



Mini-Circuits

MMIC MICROWAVE

# Gain Equalizer

EQY-4-123+

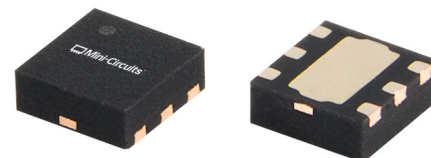
50Ω 4 dB DC to 12 GHz

## 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

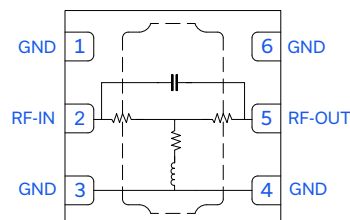
## APPLICATIONS

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



Generic photo used for illustration purposes only

## FUNCTIONAL DIAGRAM (TOP VIEW)



## 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. |



## Gain Equalizer

EQY-4-123+

50 $\Omega$  4 dB DC to 12 GHzELECTRICAL SPECIFICATIONS<sup>1,2</sup> AT +25°C AND Z<sub>0</sub> = 50 $\Omega$ , 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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# Gain Equalizer

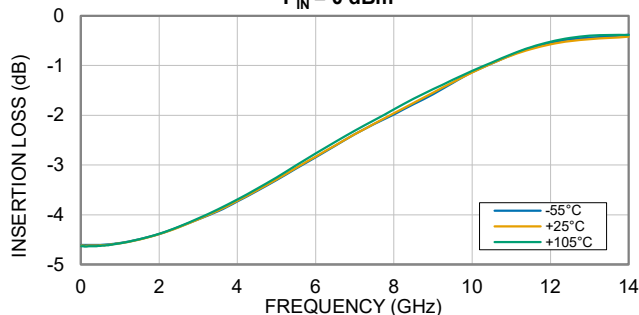
**EQY-4-123+**

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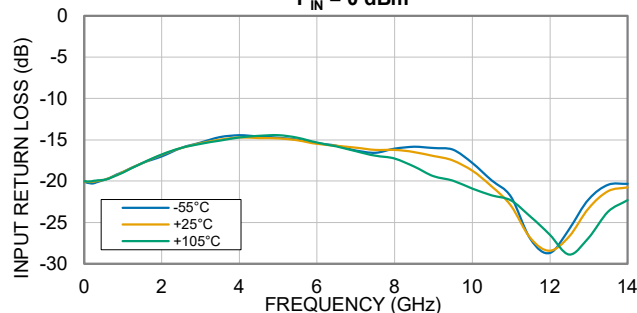
50Ω 4 dB DC to 12 GHz

## TYPICAL PERFORMANCE GRAPHS

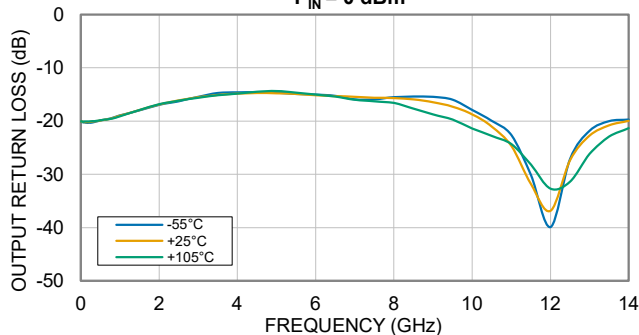
INSERTION LOSS vs. TEMPERATURE  
 $P_{IN} = 0$  dBm



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



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



ABSOLUTE MAXIMUM RATINGS<sup>3</sup>

| 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 ( $\Theta_{JC}$ ) <sup>4</sup> | 80.9°C/W |

