

MEQ20-40CSP1

Chip Scale Package MMIC DC-40 GHz 20dB Equalizer

DEVICE OVERVIEW

General Description

The MEQ20-40CSP1 is a passive MMIC equalizer in our compact 1.5mm CSP1 chip scale surface mount package. The MEQ20-40CSP1 provides a positive slope equalization from DC-40 GHz with a DC attenuation of 20 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](#)

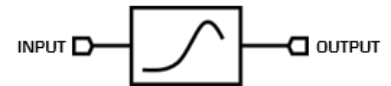
Features

- Small 1.5 x 1.5 mm package size
- DC attenuation of 20 dB
- Typical Insertion Loss 2.3 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
MEQ20-40CSP1	Chip Scale Package MMIC DC-40 GHz 20dB Equalizer	CSP1	REACH RoHS	Released	EAR99
EVB-MEQ20-40	Evaluation Board, Chip Scale Package MMIC DC-40 GHz 20 dB Equalizer	EVB	REACH RoHS	Released	EAR99

MEQ20-40CSP1

Chip Scale Package MMIC DC-40 GHz 20dB Equalizer

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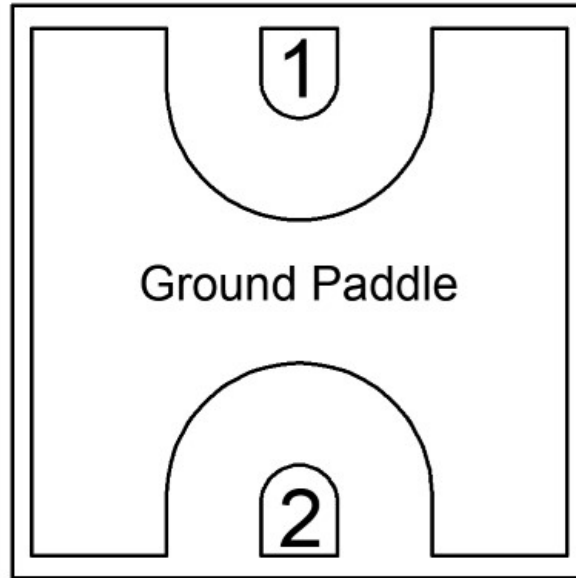
Revision History

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


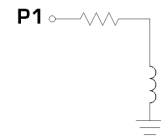

Port Configuration and Functions

Port Diagram

An x-ray view of the MEQ20-40CSP1 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.	Pad 
Pin 1	Input/Output	Pin 1 is DC connected to ground through a resistor. DC block is required if voltage present.	P1 
Pin 2	Input/Output	Pin 2 is DC connected to ground through a resistor. DC block is required if voltage present.	P2 

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	40	mA
Port 2 DC Current	40	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.

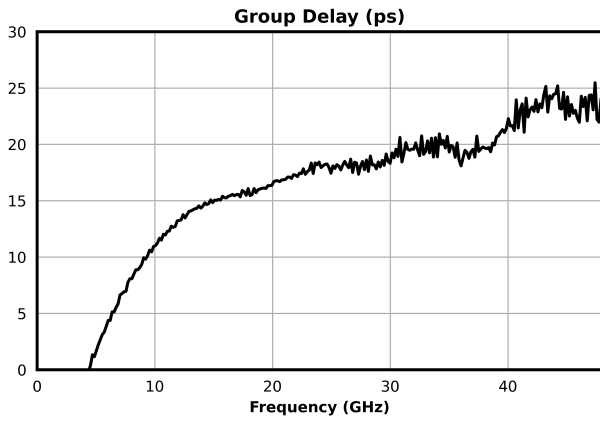
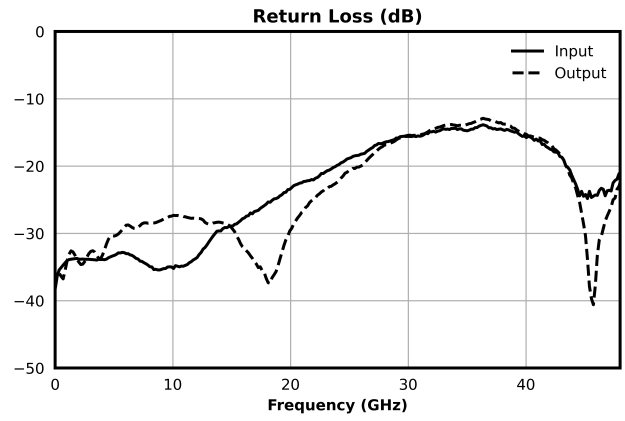
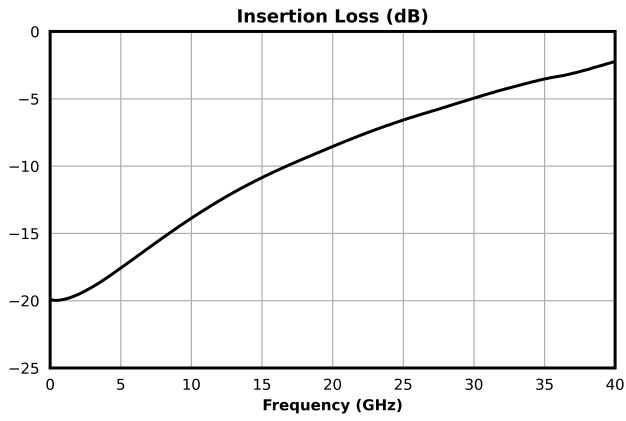
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss at DC	Configuration A, Temp = 25°C	0	0	-	19.9	-	dB
Insertion Loss	Configuration A, Temp = 25°C	20	20	-	8.6	-	dB
Insertion Loss	Configuration A, Temp = 25°C	40	40	-	2.3	-	dB
Equalization Value	Configuration A, Temp = 25°C	0	40	-	17.6	-	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.

