



Mini-Circuits®

MICROWAVE

# Gain Equalizer

**EQY-0-24+**

50Ω 0 dB DC to 20 GHz

## THE BIG DEAL

- Excellent Return Loss, 20dB typ.
- Wide bandwidth, DC to 20 GHz
- Small Size, 2 x2 mm MCLP
- 0 dB Nominal



Generic photo used for illustration purposes only

CASE STYLE: MC1631-1

## APPLICATIONS

- Fixed Satellite
- Mobile
- Radio location
- Space research

### +RoHS Compliant

The +Suffix identifies RoHS Compliance.  
See our website for methodologies and qualifications

## PRODUCT OVERVIEW

EQY-0-24+ is a 0 dB attenuator fabricated using highly repetitive GaAs IPD MMIC process. EQY-0-24+ has a nominal attenuation slope of 0 dB and is packaged in tiny 2 x 2 mm, 8-Lead MCLP™ package. If gain equalization is no longer needed, EQY-0-24+ can be used as a short without changing PCB layout.

## KEY FEATURES

| Feature                                     | Advantages                                                                                                                                                                                         |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negative Insertion Loss Slope vs. Frequency | EQY-XX-24+ Series equalizers are useful for compensating negative gain slope of amplifiers, receivers, transmitters to achieve flat gain versus frequency.                                         |
| Wide range of values 0,2,3,5,6,8,10,12 dB   | Enables circuit designer to change nominal insertion loss values without motherboard redesign making the EQY-XX-24+ Series ideal for select at test application.                                   |
| Wideband operation, DC to 20 GHz            | Supports a wide array of applications including wireless cellular, microwave communications, satellite, defense and aerospace, medical broadband and optic applications.                           |
| Excellent Power Handling Capability         | Enables its use at the output of a variety of amplifiers                                                                                                                                           |
| Small Size and simple to use (2 mm x 2 mm)  | As a single chip solution, the EQY-XX-24+ Series occupies less board space than a lumped element approach, minimizes component count and ensures repeatable performance over wide frequency range. |

\*GaAs IPD (Gallium Arsenide Integrated Passive Device)

REV. A  
ECO-014561  
EQY-0-24+  
MCL NY  
230530



**ELECTRICAL SPECIFICATIONS<sup>1</sup> AT 25°C, 50Ω, UNLESS OTHERWISE NOTED.**

| Parameter       | Condition (GHz) | Min. | Typ. | Max. | Units |
|-----------------|-----------------|------|------|------|-------|
| Frequency Range |                 | DC   |      | 20   | GHz   |
| Insertion Loss  | 0.01            | —    | 0.02 | 0.4  | dB    |
|                 | 5               | —    | 0.17 | —    |       |
|                 | 10              | —    | 0.18 | —    |       |
|                 | 18              | —    | 0.35 | 0.8  |       |
|                 | 20              | —    | 0.39 | —    |       |
| VSWR            | 0.01 - 5        | —    | 1.03 | —    | :1    |
|                 | 5 - 10          | —    | 1.10 | —    |       |
|                 | 10 - 18         | —    | 1.19 | —    |       |
|                 | 18 - 20         | —    | 1.17 | —    |       |

1. Measured on Mini-Circuits Characterization Test Board TB-EQY-0-24+. See Characterization Test Circuit (Fig. 1)

**MAXIMUM RATINGS<sup>2</sup>**

| Parameter                   | Ratings        |
|-----------------------------|----------------|
| Operating Case Temperature  | -55°C to 105°C |
| Storage Temperature         | -65°C to 150°C |
| RF Input Power <sup>3</sup> | 33 dBm         |

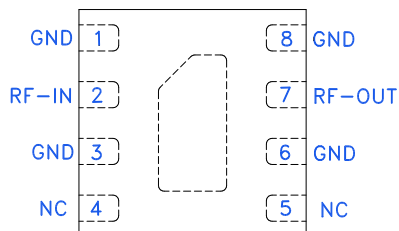
2. Permanent damage may occur if any of these limits are exceeded.

3. Derates linearly to +30 dBm at 105°C



## PAD DESCRIPTION

TOP VIEW



| Function | Pad Number       | Description                                   |
|----------|------------------|-----------------------------------------------|
| RF-IN    | 2                | RF-Input pad                                  |
| RF-OUT   | 7                | RF-Output pad                                 |
| GND      | 1,3,6,8 & Paddle | Ground                                        |
| NC       | 4,5              | No connection, connected to ground externally |

## CHARACTERIZATION TEST CIRCUIT

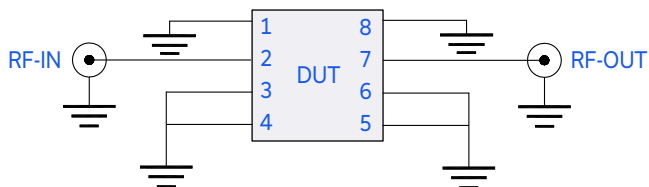
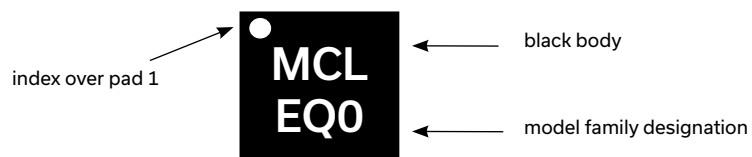


Fig 1. Block Diagram of Test Circuit used for characterization. Test Board TB-EQY-0-24+  
Conditions: Attenuation & Return Loss Pin=0 dBm