4.  $\Theta_{JC}$  = (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



## FUNCTIONAL DIAGRAM (TOP VIEW)

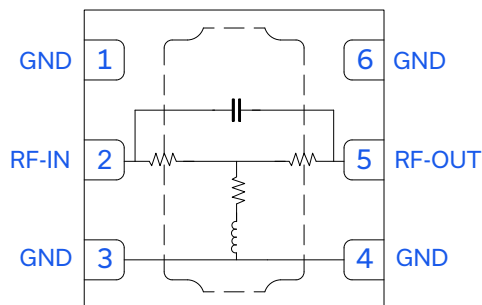


Figure 1. EQY-4-123+ Functional Diagram

## 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

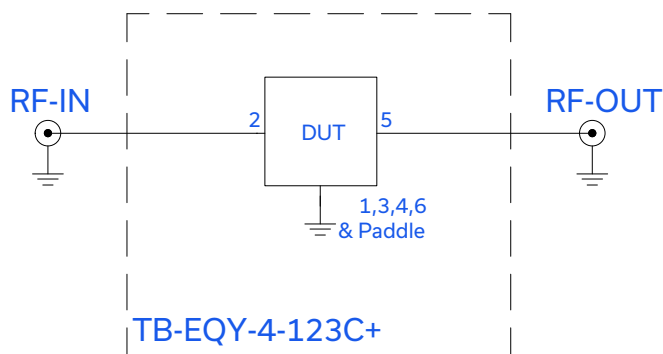


Figure 2. EQY-4-123C+ Evaluation and Application Circuit

## 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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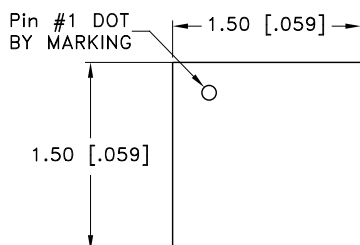
# Gain Equalizer

**EQY-4-123+**

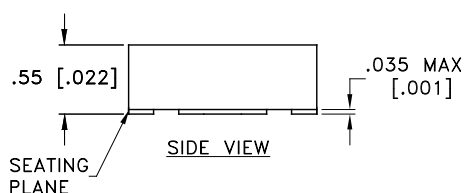
Mini-Circuits

50Ω 4 dB DC to 12 GHz

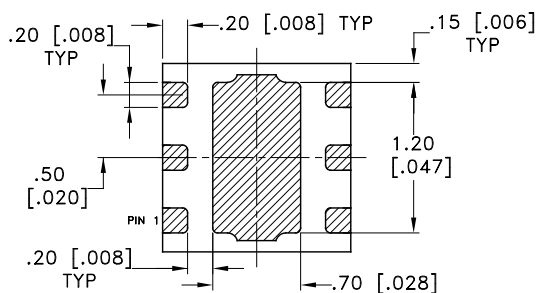
## CASE STYLE DRAWING



TOP VIEW

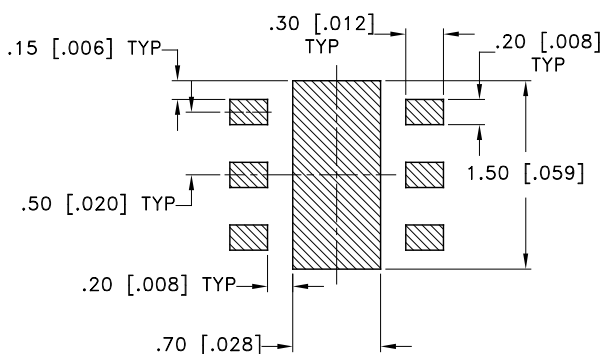


SIDE VIEW



BOTTOM VIEW

## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm 0.050$  mm

## NOTES:

1.  DENOTES METALLIZATION

Weight: 0.0036 grams

Dimensions are in mm [inches]. Tolerances: 2Pl.  $\pm 0.05$  mm [0.002 inches].

## PRODUCT MARKING



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

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# Gain Equalizer

**EQY-4-123+**

50Ω 4 dB DC to 12 GHz

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                           | F66                                                                        |
| Standard Quantities Available on Reel | 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

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/terms/viewterm.html)



[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 [sales@minicircuits.com](mailto:sales@minicircuits.com)

*Typical Performance Data***NOTE: Use PDF Bookmarks to view DATA at required conditions**TEST CONDITIONS:  $P_{IN} = 0$  dBm Temperature = +25°C

