



MMIC SURFACE MOUNT

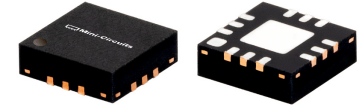
Low Pass Filter

XLF-272M+

50Ω DC to 2700 MHz Reflectionless

THE BIG DEAL

- Reflectionless Technology, Eliminates Reflections with 50Ω Match in Stopband
- Temperature Robust, up to +105°C Operation
- Compact Size, 3x3 mm 12-Lead QFN-Style Package
- Excellent Performance Repeatability



Generic photo used for illustration purposes only

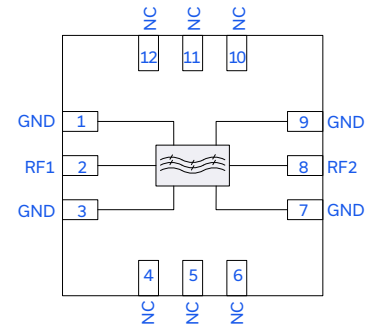
PATENTS

- Protected by US Patent Nos. 10,516,378, 10,374,577, 10,263,592, 10,230,348, 9,705,467, and 8,392,495
- Protected by China Patent Nos. 107078708B, and 102365784B
- Protected by Taiwan Patent Nos. 653826B, and 581494B

APPLICATIONS

- Test and Measurement Equipment
- Radar Systems
- SatCom Systems
- Harmonic Suppression

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' XLF-272M+ reflectionless filter employs a novel filter topology which absorbs and terminates stopband signals internally rather than reflecting them back to the source. This new capability enables unique applications for filter circuits beyond the traditional approaches. Traditional filters are reflective in the stopband, sending signals back to the source at 100% of the power level. These reflections interact with neighboring components and often result in intermodulation products and other interferences. Reflectionless filters eliminate stopband reflections, allowing them to be paired with sensitive devices and used in applications that otherwise require circuits such as isolation amplifiers or attenuators.

KEY FEATURES

| Features | Advantages |
|--|--|
| Reflectionless Technology | Reflectionless filters absorb unwanted signals, preventing reflections back to the source. This reduces generation of additional unwanted signals without the need for extra components like attenuators, improving system dynamic range and saving board space. |
| 50Ω Match in Stopband | Reflectionless filters maintain good impedance matching in the stopband, allowing for integration with high gain, wideband amplifiers without the risk of creating out of band instabilities . |
| Excellent RF Performance Repeatability | Fabricated on a GaAs process, X-series filters are inherently repeaData for large volume production. |
| Excellent Temperature Stability and Robustness | With ±0.3 dB variation over temperature, the XLF-272M+ is ideal for use in wide temperature range applications without the need for additional temperature compensation. Up to +105°C rating allows for suiData operation close to high power components. |
| Excellent Power Handling in a Compact Package <ul style="list-style-type: none"> • Passband +37 dBm at +25°C • Stopband +29 dBm at +25°C | High power handling extends the usability of these filters to the transmit path for inter-stage filtering. A compact 3x3 mm 12-Lead QFN-style package enables replacement of filter/ attenuator pairs with a single reflectionless filter, saving board space in dense assemblies. |



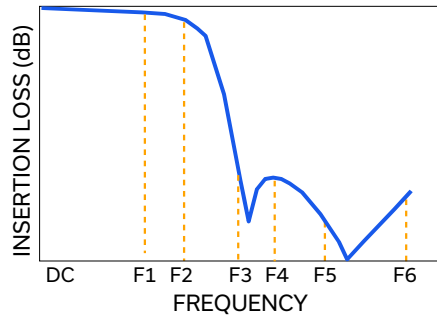


ELECTRICAL SPECIFICATIONS^{1,2,3} AT +25°C

| Parameter | | F# | Frequency (GHz) | Min. | Typ. | Max. | Units |
|-----------|-------------------|-------|-----------------|------|------|------|-------|
| Passband | Insertion Loss | DC-F1 | DC-2.7 | | 1.2 | 2.7 | dB |
| | Frequency Cut-Off | F2 | 2.9 | | 3.0 | | dB |
| | Return Loss | DC-F1 | DC-2.7 | | 20.0 | | dB |
| Stopband | Rejection | F3-F4 | 4-6 | 21 | 28 | | dB |
| | | F4-F5 | 6-10 | | 39 | | |
| | | F5-F6 | 10-20 | | 26 | | |
| | Return Loss | F3-F4 | 4-6 | | 20.0 | | dB |
| | | F4-F5 | 6-10 | | 18.0 | | |
| | | F5-F6 | 10-20 | | 13.7 | | |

