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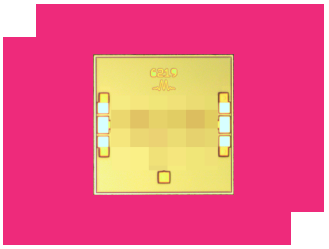
MEQ10-60ACH

Passive MMIC 60GHz Equalizer

DEVICE OVERVIEW

General Description

The MEQ10-60A is a passive MMIC equalizer. It is a positive gain slope equalizer designed to pass DC to 60GHz. Equalization can be applied to reduce low pass filtering effects in both RF/microwave and high speed digital systems. Passive GaAs MMIC technology allows production of smaller equalizer constructions that replace larger form factor circuit board constructions. Better IC tolerances allow for less unit to unit variation that traditionally etched circuits have. Low unit to unit variation allow for accurate simulations using the provided S2P file taken from measured production units.



Features

- Insertion loss typically 1.6dB at 60GHz
- 10dB low frequency attenuation
- Excellent return loss
- Broadband Operation
- RoHS Compliant

Applications

N/A

Functional Block Diagram

Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MEQ10-60ACH	Passive MMIC 60GHz Equalizer	CH	REACH RoHS	Released	EAR99

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Table Of Contents

Revision History

Revision Code	Revision Date	Comment
-	2017-01-01	Initial Release
A	2019-03-01	Added ESD rating
B	2023-01-01	Added Extended Performance to 67 GHz

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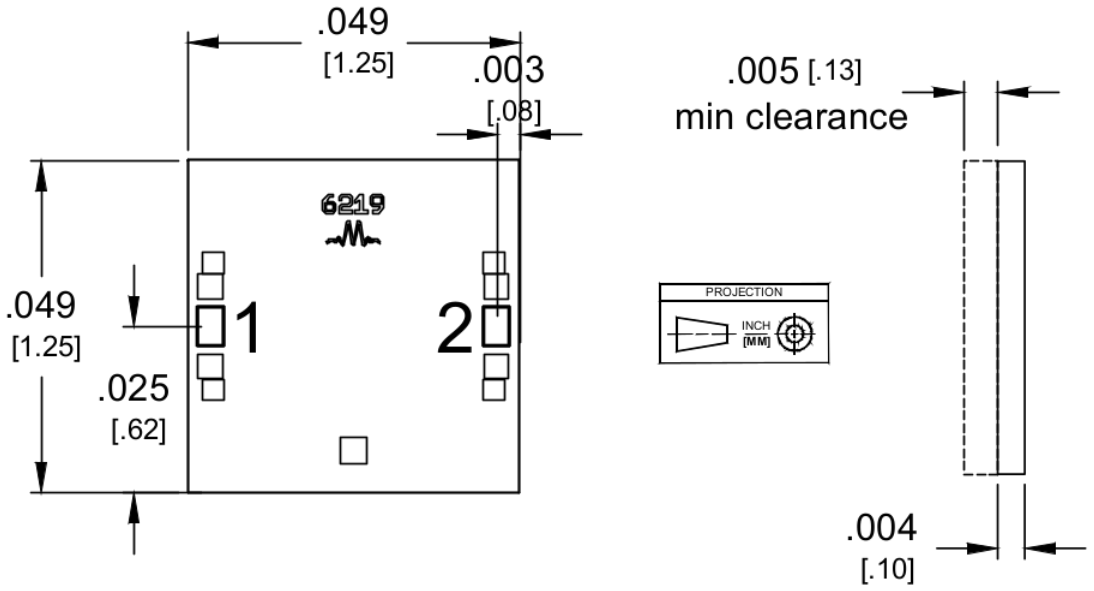
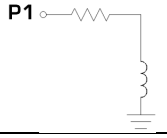
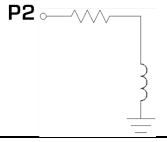
Port Configuration and Functions

Port Diagram



Port Functions

Port	Function	Description	Equivalent Circuit for Package
Port 1	Input/Output	Port 1 is DC connected to ground through a resistor. DC block is required if voltage present.	
Port 2	Input/Output	Port 2 is DC connected to ground through a resistor. DC block is required if voltage present.	

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Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Maximum Spec Guaranteed Operating Temperature	125	°C
Maximum Storage Temperature	125	°C
Minimum Spec Guaranteed Operating Temperature	-65	°C
Minimum Storage Temperature	-65	°C
Operating Temperature	25	°C

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	1.25 x 1.25 mm

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Electrical Specifications

Specifications guaranteed for +25°C for chip (CH) package, measured in a 50Ω system.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss	-	60	60	-	1.6	2.5	dB
Insertion Loss	-	40	40	-	1	-	dB
Insertion Loss at DC	-	0	0	-	10	-	dB
Return Loss	-	40	60	-	8	-	dB
Return Loss	-	0	40	12	15	-	dB
Return Loss	-	60	67	-	10	-	dB
Impedance	-	-	-	-	50	-	Ω
Insertion Loss	-	67	67	-	1.5	-	dB