| FREQ  | Insertion Loss | Input Return Loss | Output Return Loss |
|-------|----------------|-------------------|--------------------|
| (GHz) | (dB)           | (dB)              | (dB)               |
| 0.01  | -4.6           | -20.1             | -20.1              |
| 0.02  | -4.6           | -20.0             | -20.1              |
| 0.03  | -4.6           | -20.1             | -20.1              |
| 0.04  | -4.6           | -20.1             | -20.1              |
| 0.05  | -4.6           | -20.1             | -20.1              |
| 0.06  | -4.6           | -20.1             | -20.1              |
| 0.07  | -4.6           | -20.1             | -20.2              |
| 0.08  | -4.6           | -20.1             | -20.1              |
| 0.09  | -4.6           | -20.1             | -20.1              |
| 0.10  | -4.6           | -20.1             | -20.1              |
| 0.20  | -4.6           | -20.1             | -20.1              |
| 0.30  | -4.6           | -20.0             | -20.1              |
| 0.40  | -4.6           | -19.9             | -20.0              |
| 0.50  | -4.6           | -19.8             | -19.9              |
| 0.60  | -4.6           | -19.7             | -19.7              |
| 0.70  | -4.6           | -19.5             | -19.6              |
| 0.80  | -4.6           | -19.3             | -19.4              |
| 0.90  | -4.6           | -19.1             | -19.2              |
| 1.00  | -4.6           | -18.9             | -19.0              |
| 1.50  | -4.5           | -17.8             | -17.9              |
| 2.00  | -4.4           | -16.8             | -16.9              |
| 2.50  | -4.3           | -16.0             | -16.1              |
| 3.00  | -4.1           | -15.4             | -15.5              |
| 3.50  | -3.9           | -15.0             | -15.1              |
| 4.00  | -3.7           | -14.7             | -14.8              |
| 4.50  | -3.5           | -14.8             | -14.7              |
| 5.00  | -3.3           | -14.8             | -14.7              |
| 5.50  | -3.1           | -15.1             | -14.9              |
| 6.00  | -2.8           | -15.5             | -15.1              |
| 6.50  | -2.6           | -15.7             | -15.3              |
| 7.00  | -2.4           | -15.9             | -15.4              |
| 7.50  | -2.2           | -16.2             | -15.6              |
| 8.00  | -2.0           | -16.2             | -15.7              |
| 8.50  | -1.7           | -16.5             | -15.9              |
| 9.00  | -1.5           | -17.0             | -16.4              |
| 9.50  | -1.3           | -17.5             | -17.3              |
| 10.00 | -1.1           | -18.7             | -18.7              |
| 10.50 | -1.0           | -20.6             | -21.0              |
| 11.00 | -0.8           | -23.0             | -24.7              |
| 11.50 | -0.7           | -26.9             | -31.8              |
| 12.00 | -0.6           | -28.4             | -36.8              |
| 12.50 | -0.5           | -26.7             | -27.3              |
| 13.00 | -0.5           | -23.3             | -22.7              |
| 13.50 | -0.4           | -21.2             | -20.8              |
| 14.00 | -0.4           | -20.7             | -19.9              |

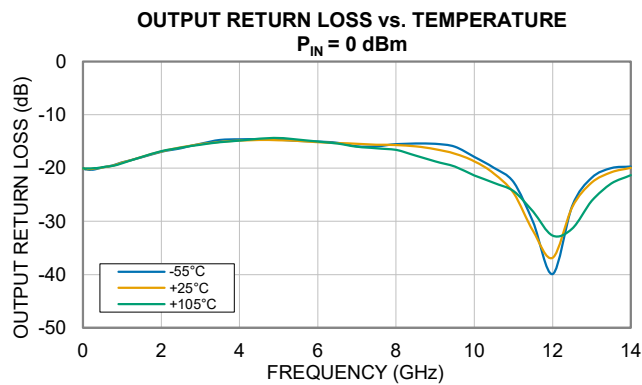
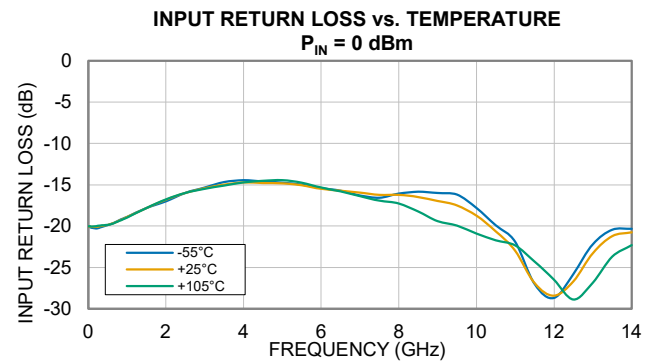
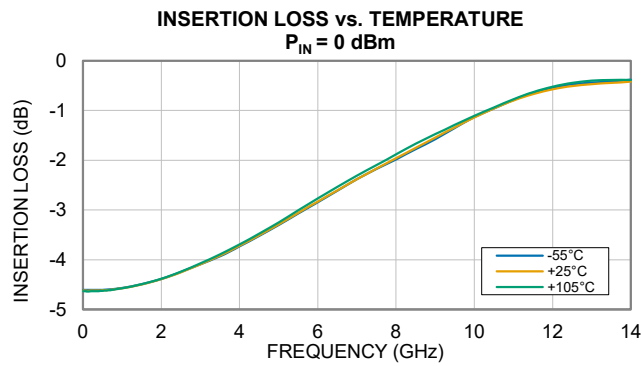
*Typical Performance Data***NOTE: Use PDF Bookmarks to view DATA at required conditions**TEST CONDITIONS:  $P_{IN} = 0$  dBm Temperature = -55°C

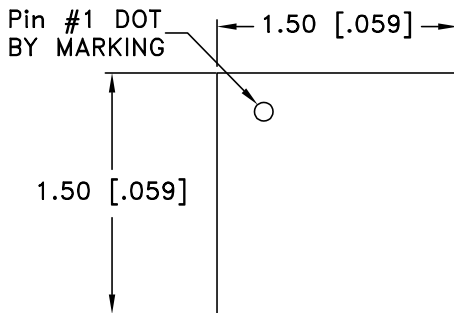
| FREQ  | Insertion Loss | Input Return Loss | Output Return Loss |
|-------|----------------|-------------------|--------------------|
| (GHz) | (dB)           | (dB)              | (dB)               |
| 0.01  | -4.6           | -20.1             | -20.1              |
| 0.02  | -4.6           | -20.1             | -20.1              |
| 0.03  | -4.6           | -20.1             | -20.2              |
| 0.04  | -4.6           | -20.1             | -20.2              |
| 0.05  | -4.6           | -20.1             | -20.2              |
| 0.06  | -4.6           | -20.2             | -20.2              |
| 0.07  | -4.6           | -20.2             | -20.2              |
| 0.08  | -4.6           | -20.2             | -20.2              |
| 0.09  | -4.6           | -20.2             | -20.2              |
| 0.10  | -4.6           | -20.2             | -20.2              |
| 0.20  | -4.6           | -20.3             | -20.3              |
| 0.30  | -4.6           | -20.2             | -20.2              |
| 0.40  | -4.6           | -20.0             | -20.1              |
| 0.50  | -4.6           | -19.9             | -19.9              |
| 0.60  | -4.6           | -19.7             | -19.7              |
| 0.70  | -4.6           | -19.5             | -19.6              |
| 0.80  | -4.6           | -19.3             | -19.4              |
| 0.90  | -4.6           | -19.1             | -19.1              |
| 1.00  | -4.6           | -18.9             | -18.9              |
| 1.50  | -4.5           | -17.8             | -18.0              |
| 2.00  | -4.4           | -17.0             | -16.9              |
| 2.50  | -4.2           | -16.0             | -16.2              |
| 3.00  | -4.1           | -15.3             | -15.4              |
| 3.50  | -3.9           | -14.7             | -14.7              |
| 4.00  | -3.7           | -14.5             | -14.6              |
| 4.50  | -3.5           | -14.6             | -14.6              |
| 5.00  | -3.3           | -14.7             | -14.6              |
| 5.50  | -3.1           | -15.0             | -14.9              |
| 6.00  | -2.8           | -15.4             | -15.0              |
| 6.50  | -2.6           | -15.7             | -15.2              |
| 7.00  | -2.4           | -16.3             | -15.9              |
| 7.50  | -2.2           | -16.6             | -15.9              |
| 8.00  | -2.0           | -16.1             | -15.5              |
| 8.50  | -1.8           | -15.9             | -15.4              |
| 9.00  | -1.6           | -16.0             | -15.4              |
| 9.50  | -1.3           | -16.2             | -16.0              |
| 10.00 | -1.1           | -17.8             | -17.9              |
| 10.50 | -1.0           | -19.9             | -19.9              |
| 11.00 | -0.8           | -21.9             | -22.7              |
| 11.50 | -0.6           | -27.0             | -30.1              |
| 12.00 | -0.5           | -28.7             | -39.9              |
| 12.50 | -0.5           | -25.8             | -27.1              |
| 13.00 | -0.4           | -22.2             | -21.8              |
| 13.50 | -0.4           | -20.4             | -20.0              |
| 14.00 | -0.4           | -20.3             | -19.7              |

*Typical Performance Data***NOTE: Use PDF Bookmarks to view DATA at required conditions**TEST CONDITIONS:  $P_{IN} = 0 \text{ dBm}$  Temperature =  $+105^{\circ}\text{C}$ 

