to the 1F fundamental input power.
[4][5][6] Suppressions and isolations measured with an input source with >60dBc (relative to fundamental input) harmonic suppression. Suppression is defined as the harmonic power relative to the 2F doubled output power.

Typical Performance Plots

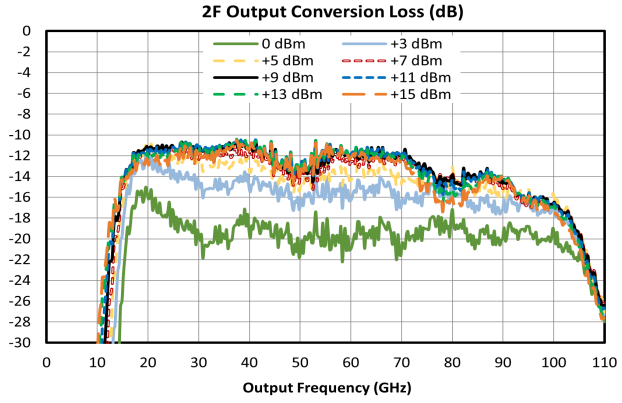
2F Output Power (dBm)



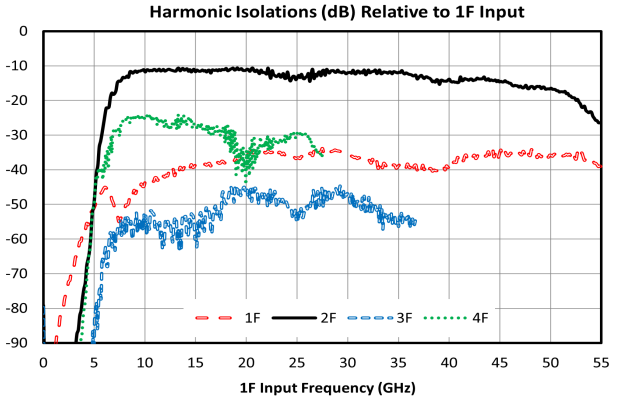
2F Output Conversion Loss (dB)



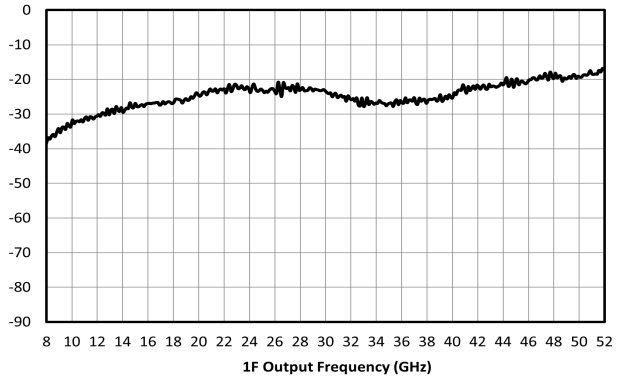
2F Output Conversion Loss (dB)



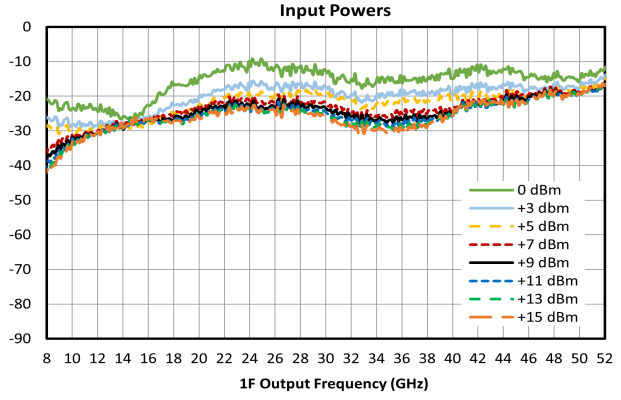
Harmonic Isolations (dB) Relative to 1F Input



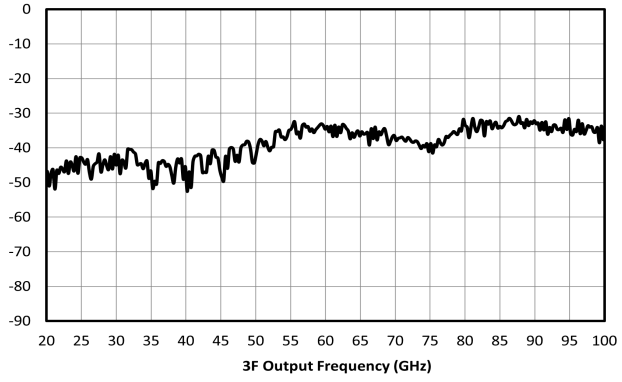
1F Output Suppression (dBc) Relative to 2F Output