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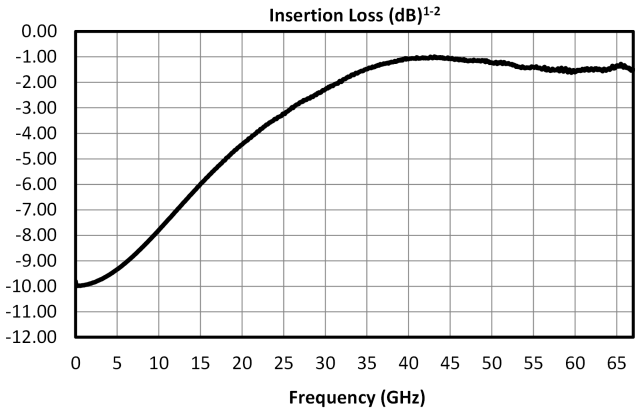
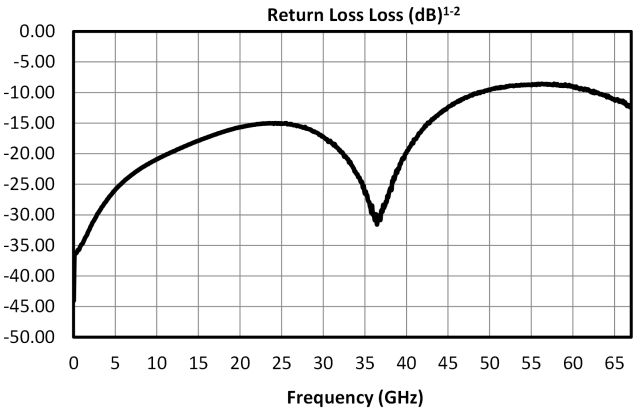
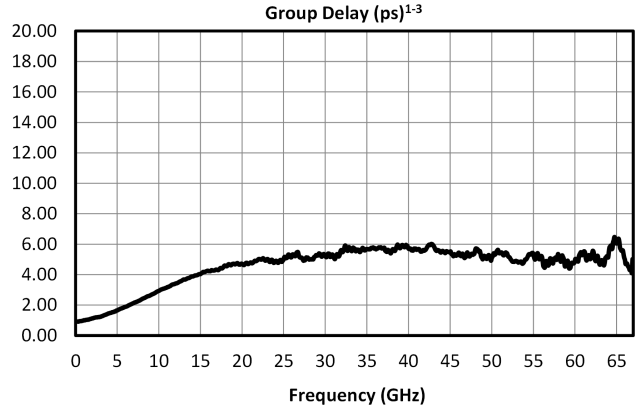
Typical Performance Plots







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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. In circumstances where the chip more than .001” thinner than the substrate, a heat spreading spacer tab is optional to further reduce bondwire length and parasitic inductance.

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Handling Precautions

General Handling: Chips should be handled with a vacuum collet when possible, or with sharp tweezers using well trained personnel. The surface of the chip is fragile and should not be contacted if possible.

Static Sensitivity: GaAs MMIC devices are subject to static discharge, 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.

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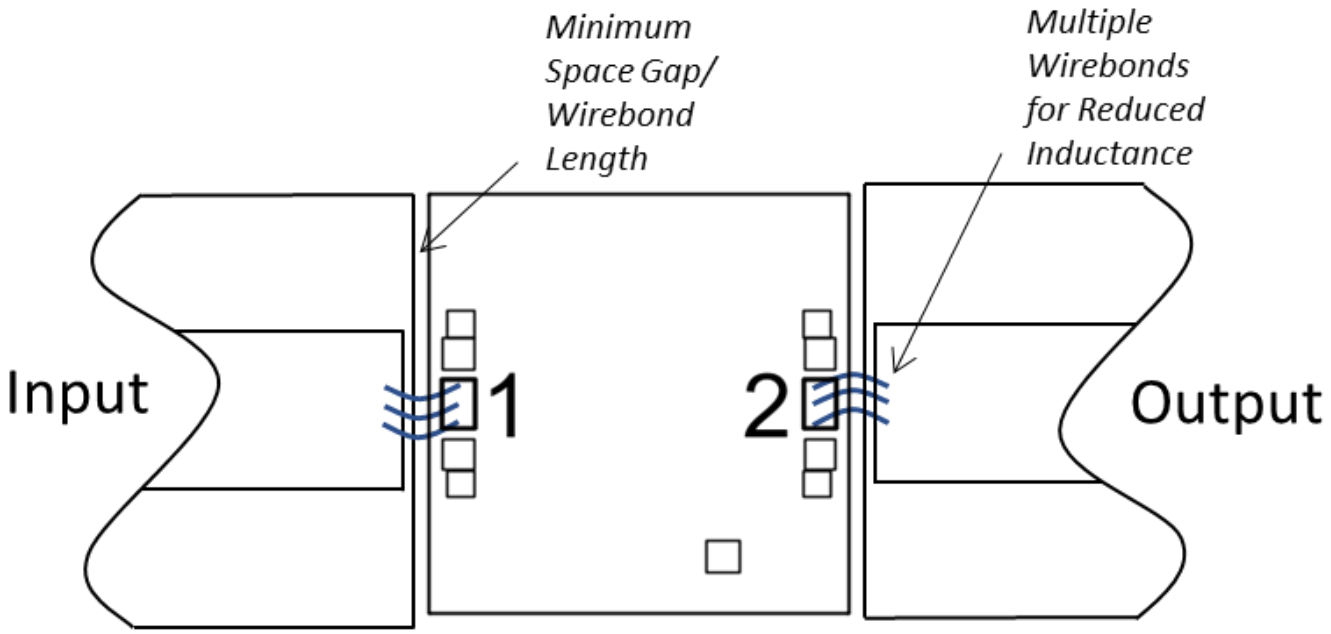
Bonding Diagram



