*Microwave*

# Gain Equalizer

# VEQY-1-63+

50Ω 1dB DC to 6 GHz

*Generic photo used for illustration purposes only*
CASE STYLE: FF704

***+RoHS Compliant***
*The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications*

## The Big Deal

- Excellent VSWR, 1.1:1 typ.
- Wide bandwidth, DC - 6 GHz
- Connectorized package

## Product Overview

Mini-Circuits' VEQY-1-63+ is an absorptive Gain Equalizer fabricated using highly repetitive GaAs IPD* MMIC process incorporating resistors, capacitors and inductors having negative insertion loss slope. VEQY-1-63+ has a nominal attenuation slope of 1 dB.

## Key Features

| Feature | Advantages |
|---|---|
| Negative Insertion Loss Slope vs. Frequency | Useful for compensating negative gain slope of amplifiers, receivers, transmitters to achieve flat gain versus frequency. |
| Wideband operation, DC to 6 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 31 dBm | Enables its use at the output of a variety of amplifiers |
| Connectorized package | The connectorized package is easy to interface with other devices and well suited for test setups. |

*GaAs IPD (Gallium Arsenide Integrated Passive Device)

*Microwave*

# Gain Equalizer

50Ω 1dB DC to 6 GHz

# VEQY-1-63+

*Generic photo used for illustration purposes only*

CASE STYLE: FF704

| Connectors | Model |
|---|---|
| **SMA** | VEQY-1-63+ |

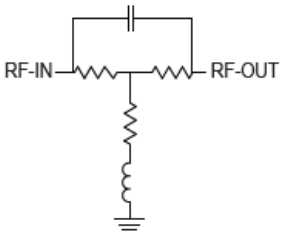
## Features

- 1 dB Slope
- Wide Bandwidth, DC-6 GHz
- Excellent VSWR, 1.1:1 typ.
- Connectorized package

## Applications

- Communications
- Radar
- Defense

## Simplified schematic




## Electrical Specifications at 25°C

| Parameter | Condition (GHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | DC | — | 6 | GHz |
| Insertion Loss | 0.01 | 1.1 | 1.5 | 1.9 | dB |
| | 1 | — | 1.5 | — | |
| | 2 | — | 1.3 | — | |
| | 3 | 0.6 | 1.1 | 1.5 | |
| | 4 | — | 0.9 | — | |
| | 5 | — | 0.7 | — | |
| | 6 | 0.2 | 0.6 | 1.0 | |
| VSWR | 0.01 - 1 | — | 1.07 | — | :1 |
| | 1 - 2 | — | 1.10 | — | |
| | 2 - 3 | — | 1.13 | — | |
| | 3 - 4 | — | 1.13 | — | |
| | 4 - 5 | — | 1.09 | — | |
| | 5 - 6 | — | 1.07 | — | |