## PRODUCT MARKING

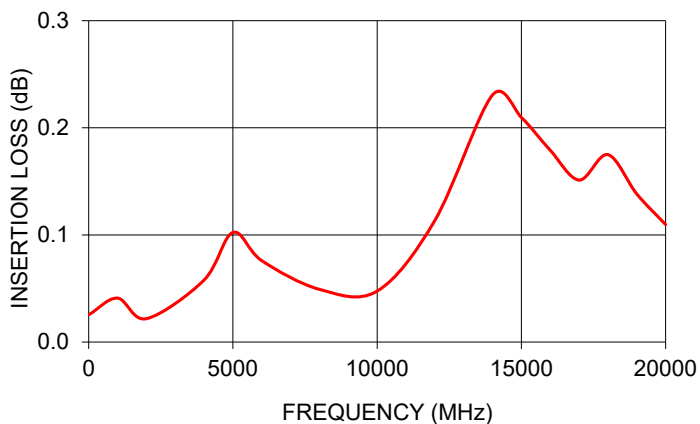
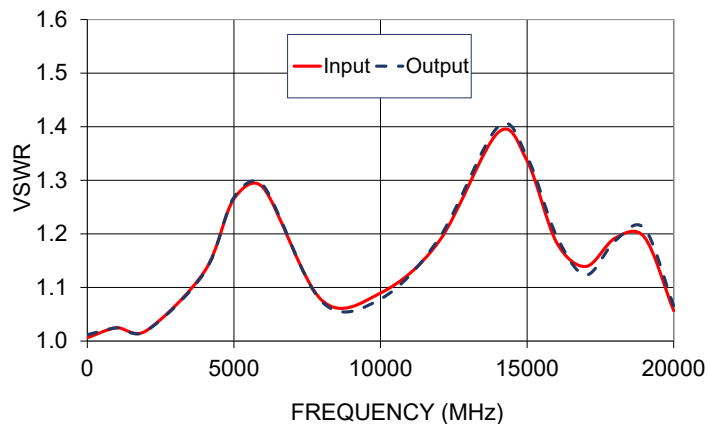


Marking may contain other features or characters for internal lot control



## TYPICAL PERFORMANCE DATA AT 25°C

| Frequency (MHz) | Insertion Loss (dB) | Input VSWR (:1) | Output VSWR (:1) |
|-----------------|---------------------|-----------------|------------------|
| 10              | 0.03                | 1.01            | 1.01             |
| 1000            | 0.04                | 1.02            | 1.02             |
| 2000            | 0.02                | 1.02            | 1.02             |
| 4000            | 0.06                | 1.13            | 1.13             |
| 5000            | 0.10                | 1.27            | 1.27             |
| 6000            | 0.08                | 1.29            | 1.29             |
| 8000            | 0.05                | 1.08            | 1.07             |
| 10000           | 0.05                | 1.09            | 1.08             |
| 12000           | 0.11                | 1.19            | 1.19             |
| 14000           | 0.23                | 1.39            | 1.40             |
| 15000           | 0.21                | 1.34            | 1.34             |
| 16000           | 0.18                | 1.18            | 1.20             |
| 17000           | 0.15                | 1.14            | 1.12             |
| 18000           | 0.17                | 1.19            | 1.19             |
| 19000           | 0.14                | 1.19            | 1.21             |
| 20000           | 0.11                | 1.06            | 1.07             |

EQY-0-24+  
INSERTION LOSSEQY-0-24+  
VSWR



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EQY-0-24+

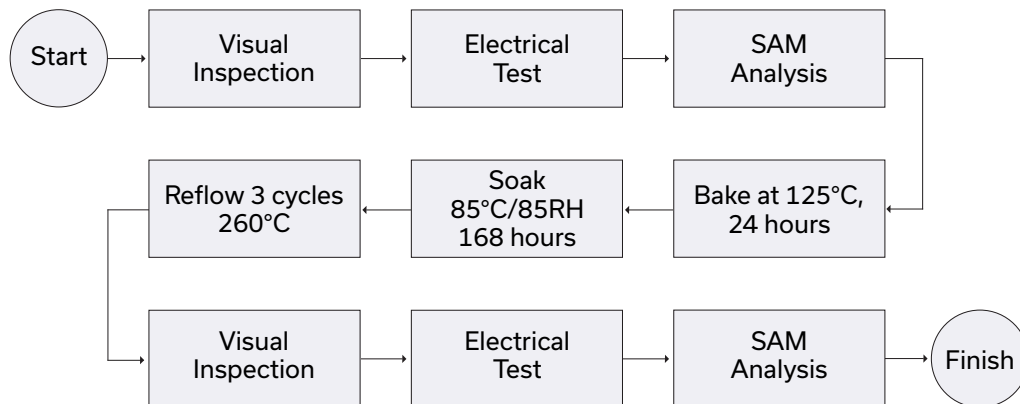
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

|                                                      |                                                              |
|------------------------------------------------------|--------------------------------------------------------------|
| Performance Data                                     | Data Table                                                   |
|                                                      | Swept Graphs                                                 |
| Case Style                                           | MC1631-1 Plastic package, Lead finish: Matte-tin             |
| Tape & Reel<br>Standard quantities available on reel | F66<br>7" reels with 20, 50, 100, 200, 500, 1K or 2K devices |
| Suggested Layout for PCB Design                      | PL-618                                                       |
| Evaluation Board                                     | TB-EQY-0-24+                                                 |
| Environmental Ratings                                | ENV08T1                                                      |

## ESD RATING

Human Body Model (HBM): Class 2 (Pass 2000V) in accordance with ANSI/ESD STM 5.1 - 2001 Machine.

## MSL TEST FLOW CHART



- 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](http://www.minicircuits.com/terms/viewterm.html)