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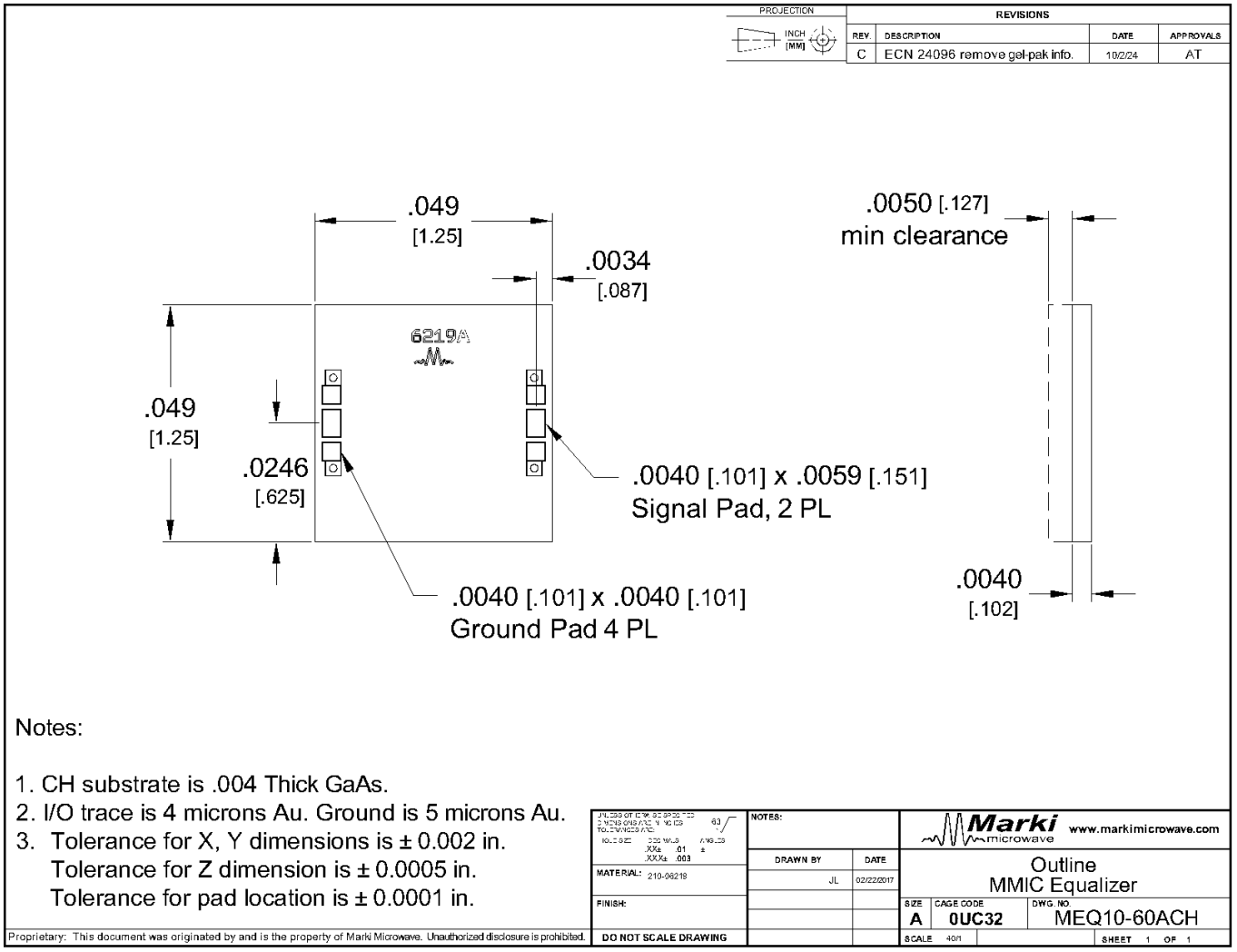
Mechanical Data

Outline Drawing

Download : Outline 2D Drawing



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Notes

DATA SHEET NOTES:

1. Equalizer is symmetrical. Reverse measurement is equivalent to forward measurement.
2. Measured typical data available for integrated circuit only.
3. Group delay calculated using wrapped phase response.
4. Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.
5. Catalog circuits are continually improved. Configuration control requires custom model numbers and specifications.

Note: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

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