## Absolute Maximum Ratings[1]

| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power | 31 dBm |

1 Permanent damage may occur if any of these limits are exceeded

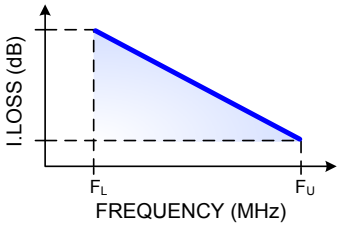
## ESD rating

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

## Typical Performance Data at 25°C

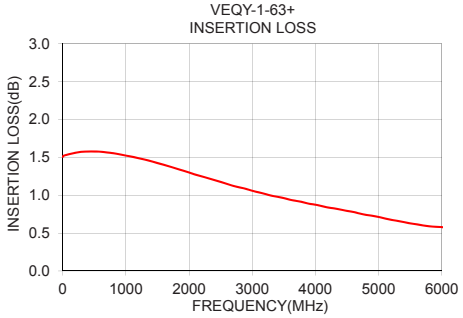
| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | |
|---|---|---|---|
| | | Input | Output |
| 10 | 1.52 | 1.06 | 1.06 |
| 50 | 1.53 | 1.06 | 1.06 |
| 100 | 1.54 | 1.06 | 1.06 |
| 500 | 1.58 | 1.07 | 1.07 |
| 1000 | 1.52 | 1.06 | 1.07 |
| 1300 | 1.47 | 1.06 | 1.07 |
| 1500 | 1.42 | 1.07 | 1.08 |
| 1800 | 1.35 | 1.09 | 1.08 |
| 2000 | 1.30 | 1.10 | 1.08 |
| 2500 | 1.18 | 1.12 | 1.08 |
| 2800 | 1.10 | 1.13 | 1.08 |
| 3000 | 1.06 | 1.13 | 1.08 |
| 3500 | 0.96 | 1.12 | 1.08 |
| 4000 | 0.87 | 1.09 | 1.08 |
| 4500 | 0.79 | 1.05 | 1.08 |
| 5000 | 0.71 | 1.02 | 1.07 |
| 5500 | 0.63 | 1.04 | 1.05 |
| 6000 | 0.58 | 1.05 | 1.03 |

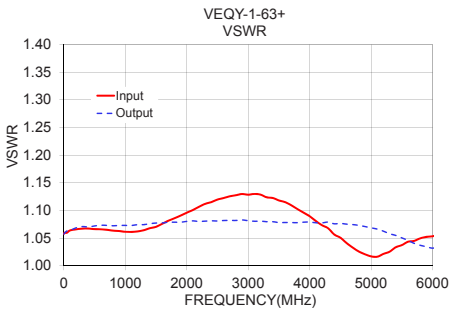
## Typical Frequency Response




***+RoHS Compliant***

*The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications*




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.

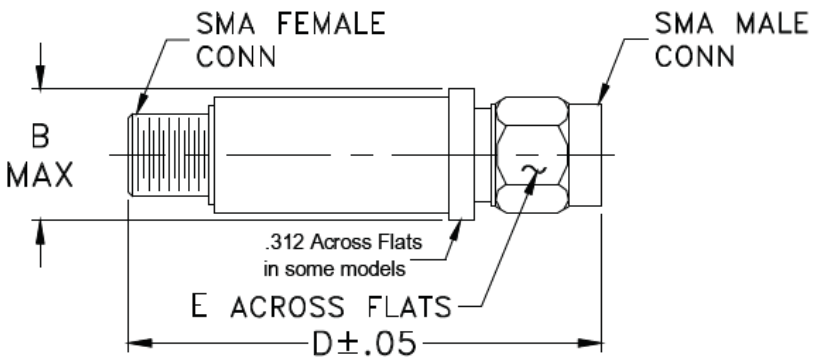
**B.** Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

**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/MCLStore/terms.jsp

## Coaxial Connections

| | |
|---|---|
| PORT - 1 | SMA-Female |
| PORT - 2 | SMA-Male |

## Outline Drawing




## Outline Dimensions ( inch / mm )

| B | D | E | wt. |
|---|---|---|---|
| **.410** | **1.43** | **.312** | grams |
| 10.41 | 36.32 | 7.92 | 10 |