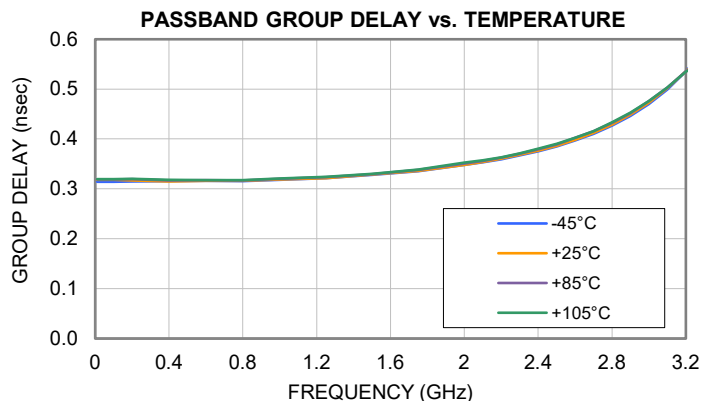
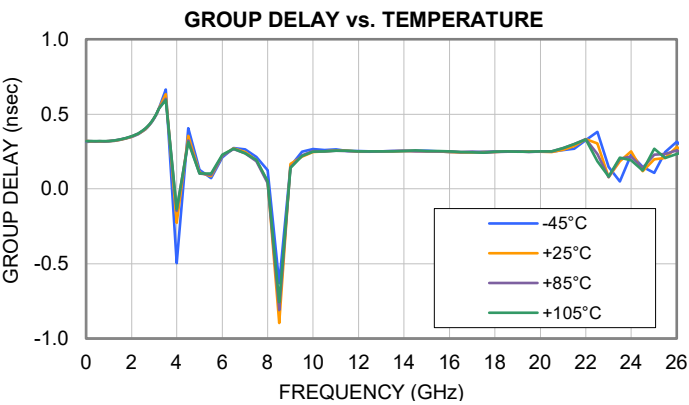
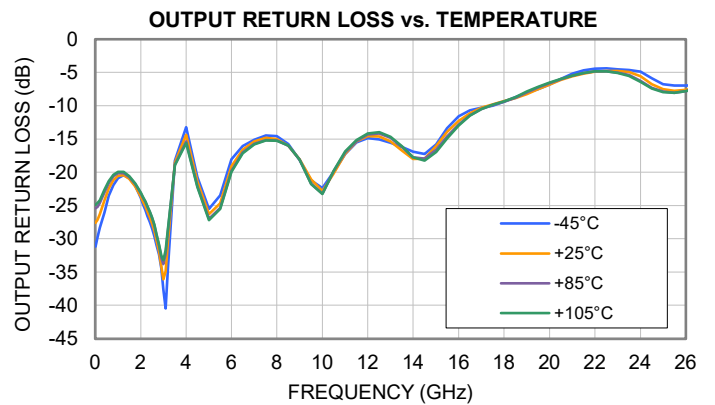
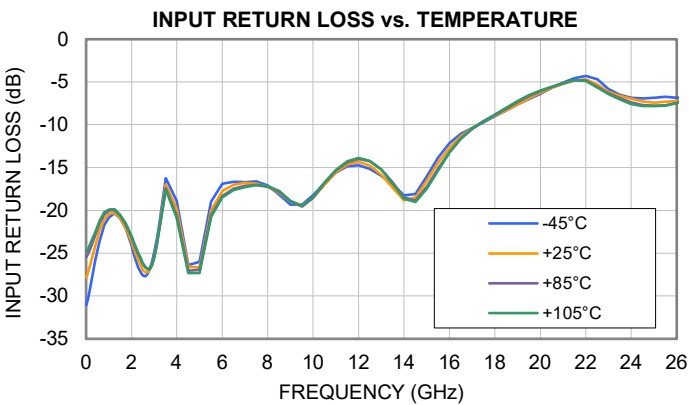
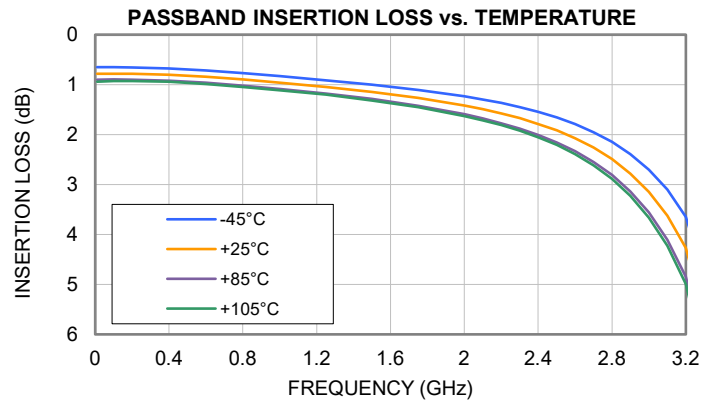
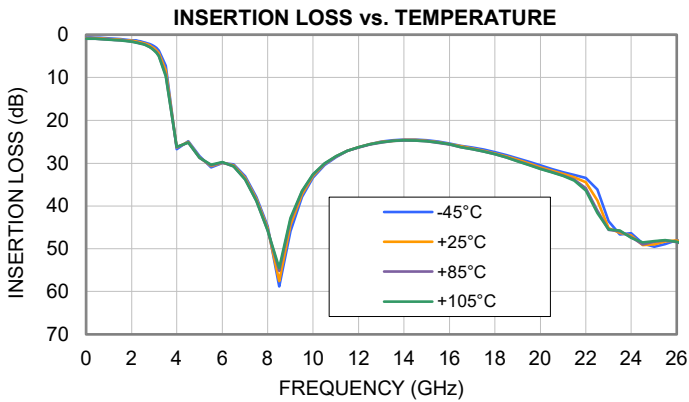
1. Tested on Mini-Circuits Characterization Test Board TB-XLF-272MC+. See Figure 2. De-embedded to the device reference plane.
2. Bi-directional RF1 and RF2 ports can be interchanged. See S-Parameters for actual performance.
3. All electrical specifications measured at RF Input Power = -10 dBm.

TYPICAL FREQUENCY RESPONSE AT +25°C





TYPICAL PERFORMANCE GRAPHS



**ABSOLUTE MAXIMUM RATINGS⁴**

| Parameter | Ratings |
|---|-----------------|
| Operating Temperature | -45°C to +105°C |
| Storage Temperature | -65°C to +150°C |
| Input Power, Passband (DC to F2) ⁵ | +37 dBm |
| Input Power, Stopband (F3 to F6) ⁶ | +29 dBm |

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

5. Power rating above +25°C operating temperature decreases linearly to +34 dBm at +105°C.

6. Power rating above +25°C operating temperature decreases linearly to +26 dBm at +105°C.

THERMAL RESISTANCE

| Parameter | Ratings |
|---|---------|
| Thermal Resistance (Θ_{jc}) ^{7,8} | 6.7°C/W |

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

8. Measured at 1 GHz with RF Input Power equal to 1 W.

ESD RATING

| | Class | Voltage Range | Reference Standard |
|-----|-------|-------------------|-----------------------------|
| HBM | 1A | 250 V to <500 V | ANSI/ESDA/JEDEC JS-001-2017 |
| CDM | C2 | 500 V to < 1000 V | JESD22-C101F |



ESD HANDLING PRECAUTION: This device is designed to be Class 1A 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

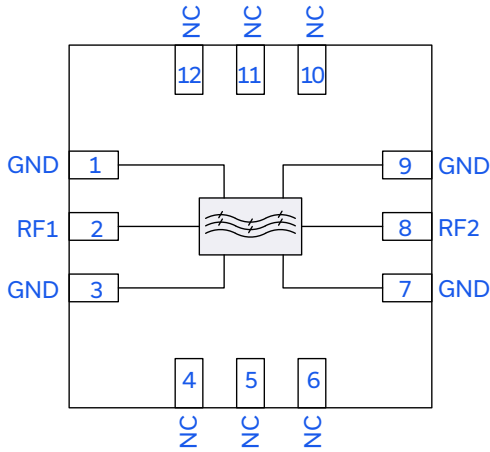


Figure 1. XLF-272M+ Functional Diagram

PAD DESCRIPTION

| Function | Pad Number | Description (Refer to Figure 2) |
|----------|----------------------|-------------------------------------|
| RF1 | 2 | RF1 Pad connects to RF-Input port. |
| RF2 | 8 | RF2 Pad connects to RF-Output port. |
| GND | 1, 3, 7, 9, & Paddle | Connects to Ground. |
| NC | 4-6, 10-12 | Not used internally. |

CHARACTERIZATION TEST BOARD

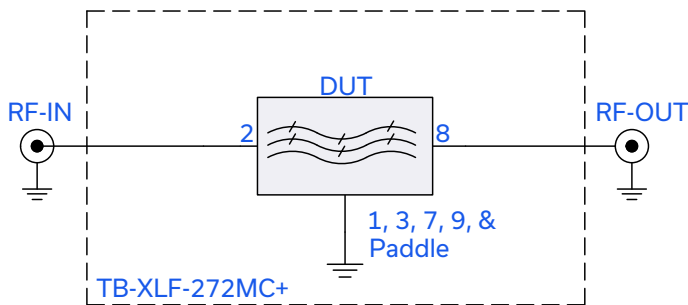


Figure 2. DUT soldered on Mini-Circuits Characterization Test Board TB-XLF-272MC+

Electrical Parameters and Conditions

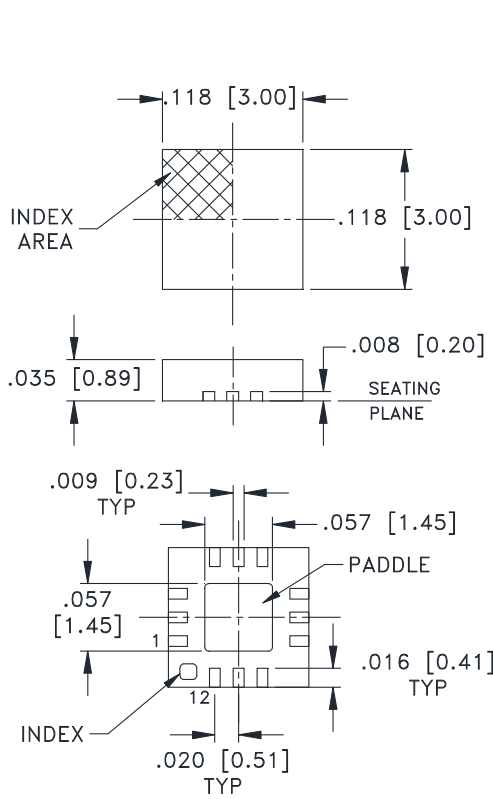
Passband Insertion Loss, Stopband Rejection, and Return Loss measured using N5242A PNA-X Microwave Network Analyzer.

