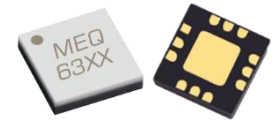


## 1 Device Overview



QFN

### 1.1 General Description

The MEQX-20ASM family of passive MMIC equalizer QFN are an ideal solution for compensating for low pass filtering effects in RF/microwave and high speed digital systems. They provide positive slope from DC to 20GHz with DC attenuation options between 3 and 11dB. 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.

### 1.2 Features

- DC attenuation options from 3 to 11dB
- Typical Insertion Loss 1.2 dB at 20GHz
- VSWR < 1.5:1 Over Entire Band
- S2P data: [MEQX-XASM.zip](#)

### 1.3 Applications

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

### 1.4 Functional Block Diagram



### 1.5 Part Ordering Options<sup>1</sup>

Part Number	Loss at DC (dB)	Description	Package	Green Status	Product Lifecycle	Export Classification
MEQ3-20ASM	3	3x3 mm QFN	SM	RoHS	Active	EAR99
MEQ5-20ASM	5					
MEQ6-20ASM	6					
MEQ7-20ASM	7.4					
MEQ10-20ASM	10					
MEQ11-20ASM	11					
EVAL-MEQ3-20A	3	Connectorized Eval Module	Module			
EVAL-MEQ5-20A	5					
EVAL-MEQ6-20A	6					
EVAL-MEQ7-20A	7.4					
EVAL-MEQ10-20A	10					
EVAL-MEQ11-20A	11					

<sup>1</sup> Refer to our [website](#) for a list of definitions for terminology presented in this table.

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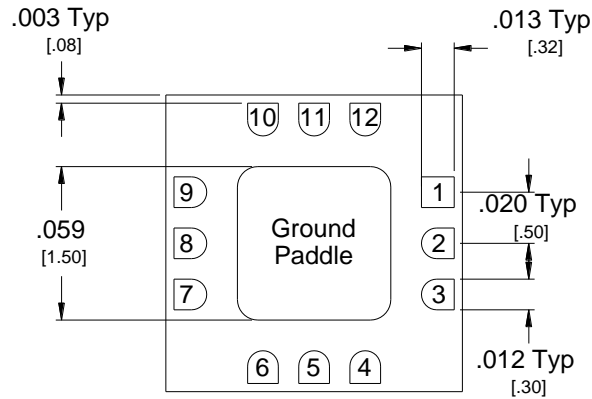
## Revision History

Revision Code	Revision Date	Comment
-	June 27, 2018	Datasheet Initial Release
A	August 2018	Added §4.2, EVAL Outline
B	November 2018	Updated §4.2, EVAL Outline
C	March 2019	Added ESD Rating
D	May 2019	Corrected Table in 4.1, Added Package Dimension Tolerance Spec
E	August 2019	Added §4.2, SM Footprint

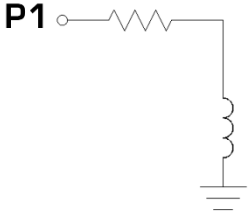
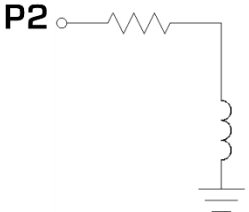
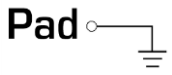
## 2 Port Configurations and Functions

### 2.1 Port Diagram

A top-down view of the MEQX-20ASM package outline drawing is shown below. The MEQ equalizers are symmetrical allowing Port 1 or Port 2 to be used as the input.



### 2.2 Port Functions

Port	Function	Description	Equivalent Circuit
Pin 1	Input/Output	Port 1 is DC connected to ground through a resistor. DC block is required if voltage present.	
Pin 9	Input/Output	Port 2 is DC connected to ground through a resistor. DC block is required if voltage present.	
GND	Ground	SM package ground path is provided through the ground paddle.	

### 3 Specifications

#### 3.1 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	Units
Port 1 DC Current	40	mA
Port 2 DC Current	40	mA
Power Handling, at any Port	+30	dBm
Operating Temperature	-55 to +100	°C
Storage Temperature	-65 to +125	°C

#### 3.2 Package Information

Parameter	Details	Rating
ESD	Human Body Model (HBM), per MIL-STD-750, Method 1020	1A

#### 3.3 Electrical Specifications<sup>2</sup>

The electrical specifications apply at  $T_A=+25^{\circ}\text{C}$  in a  $50\Omega$  system. Typical data shown is for the equalizer in a SM package with a sine wave input applied to port 1.

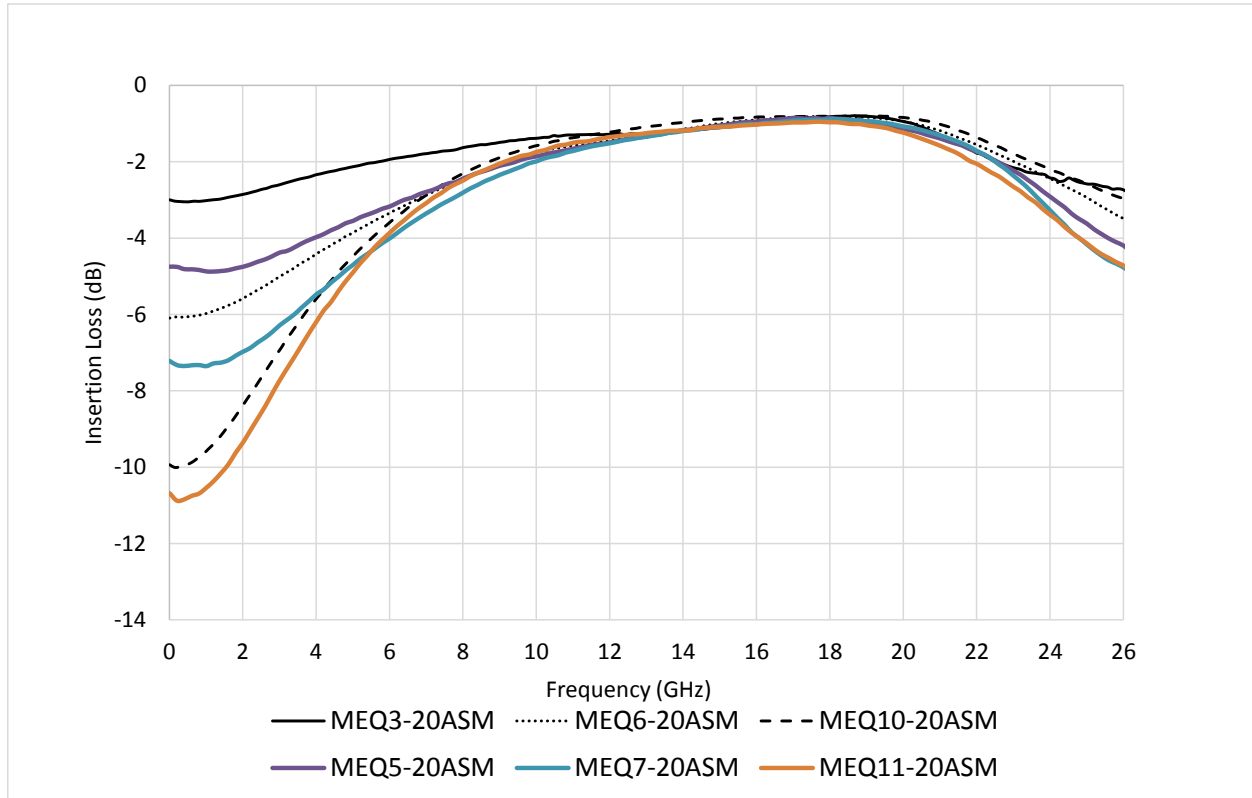
Min and Max limits are guaranteed at  $T_A=+25^{\circ}\text{C}$ . All bare die are 100% DC tested and visually inspected.

Part Number	Typical Insertion Loss		Typical Return Loss	Units
	DC	20 GHz	DC-14 GHz	
MEQ3-20ASM	3	1	19	dB
MEQ5-20ASM	5	1.1	22	dB
MEQ6-20ASM	6	1	23	dB
MEQ7-20ASM	7.5	1.1	26	dB
MEQ10-20ASM	10	0.9	20	dB
MEQ11-20ASM	11	1.2	27	dB

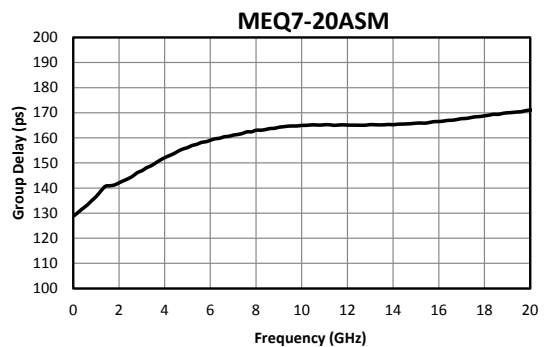
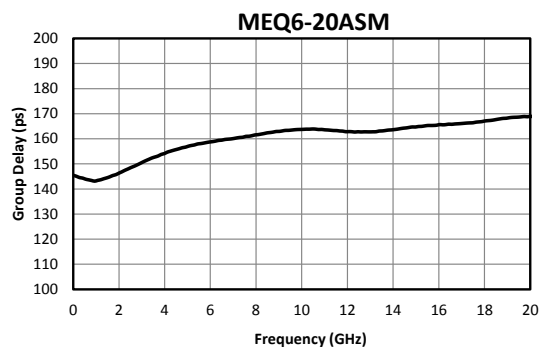
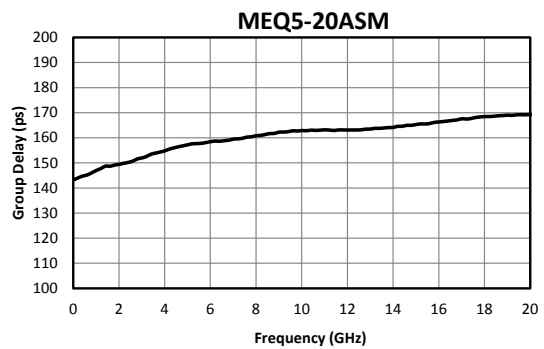
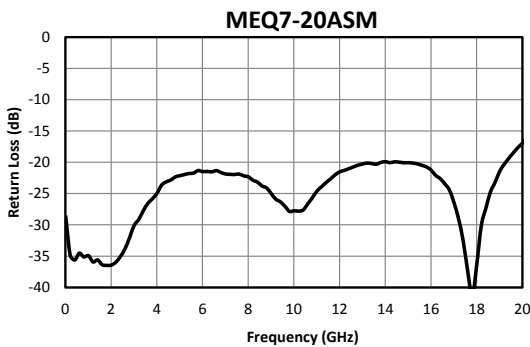
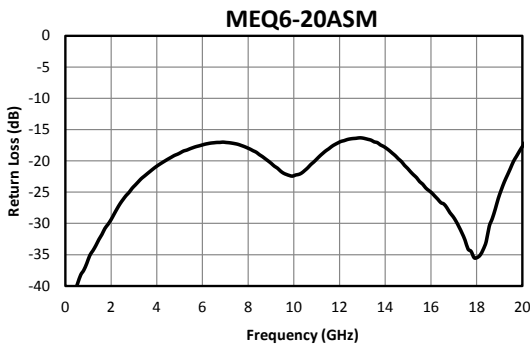
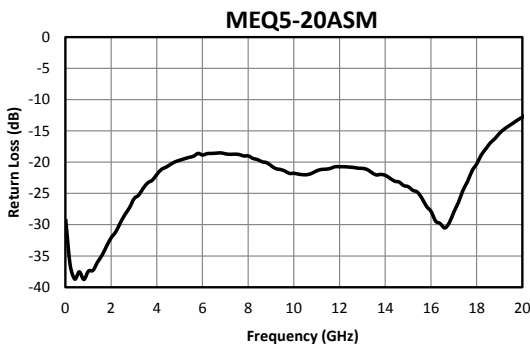
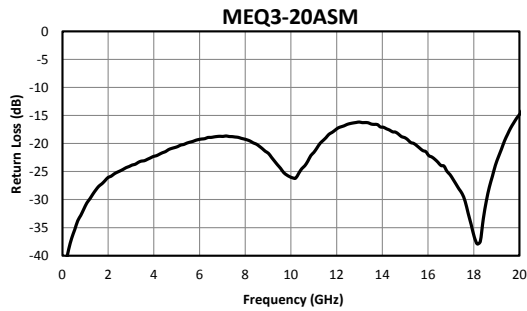
<sup>2</sup> Equalizer is symmetrical. Reverse measurement is equivalent to forward measurement. All measurements taken in eval board without de-embedding.

### 3.4 Typical Performance Plots

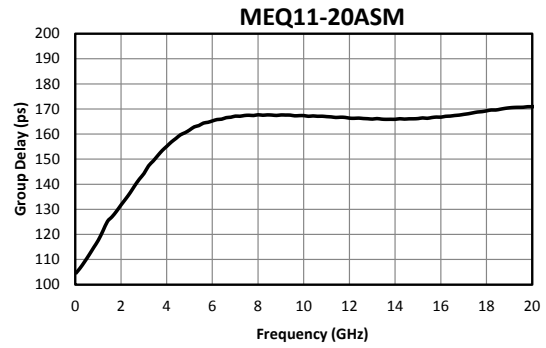
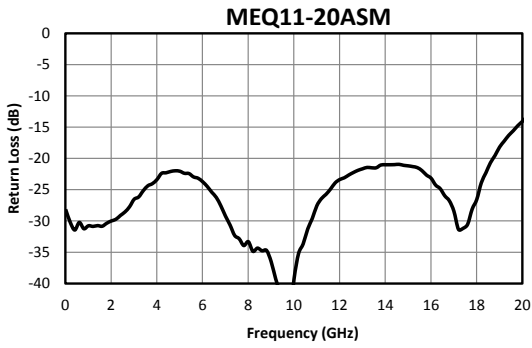
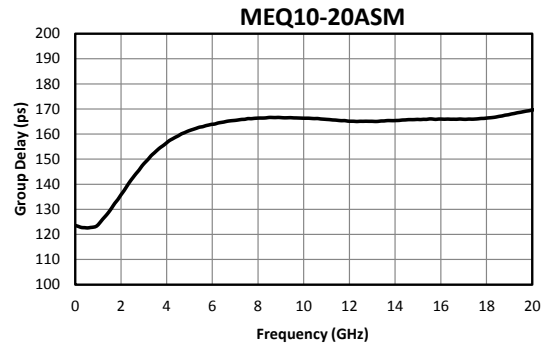
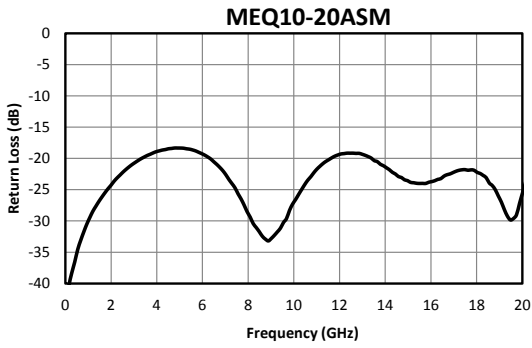
#### 3.4.1 Insertion Loss



### 3.4.2 Return Loss & Group Delay<sup>3</sup>

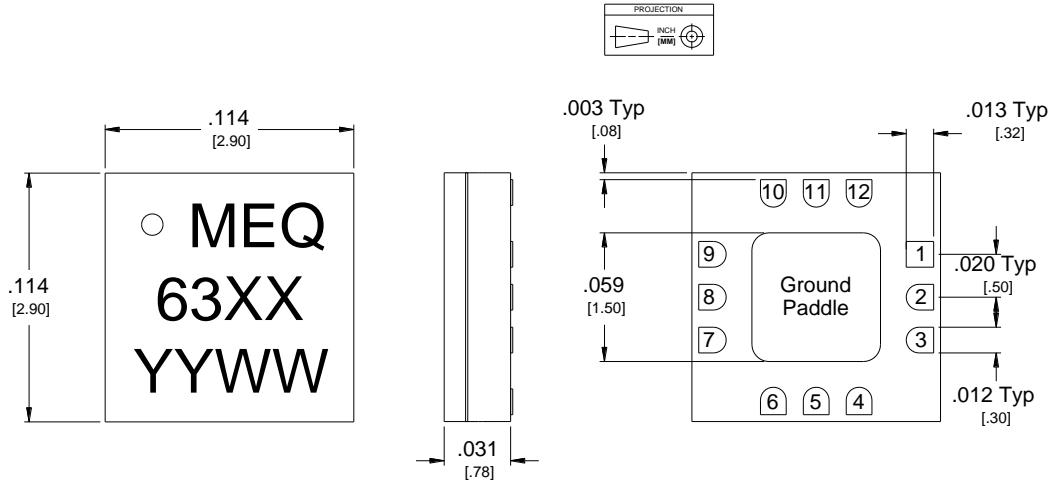


<sup>3</sup> Group delay measured in eval board without de-embedding.



## 4 Mechanical Data

### 4.1 SM Package Outline Drawing



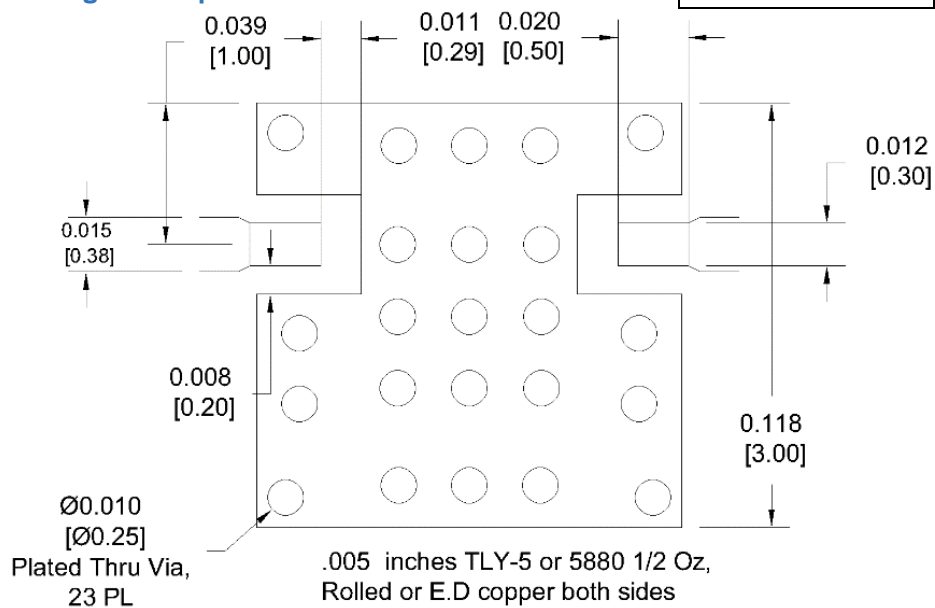
Unless otherwise specified, dimensions are in inches. Tolerances are:

.XX ±.02  
.XXX ±.005

- Substrate material is ceramic.
- I/O Leads and Ground Paddle plating is (from base to finish):  
Ni: 8.89um MAX 1.27um MIN  
Pd: 0.17um MAX 0.07um MIN  
Au 0.254um MAX 0.03um MIN
- All unconnected pads should be connected to PCB RF ground.

Part Number	Circuit Number
MEQ3-20ASM	6339
MEQ6-20ASM	6340
MEQ10-20ASM	6341
MEQ5-20ASM	6342
MEQ7-20ASM	6343
MEQ11-20ASM	6345

### 4.2 SM Package Footprint



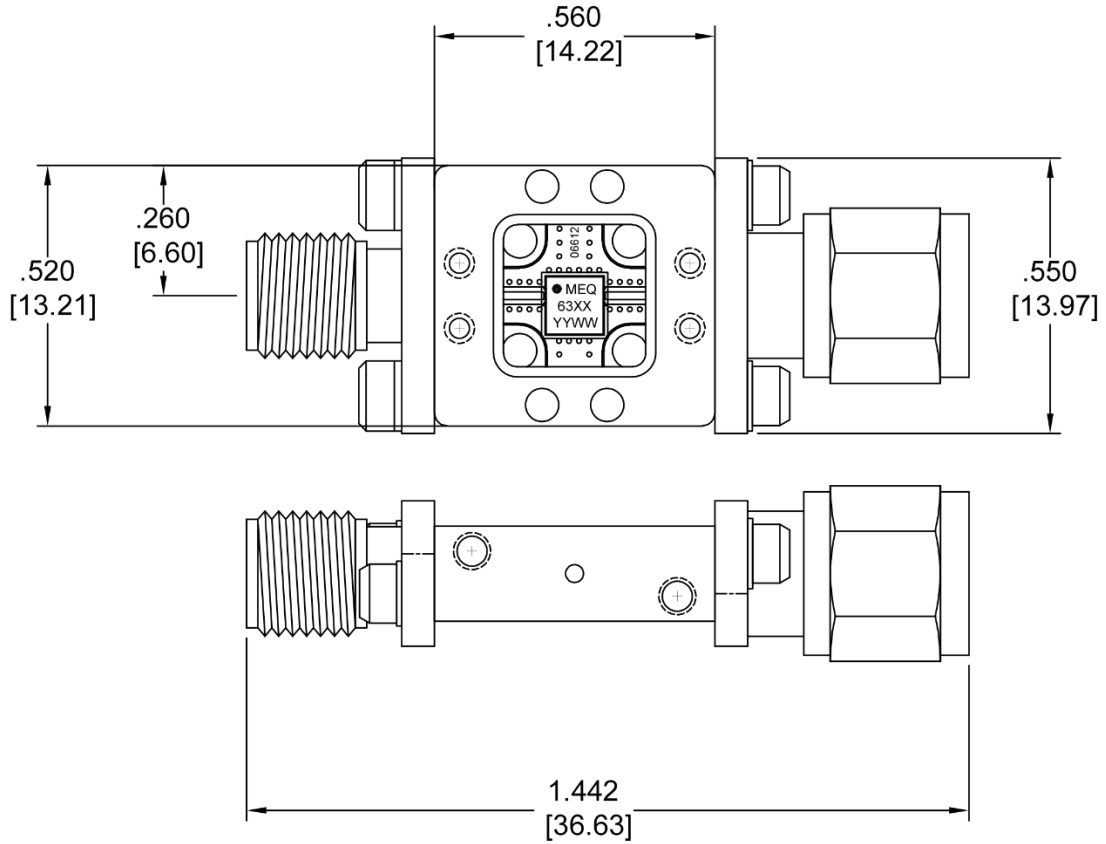
SM-Package Surface-Mount Landing Pattern

[Click here for a DXF of the above layout.](#)

[Click here for leaded solder reflow.](#) [Click here for lead-free solder reflow](#)



### 4.3 Eval Package Outline Drawing



XX	Part Number
39	Eval-MEQ3-20A
40	Eval-MEQ6-20A
41	Eval-MEQ10-20A
42	Eval-MEQ5-20A
43	Eval-MEQ7-20A
45	Eval-MEQ11-20A

Port	Connector Type
I	SMA Female
O	SMA Male

Note: Eval-Package Connectors are not removeable.

Unless otherwise specified, dimensions are in inches. Tolerances are:

.XX ±.02  
.XXX ±.005

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