*Note: Please refer to case style drawing for details*

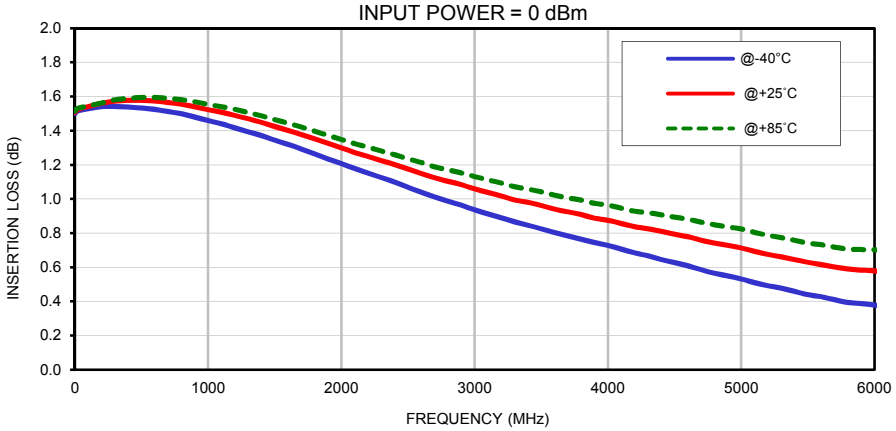
# Gain Equalizer VEQY-1-63+

*Typical Performance Data*

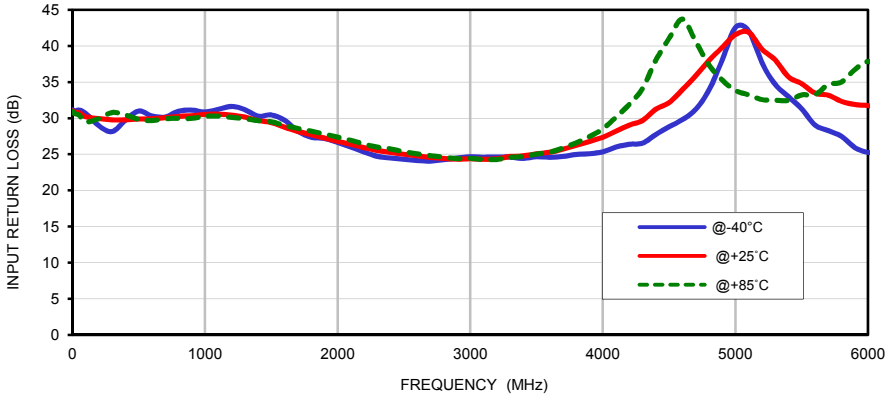
| FREQ. (MHz) | INSERTION LOSS (dB) | | | INPUT RETURN LOSS (dB) | | | OUTPUT RETURN LOSS (dB) | | |
|---|---|---|---|---|---|---|---|---|---|
| | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C |
| 1 | 1.50 | 1.51 | 1.51 | 31.16 | 31.03 | 30.93 | 31.19 | 31.07 | 30.97 |
| 10 | 1.51 | 1.52 | 1.53 | 30.92 | 30.77 | 30.68 | 30.98 | 30.88 | 30.80 |
| 50 | 1.52 | 1.53 | 1.54 | 31.11 | 30.77 | 30.41 | 29.74 | 30.32 | 30.63 |
| 100 | 1.53 | 1.54 | 1.54 | 30.68 | 30.20 | 29.50 | 29.02 | 30.21 | 31.54 |
| 200 | 1.54 | 1.56 | 1.56 | 28.94 | 29.94 | 29.94 | 29.56 | 29.59 | 30.53 |
| 300 | 1.54 | 1.57 | 1.58 | 28.15 | 29.77 | 30.78 | 31.26 | 29.33 | 28.36 |
| 400 | 1.54 | 1.58 | 1.59 | 29.72 | 29.76 | 30.44 | 30.44 | 29.40 | 28.43 |
| 500 | 1.53 | 1.58 | 1.59 | 30.99 | 29.89 | 29.83 | 29.15 | 29.20 | 28.36 |
| 600 | 1.52 | 1.57 | 1.59 | 30.30 | 29.92 | 29.68 | 29.57 | 29.04 | 27.87 |
| 700 | 1.51 | 1.56 | 1.59 | 30.15 | 30.05 | 29.91 | 29.25 | 29.08 | 27.94 |
| 800 | 1.50 | 1.55 | 1.58 | 30.96 | 30.25 | 29.97 | 28.59 | 29.15 | 28.28 |
| 900 | 1.48 | 1.54 | 1.57 | 31.12 | 30.34 | 29.96 | 29.08 | 29.09 | 28.33 |
| 1000 | 1.46 | 1.52 | 1.55 | 30.85 | 30.53 | 30.25 | 30.07 | 29.08 | 28.51 |
| 1100 | 1.44 | 1.51 | 1.54 | 31.21 | 30.56 | 30.30 | 30.41 | 29.09 | 28.93 |
| 1200 | 1.42 | 1.49 | 1.52 | 31.62 | 30.43 | 30.10 | 30.52 | 28.93 | 28.96 |
| 1300 | 1.39 | 1.47 | 1.51 | 31.18 | 30.15 | 29.94 | 31.10 | 28.92 | 29.05 |
| 1400 | 1.37 | 1.45 | 1.49 | 30.28 | 29.68 | 29.65 | 30.52 | 28.73 | 29.07 |