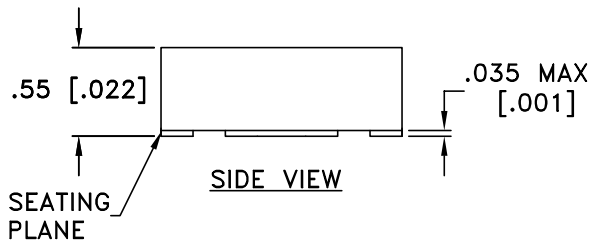
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|-------|----------------|-------------------|--------------------|
| (GHz) | (dB)           | (dB)              | (dB)               |
| 0.01  | -4.6           | -20.0             | -20.0              |
| 0.02  | -4.6           | -20.0             | -20.1              |
| 0.03  | -4.6           | -20.0             | -20.1              |
| 0.04  | -4.6           | -20.0             | -20.1              |
| 0.05  | -4.6           | -20.0             | -20.1              |
| 0.06  | -4.6           | -20.0             | -20.1              |
| 0.07  | -4.6           | -20.0             | -20.1              |
| 0.08  | -4.6           | -20.0             | -20.1              |
| 0.09  | -4.6           | -20.0             | -20.1              |
| 0.10  | -4.6           | -20.0             | -20.1              |
| 0.20  | -4.6           | -20.0             | -20.0              |
| 0.30  | -4.6           | -19.9             | -20.0              |
| 0.40  | -4.6           | -19.9             | -19.9              |
| 0.50  | -4.6           | -19.9             | -19.8              |
| 0.60  | -4.6           | -19.7             | -19.7              |
| 0.70  | -4.6           | -19.6             | -19.6              |
| 0.80  | -4.6           | -19.4             | -19.5              |
| 0.90  | -4.6           | -19.2             | -19.3              |
| 1.00  | -4.6           | -19.0             | -19.1              |
| 1.50  | -4.5           | -17.8             | -17.9              |
| 2.00  | -4.4           | -16.8             | -16.8              |
| 2.50  | -4.2           | -16.0             | -16.2              |
| 3.00  | -4.1           | -15.5             | -15.6              |
| 3.50  | -3.9           | -15.1             | -15.1              |
| 4.00  | -3.7           | -14.7             | -14.8              |
| 4.50  | -3.5           | -14.5             | -14.5              |
| 5.00  | -3.2           | -14.4             | -14.3              |
| 5.50  | -3.0           | -14.8             | -14.7              |
| 6.00  | -2.8           | -15.3             | -15.0              |
| 6.50  | -2.5           | -15.8             | -15.4              |
| 7.00  | -2.3           | -16.4             | -16.0              |
| 7.50  | -2.1           | -16.9             | -16.3              |
| 8.00  | -1.9           | -17.3             | -16.6              |
| 8.50  | -1.7           | -18.2             | -17.7              |
| 9.00  | -1.5           | -19.4             | -18.7              |
| 9.50  | -1.3           | -19.9             | -19.7              |
| 10.00 | -1.1           | -20.9             | -21.4              |
| 10.50 | -0.9           | -21.7             | -22.8              |
| 11.00 | -0.8           | -22.3             | -24.3              |
| 11.50 | -0.6           | -24.3             | -28.2              |
| 12.00 | -0.5           | -26.5             | -32.7              |
| 12.50 | -0.4           | -28.9             | -31.4              |
| 13.00 | -0.4           | -26.8             | -26.1              |
| 13.50 | -0.4           | -23.7             | -22.9              |
| 14.00 | -0.4           | -22.3             | -21.3              |