Conditions:

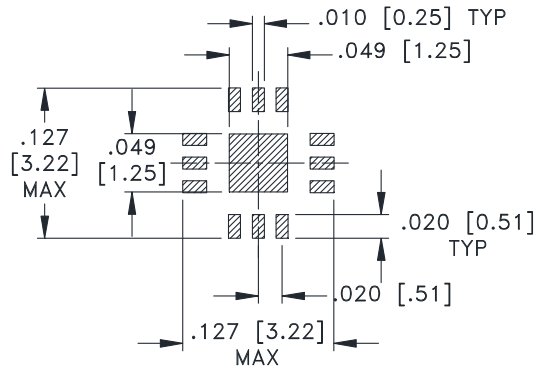
1. RF Input Power = -10 dBm
2. XLF-272M+ is bi-directional. RF1 and RF2 are interchangeable.



CASE STYLE DRAWING



PCB Land Pattern

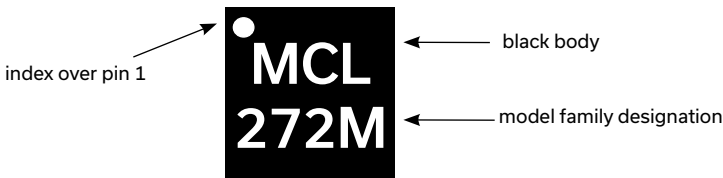


SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN ±.002

Weight: .02 Grams

Dimensions are in inches [mm]. Tolerances in inches: 2 Pl. ±.01; 3 Pl. ±.004

PRODUCT MARKING



Marking may contain other features or characters for internal lot control



MMIC SURFACE MOUNT

Low Pass Filter

XLF-272M+

50Ω DC to 2700 MHz Reflectionless

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

| | |
|---|---|
| Performance Data & Graphs | Data Graphs S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style | DQ1225. Plastic package, exposed paddle, Lead Finish: Matte-Tin |
| RoHS Status | Compliant |
| Tape & Reel Standard quantities available on reel | F66 7" reels with 20, 50, 100, 200, 500 or 1K devices |
| Suggested Layout for PCB Design | PL-766 |
| Evaluation Board | TB-XLF-272MC+ Gerber File |
| Environmental Ratings | ENV82 |

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



Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = S11 (dB)

Insertion Loss = -S21 (dB)

Output Return Loss = S22 (dB)

TEST CONDITION: Temperature = +25°C

| FREQ | Insertion Loss | Input Return Loss | Output Return Loss | Group Delay |
|-------|----------------|-------------------|--------------------|-------------|
| (GHz) | (dB) | (dB) | (dB) | (nsec) |
| 0.01 | 0.78 | -27.8 | -27.6 | 0.32 |
| 0.10 | 0.78 | -27.1 | -27.1 | 0.32 |
| 0.20 | 0.78 | -26.2 | -26.3 | 0.32 |
| 0.40 | 0.80 | -24.1 | -24.2 | 0.32 |
| 0.60 | 0.84 | -22.3 | -22.4 | 0.32 |
| 0.80 | 0.89 | -21.1 | -21.2 | 0.32 |
| 1.00 | 0.96 | -20.4 | -20.5 | 0.32 |
| 1.25 | 1.04 | -20.3 | -20.4 | 0.32 |
| 1.50 | 1.14 | -20.9 | -21.0 | 0.33 |
| 1.75 | 1.26 | -22.1 | -22.1 | 0.34 |
| 2.00 | 1.42 | -23.7 | -23.7 | 0.35 |
| 2.10 | 1.49 | -24.4 | -24.4 | 0.35 |
| 2.20 | 1.57 | -25.2 | -25.1 | 0.36 |
| 2.30 | 1.67 | -25.9 | -25.9 | 0.37 |
| 2.40 | 1.78 | -26.4 | -26.7 | 0.38 |
| 2.50 | 1.91 | -26.9 | -27.7 | 0.39 |
| 2.60 | 2.07 | -27.3 | -28.8 | 0.40 |
| 2.70 | 2.26 | -27.3 | -30.2 | 0.41 |
| 2.80 | 2.49 | -27.0 | -31.9 | 0.43 |
| 2.90 | 2.78 | -26.3 | -34.1 | 0.45 |
| 3.00 | 3.15 | -25.4 | -36.1 | 0.47 |
| 3.10 | 3.63 | -24.1 | -34.9 | 0.50 |
| 3.20 | 4.28 | -22.4 | -30.4 | 0.54 |
| 3.50 | 8.40 | -17.0 | -18.6 | 0.63 |
| 4.00 | 26.31 | -19.8 | -14.4 | -0.23 |
| 4.50 | 25.05 | -26.6 | -21.4 | 0.35 |
| 5.00 | 28.59 | -26.7 | -26.3 | 0.11 |
| 5.50 | 30.69 | -20.0 | -24.6 | 0.08 |
| 6.00 | 29.89 | -17.7 | -19.1 | 0.22 |
| 6.50 | 30.51 | -17.0 | -16.6 | 0.27 |
| 7.00 | 33.45 | -16.8 | -15.3 | 0.25 |
| 7.50 | 38.40 | -16.9 | -14.8 | 0.19 |
| 8.00 | 45.24 | -17.2 | -15.0 | 0.05 |
| 8.50 | 57.57 | -17.9 | -16.0 | -0.90 |
| 9.00 | 44.47 | -19.0 | -18.1 | 0.17 |
| 9.50 | 37.20 | -19.4 | -21.1 | 0.22 |
| 10.00 | 32.99 | -18.6 | -22.8 | 0.24 |
| 10.50 | 30.25 | -17.0 | -20.2 | 0.25 |
| 11.00 | 28.43 | -15.5 | -17.2 | 0.26 |
| 11.50 | 27.16 | -14.6 | -15.4 | 0.26 |
| 12.00 | 26.24 | -14.4 | -14.6 | 0.25 |
| 12.50 | 25.56 | -14.8 | -14.6 | 0.25 |
| 13.00 | 25.06 | -15.8 | -15.4 | 0.25 |
| 13.50 | 24.72 | -17.4 | -16.7 | 0.25 |
| 14.00 | 24.56 | -18.8 | -18.0 | 0.25 |
| 14.50 | 24.58 | -18.5 | -17.9 | 0.25 |
| 15.00 | 24.79 | -16.5 | -16.1 | 0.25 |
| 15.50 | 25.12 | -14.4 | -13.9 | 0.25 |
| 16.00 | 25.55 | -12.7 | -12.3 | 0.25 |
| 16.50 | 26.05 | -11.3 | -11.1 | 0.24 |
| 17.00 | 26.58 | -10.4 | -10.3 | 0.24 |
| 17.50 | 27.13 | -9.6 | -9.8 | 0.25 |
| 18.00 | 27.73 | -8.9 | -9.3 | 0.25 |
| 18.50 | 28.42 | -8.3 | -8.9 | 0.25 |
| 19.00 | 29.17 | -7.6 | -8.2 | 0.25 |
| 19.50 | 30.03 | -6.9 | -7.5 | 0.25 |
| 20.00 | 30.91 | -6.3 | -6.8 | 0.25 |
| 20.50 | 31.73 | -5.7 | -6.1 | 0.25 |
| 21.00 | 32.48 | -5.2 | -5.5 | 0.26 |
| 21.50 | 33.24 | -4.8 | -5.1 | 0.29 |
| 22.00 | 34.49 | -4.7 | -4.9 | 0.33 |
| 22.50 | 38.68 | -5.3 | -4.8 | 0.30 |
| 23.00 | 45.22 | -6.2 | -4.8 | 0.08 |
| 23.50 | 46.27 | -6.6 | -4.9 | 0.19 |
| 24.00 | 46.93 | -7.0 | -5.5 | 0.25 |
| 24.50 | 49.14 | -7.3 | -6.7 | 0.12 |
| 25.00 | 49.03 | -7.4 | -7.5 | 0.20 |
| 25.50 | 48.34 | -7.3 | -7.7 | 0.21 |
| 26.00 | 48.07 | -7.3 | -7.6 | 0.28 |
| 26.50 | 49.00 | -7.0 | -7.3 | 0.24 |



Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = S11 (dB)

Insertion Loss = -S21 (dB)

Output Return Loss = S22 (dB)

TEST CONDITION: Temperature = -45°C

| FREQ | Insertion Loss | Input Return Loss | Output Return Loss | Group Delay |
|-------|----------------|-------------------|--------------------|-------------|
| (GHz) | (dB) | (dB) | (dB) | (nsec) |
| 0.01 | 0.65 | -31.1 | -31.1 | 0.31 |
| 0.10 | 0.65 | -30.1 | -29.8 | 0.31 |
| 0.20 | 0.65 | -28.7 | -28.3 | 0.32 |
| 0.40 | 0.68 | -25.8 | -26.0 | 0.32 |
| 0.60 | 0.71 | -23.6 | -23.5 | 0.32 |
| 0.80 | 0.77 | -21.7 | -21.9 | 0.32 |
| 1.00 | 0.83 | -20.8 | -20.9 | 0.32 |
| 1.25 | 0.91 | -20.3 | -20.4 | 0.32 |
| 1.50 | 1.00 | -20.9 | -20.9 | 0.33 |
| 1.75 | 1.10 | -22.1 | -22.0 | 0.34 |
| 2.00 | 1.23 | -24.2 | -23.9 | 0.35 |
| 2.10 | 1.29 | -25.1 | -24.7 | 0.35 |
| 2.20 | 1.36 | -25.9 | -25.7 | 0.36 |
| 2.30 | 1.45 | -26.7 | -26.6 | 0.37 |
| 2.40 | 1.54 | -27.2 | -27.5 | 0.38 |
| 2.50 | 1.66 | -27.6 | -28.4 | 0.39 |
| 2.60 | 1.79 | -27.7 | -29.6 | 0.40 |
| 2.70 | 1.95 | -27.5 | -30.9 | 0.41 |
| 2.80 | 2.15 | -26.9 | -32.3 | 0.43 |
| 2.90 | 2.39 | -26.1 | -34.5 | 0.45 |
| 3.00 | 2.70 | -24.9 | -37.6 | 0.47 |
| 3.10 | 3.10 | -23.5 | -40.4 | 0.50 |
| 3.20 | 3.65 | -21.9 | -34.3 | 0.54 |
| 3.50 | 7.21 | -16.2 | -18.3 | 0.66 |
| 4.00 | 26.73 | -18.9 | -13.2 | -0.50 |
| 4.50 | 24.92 | -26.4 | -20.7 | 0.40 |
| 5.00 | 28.34 | -26.0 | -25.5 | 0.13 |
| 5.50 | 30.96 | -19.0 | -23.5 | 0.07 |
| 6.00 | 29.99 | -16.9 | -18.0 | 0.21 |
| 6.50 | 30.30 | -16.7 | -16.0 | 0.27 |
| 7.00 | 33.05 | -16.7 | -15.1 | 0.26 |
| 7.50 | 37.92 | -16.6 | -14.5 | 0.21 |
| 8.00 | 44.74 | -17.1 | -14.6 | 0.12 |
| 8.50 | 58.78 | -18.2 | -15.7 | -0.63 |
| 9.00 | 45.82 | -19.3 | -18.1 | 0.15 |
| 9.50 | 37.80 | -19.3 | -21.2 | 0.25 |
| 10.00 | 33.32 | -18.3 | -22.4 | 0.27 |
| 10.50 | 30.45 | -16.8 | -19.9 | 0.26 |
| 11.00 | 28.53 | -15.6 | -17.2 | 0.26 |
| 11.50 | 27.18 | -14.8 | -15.5 | 0.25 |
| 12.00 | 26.20 | -14.7 | -14.9 | 0.25 |
| 12.50 | 25.50 | -15.2 | -15.1 | 0.25 |
| 13.00 | 24.99 | -16.0 | -15.6 | 0.25 |
| 13.50 | 24.64 | -17.0 | -16.2 | 0.25 |
| 14.00 | 24.46 | -18.2 | -16.9 | 0.25 |
| 14.50 | 24.45 | -18.1 | -17.2 | 0.26 |
| 15.00 | 24.63 | -16.1 | -15.8 | 0.25 |
| 15.50 | 24.96 | -13.8 | -13.4 | 0.25 |
| 16.00 | 25.41 | -12.1 | -11.6 | 0.25 |
| 16.50 | 25.96 | -11.1 | -10.7 | 0.24 |
| 17.00 | 26.33 | -10.3 | -10.3 | 0.25 |
| 17.50 | 26.83 | -9.7 | -10.0 | 0.25 |
| 18.00 | 27.42 | -9.0 | -9.4 | 0.25 |
| 18.50 | 28.11 | -8.3 | -8.7 | 0.25 |
| 19.00 | 28.88 | -7.6 | -8.0 | 0.25 |
| 19.50 | 29.70 | -7.0 | -7.5 | 0.25 |
| 20.00 | 30.54 | -6.4 | -6.8 | 0.25 |
| 20.50 | 31.39 | -5.7 | -6.0 | 0.25 |
| 21.00 | 32.15 | -5.1 | -5.2 | 0.26 |
| 21.50 | 32.80 | -4.6 | -4.6 | 0.27 |
| 22.00 | 33.47 | -4.3 | -4.4 | 0.33 |
| 22.50 | 36.18 | -4.7 | -4.4 | 0.38 |
| 23.00 | 43.60 | -5.9 | -4.5 | 0.15 |
| 23.50 | 46.71 | -6.5 | -4.6 | 0.05 |
| 24.00 | 46.34 | -6.8 | -4.9 | 0.23 |
| 24.50 | 48.72 | -6.9 | -5.9 | 0.15 |
| 25.00 | 49.49 | -6.9 | -6.7 | 0.11 |
| 25.50 | 48.84 | -6.7 | -7.0 | 0.25 |
| 26.00 | 47.94 | -6.9 | -7.0 | 0.31 |
| 26.50 | 48.90 | -6.7 | -6.9 | 0.25 |

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = S11 (dB)

Insertion Loss = -S21 (dB)

Output Return Loss = S22 (dB)