| 1500 | 1.34 | 1.42 | 1.46 | 30.45 | 29.38 | 29.50 | 30.10 | 28.60 | 29.10 |
| 1600 | 1.32 | 1.40 | 1.44 | 29.71 | 28.74 | 28.99 | 30.06 | 28.58 | 29.04 |
| 1700 | 1.29 | 1.38 | 1.42 | 28.19 | 28.16 | 28.58 | 28.67 | 28.44 | 28.93 |
| 1800 | 1.26 | 1.35 | 1.40 | 27.36 | 27.72 | 28.22 | 28.03 | 28.44 | 28.91 |
| 1900 | 1.23 | 1.33 | 1.37 | 27.20 | 27.26 | 27.80 | 28.23 | 28.44 | 28.86 |
| 2000 | 1.21 | 1.30 | 1.35 | 26.66 | 26.79 | 27.37 | 27.82 | 28.28 | 28.69 |
| 2100 | 1.18 | 1.27 | 1.32 | 26.00 | 26.38 | 26.94 | 27.68 | 28.19 | 28.55 |
| 2200 | 1.15 | 1.25 | 1.30 | 25.31 | 25.91 | 26.41 | 27.72 | 28.30 | 28.68 |
| 2300 | 1.12 | 1.22 | 1.28 | 24.71 | 25.52 | 25.99 | 27.47 | 28.24 | 28.60 |
| 2400 | 1.10 | 1.20 | 1.26 | 24.50 | 25.29 | 25.75 | 27.77 | 28.18 | 28.59 |
| 2500 | 1.07 | 1.18 | 1.23 | 24.31 | 24.97 | 25.34 | 28.31 | 28.20 | 28.58 |
| 2600 | 1.04 | 1.15 | 1.21 | 24.15 | 24.78 | 25.07 | 28.41 | 28.12 | 28.39 |
| 2700 | 1.01 | 1.12 | 1.19 | 24.05 | 24.58 | 24.81 | 28.46 | 28.10 | 28.34 |
| 2800 | 0.99 | 1.10 | 1.17 | 24.25 | 24.45 | 24.62 | 28.64 | 28.11 | 28.33 |
| 2900 | 0.96 | 1.08 | 1.15 | 24.48 | 24.31 | 24.41 | 28.34 | 28.02 | 28.10 |
| 3000 | 0.94 | 1.06 | 1.13 | 24.65 | 24.39 | 24.43 | 27.93 | 28.15 | 28.15 |
| 3100 | 0.91 | 1.04 | 1.11 | 24.60 | 24.30 | 24.30 | 27.71 | 28.26 | 28.28 |
| 3200 | 0.89 | 1.02 | 1.09 | 24.64 | 24.38 | 24.29 | 27.39 | 28.24 | 28.18 |
| 3300 | 0.87 | 0.99 | 1.07 | 24.61 | 24.70 | 24.57 | 27.25 | 28.34 | 28.36 |
| 3400 | 0.85 | 0.98 | 1.06 | 24.43 | 24.78 | 24.70 | 27.41 | 28.34 | 28.55 |
| 3500 | 0.83 | 0.96 | 1.04 | 24.67 | 25.08 | 25.04 | 27.66 | 28.51 | 28.88 |