## Typical Performance Curves

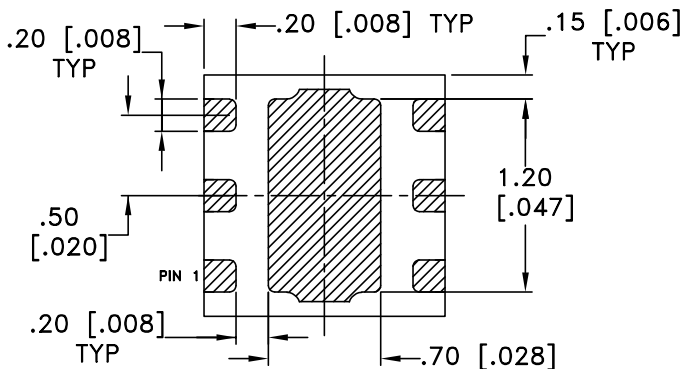




TOP VIEW

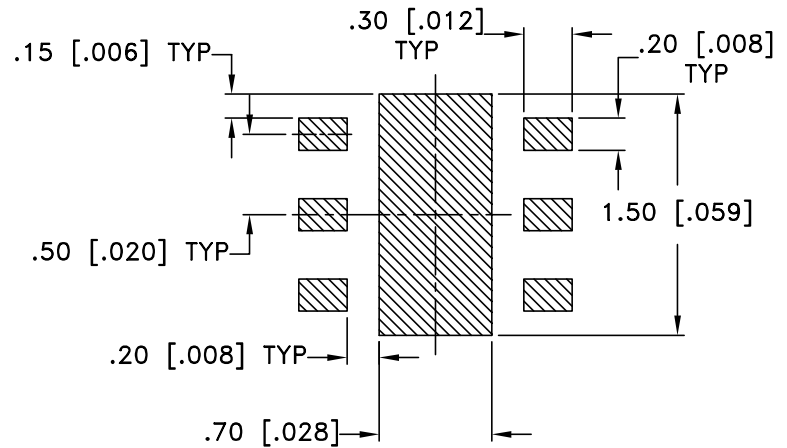


SIDE VIEW



BOTTOM VIEW

PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm 0.050$  mm

### NOTES:

1.  DENOTES METALLIZATION

Weight: .0036 grams

Dimensions are in mm [inches]. Tolerances: 2 Pl.  $\pm 0.05$  mm

### Notes:

1. Case material: Plastic.
2. Termination finish: NiPdAu ( $3\mu\text{m}/0.080\mu\text{m}/0.080\mu\text{m}$ ).



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

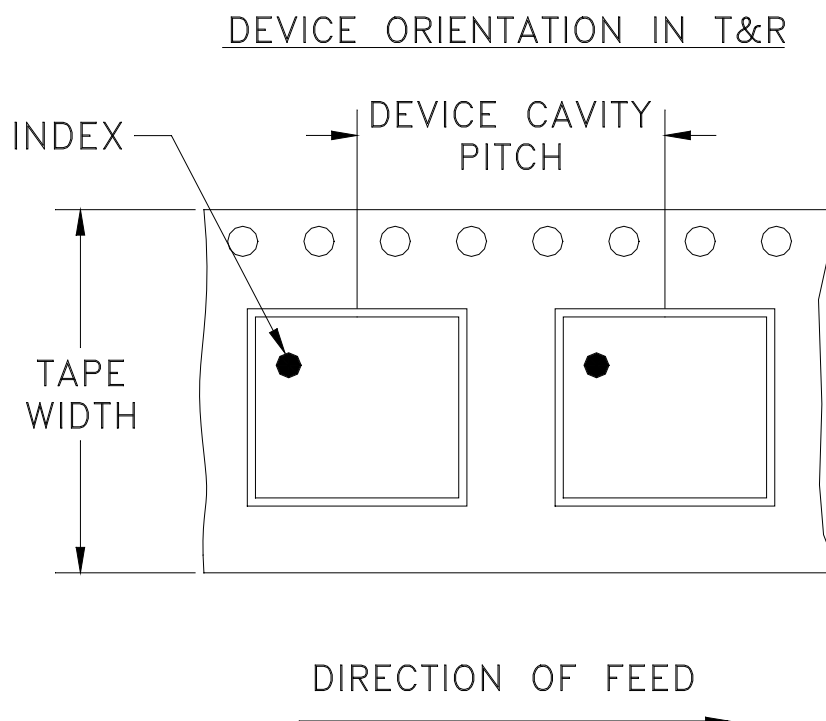


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RF/IF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F66



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel<br>see note  |                  |
|-------------------|----------------------------|----------------------|-------------------------------|------------------|
| 8                 | 4                          | 7                    | Small<br>quantity<br>standard | 20               |
|                   |                            |                      |                               | 50               |
|                   |                            |                      |                               | 100              |
|                   |                            |                      |                               | 200              |
|                   |                            |                      |                               | 500              |
|                   |                            | 7                    | Standard                      | 1000, 2000, 3000 |

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



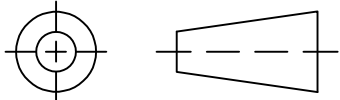
INTERNET <http://www.minicircuits.com>

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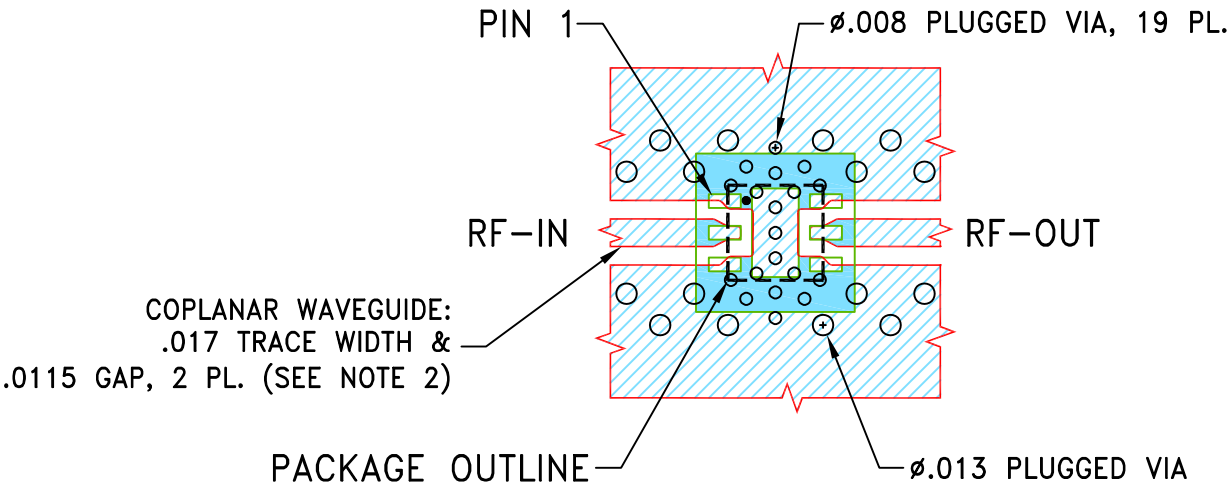
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION

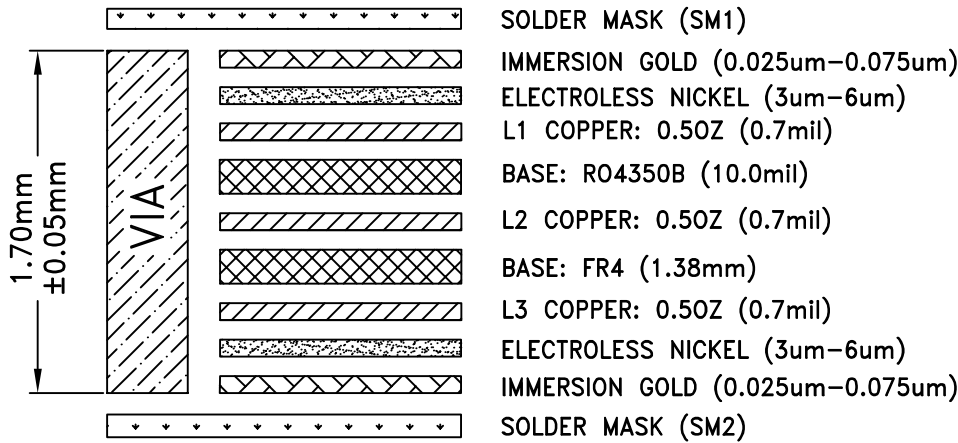


| REVISIONS |            |             |          |     |      |
|-----------|------------|-------------|----------|-----|------|
| REV       | ECN No.    | DESCRIPTION | DATE     | DR  | AUTH |
| OR        | ECO-026893 | NEW RELEASE | 09/15/25 | ITG | IL   |
|           |            |             |          |     |      |
|           |            |             |          |     |      |
|           |            |             |          |     |      |

SUGGESTED MOUNTING CONFIGURATION  
FOR KC3011 CASE STYLE



3 LAYER STACKUP DETAIL



NOTES:

- PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
- TRACE WIDTH & GAP ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010", COPPER: 1 OZ. EACH LAYER. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
- LAYERS L2 & L3 OF PCB ARE CONTINUOUS GROUND PLANES.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

| UNLESS OTHERWISE SPECIFIED                                                                                       | INITIALS |     | DATE     |
|------------------------------------------------------------------------------------------------------------------|----------|-----|----------|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES ON:<br>2 PL DECIMALS ±<br>3 PL DECIMALS ± .005<br>ANGLES ±<br>FRACTIONS ± | DRAWN    | ITG | 09/15/25 |
|                                                                                                                  | CHECKED  | GF  | 09/15/25 |
|                                                                                                                  | APPROVED | IL  | 09/15/25 |
|                                                                                                                  |          |     |          |

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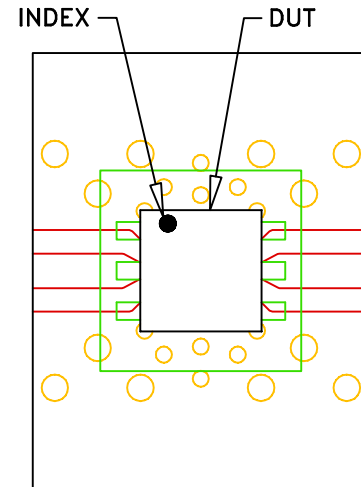
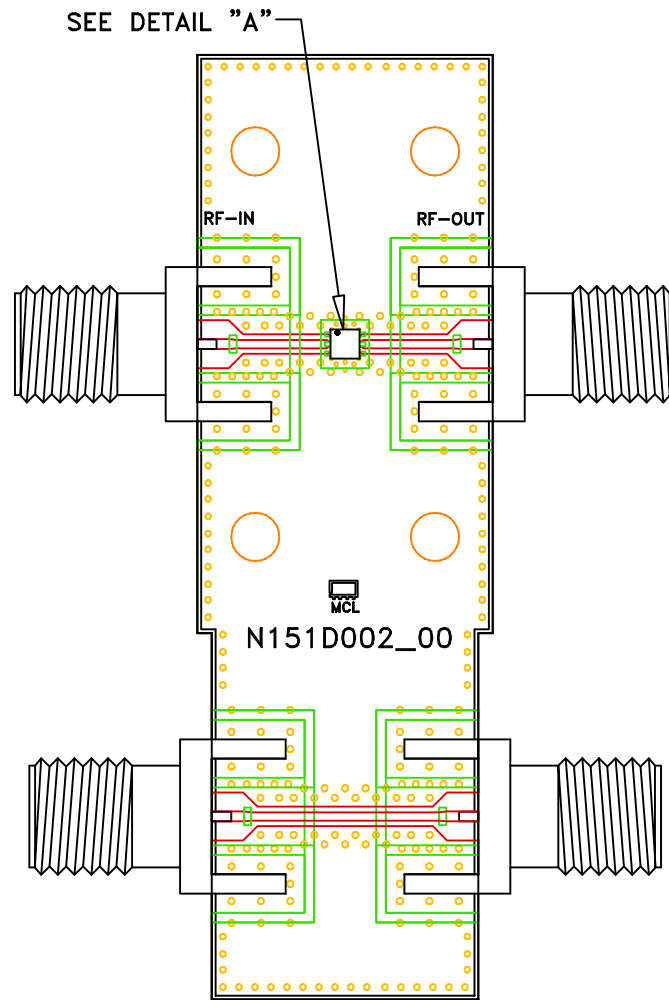
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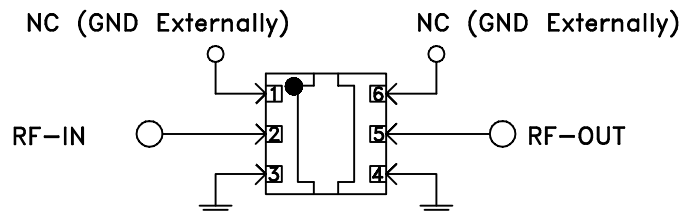
PL, KC3011, TB-EQY-X-123+

| SIZE  | CODE IDENT | DRAWING NO: | REV:          |
|-------|------------|-------------|---------------|
| A     | 15542      | 98-PL-835   | OR            |
| FILE: | 98PL835    | SCALE: 8:1  | SHEET: 1 OF 1 |

# Evaluation Board and Circuit



DETAIL "A"  
(SCALE 6:1)



SCHEMATIC DIAGRAM  
(SCALE 6:1)

| Function            | Pad |
|---------------------|-----|
| RF-IN               | 2   |
| RF-OUT              | 5   |
| GND                 | 3,4 |
| NC (GND Externally) | 1,6 |

## NOTES:

1. 50 Ohm SMA Female Connectors.
2. PCB Material: Roger R04350B or equivalent,  
Dielectric constant=3.5, Thickness=0.010 inch.

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All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification                  | Test/Inspection Condition                                                                                  | Reference/Spec                                                  |
|--------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Operating Temperature          | -40° to 85° C or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C<br>Ambient Environment | Individual Model Data Sheet                                     |
| Storage Temperature            | -55° to 100° C or -65° to 150°<br>Ambient Environment                                                      | Individual Model Data Sheet                                     |
| HTOL                           | 1000 hours at 125°C                                                                                        | MIL-STD-883, Method 1005, Condition B                           |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                  | MIL-STD-202, Method 107, Condition A-3, except +100°C           |
| Mechanical Shock               | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only                                                           | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Vibration (Variable Frequency) | 50g peak                                                                                                   | MIL-STD-883, Method 2007, Condition B                           |
| Autoclave                      | 15 psig, 100% RH, 121°C, 96 hours                                                                          | JESD22-A102, Condition C                                        |
| HAST                           | 130°C, 85% RH, 96 hours                                                                                    | JESD22-A110                                                     |
| Solderability                  | 10X Magnification                                                                                          | J-STD-002, Para 4.2.5, Test S, 95% Coverage                     |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 240°C peak<br>Pb-Free Process: 260°C peak                                           | J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1                   |
| Moisture Sensitivity: Level 1  | Bake at 125°C for 24 hours<br>Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak             | J-STD-020                                                       |



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| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec          |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |