MMIC MICROWAVE

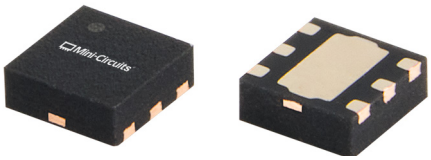
Gain Equalizer

EQY-4-123+

50Ω 4 dB DC to 12 GHz

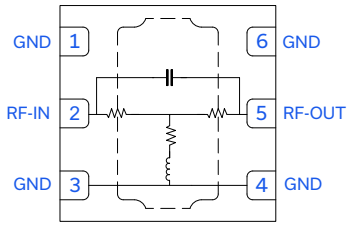
THE BIG DEAL

- Wideband, DC to 12 GHz
- Linear Positive Slope Across Operating Band
- Excellent Return Loss, 15 dB Typ.
- 1.5x1.5 mm, 6-Lead QFN-Style Package



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM (TOP VIEW)



APPLICATIONS

- Test & Measurement Equipment
- Satellite Communications
- Radar, EW, and ECM Defense Systems

PRODUCT OVERVIEW

EQY-4-123+ is a wideband, absorptive gain slope equalizer fabricated using a highly reliable and repeatable GaAs MMIC IPD process. Operating from DC to 12 GHz, this model achieves outstanding linear slope while maintaining excellent return loss throughout the entire band due to its absorptive design. This model is packaged in a compact 1.5x1.5 mm package, making it an ideal choice for dense circuit layouts across a wide range of applications such as Test & Measurement, Satellite Communications, and Radar, EW, and ECM Defense Systems.

KEY FEATURES

Feature	Advantages
Wideband Operation, DC to 12 GHz	Broadband positive gain slope equalization can effectively compensate negative gain slope of amplifiers, receivers, transmitters and transmission lines to achieve flat gain across frequency in wideband systems.
Excellent Return Loss, 15 dB Typ.	Excellent return loss across the full frequency range minimizes unwanted reflections and enables this model to be seamlessly cascaded within wideband signal chains.
1.5x1.5 mm 6-Lead QFN-Style Package	Small footprint saves space in dense layouts while providing low inductance and excellent thermal contact to the PCB. Industry-standard packaging allows for ease of assembly in high-volume manufacturing processes.

REV. OR
ECO-027036
EQY-4-123+
MCL NY
250904

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ELECTRICAL SPECIFICATIONS[1,2] AT +25°C AND Zo = 50Ω, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		DC		12	GHz
Insertion Loss	0.01	4.2	4.6	5.1	dB
	2	3.9	4.4	5.0	
	5	2.9	3.3	4.0	
	10	0.6	1.2	2.2	
	12	0.1	0.6	1.7	
Input Return Loss	0.01		20		dB
	2		17		
	5		15		
	10		19		
	12		20		
Output Return Loss	0.01		20		dB
	2		17		
	5		15		
	10		18		
	12		20		

1. Tested on Mini-Circuits Characterization Test Board TB-EQY-4-123C+. See Figure 2. Board loss de-embedded to the device.
2. Bi-directional RF-IN and RF-OUT ports can be interchanged.

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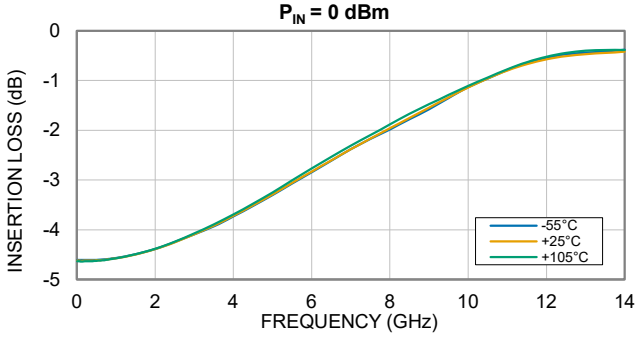
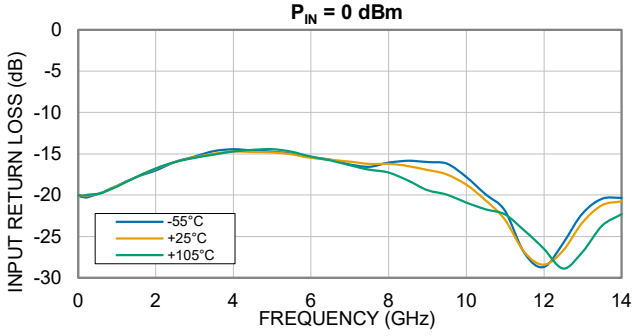
TYPICAL PERFORMANCE GRAPHS

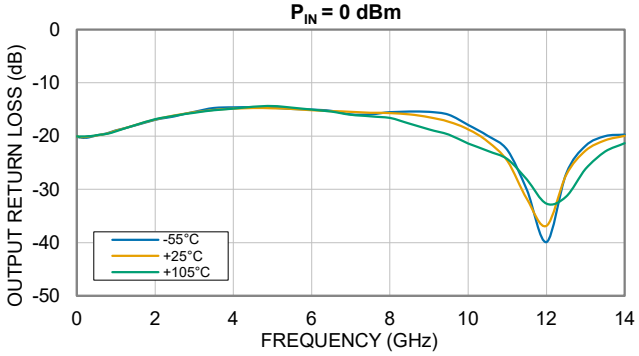
INSERTION LOSS vs. TEMPERATURE
P_{IN} = 0 dBm



INPUT RETURN LOSS vs. TEMPERATURE
P_{IN} = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
P_{IN} = 0 dBm



ABSOLUTE MAXIMUM RATINGS[3]

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-65°C to +150°C
RF Input Power	+24 dBm

3. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.

THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance (Θ_{JC})[4]	80.9°C/W

4. Θ_{JC} = (Hot Spot Temperature on Die - Temperature at Ground Lead)/Dissipated Power

ESD RATING

	Class	Voltage Range	Reference Standard
HBM	1B	500 V to < 1000 V	ANSI/ESDA/JEDEC JS-001-2023
CDM	C3	> 1000 V	ANSI/ESDA/JEDEC JS-002-2022

ESD HANDLING PRECAUTION: This device is designed to be Class 1B for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020E /JEDEC J-STD-033C

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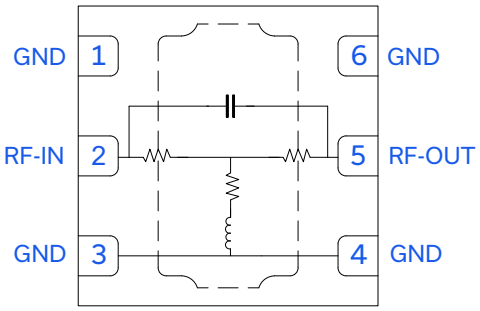

Figure 1. EQY-4-123+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description (Refer to Figure 2)
RF-IN	2	RF-IN Pad connects to RF Input port.
RF-OUT	5	RF-OUT Pad connects to RF Output port.
GND	1, 3, 4, 6, & Paddle	Connects to ground.

CHARACTERIZATION TEST BOARD

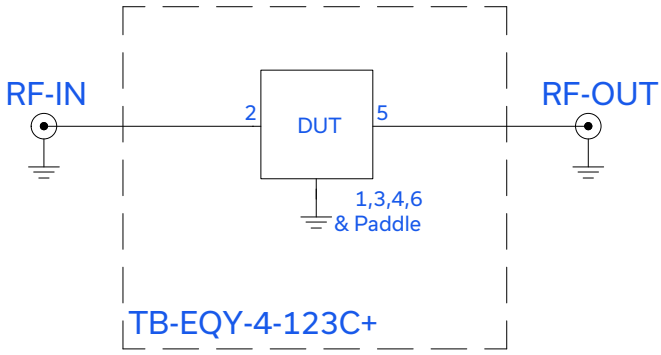

Figure 2. EQY-4-123C+ Evaluation and Application Circuit

Electrical Parameters and Conditions
Insertion Loss and Return Loss are measured using N5242B PNA-X Microwave Network Analyzer.

Conditions:
1. Insertion Loss and Return Loss: P_{IN} = 0 dBm

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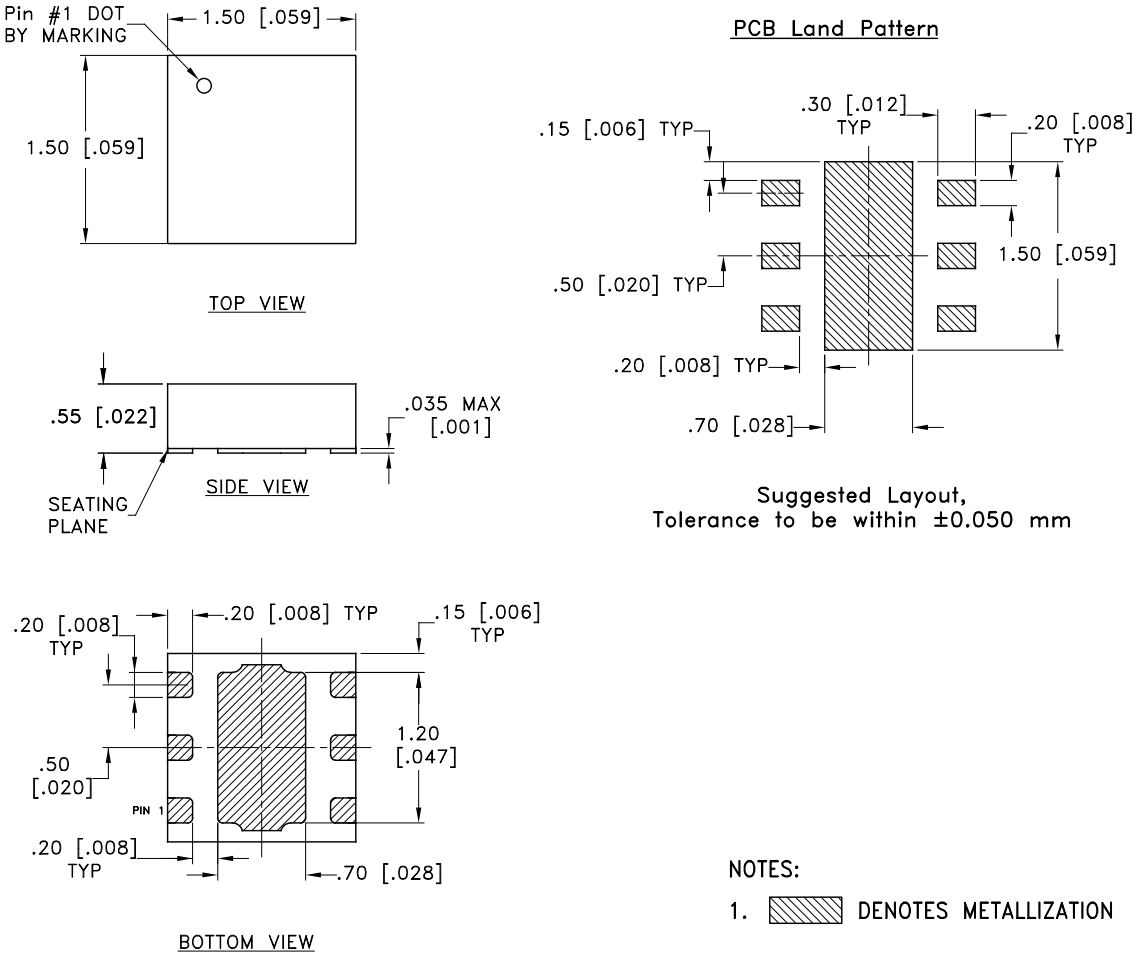
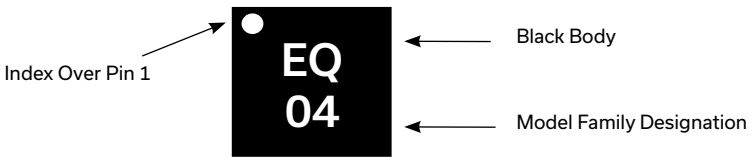
CASE STYLE DRAWING



Weight: 0.0036 grams
Dimensions are in mm [inches]. Tolerances: 2Pl. ±0.05 mm [0.002 inches].

PRODUCT MARKING



Marking may contain other features or characters for internal lot control.

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ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD CLICK HERE

Performance Data	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	KC3011 Plastic package, exposed paddle, Lead Finish: Nickel Palladium Gold
RoHS Status	Compliant
Tape & Reel **Standard Quantities Available on Reel**	F66 7" Reels with 20, 50, 100, 200, 500, 1000, 2000, or 3000 devices
Suggested Layout for PCB Design	PL-835
Evaluation Board	TB-EQY-4-123C+ Gerber File
Environmental Ratings	ENV08T1

NOTES

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html