| 3600 | 0.80 | 0.94 | 1.02 | 24.59 | 25.29 | 25.29 | 27.62 | 28.50 | 29.26 |
| 3700 | 0.78 | 0.92 | 1.01 | 24.69 | 25.71 | 25.87 | 27.69 | 28.51 | 29.81 |
| 3800 | 0.76 | 0.91 | 0.99 | 24.98 | 26.24 | 26.60 | 27.27 | 28.53 | 30.44 |
| 3900 | 0.74 | 0.89 | 0.97 | 25.08 | 26.78 | 27.46 | 26.52 | 28.43 | 31.08 |
| 4000 | 0.73 | 0.87 | 0.96 | 25.35 | 27.37 | 28.51 | 26.37 | 28.40 | 31.46 |
| 4100 | 0.71 | 0.86 | 0.95 | 26.01 | 28.21 | 30.16 | 26.20 | 28.55 | 31.96 |
| 4200 | 0.68 | 0.84 | 0.93 | 26.39 | 29.03 | 31.92 | 26.00 | 28.57 | 31.84 |
| 4300 | 0.67 | 0.83 | 0.92 | 26.55 | 29.69 | 34.12 | 26.22 | 28.42 | 30.80 |
| 4400 | 0.65 | 0.81 | 0.91 | 27.75 | 31.23 | 38.02 | 27.05 | 28.75 | 30.18 |
| 4500 | 0.63 | 0.79 | 0.89 | 28.81 | 32.15 | 41.04 | 27.17 | 28.68 | 29.25 |
| 4600 | 0.61 | 0.78 | 0.88 | 29.81 | 33.93 | 43.69 | 27.72 | 28.82 | 28.52 |
| 4700 | 0.59 | 0.76 | 0.86 | 31.21 | 35.84 | 40.62 | 29.13 | 28.91 | 27.77 |
| 4800 | 0.56 | 0.74 | 0.85 | 33.87 | 37.96 | 37.37 | 30.41 | 29.07 | 27.30 |
| 4900 | 0.55 | 0.73 | 0.84 | 38.02 | 39.78 | 35.29 | 30.72 | 29.32 | 27.20 |
| 5000 | 0.53 | 0.71 | 0.82 | 42.54 | 41.54 | 33.83 | 31.31 | 29.60 | 27.34 |
| 5100 | 0.51 | 0.69 | 0.80 | 42.07 | 41.87 | 33.22 | 32.08 | 29.88 | 27.50 |
| 5200 | 0.49 | 0.67 | 0.79 | 37.69 | 39.53 | 32.56 | 30.97 | 30.38 | 28.07 |
| 5300 | 0.48 | 0.66 | 0.77 | 34.66 | 38.06 | 32.49 | 29.70 | 31.02 | 29.07 |
| 5400 | 0.46 | 0.64 | 0.76 | 32.97 | 35.71 | 32.46 | 29.59 | 31.48 | 30.07 |
| 5800 | 0.39 | 0.59 | 0.71 | 27.48 | 32.32 | 35.00 | 28.54 | 34.84 | 37.38 |
| 5900 | 0.39 | 0.58 | 0.70 | 25.94 | 31.89 | 36.71 | 26.84 | 35.46 | 42.39 |
| 6000 | 0.38 | 0.58 | 0.70 | 25.27 | 31.73 | 37.84 | 26.46 | 36.12 | 54.10 |