TEST CONDITION: Temperature = +85°C

| FREQ | Insertion Loss | Input Return Loss | Output Return Loss | Group Delay |
|-------|----------------|-------------------|--------------------|-------------|
| (GHz) | (dB) | (dB) | (dB) | (nsec) |
| 0.01 | 0.90 | -25.4 | -25.4 | 0.32 |
| 0.10 | 0.90 | -25.0 | -25.2 | 0.32 |
| 0.20 | 0.90 | -24.4 | -24.6 | 0.32 |
| 0.40 | 0.92 | -22.9 | -23.0 | 0.32 |
| 0.60 | 0.96 | -21.5 | -21.6 | 0.32 |
| 0.80 | 1.02 | -20.5 | -20.6 | 0.32 |
| 1.00 | 1.08 | -20.0 | -20.1 | 0.32 |
| 1.25 | 1.18 | -20.0 | -20.1 | 0.32 |
| 1.50 | 1.29 | -20.6 | -20.7 | 0.33 |
| 1.75 | 1.42 | -21.7 | -21.8 | 0.34 |
| 2.00 | 1.59 | -23.2 | -23.2 | 0.35 |
| 2.10 | 1.67 | -23.9 | -23.8 | 0.36 |
| 2.20 | 1.77 | -24.5 | -24.5 | 0.36 |
| 2.30 | 1.88 | -25.2 | -25.2 | 0.37 |
| 2.40 | 2.01 | -25.7 | -26.0 | 0.38 |
| 2.50 | 2.16 | -26.3 | -26.9 | 0.39 |
| 2.60 | 2.34 | -26.7 | -28.0 | 0.40 |
| 2.70 | 2.55 | -26.9 | -29.3 | 0.42 |
| 2.80 | 2.81 | -26.8 | -31.0 | 0.43 |
| 2.90 | 3.14 | -26.3 | -32.8 | 0.45 |
| 3.00 | 3.56 | -25.4 | -33.8 | 0.48 |
| 3.10 | 4.10 | -24.1 | -32.2 | 0.50 |
| 3.20 | 4.84 | -22.5 | -28.8 | 0.54 |
| 3.50 | 9.40 | -17.4 | -18.8 | 0.60 |
| 4.00 | 26.20 | -20.6 | -15.3 | -0.15 |
| 4.50 | 25.18 | -27.1 | -22.1 | 0.32 |
| 5.00 | 28.76 | -27.0 | -27.0 | 0.10 |
| 5.50 | 30.50 | -20.6 | -25.3 | 0.09 |
| 6.00 | 29.83 | -18.3 | -19.8 | 0.22 |
| 6.50 | 30.71 | -17.5 | -17.0 | 0.27 |
| 7.00 | 33.78 | -17.1 | -15.7 | 0.24 |
| 7.50 | 38.78 | -17.1 | -15.2 | 0.18 |
| 8.00 | 45.67 | -17.2 | -15.2 | 0.04 |
| 8.50 | 55.13 | -17.8 | -16.0 | -0.81 |
| 9.00 | 43.24 | -18.9 | -18.1 | 0.15 |
| 9.50 | 36.67 | -19.6 | -21.7 | 0.22 |
| 10.00 | 32.71 | -18.6 | -23.2 | 0.25 |
| 10.50 | 30.11 | -16.8 | -19.8 | 0.25 |
| 11.00 | 28.38 | -15.3 | -17.0 | 0.26 |
| 11.50 | 27.15 | -14.4 | -15.3 | 0.25 |
| 12.00 | 26.29 | -14.0 | -14.3 | 0.25 |
| 12.50 | 25.65 | -14.3 | -14.2 | 0.25 |
| 13.00 | 25.17 | -15.2 | -14.8 | 0.25 |
| 13.50 | 24.82 | -16.8 | -16.2 | 0.25 |
| 14.00 | 24.67 | -18.5 | -17.7 | 0.26 |
| 14.50 | 24.70 | -18.8 | -18.0 | 0.25 |
| 15.00 | 24.89 | -17.2 | -16.6 | 0.25 |
| 15.50 | 25.21 | -15.1 | -14.6 | 0.25 |
| 16.00 | 25.64 | -13.2 | -12.8 | 0.25 |
| 16.50 | 26.26 | -11.7 | -11.4 | 0.25 |
| 17.00 | 26.71 | -10.5 | -10.5 | 0.25 |
| 17.50 | 27.29 | -9.6 | -9.9 | 0.24 |
| 18.00 | 27.93 | -8.9 | -9.4 | 0.25 |
| 18.50 | 28.67 | -8.1 | -8.8 | 0.25 |
| 19.00 | 29.50 | -7.3 | -8.0 | 0.25 |
| 19.50 | 30.40 | -6.6 | -7.3 | 0.25 |
| 20.00 | 31.30 | -6.0 | -6.6 | 0.25 |
| 20.50 | 32.10 | -5.6 | -6.0 | 0.25 |
| 21.00 | 32.91 | -5.1 | -5.5 | 0.27 |
| 21.50 | 33.86 | -4.8 | -5.1 | 0.30 |
| 22.00 | 35.88 | -4.8 | -4.8 | 0.33 |
| 22.50 | 41.07 | -5.6 | -4.8 | 0.23 |
| 23.00 | 45.58 | -6.3 | -5.0 | 0.08 |
| 23.50 | 45.93 | -6.9 | -5.4 | 0.20 |
| 24.00 | 47.28 | -7.4 | -6.3 | 0.22 |
| 24.50 | 48.96 | -7.7 | -7.3 | 0.14 |
| 25.00 | 48.38 | -7.8 | -7.9 | 0.23 |
| 25.50 | 48.03 | -7.7 | -8.0 | 0.23 |
| 26.00 | 48.46 | -7.4 | -7.8 | 0.26 |
| 26.50 | 49.32 | -7.0 | -7.3 | 0.22 |



Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = S11 (dB)

Insertion Loss = -S21 (dB)

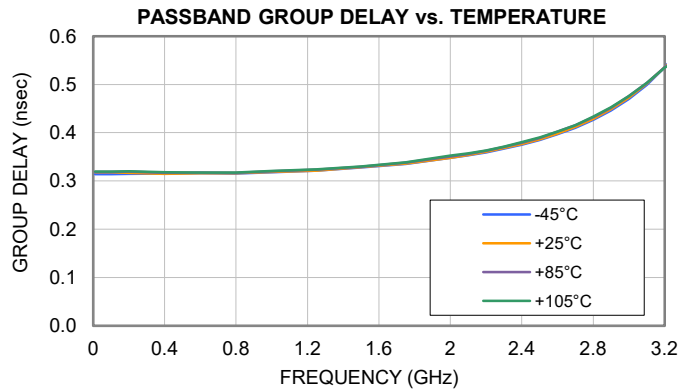
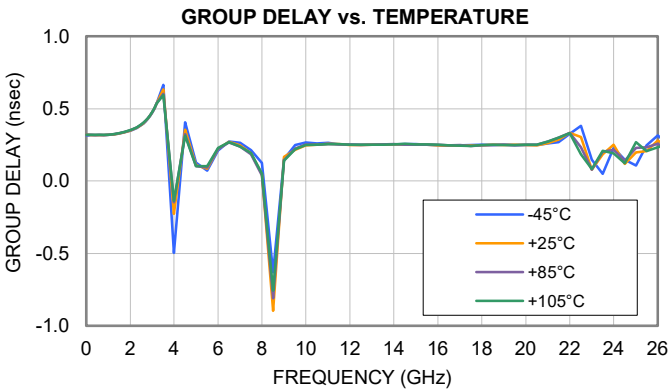
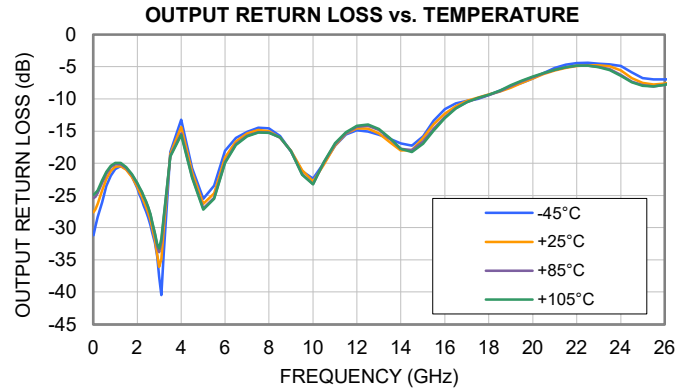
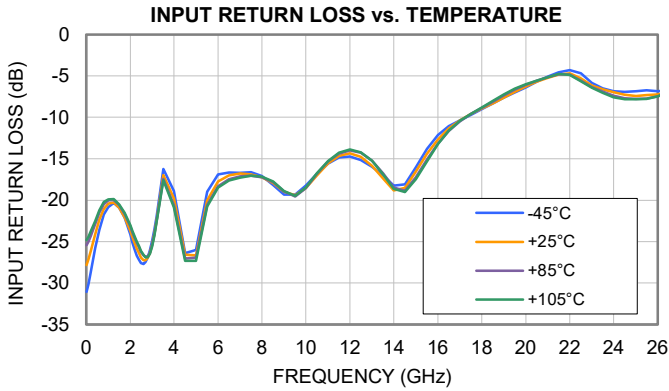
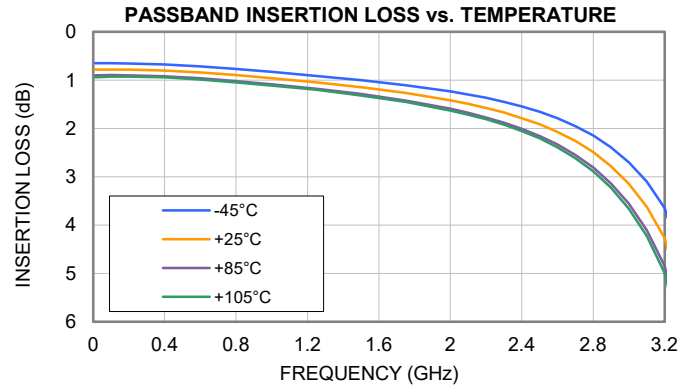
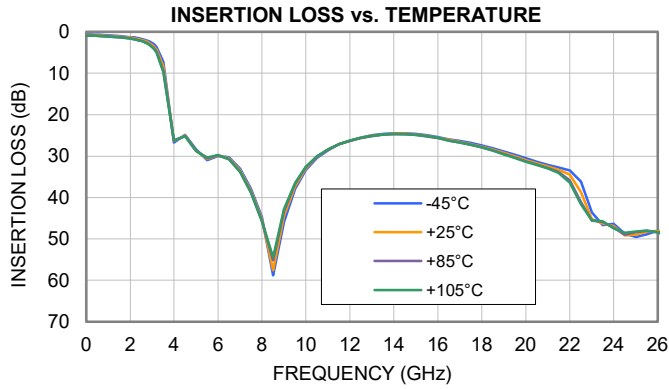
Output Return Loss = S22 (dB)

TEST CONDITION: Temperature = +105°C

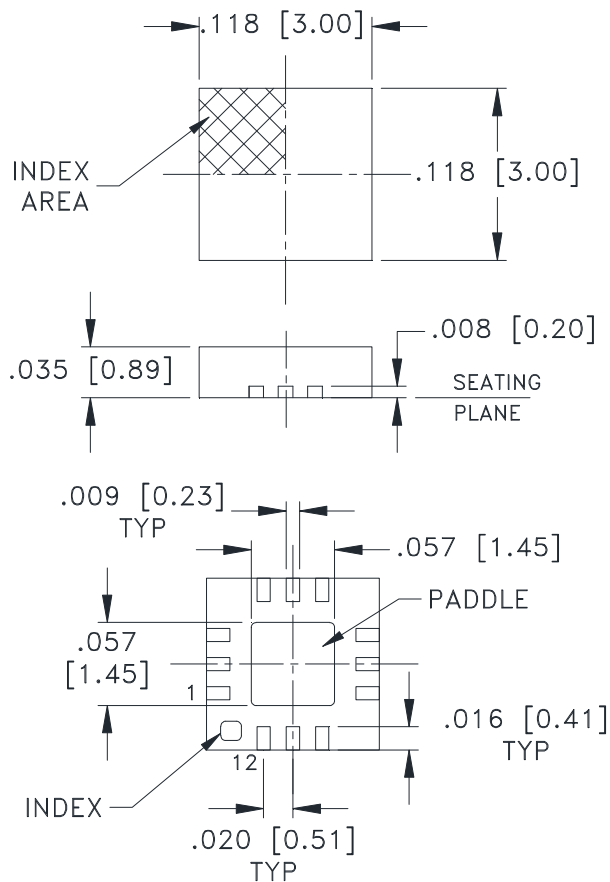
| FREQ | Insertion Loss | Input Return Loss | Output Return Loss | Group Delay |
|-------|----------------|-------------------|--------------------|-------------|
| (GHz) | (dB) | (dB) | (dB) | (nsec) |
| 0.01 | 0.94 | -24.8 | -24.9 | 0.32 |
| 0.10 | 0.93 | -24.5 | -24.6 | 0.32 |
| 0.20 | 0.93 | -23.8 | -24.2 | 0.32 |
| 0.40 | 0.94 | -22.6 | -22.6 | 0.32 |
| 0.60 | 0.98 | -21.2 | -21.3 | 0.32 |
| 0.80 | 1.04 | -20.2 | -20.3 | 0.32 |
| 1.00 | 1.11 | -19.9 | -20.0 | 0.32 |
| 1.25 | 1.20 | -19.9 | -20.0 | 0.32 |
| 1.50 | 1.31 | -20.5 | -20.6 | 0.33 |
| 1.75 | 1.45 | -21.5 | -21.7 | 0.34 |
| 2.00 | 1.63 | -23.0 | -23.1 | 0.35 |
| 2.10 | 1.71 | -23.7 | -23.7 | 0.36 |
| 2.20 | 1.81 | -24.4 | -24.4 | 0.36 |
| 2.30 | 1.92 | -25.0 | -25.1 | 0.37 |
| 2.40 | 2.05 | -25.5 | -25.9 | 0.38 |
| 2.50 | 2.21 | -26.1 | -26.8 | 0.39 |
| 2.60 | 2.39 | -26.6 | -27.9 | 0.40 |
| 2.70 | 2.61 | -26.9 | -29.2 | 0.42 |
| 2.80 | 2.89 | -26.9 | -30.8 | 0.43 |
| 2.90 | 3.22 | -26.5 | -32.5 | 0.45 |
| 3.00 | 3.66 | -25.6 | -33.2 | 0.48 |
| 3.10 | 4.23 | -24.3 | -31.7 | 0.50 |
| 3.20 | 4.99 | -22.6 | -28.5 | 0.53 |
| 3.50 | 9.68 | -17.6 | -18.9 | 0.59 |
| 4.00 | 26.17 | -20.9 | -15.6 | -0.14 |
| 4.50 | 25.21 | -27.3 | -22.2 | 0.31 |
| 5.00 | 28.75 | -27.3 | -27.2 | 0.10 |
| 5.50 | 30.40 | -20.7 | -25.5 | 0.10 |
| 6.00 | 29.77 | -18.5 | -20.0 | 0.23 |
| 6.50 | 30.72 | -17.6 | -17.2 | 0.27 |
| 7.00 | 33.85 | -17.3 | -15.8 | 0.24 |
| 7.50 | 38.86 | -17.1 | -15.2 | 0.19 |
| 8.00 | 45.74 | -17.2 | -15.2 | 0.05 |
| 8.50 | 54.47 | -17.7 | -16.0 | -0.76 |
| 9.00 | 42.85 | -18.9 | -18.1 | 0.14 |
| 9.50 | 36.45 | -19.5 | -21.8 | 0.22 |
| 10.00 | 32.57 | -18.5 | -23.3 | 0.25 |
| 10.50 | 30.03 | -16.7 | -19.8 | 0.25 |
| 11.00 | 28.31 | -15.3 | -16.9 | 0.26 |
| 11.50 | 27.11 | -14.3 | -15.1 | 0.26 |
| 12.00 | 26.26 | -13.9 | -14.1 | 0.25 |
| 12.50 | 25.62 | -14.2 | -14.0 | 0.25 |
| 13.00 | 25.13 | -15.2 | -14.7 | 0.25 |
| 13.50 | 24.80 | -16.9 | -16.1 | 0.25 |
| 14.00 | 24.65 | -18.7 | -17.8 | 0.25 |
| 14.50 | 24.67 | -19.0 | -18.2 | 0.26 |
| 15.00 | 24.86 | -17.5 | -17.0 | 0.25 |
| 15.50 | 25.18 | -15.3 | -14.9 | 0.25 |
| 16.00 | 25.62 | -13.2 | -13.0 | 0.25 |
| 16.50 | 26.26 | -11.6 | -11.5 | 0.25 |
| 17.00 | 26.72 | -10.4 | -10.5 | 0.24 |
| 17.50 | 27.29 | -9.6 | -9.9 | 0.24 |
| 18.00 | 27.94 | -8.8 | -9.4 | 0.25 |
| 18.50 | 28.71 | -8.0 | -8.7 | 0.25 |
| 19.00 | 29.57 | -7.2 | -7.9 | 0.25 |
| 19.50 | 30.47 | -6.5 | -7.1 | 0.25 |
| 20.00 | 31.37 | -6.0 | -6.5 | 0.25 |
| 20.50 | 32.16 | -5.5 | -6.0 | 0.25 |
| 21.00 | 32.96 | -5.1 | -5.5 | 0.27 |
| 21.50 | 34.01 | -4.8 | -5.1 | 0.30 |
| 22.00 | 36.34 | -4.9 | -4.8 | 0.33 |
| 22.50 | 41.64 | -5.6 | -4.8 | 0.18 |
| 23.00 | 45.51 | -6.4 | -5.1 | 0.08 |
| 23.50 | 45.73 | -7.0 | -5.5 | 0.21 |
| 24.00 | 47.44 | -7.6 | -6.4 | 0.19 |
| 24.50 | 48.52 | -7.8 | -7.4 | 0.12 |
| 25.00 | 48.19 | -7.8 | -8.0 | 0.27 |
| 25.50 | 47.95 | -7.8 | -8.1 | 0.21 |
| 26.00 | 48.40 | -7.5 | -7.8 | 0.23 |
| 26.50 | 49.26 | -6.9 | -7.3 | 0.25 |



