

Wideband, High Gain, Low Noise

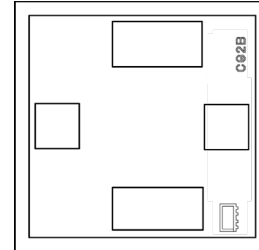
Monolithic Amplifier Die

GALI-S66-D+

50Ω DC to 3 GHz

The Big Deal

- Low Noise Figure, 2.4 dB typ.
- High Gain, 18.2 dB typ. at 2 GHz
- Excellent Return Loss, 20 dB typ.
- Internally Matched to 50 Ohms



Product Overview

GALI-S66-D+ (RoHS compliant) is a low current, low noise wideband amplifier Die offering high dynamic range. It is fabricated using GaAs HBT technology.

Key Features

| Feature | Advantages |
|-------------------------------|---|
| Broad Band: DC to 3 GHz | Broadband covering primary wireless communications bands: Cellular, PCS, communication receivers and transmitters |
| Low Noise Figure, 2.4 dB typ. | Low noise in combination with low current saves DC power consumption and ideal for frontend applications. |
| High Gain, 18.2 dB at 2 GHz | Minimize the effect of subsequent stages on overall Noise Figure |
| Unpackaged Die | Enables the user to integrate the amplifier directly into hybrids |



Wideband, High Gain, Low Noise

Monolithic Amplifier Die

GALI-S66-D+

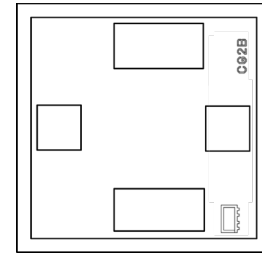
50Ω DC to 3 GHz

Product Features

- Low Noise Figure, 2.4 dB typ.
- High Gain, 18.2 dB typ. at 2 GHz
- Frequency range, DC to 3 GHz
- Internally Matched to 50 Ohms

Typical Applications

- Cellular infrastructure
- PCS
- Communication receivers & transmitters



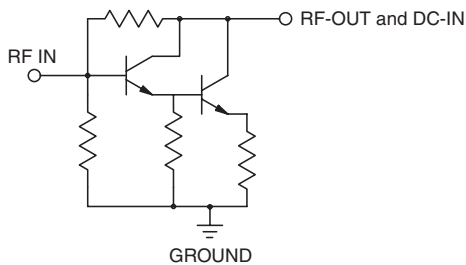
+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Ordering Information: Refer to Last Page

General Description

GALI-S66-D+ (RoHS compliant) is a low current, low noise wideband amplifier Die offering high dynamic range. It is fabricated using GaAs HBT technology.

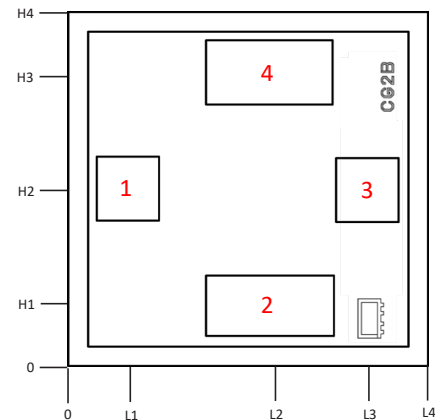
Simplified Schematic and Pad description



| Pad # | Function | Description |
|-------|------------------|---|
| 1 | RF-IN | RF input pad. This pad requires the use of an external DC blocking capacitor chosen for the frequency of operation. |
| 3 | RF-OUT and DC-IN | RF output and bias pad. DC voltage is present on this pin; therefore a DC blocking capacitor is necessary for proper operation. An RF choke and Bias resistor are needed to feed DC bias without loss of RF signal due to the bias connection, as shown in "Recommended Application Circuit". |
| 2,4 | GROUND | Ground pads. Connect to ground per assembly diagram. |

Note: 1. Bond Pad material - Gold
2. Bottom of Die - Gold plated

Bonding Pad Position



| Dimensions in μm , Typical | | | | | | | |
|---------------------------------------|-------|------------------|-----|-----------------|-------|-----------------------------|-----|
| L1 | L2 | L3 | L4 | H1 | H2 | H3 | H4 |
| 95.0 | 313.5 | 465 | 560 | 95.0 | 275.0 | 455 | 550 |
| Bond pad #1 & #3 | | Thickness | | Die size | | Bond pad #2 & #4 | |
| 95.0 x 95.0 | | 100 | | 560.0 x 550.0 | | 145.0 x 95.0 | |