MEQ20-40CSP1

Chip Scale Package MMIC DC-40 GHz 20dB Equalizer

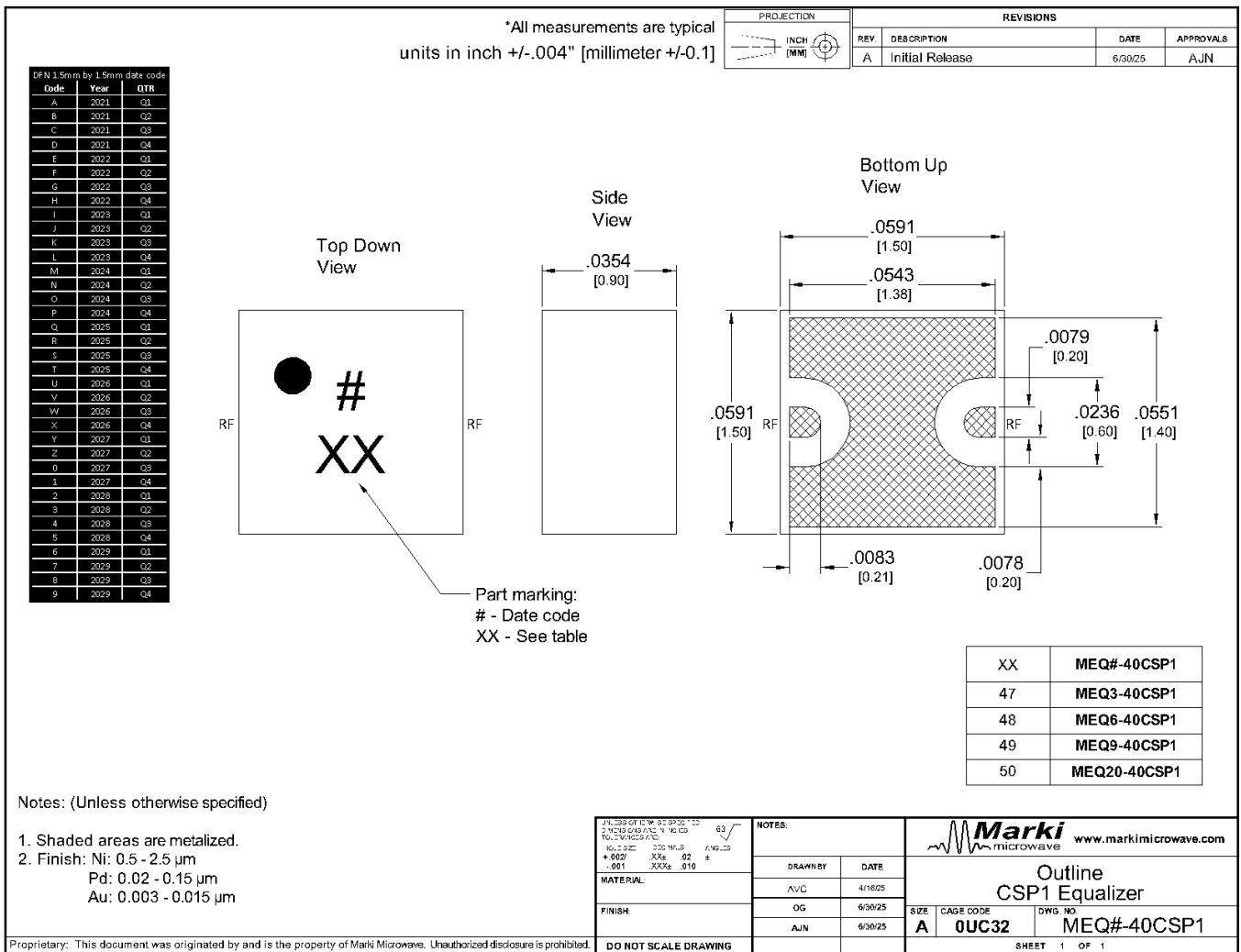
Typical Performance Plot



Mechanical Data

Outline Drawing

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

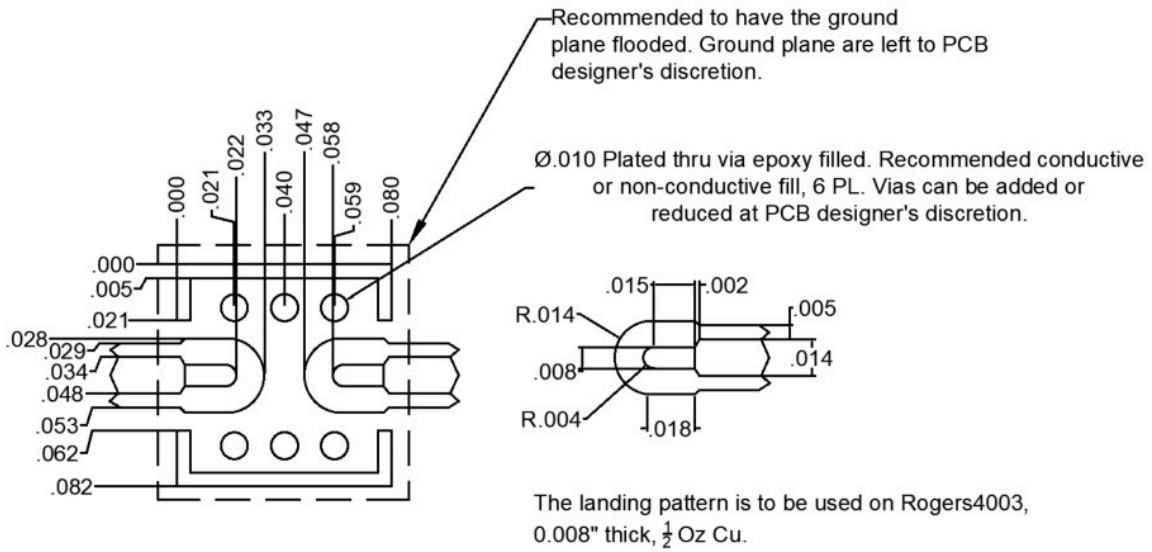


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Chip Scale Package MMIC DC-40 GHz 20dB
Equalizer

Footprint Image

Download : [Footprint Drawing](#)

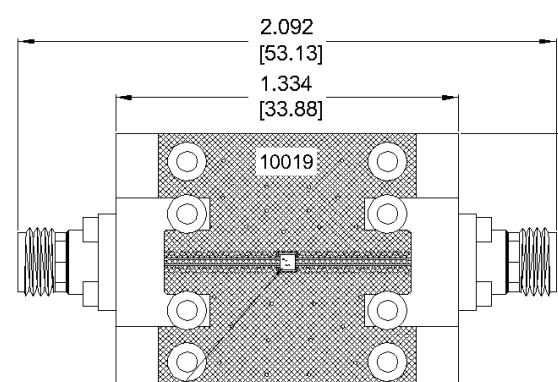


MEQ20-40CSP1

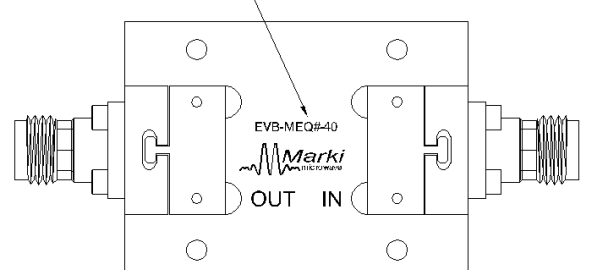
Chip Scale Package MMIC DC-40 GHz 20dB Equalizer

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.

RoHS Compliant (SN96.5/AG3.5) Components/Assembly

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DO NOT SCALE DRAWING

J:\1553\011\EW_02\SP20_122 5/16/05 09:27:13 1/4/05 TOL: 0.0025 (0.0635)		NOTES: DRAWN BY: DATE: AVC 5/16/05 OG 6/30/25 AJN 6/30/25
MATERIAL: FINISH:		



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Outline
MEQ Eval Board CSP1

SIZE	CAGE CODE	DWG. NO.
A	0UC32	EVB-MEQ#-40

SHEET 1 OF 1

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