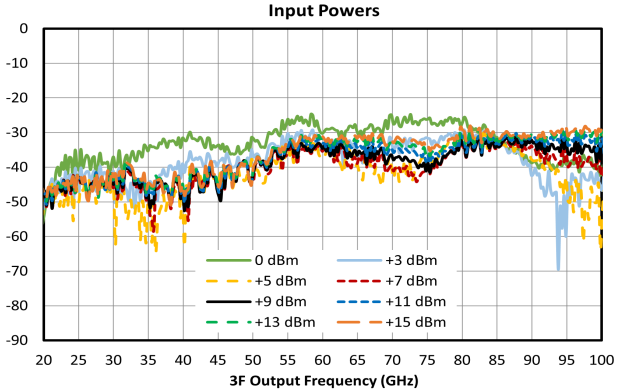
1F Output Suppression (dBc) Relative to 2F Output vs. Different Input Powers

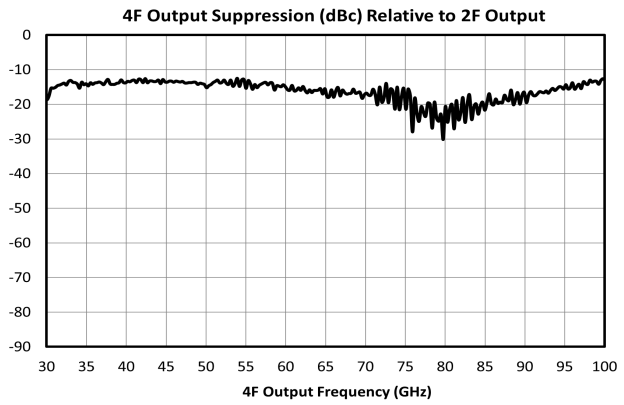


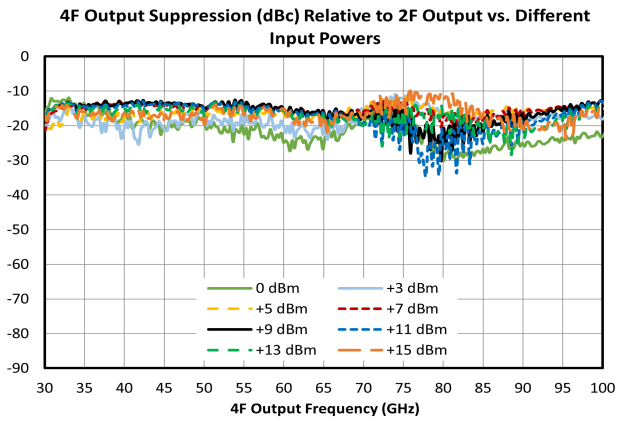
3F Output Suppression (dBc) Relative to 2F Output

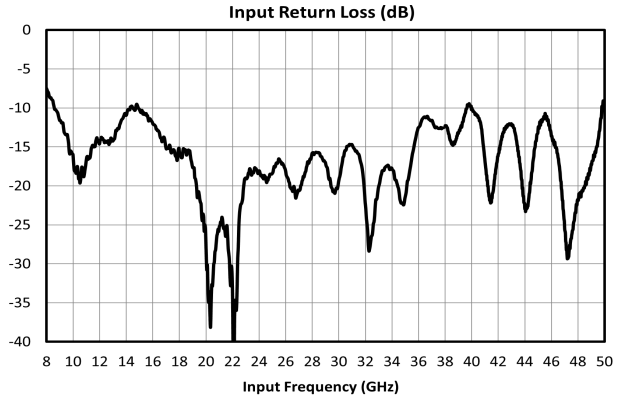


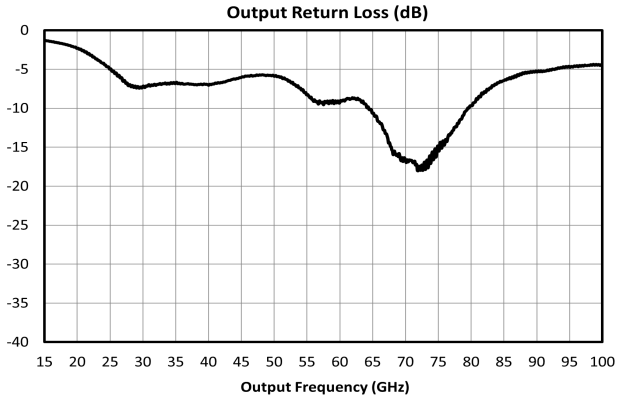
3F Output Suppression (dBc) Relative to 2F Output vs. Different Input Powers











Die Mounting Recommendations

Mounting and Bonding Recommendations

Marki MMICs should be attached directly to a ground plane with conductive epoxy. The ground plane electrical impedance should be as low as practically possible. This will prevent resonances and permit the best possible electrical performance. Datasheet performance is only guaranteed in an environment with a low electrical impedance ground.

Mounting - To epoxy the chip, apply a minimum amount of conductive epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip. Cure epoxy according to manufacturer instructions.

Wire Bonding - Ball or wedge bond with 0.025 mm (1 mil) diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 °C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package or substrate. All bonds should be as short as possible <0.31 mm (12 mils).

Circuit Considerations – 50 Ω transmission lines should be used for all high frequency connections in and out of the chip. Wirebonds should be kept as short as possible, with multiple wirebonds recommended for higher frequency connections to reduce parasitic inductance.

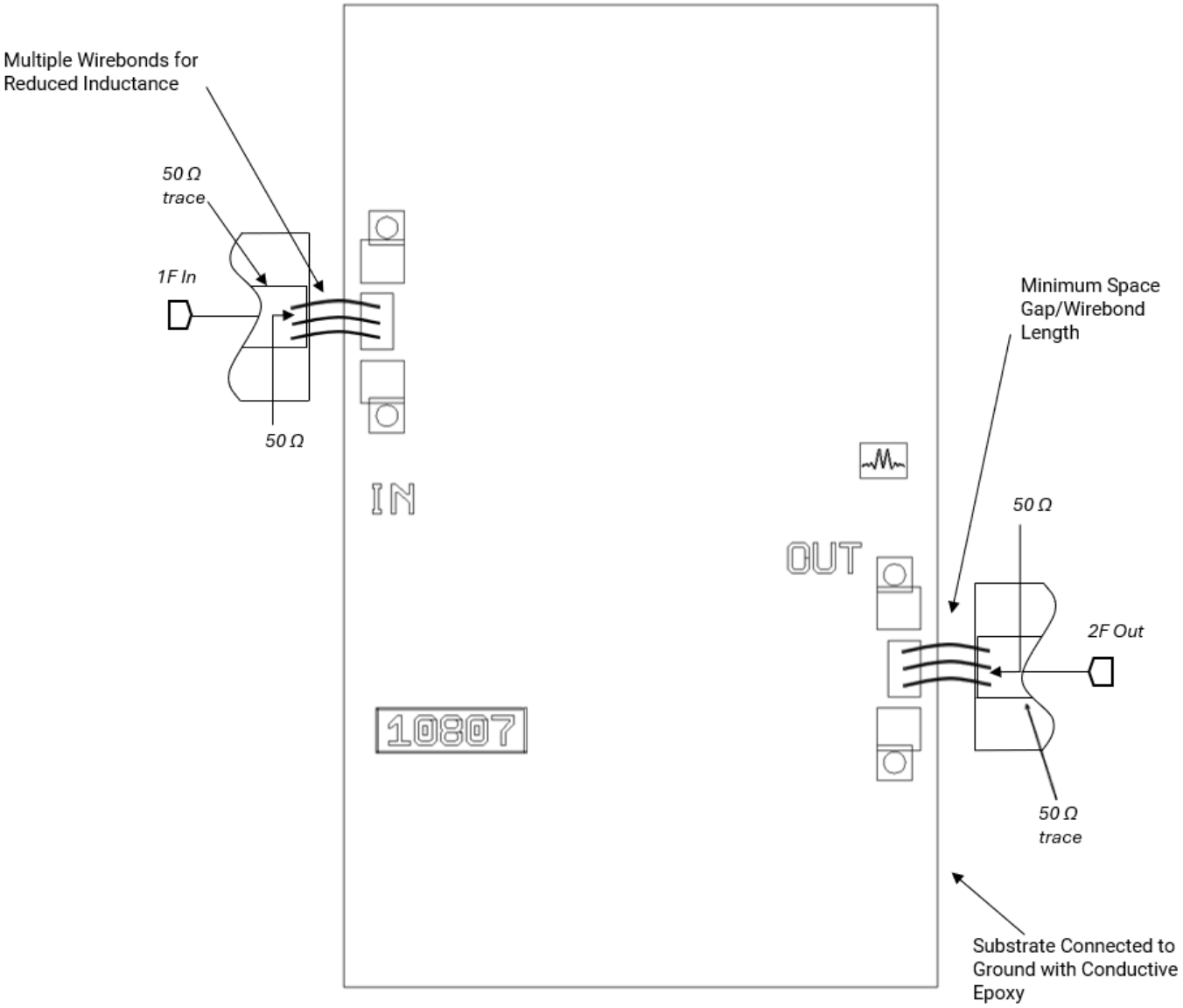
Handling Precautions

General Handling
Chips should be handled with care using tweezers or a vacuum collet. Users should take precautions to protect chips from direct human contact that can deposit contaminants, like perspiration and skin oils on any of the chip's surfaces.

Static Sensitivity
GaAs MMIC devices are sensitive to ESD and should be handled, assembled, tested, and transported only in static protected environments.

Cleaning and Storage: Do not attempt to clean the chip with a liquid cleaning system or expose the bare chips to liquid. Once the ESD sensitive bags the chips are stored in are opened, chips should be stored in a dry nitrogen atmosphere.

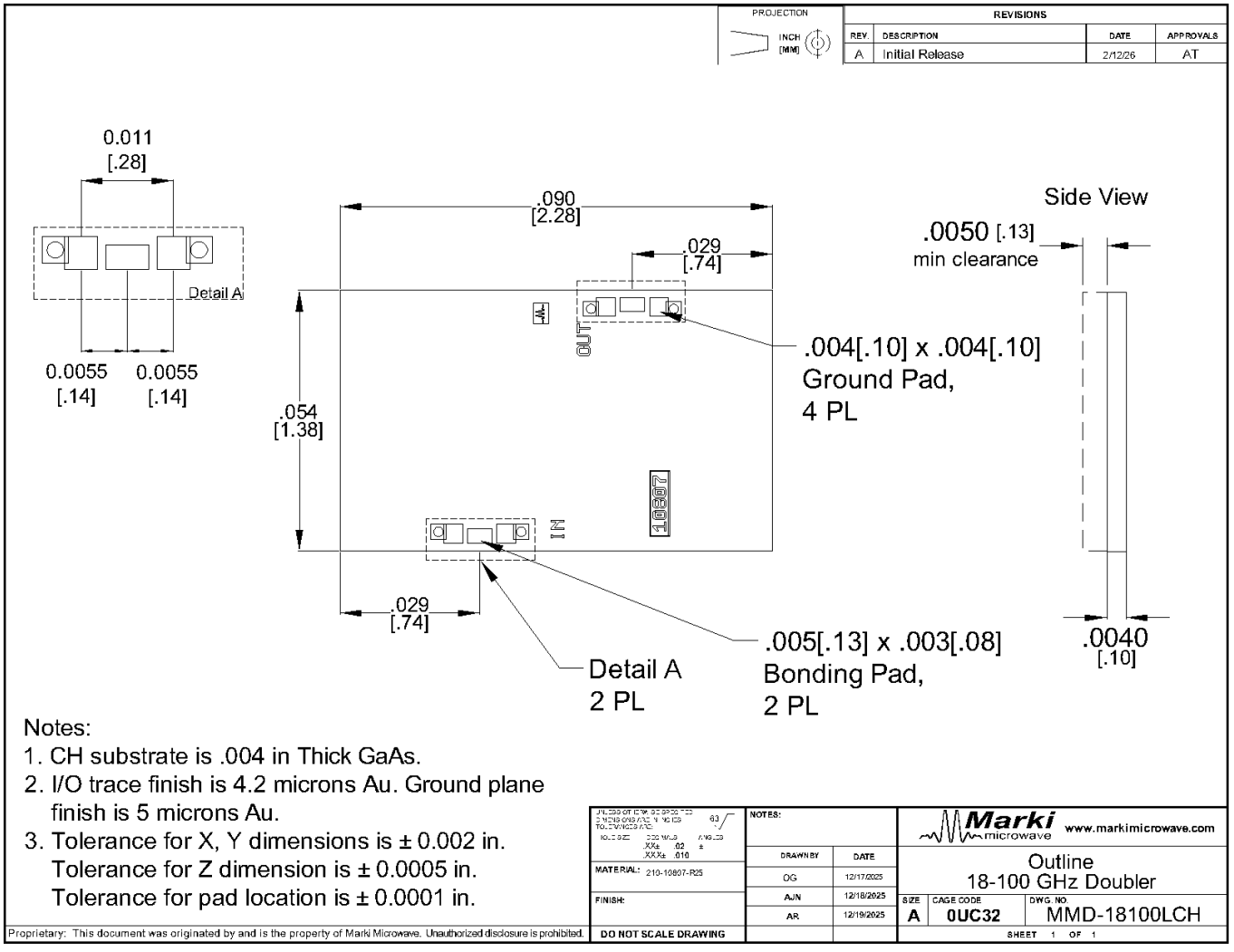
Bonding Diagram



Mechanical Data

Outline Drawing

Download : Outline 2D Drawing



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