*Typical Performance Curves*

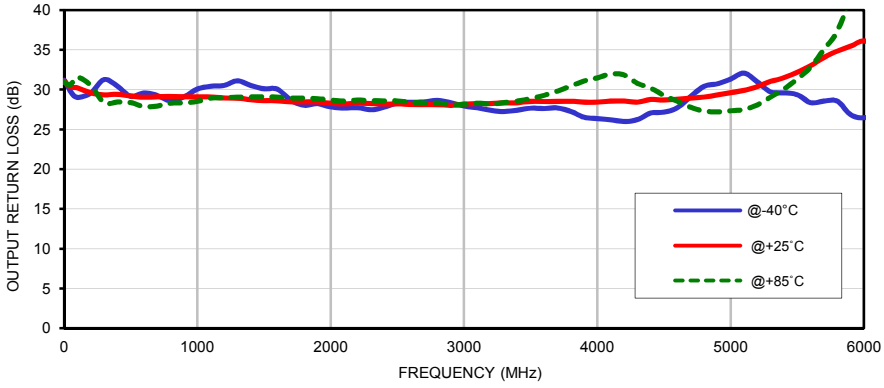
**INSERTION LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm




**INPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



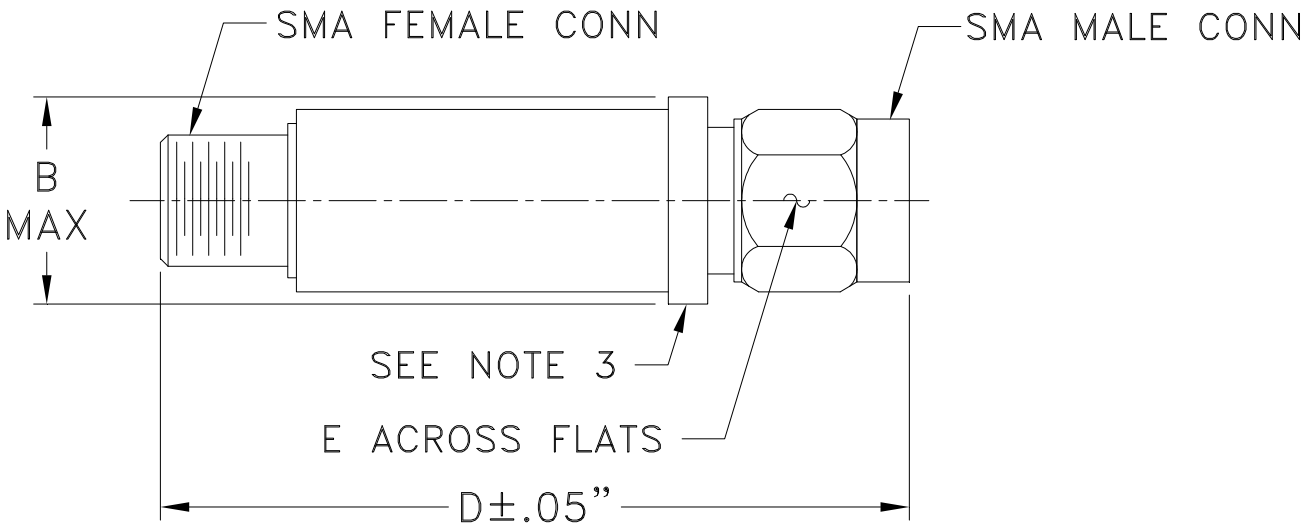

**OUTPUT RETURN LOSS vs. TEMPERATURE**
INPUT POWER = 0 dBm



# Case Style FF

**FF704**

## Outline Dimensions




| CASE #. | A | B | C | D | E | WT GRAMS |
|---|---|---|---|---|---|---|
| FF704 | --<br>-- | .410<br>(10.41) | --<br>-- | 1.43<br>(36.32) | .312<br>(7.92) | 10.0 |

**Dimensions are in inches (mm). Tolerances: 2Pl. ± .04; 3Pl. ± .030**

**Notes:**

1. Case material: Stainless steel.
2. Case finish: Gold plated.
3. Round Flange may have .312 Across Flats in some models.

Mini-Circuits

**Environmental Specifications** **ENV105**

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<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |