

# MEQ9-40CSP1

## Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer

### DEVICE OVERVIEW

#### General Description

The MEQ9-40CSP1 is a passive MMIC equalizer in our compact 1.5mm CSP1 chip scale surface mount package. The MEQ9-40CSP1 provides a positive slope equalization from DC-40 GHz with a DC attenuation of 9 dB, and achieves a 23 dB return loss all in a compact form factor. The chip scale package allows for extreme miniaturization of the SMT footprint while maintaining standard solder reflow processes. Designed for RF systems that prioritize SWaP, this equalizer compensates for frequency-dependent losses and improves gain flatness across broadband signal chains. Common applications include compensating for high frequency amplifier gain roll off, equalizing filter passbands, and improving the eye diagram in high-speed digital systems.



[Download s-parameters here](#)

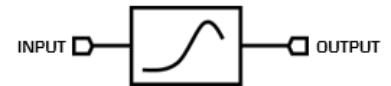
#### Features

- Small 1.5 x 1.5 mm package size
- DC attenuation of 9 dB
- Typical Insertion Loss 0.8 dB at 40GHz
- Typical Return Loss of 23 dB Over Operating Band
- Low SWaP
- This product embodies Marki Microwave's U.S. Pat. 11,869,858.

#### Applications

- RF Transceivers
- High-Speed Data
- Telecom
- Amplifier Compensation
- Frequency-Dependent Loss Compensation

#### Functional Block Diagram



#### Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MEQ9-40CSP1	Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer	CSP1	REACH RoHS	Released	EAR99
<a href="#">EVB-MEQ9-40</a>	Evaluation Board, Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer	EVB	REACH RoHS	Released	EAR99

## MEQ9-40CSP1

### Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer

#### 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 Plot
- **Mechanical Data**
  - Outline Drawing
- **Footprint Image**
- **Evaluation Board**
  - Evaluation Board Outline Drawing

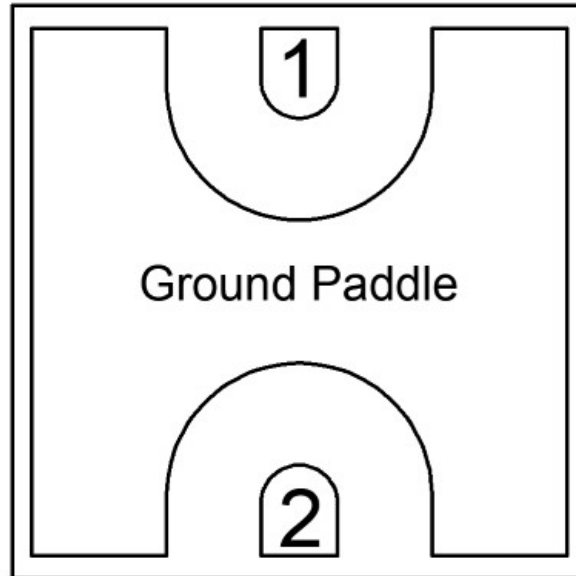
#### Revision History

Revision Code	Revision Date	Comment
-	2025-08-13	Initial Release


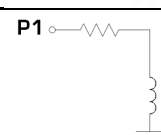
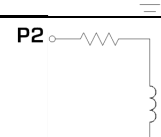
### Port Configuration and Functions

#### Port Diagram

An x-ray view of the MEQ9-40CSP1 package outline drawing is shown below. The MEQ equalizers are symmetrical allowing Port 1 or Port 2 to be used as the input.



#### Port Functions

Port	Function	Description	DC Equivalent Circuit
GND	Ground	SM package ground path is provided through the ground paddle.	<b>Pad</b> 
Pin 1	Input/Output	Pin 1 is DC connected to ground through a resistor. DC block is required if voltage present.	<b>P1</b> 
Pin 2	Input/Output	Pin 2 is DC connected to ground through a resistor. DC block is required if voltage present.	<b>P2</b> 

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### 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	25	mA
Port 2 DC Current	25	mA
Power Handling, at any Port (25°C)	30	dBm

#### Package Information

Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: CSP1	0.04g
Dimensions	-	1.50 x 1.50 mm
Moisture Sensitivity Level	-	MSL 3

#### Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the equalizer in a CSP1 package with a sine wave input applied to port 1. Min and Max limits are guaranteed at TA=+25°C.

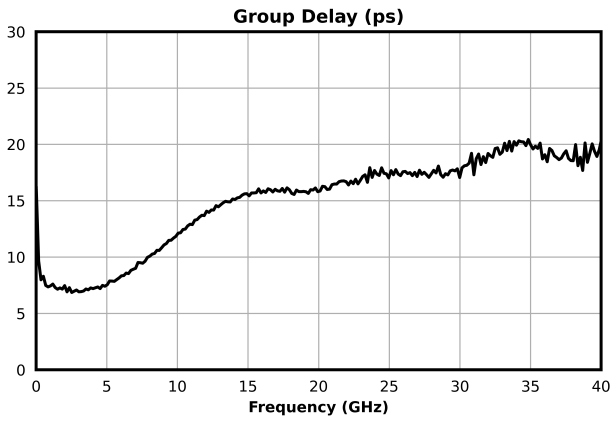
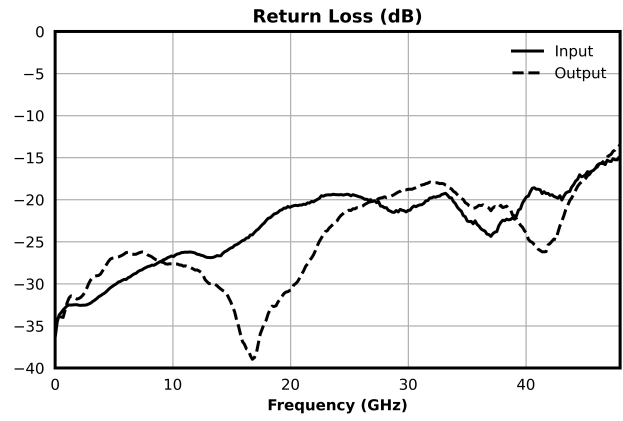
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss at DC	Configuration A, Temp = 25°C	0	0	-	9.1	-	dB
Insertion Loss	Configuration A, Temp = 25°C	20	20	-	4.3	-	dB
Insertion Loss	Configuration A, Temp = 25°C	40	40	-	0.8	-	dB
Equalization Value	Configuration A, Temp = 25°C	0	40	-	8.3	-	dB
Return Loss	Configuration A, Temp = 25°C	0	40	-	23	-	dB
Group Delay	Configuration A, Temp = 25°C	0	40	-	16	-	ps

Equalizer is symmetrical. Reverse measurement is equivalent to forward measurement. All measurements taken in EVB package and de-embedded to the CSP1 pad interface.

# MEQ9-40CSP1

Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer

## Typical Performance Plot



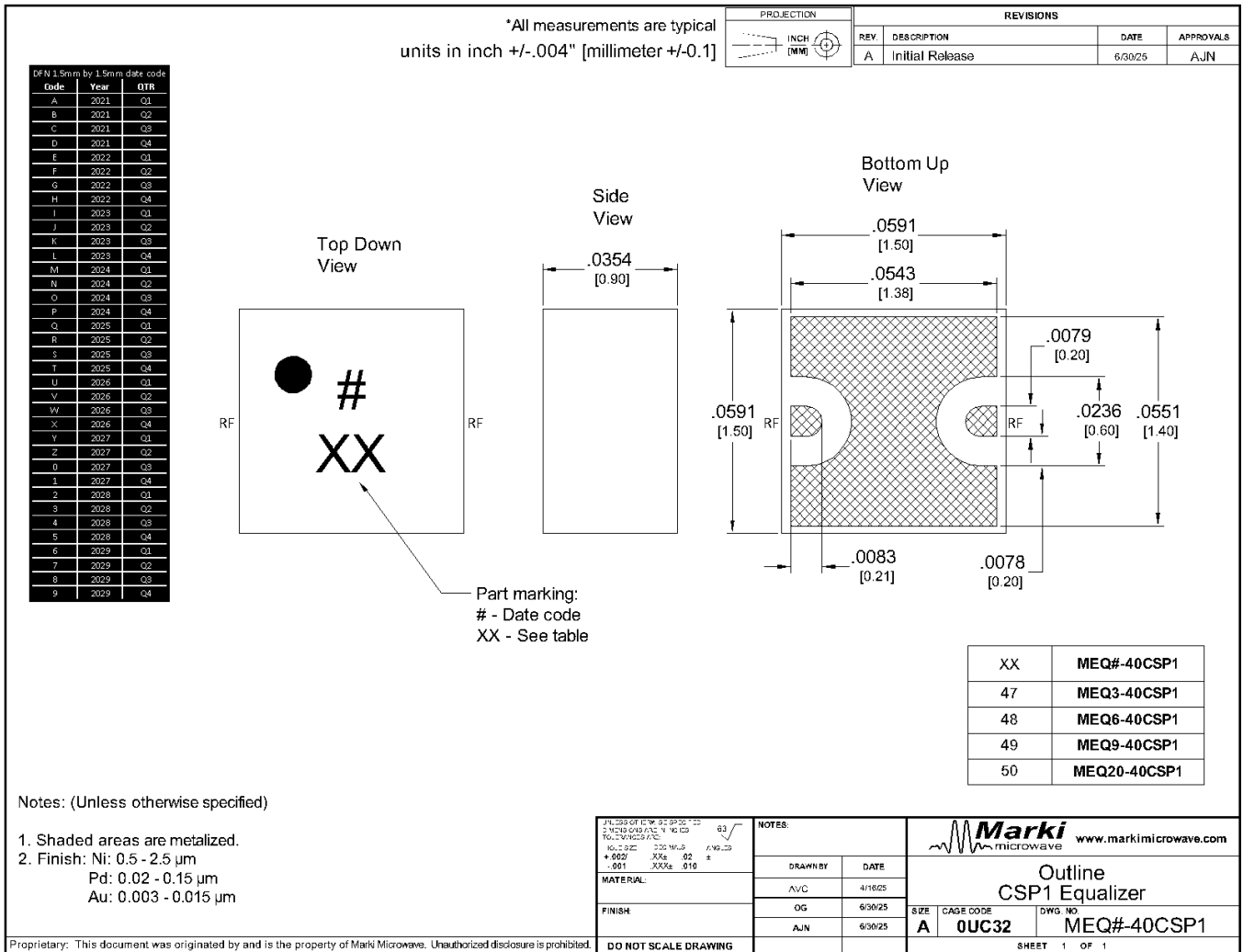
# MEQ9-40CSP1

Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer

## Mechanical Data

### Outline Drawing

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

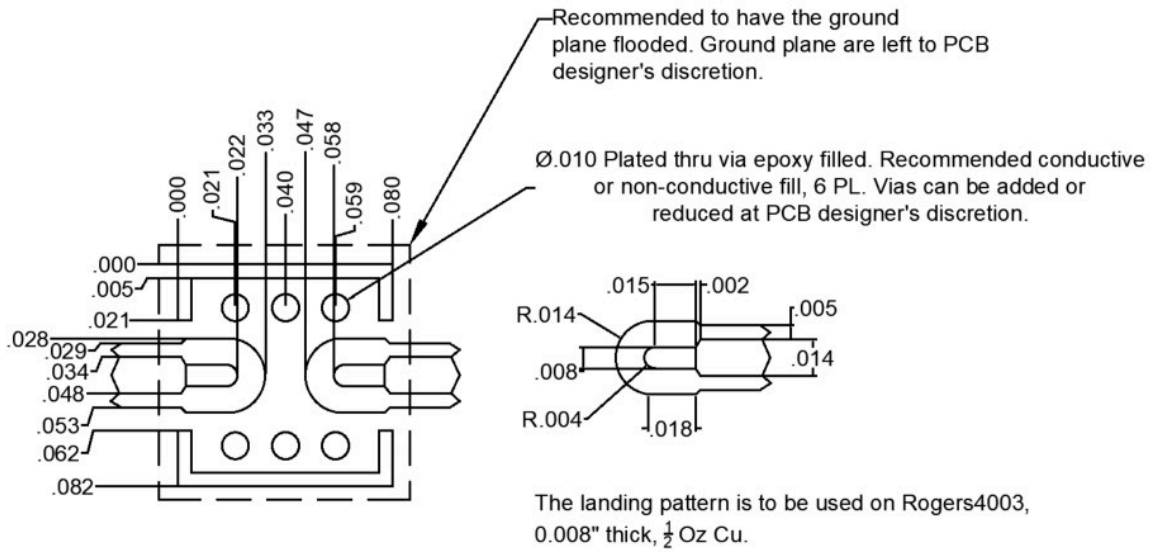


## MEQ9-40CSP1

Chip Scale Package MMIC DC-40 GHz 9 dB  
Equalizer

### Footprint Image

Download : [Footprint Drawing](#)

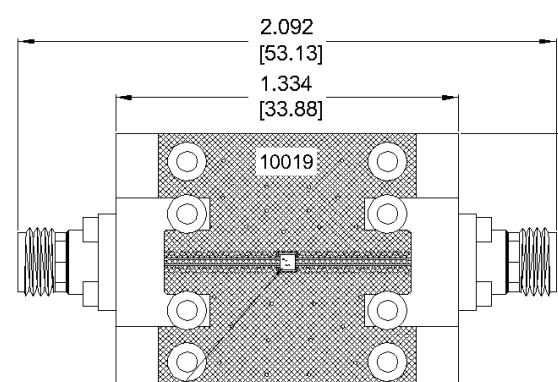


# MEQ9-40CSP1

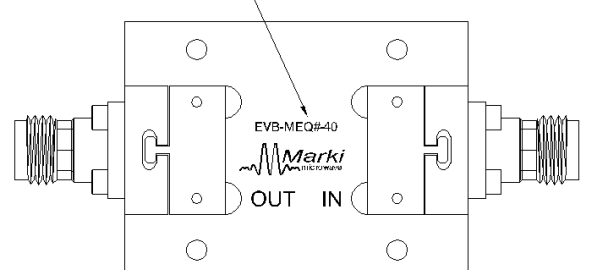
Chip Scale Package MMIC DC-40 GHz 9 dB Equalizer

## Evaluation Board - Outline Drawing

All measurements are typical



Top View




Bottom-up View

Part marking:  
#: Date code  
XX: See table

XX	Surface Mount P/N	EVB P/N
47	MEQ3-40CSP1	EVB-MEQ3-40
48	MEQ6-40CSP1	EVB-MEQ6-40
49	MEQ9-40CSP1	EVB-MEQ9-40
50	MEQ20-40CSP1	EVB-MEQ20-40

**Port Connector Type**  
1, 2 2.92mm Female  
**Note: Connectors are not removable.**

JUL 2009 OF 12 W 02 00 00 100 5 11 210 010 110 1 10 000 TOL 2 11 020 110		63 1 10.0 0.02 0.05 0.1 0.2 0.5 1.0 2.0 5.0 10.0 20.0 50.0 100.0 200.0 500.0 1000.0 +0.002 0.005 0.010 0.020 0.050 0.100 0.200 0.500 1.000 2.000 5.000 10.000 20.000 50.000 100.000		<b>NOTES:</b> DRAWN BY DATE AVC 5/16/05 OG 6/30/25 AJN 6/30/25		 www.markimicrowave.com <b>Outline</b> <b>MEQ Eval Board CSP1</b> SIZE CAGE CODE DWG. NO. <b>A 0UC32 EVB-MEQ#-40</b>	
RoHS Compliant (SN96.5/AG3.5) Components/Assembly Proprietary: This document was originated by and is the property of Marki Microwave. Unauthorized disclosure is prohibited.		<b>DO NOT SCALE DRAWING</b>		SHEET 1 OF 1			

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