Electrical Specifications at 25°C, and 16mA, unless noted¹

| Parameter | | Min. | Typ. | Max. | Units |
|---|----------------|------|------|------|-------|
| Frequency Range | | DC | | 3 | GHz |
| Gain | f=0.1 GHz | — | 21.6 | — | dB |
| | f=1 GHz | — | 20.3 | — | |
| | f=2 GHz | — | 18.2 | — | |
| | f=3 GHz | — | 16.4 | — | |
| Input Return Loss | f= DC to 3 GHz | | 25 | | dB |
| Output Return Loss | f= DC to 3 GHz | | 20 | | dB |
| Output Power @ 1 dB compression | f=2 GHz | | 3.3 | | dBm |
| Output IP3 | f=2 GHz | | 19.1 | | dBm |
| Noise Figure | f=2 GHz | | 2.4 | | dB |
| Recommended Device Operating Current | | | 16 | | mA |
| Device Operating Voltage | | 3.0 | 3.5 | 4.0 | V |
| Device Voltage Variation vs. Temperature at 16 mA | | | -2.1 | | mV/°C |
| Device Voltage Variation vs. Current at 25°C | | | 3.7 | | mV/mA |
| Thermal Resistance, junction-to-case ¹ | | | 64 | | °C/W |

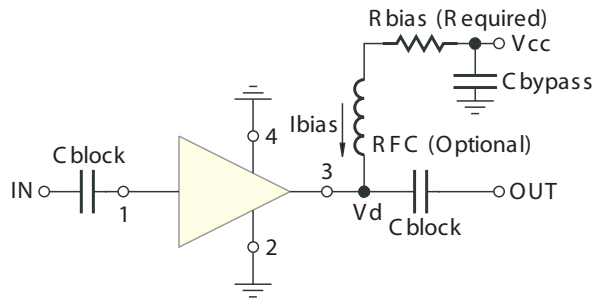
1. Measured on Mini-Circuits Characterization test board TB-409-S66+. DUT packaged in industry standard SOT-89 package. See characterization test circuit. (Fig. 1)

Absolute Maximum Ratings³

| Parameter | Ratings |
|-----------------------|---------------|
| Operating Temperature | -45°C to 85°C |
| Operating Current | 50mA |
| Input Power | 20dBm |

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

Recommended Application and Characterization Test Circuit



Test Board includes case, connectors, and components (in bold) soldered to PCB

| R BIAS | |
|--------|---|
| Vcc | "1%" Res. Values (ohms) for Optimum Biasing |
| 7 | 187 |
| 8 | 243 |
| 9 | 301 |
| 10 | 374 |
| 11 | 432 |
| 12 | 499 |
| 13 | 562 |
| 14 | 619 |
| 15 | 681 |
| 16 | 750 |
| 17 | 806 |
| 18 | 866 |
| 19 | 931 |
| 20 | 976 |

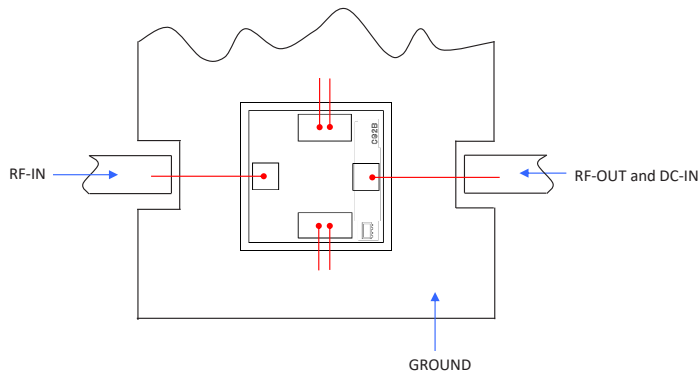
Fig 1. Block Diagram of Test Circuit used for characterization. (DUT, Die packaged in SOT-89 package, soldered on Mini-Circuits Characterization test board TB-409-S66+)

Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain and Return loss: Pin= -25dBm.
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5 dBm/tone at output.