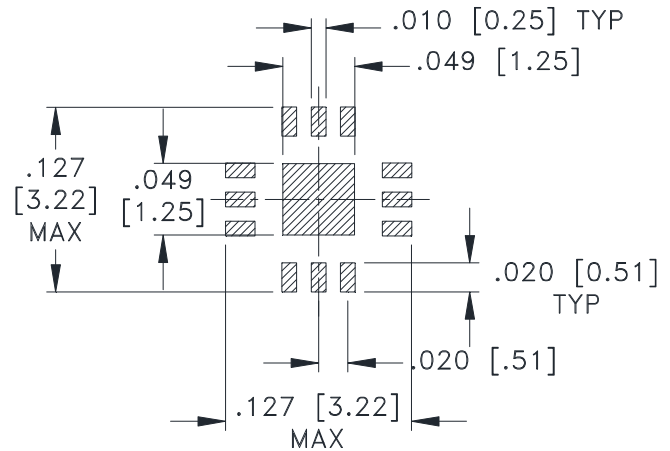
Typical Performance Curves



Outline Dimensions



PCB Land Pattern



SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN $\pm .002$

Weight: .02 Grams

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .01$; 3 Pl. $\pm .004$

Notes:

1. Case material: Plastic.
2. Termination finish:
 - For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. All models, (+) suffix. See Data sheet.
 - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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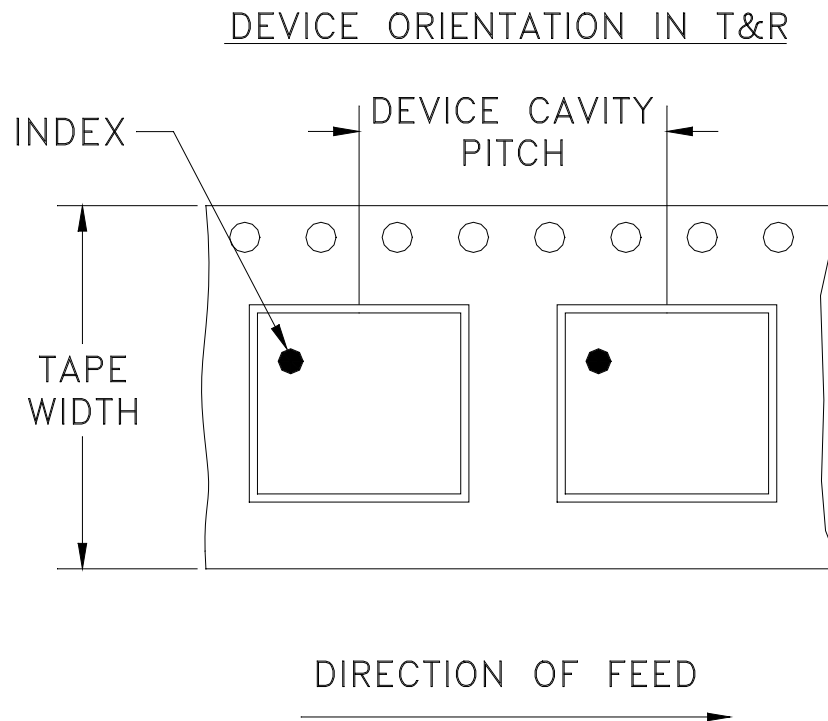
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P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Tape & Reel Packaging TR-F66



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|----------------|-------------------------|-------------------|------------------------------|------------------|
| 8 | 4 | 7 | Small quantity 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

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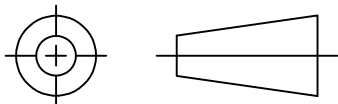
INTERNET <http://www.minicircuits.com>

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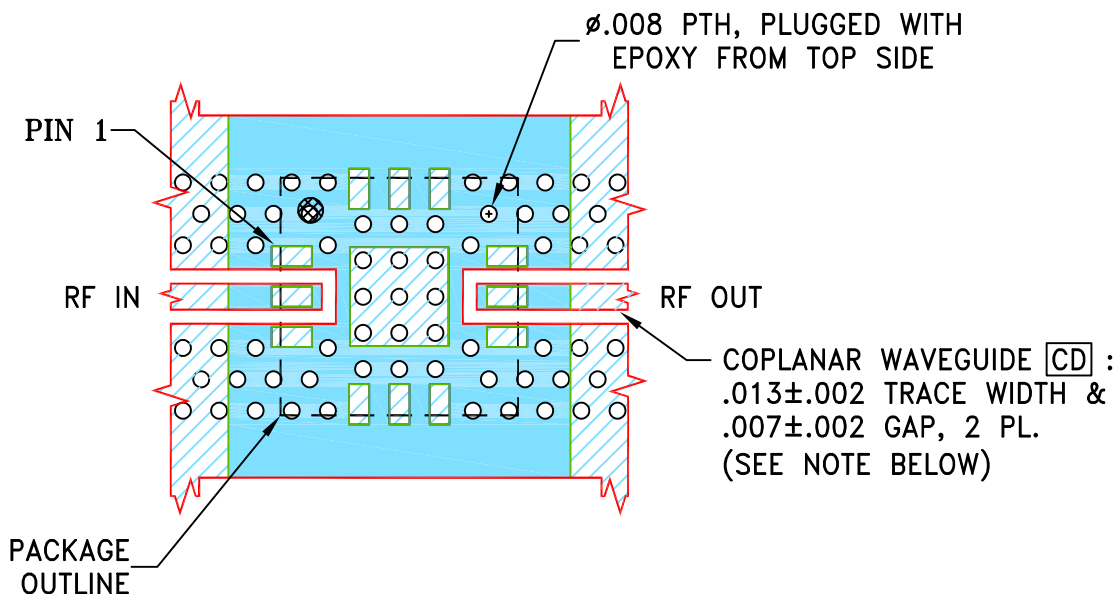
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|------------|-------------|----------|-----|------|
| OR | ECO-019660 | NEW RELEASE | 10/25/23 | ITG | IL |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR
DQ1225 CASE STYLE

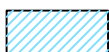


NOTES:

- TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B, DIELECTRIC THICKNESS .0066"; COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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 | DRAWN ITG | 10/25/23 |
| TOLERANCES ON: | CHECKED GF | 10/25/23 |
| 2 PL DECIMALS ± | APPROVED IL | 10/25/23 |
| 3 PL DECIMALS ± .005 | | |
| ANGLES ± | | |
| FRACTIONS ± | | |



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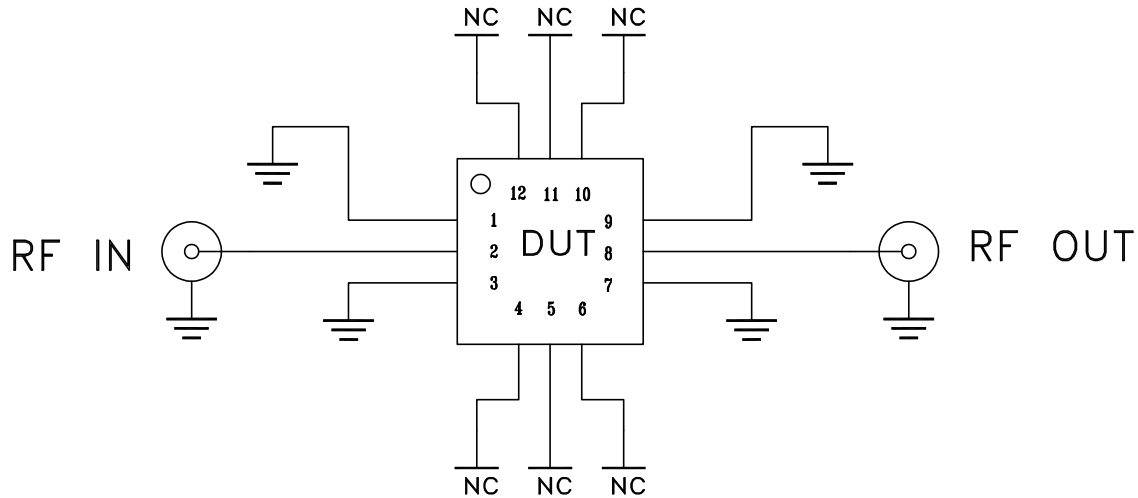
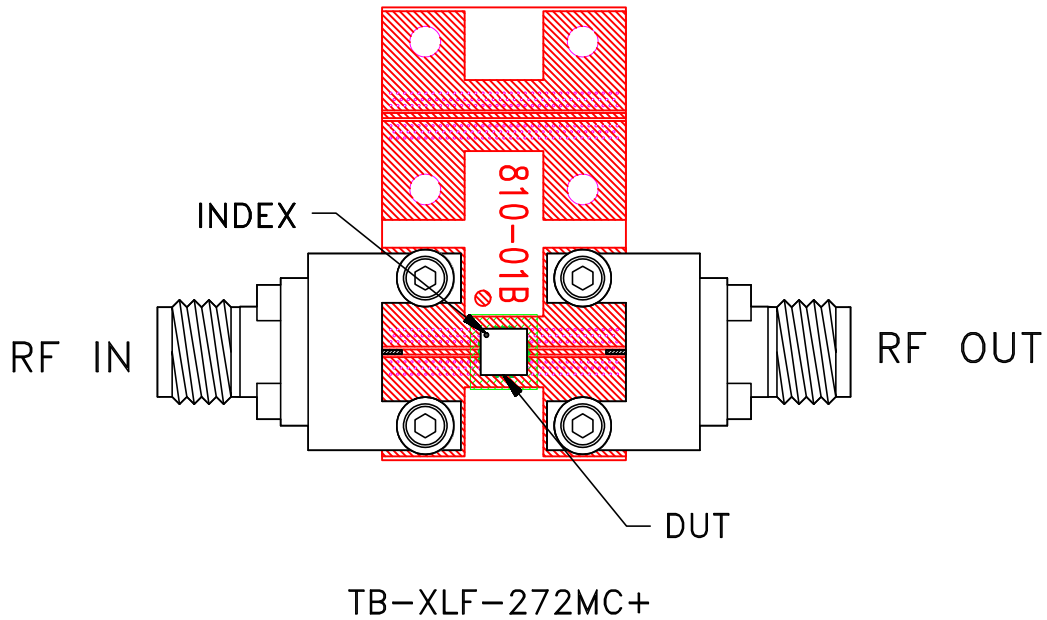
PL,DQ1225,TB-XLF-272MC+/272M+

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|-------|------------|-------------|---------------|
| A | 15542 | 98-PL-766 | OR |
| FILE: | 98PL766 | SCALE: 10:1 | SHEET: 1 OF 1 |

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
Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm 2.92 mm Female connectors.
2. PCB Material: R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.0066 inch.

 **Mini-Circuits®**



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 | -55° to 105°C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -65° to 150° C Ambient Environment | Individual Model Data Sheet |
| Autoclave | 15 psig, 100% RH, 121°C, 96 hours | JESD22-A102-C, Condition C |
| Temperature Cycling | -65° to 150°C, 100 cycles | JESD22-A104 |
| Temperature Humidity | 85°C/ 85% RH, 168 hours | JESD22-113 |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 240°C peak 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 Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 240°C peak (Non-RoHS) or 260°C (RoHS) | J-STD-020C |
| Solderability | 10X magnification, 95% coverage | JESD22-B102, Method 1: Dip and Look Test |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |