Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

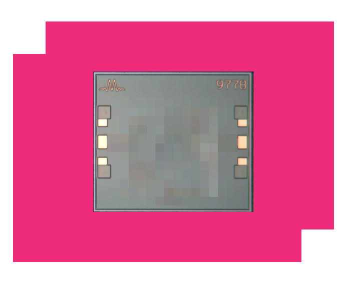
MEQ6-70ACH

Passive GaAs MMIC 70 GHz Equalizer

DEVICE OVERVIEW

General Description

The MEQ6-70ACH passive MMIC equalizer die is an ideal solution for compensating for low pass filtering effects in RF/microwave and high speed digital systems. It provides positive slope from DC to 70GHz with 6 dB DC attenuation. The unique design offers superior return loss to competitors. GaAs MMIC technology provides consistent unit-to-unit performance in a small, low cost form factor.



Download s-parameters here

Features

- 4 dB, 6 dB, 8 dB, 10 dB DC attenuation options available
- Typical insertion loss 1.4 dB at 70 GHz
- Return loss better than 20 dB over entire band

Applications

- RF Transceivers
- High-Speed Data
- Telecom
- Cable Loss Compensation
- Amplifier Compensation
- 5G

Functional Block Diagram

Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MEQ6-70ACH	Passive GaAs MMIC 70 GHz Equalizer	CH	REACH RoHS	Released	EAR99

Rev: - | Copyright © 2024 Marki Microwave LLC.

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
  - Electrical Specifications
  - Typical Performance Plots
- **Die Mounting Recommendations**
  - Mounting and Bounding Recommendations
- **Mechanical Data**
  - Outline Drawing

Revision History

Revision Code	Revision Date	Comment
-	2024-06-04	Initial Release

Rev: - | Copyright © 2024 Marki Microwave LLC.

Port Configuration and Functions

Port Diagram

1

2

Port Functions

Port	Function	Description	DC Equivalent Circuit
Port 1	Input/Output	Port 1 is DC connected to ground through a resistor. DC block is required if voltage present.	P1
Port 2	Input/Output	Port 2 is DC connected to ground through a resistor. DC block is required if voltage present.	P2

Rev: - | Copyright © 2024 Marki Microwave LLC.

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
Port 1 DC Current	15	mA
Port 2 DC Current	15	mA

Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	1.25 x 1.1 mm

Rev: - | Copyright © 2024 Marki Microwave LLC.

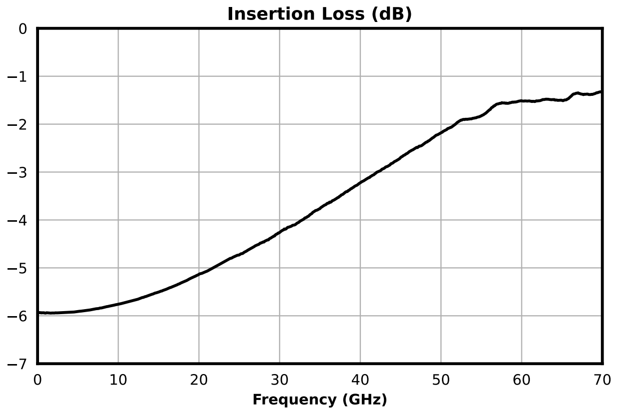
Electrical Specifications

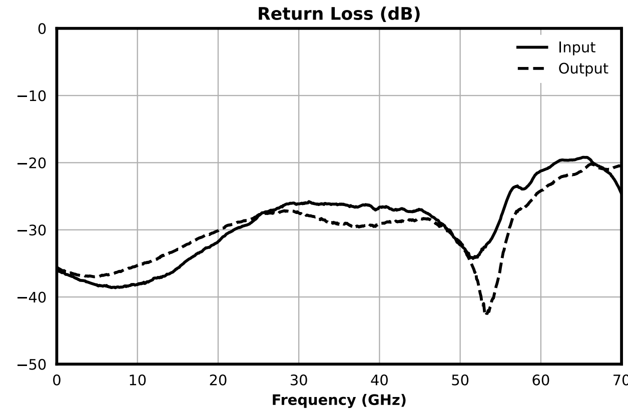
The electrical specifications apply at TA=+25°C in a 50Ω system. Min and Max limits are guaranteed at TA=+25°C. All bare die are 100% visually inspected and RF performance is guaranteed by sample testing.

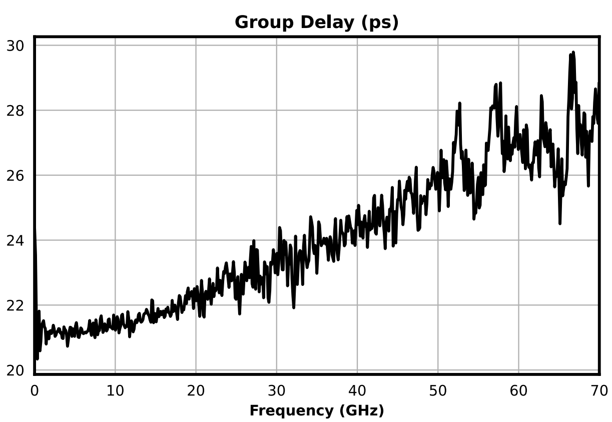
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss	Freq=70GHz	70	70	-	1.4	-	dB
Insertion Loss at DC	Freq=0GHz	0	0	-	6	-	dB
Return Loss	-	0	70	-	29	-	dB

Rev: - | Copyright © 2024 Marki Microwave LLC.

Typical Performance Plots







Rev: - | Copyright © 2024 Marki Microwave LLC.

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.

Rev: - | Copyright © 2024 Marki Microwave LLC.

Bonding Diagram

Rev: - | Copyright © 2024 Marki Microwave LLC.

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.

Rev: - | Copyright © 2024 Marki Microwave LLC.

Mechanical Data

Outline Drawing

Download : Outline 2D Drawing

PROJECTION
INCH
[MM]

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVALS
C	ECN 24096 remove gel-pak info.	10/04/24	AT

Die Number

Min Clearance

0.049
[1.25]

Marki Logo

9778

0.005
[0.13]

0.0031
[0.08]

0.0030[0.075] x 0.0024[0.06]
Ground Pad, 4PL

0.0059
[0.15]

0.043
[1.10]

0.0030[0.07] x 0.0042[0.10]
Bond Pad, 2PL

0.0217
[0.55]

0.004
[0.10]

Notes:

1. CH substrate is .004 in Thick GaAs.
2. Traces are 5 microns Au.
3. Tolerance for X, Y dimensions is ± 0.002 in.
   Tolerance for Z dimension is ± 0.0005 in.
   Tolerance for pad location is ± 0.0001 in.

Proprietary: This document was originated by and is the property of Marki Microwave. Unauthorized disclosure is prohibited.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
HOLE SIZE +.002/ -.001 | DECIMALS .XX± .01 .XXX± .002 | ANGLES ±
63

MATERIAL: Die # 210-09778

FINISH:

DO NOT SCALE DRAWING

NOTES:

DRAWN BY	DATE
AT	4/12/24

Marki microwave www.markimicrowave.com

Outline
Chip Equalizer

SIZE A | CAGE CODE 0UC32 | DWG. NO. MEQ6-70ACH

SCALE None | SHEET 1 OF 1

Rev: - | Copyright © 2024 Marki Microwave LLC.

DISCLAIMER

MARKI MICROWAVE, LLC., (“MARKI”) PROVIDES TECHNICAL SPECIFICATIONS AND DATA (INCLUDING DATASHEETS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, AND OTHER INFORMATION AND RESOURCES “AS IS” AND WITH ALL FAULTS. MARKI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.
These resources are intended for developers skilled in the art designing with Marki products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards and other requirements. Marki makes no guarantee regarding the suitability of its products for any particular purpose, nor does Marki assume any liability whatsoever arising out of your use or application of any Marki product.
Marki grants you permission to use these resources only for development of an application that uses Marki products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Marki intellectual property or to any third-party intellectual property. Marki reserves the right to make changes to the product(s) or information contained herein without notice.
MARKI MICROWAVE and T3 MIXER are trademarks or registered trademarks of Marki Microwave, LLC. All other trademarks used are the property of their respective owners.
© 2024, Marki Microwave, LLC