Assembly Diagram



Assembly and Handling Procedure

1. Storage
Dice should be stored in a dry nitrogen purged desiccators or equivalent.
2. ESD
MMIC HBT amplifier dice are susceptible to electrostatic and mechanical damage. Die are supplied in antistatic protected material, which should be opened in clean room conditions at an appropriately grounded anti-static workstation. Devices need careful handling using correctly designed collets, vacuum pickup tips or sharp antistatic tweezers to deter ESD damage to dice.
3. Die Attach
The die mounting surface must be clean and flat. Using conductive silver filled epoxy, recommended epoxies are DieMat DM6030HK-PT/H579 or Ablestik 84-1LMISR4. Apply sufficient epoxy to meet required epoxy bond line thickness, epoxy fillet height and epoxy coverage around total die periphery. Parts shall be cured in a nitrogen filled atmosphere per manufacturer's cure condition. It is recommended to use antistatic die pick up tools only.
4. Wire Bonding
Bond pad openings in the surface passivation above the bond pads are provided to allow wire bonding to the dice gold bond pads. Thermosonic bonding is used with minimized ultrasonic content. Bond force, time, ultrasonic power and temperature are all critical parameters. Suggested wire is pure gold, 1 mil diameter. Bonds must be made from the bond pads on the die to the package or substrate. All bond wires should be kept as short as low as reasonable to minimize performance degradation due to undesirable series inductance.

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id = 16mA, Vd = 3.51V @ Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|------------------|--------------|
| | | | | | K | Measure | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 10 | 21.75 | 23.95 | 32.92 | 35.83 | 1.03 | 0.40 | 19.87 | 4.80 | 2.35 |
| 20 | 21.69 | 24.05 | 38.23 | 30.44 | 1.04 | 0.42 | 23.52 | 4.33 | 2.20 |
| 30 | 21.65 | 24.10 | 37.12 | 30.77 | 1.04 | 0.43 | 20.09 | 4.13 | 2.19 |
| 40 | 21.62 | 23.96 | 35.71 | 30.85 | 1.04 | 0.42 | 19.71 | 3.26 | 2.07 |
| 50 | 21.63 | 23.88 | 36.78 | 30.10 | 1.03 | 0.40 | 19.79 | 3.42 | 2.11 |
| 60 | 21.64 | 23.89 | 36.56 | 30.51 | 1.03 | 0.40 | 20.27 | 3.92 | 2.13 |
| 70 | 21.62 | 24.00 | 37 | 30.32 | 1.04 | 0.42 | 19.00 | 3.99 | 2.09 |
| 80 | 21.62 | 24.03 | 36.95 | 30.32 | 1.04 | 0.43 | 18.75 | 3.70 | 1.97 |
| 90 | 21.61 | 24.01 | 36.25 | 30.29 | 1.04 | 0.42 | 19.18 | 3.93 | 2.05 |
| 100 | 21.60 | 24.01 | 35.35 | 30.41 | 1.04 | 0.43 | 17.99 | 3.99 | 2.14 |
| 200 | 21.52 | 24.03 | 34.63 | 28.82 | 1.04 | 0.44 | 18.46 | 3.52 | 1.97 |
| 300 | 21.45 | 24.09 | 34.29 | 27.17 | 1.04 | 0.46 | 18.66 | 3.39 | 2.27 |
| 400 | 21.36 | 24.04 | 33.19 | 26.03 | 1.05 | 0.46 | 19.09 | 3.63 | 2.12 |
| 500 | 21.23 | 24.02 | 32.23 | 24.36 | 1.05 | 0.47 | 18.21 | 3.66 | 2.23 |
| 600 | 21.09 | 24.01 | 31.11 | 23.17 | 1.05 | 0.49 | 18.07 | 3.62 | 2.20 |
| 700 | 20.94 | 23.95 | 29.97 | 22.09 | 1.05 | 0.50 | 18.93 | 3.75 | 2.16 |
| 800 | 20.77 | 23.98 | 28.87 | 21.15 | 1.06 | 0.52 | 18.96 | 3.83 | 2.15 |
| 900 | 20.57 | 23.93 | 27.78 | 20.31 | 1.06 | 0.54 | 18.27 | 3.20 | 2.16 |
| 1000 | 20.38 | 23.92 | 26.91 | 19.59 | 1.07 | 0.55 | 17.38 | 3.35 | 2.20 |
| 1200 | 19.98 | 23.87 | 24.99 | 18.29 | 1.08 | 0.59 | 19.12 | 3.73 | 2.27 |
| 1400 | 19.53 | 23.79 | 23.26 | 17.29 | 1.10 | 0.62 | 18.50 | 3.54 | 2.21 |
| 1600 | 19.07 | 23.75 | 21.75 | 16.61 | 1.11 | 0.66 | 18.98 | 3.65 | 2.32 |
| 1800 | 18.64 | 23.67 | 20.26 | 15.99 | 1.13 | 0.69 | 19.50 | 3.79 | 2.26 |
| 2000 | 18.20 | 23.56 | 18.82 | 15.54 | 1.14 | 0.71 | 18.68 | 3.26 | 2.26 |
| 2200 | 17.80 | 23.46 | 17.59 | 15.12 | 1.15 | 0.74 | 19.03 | 3.17 | 2.36 |
| 2400 | 17.39 | 23.40 | 16.46 | 15.01 | 1.17 | 0.77 | 19.35 | 3.53 | 2.29 |
| 2600 | 17.02 | 23.32 | 15.37 | 14.92 | 1.18 | 0.79 | 19.18 | 3.31 | 2.43 |
| 2800 | 16.66 | 23.23 | 14.56 | 14.90 | 1.20 | 0.81 | 19.13 | 3.42 | 2.49 |
| 3000 | 16.34 | 23.17 | 13.66 | 14.83 | 1.21 | 0.83 | 18.95 | 3.28 | 2.38 |
| 3200 | 16.04 | 23.06 | 12.91 | 14.86 | 1.21 | 0.85 | 18.81 | 3.19 | 2.43 |
| 3400 | 15.73 | 23.00 | 12.45 | 15.07 | 1.23 | 0.87 | 18.84 | 3.56 | 2.50 |
| 3600 | 15.45 | 22.98 | 11.98 | 15.36 | 1.25 | 0.89 | 18.73 | 3.43 | 2.56 |
| 3800 | 15.28 | 22.86 | 11.39 | 15.14 | 1.24 | 0.90 | 18.83 | 3.64 | 2.61 |
| 4000 | 15.05 | 22.76 | 11.13 | 15.34 | 1.25 | 0.91 | 18.45 | 3.68 | 2.58 |
| 4200 | 14.85 | 22.71 | 10.94 | 15.53 | 1.26 | 0.92 | 18.14 | 3.51 | 2.56 |
| 4400 | 14.66 | 22.58 | 10.85 | 15.53 | 1.27 | 0.93 | 17.66 | 3.32 | 2.56 |
| 4600 | 14.53 | 22.48 | 10.63 | 15.30 | 1.26 | 0.93 | 17.63 | 2.99 | 2.62 |
| 4800 | 14.37 | 22.49 | 10.82 | 15.51 | 1.28 | 0.93 | 17.24 | 3.30 | 2.59 |
| 5000 | 14.26 | 22.39 | 10.86 | 15.32 | 1.28 | 0.93 | 16.60 | 2.88 | 2.74 |
| 5200 | 14.14 | 22.24 | 10.89 | 14.81 | 1.27 | 0.93 | 16.48 | 3.05 | 2.72 |
| 5400 | 14.07 | 22.24 | 11.16 | 14.68 | 1.29 | 0.93 | 15.80 | 3.06 | 2.72 |
| 5600 | 14.09 | 22.33 | 11.07 | 14.22 | 1.28 | 0.93 | 15.45 | 2.49 | 2.79 |
| 5800 | 14.00 | 22.27 | 11.07 | 13.66 | 1.28 | 0.93 | 14.88 | 2.54 | 2.74 |
| 6000 | 13.92 | 22.06 | 11.33 | 13.06 | 1.26 | 0.91 | 14.70 | 2.40 | 2.78 |

Note: Test data of Die packaged in industry standard SOT-89 package



Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id = 12mA, Vd = 3.49V @ Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|------------------|--------------|
| | | | | | K | Measure | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 10 | 19.47 | 22.52 | 14.22 | 15.62 | 1.05 | 0.47 | 23.03 | 0.12 | 2.22 |
| 20 | 19.38 | 22.37 | 13.97 | 15.58 | 1.05 | 0.46 | 19.91 | -0.07 | 2.38 |
| 30 | 19.32 | 22.40 | 13.86 | 15.53 | 1.05 | 0.47 | 22.41 | -0.25 | 2.34 |
| 40 | 19.29 | 22.37 | 13.77 | 15.50 | 1.05 | 0.47 | 23.33 | -0.87 | 2.21 |
| 50 | 19.31 | 22.30 | 13.93 | 15.63 | 1.05 | 0.46 | 21.61 | -0.82 | 2.30 |
| 60 | 19.31 | 22.36 | 13.84 | 15.53 | 1.05 | 0.47 | 22.99 | -0.40 | 2.36 |
| 70 | 19.30 | 22.40 | 13.89 | 15.60 | 1.05 | 0.48 | 19.25 | -0.33 | 2.25 |
| 80 | 19.29 | 22.39 | 13.86 | 15.59 | 1.05 | 0.48 | 18.51 | -0.55 | 2.14 |
| 90 | 19.28 | 22.42 | 13.81 | 15.61 | 1.05 | 0.48 | 19.65 | -0.38 | 2.18 |
| 100 | 19.27 | 22.36 | 13.77 | 15.53 | 1.05 | 0.48 | 18.25 | -0.36 | 2.40 |
| 200 | 19.21 | 22.38 | 13.76 | 15.64 | 1.05 | 0.49 | 18.41 | -0.71 | 2.08 |
| 300 | 19.16 | 22.39 | 13.84 | 15.69 | 1.05 | 0.49 | 17.72 | -0.84 | 2.53 |
| 400 | 19.11 | 22.40 | 13.90 | 15.71 | 1.05 | 0.51 | 18.63 | -0.64 | 2.25 |
| 500 | 19.03 | 22.36 | 13.96 | 15.75 | 1.05 | 0.51 | 17.09 | -0.70 | 2.42 |
| 600 | 18.93 | 22.38 | 13.99 | 15.77 | 1.05 | 0.53 | 16.54 | -0.72 | 2.37 |
| 700 | 18.84 | 22.31 | 14.04 | 15.80 | 1.05 | 0.54 | 16.88 | -0.65 | 2.32 |
| 800 | 18.71 | 22.32 | 14.02 | 15.84 | 1.05 | 0.56 | 16.50 | -0.60 | 2.34 |
| 900 | 18.58 | 22.30 | 13.99 | 15.76 | 1.05 | 0.57 | 16.35 | -1.11 | 2.66 |
| 1000 | 18.45 | 22.24 | 14.02 | 15.74 | 1.05 | 0.59 | 15.36 | -0.97 | 2.35 |
| 1200 | 18.16 | 22.21 | 13.92 | 15.44 | 1.05 | 0.62 | 16.99 | -0.76 | 2.46 |
| 1400 | 17.82 | 22.18 | 13.63 | 15.06 | 1.06 | 0.66 | 16.46 | -0.93 | 2.39 |
| 1600 | 17.45 | 22.15 | 13.28 | 14.64 | 1.06 | 0.69 | 16.69 | -0.87 | 2.49 |
| 1800 | 17.11 | 22.13 | 12.85 | 14.14 | 1.07 | 0.72 | 17.48 | -0.78 | 2.38 |
| 2000 | 16.74 | 22.10 | 12.31 | 13.68 | 1.08 | 0.75 | 16.48 | -1.21 | 2.36 |
| 2200 | 16.40 | 22.08 | 11.79 | 13.23 | 1.08 | 0.78 | 17.03 | -1.33 | 2.48 |
| 2400 | 16.04 | 22.11 | 11.31 | 12.93 | 1.09 | 0.81 | 17.14 | -0.99 | 2.42 |
| 2600 | 15.71 | 22.11 | 10.77 | 12.64 | 1.10 | 0.84 | 16.72 | -1.20 | 2.53 |
| 2800 | 15.40 | 22.08 | 10.34 | 12.47 | 1.11 | 0.86 | 17.45 | -1.06 | 2.60 |
| 3000 | 15.11 | 22.15 | 9.85 | 12.25 | 1.12 | 0.88 | 17.41 | -1.12 | 2.46 |
| 3200 | 14.85 | 22.07 | 9.45 | 12.11 | 1.12 | 0.90 | 17.79 | -1.19 | 2.57 |
| 3400 | 14.58 | 22.08 | 9.20 | 12.15 | 1.14 | 0.92 | 17.66 | -0.88 | 2.55 |
| 3600 | 14.34 | 22.11 | 8.95 | 12.26 | 1.16 | 0.93 | 18.41 | -0.88 | 2.60 |
| 3800 | 14.20 | 22.04 | 8.59 | 12.07 | 1.14 | 0.95 | 18.94 | -0.55 | 2.63 |
| 4000 | 14.01 | 22.04 | 8.45 | 12.21 | 1.16 | 0.96 | 19.00 | -0.42 | 2.59 |
| 4200 | 13.84 | 22.03 | 8.38 | 12.40 | 1.17 | 0.97 | 18.52 | -0.44 | 2.61 |
| 4400 | 13.70 | 21.98 | 8.35 | 12.51 | 1.18 | 0.98 | 18.35 | -0.40 | 2.58 |
| 4600 | 13.61 | 21.91 | 8.23 | 12.46 | 1.17 | 0.98 | 18.59 | -0.57 | 2.65 |
| 4800 | 13.47 | 21.99 | 8.41 | 12.76 | 1.21 | 0.99 | 17.32 | 0.03 | 2.66 |
| 5000 | 13.39 | 21.90 | 8.46 | 12.83 | 1.21 | 0.99 | 16.81 | -0.32 | 2.79 |
| 5200 | 13.31 | 21.85 | 8.50 | 12.66 | 1.20 | 0.99 | 15.87 | 0.22 | 2.79 |
| 5400 | 13.27 | 21.82 | 8.72 | 12.76 | 1.21 | 0.99 | 15.52 | 0.56 | 2.77 |
| 5600 | 13.30 | 21.91 | 8.66 | 12.50 | 1.21 | 0.99 | 14.84 | -0.15 | 2.90 |
| 5800 | 13.25 | 21.89 | 8.68 | 12.27 | 1.20 | 0.99 | 14.08 | 0.30 | 2.85 |
| 6000 | 13.19 | 21.70 | 8.87 | 12.10 | 1.19 | 0.98 | 14.08 | 0.33 | 2.89 |

Note: Test data of Die packaged in industry standard SOT-89 package

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

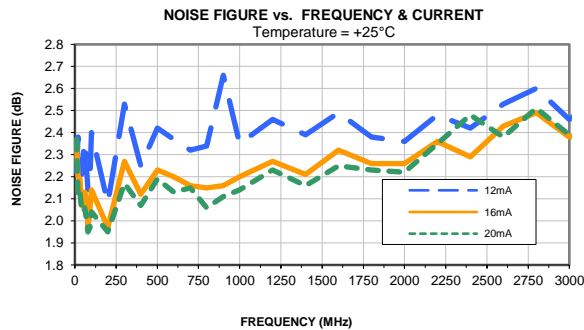
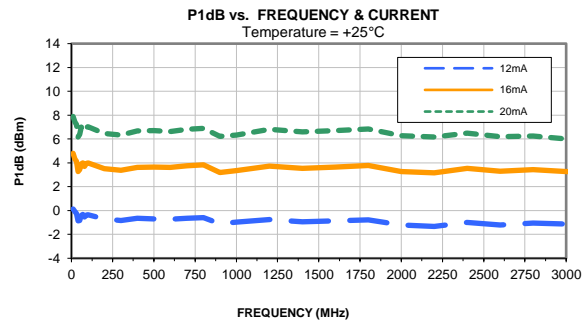
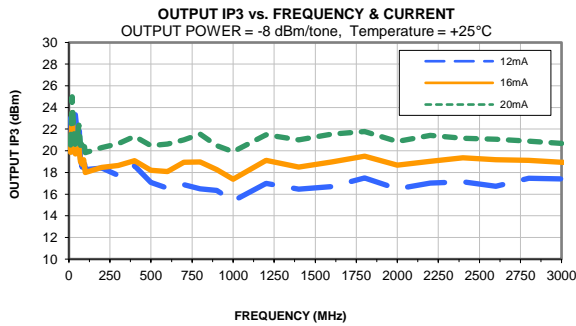
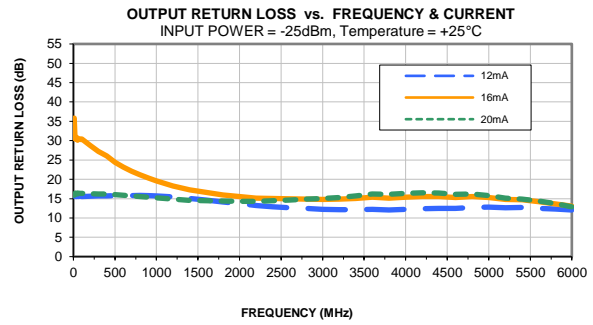
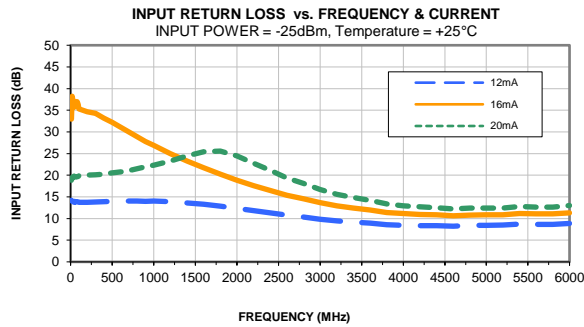
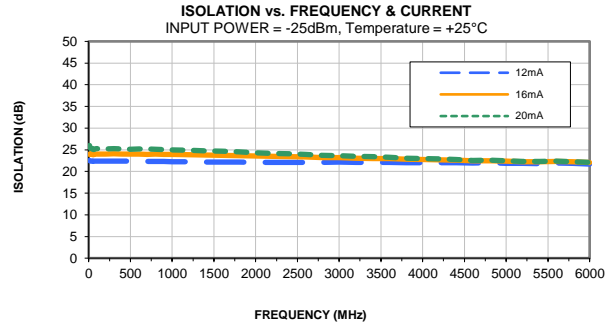
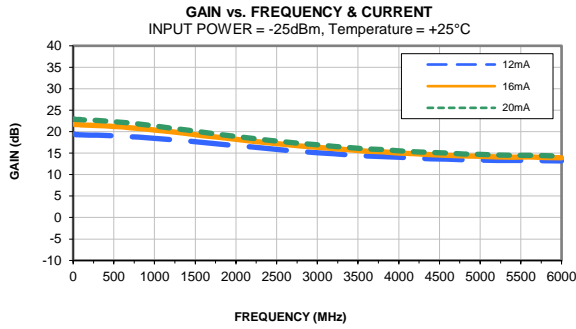
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id = 20mA, Vd = 3.52V @ Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|------------------|--------------|
| | | | | | K | Measure | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 10 | 22.97 | 25.99 | 18.81 | 15.85 | 1.05 | 0.46 | 20.53 | 7.89 | 2.37 |
| 20 | 22.88 | 25.32 | 19.50 | 16.36 | 1.03 | 0.39 | 24.99 | 7.42 | 2.11 |
| 30 | 22.85 | 25.29 | 19.59 | 16.42 | 1.03 | 0.39 | 21.76 | 7.23 | 2.13 |
| 40 | 22.83 | 25.25 | 19.78 | 16.40 | 1.03 | 0.39 | 20.54 | 6.17 | 2.05 |
| 50 | 22.83 | 25.15 | 19.62 | 16.23 | 1.03 | 0.38 | 21.18 | 6.38 | 2.04 |
| 60 | 22.84 | 25.05 | 19.61 | 16.43 | 1.03 | 0.36 | 22.37 | 6.99 | 2.06 |
| 70 | 22.82 | 25.21 | 19.62 | 16.35 | 1.03 | 0.39 | 20.52 | 6.99 | 2.01 |
| 80 | 22.82 | 25.16 | 19.66 | 16.39 | 1.03 | 0.38 | 20.61 | 6.67 | 1.95 |
| 90 | 22.81 | 25.23 | 19.71 | 16.35 | 1.03 | 0.39 | 20.94 | 6.97 | 1.97 |
| 100 | 22.80 | 25.24 | 19.85 | 16.37 | 1.03 | 0.39 | 19.84 | 7.02 | 2.04 |
| 200 | 22.71 | 25.19 | 19.99 | 16.29 | 1.03 | 0.40 | 20.30 | 6.47 | 1.95 |
| 300 | 22.61 | 25.25 | 20.13 | 16.23 | 1.04 | 0.42 | 20.66 | 6.33 | 2.17 |
| 400 | 22.50 | 25.20 | 20.27 | 16.24 | 1.04 | 0.43 | 21.33 | 6.69 | 2.07 |
| 500 | 22.34 | 25.15 | 20.52 | 16.03 | 1.04 | 0.44 | 20.48 | 6.72 | 2.19 |
| 600 | 22.17 | 25.16 | 20.76 | 15.89 | 1.05 | 0.46 | 20.62 | 6.64 | 2.13 |
| 700 | 21.99 | 25.16 | 21.09 | 15.70 | 1.06 | 0.48 | 21.00 | 6.81 | 2.15 |
| 800 | 21.78 | 25.08 | 21.49 | 15.54 | 1.06 | 0.49 | 21.53 | 6.90 | 2.06 |
| 900 | 21.55 | 25.07 | 21.93 | 15.34 | 1.07 | 0.51 | 20.48 | 6.23 | 2.11 |
| 1000 | 21.32 | 24.99 | 22.35 | 15.18 | 1.08 | 0.53 | 19.92 | 6.34 | 2.14 |
| 1200 | 20.85 | 24.89 | 23.27 | 14.87 | 1.09 | 0.56 | 21.47 | 6.82 | 2.23 |
| 1400 | 20.35 | 24.75 | 24.47 | 14.56 | 1.11 | 0.59 | 21.02 | 6.59 | 2.16 |
| 1600 | 19.84 | 24.64 | 25.42 | 14.46 | 1.13 | 0.63 | 21.53 | 6.71 | 2.25 |
| 1800 | 19.37 | 24.49 | 25.57 | 14.34 | 1.15 | 0.66 | 21.78 | 6.84 | 2.23 |
| 2000 | 18.90 | 24.29 | 24.44 | 14.28 | 1.16 | 0.68 | 20.86 | 6.27 | 2.22 |
| 2200 | 18.47 | 24.16 | 22.76 | 14.26 | 1.17 | 0.71 | 21.41 | 6.18 | 2.35 |
| 2400 | 18.03 | 24.05 | 21.11 | 14.43 | 1.19 | 0.73 | 21.16 | 6.50 | 2.48 |
| 2600 | 17.64 | 23.91 | 19.36 | 14.64 | 1.21 | 0.76 | 21.08 | 6.19 | 2.38 |
| 2800 | 17.26 | 23.75 | 18.09 | 14.87 | 1.22 | 0.78 | 20.88 | 6.26 | 2.51 |
| 3000 | 16.93 | 23.61 | 16.70 | 15.06 | 1.23 | 0.80 | 20.67 | 6.00 | 2.39 |
| 3200 | 16.61 | 23.46 | 15.58 | 15.33 | 1.24 | 0.82 | 20.36 | 5.91 | 2.40 |
| 3400 | 16.29 | 23.40 | 14.85 | 15.70 | 1.26 | 0.84 | 19.81 | 6.15 | 2.46 |
| 3600 | 15.99 | 23.29 | 14.18 | 16.19 | 1.27 | 0.85 | 19.68 | 5.91 | 2.55 |
| 3800 | 15.81 | 23.06 | 13.35 | 16.10 | 1.26 | 0.86 | 19.54 | 5.99 | 2.52 |
| 4000 | 15.56 | 22.96 | 12.96 | 16.35 | 1.27 | 0.87 | 19.12 | 5.86 | 2.58 |
| 4200 | 15.34 | 22.88 | 12.69 | 16.51 | 1.28 | 0.88 | 18.77 | 5.58 | 2.57 |
| 4400 | 15.14 | 22.72 | 12.51 | 16.45 | 1.28 | 0.89 | 18.36 | 5.28 | 2.57 |
| 4600 | 15.00 | 22.56 | 12.22 | 16.09 | 1.27 | 0.89 | 18.12 | 4.89 | 2.58 |
| 4800 | 14.82 | 22.58 | 12.41 | 16.19 | 1.29 | 0.89 | 17.59 | 4.91 | 2.58 |
| 5000 | 14.70 | 22.47 | 12.44 | 15.81 | 1.29 | 0.89 | 17.11 | 4.50 | 2.70 |
| 5200 | 14.57 | 22.29 | 12.45 | 15.12 | 1.28 | 0.89 | 16.99 | 4.44 | 2.74 |
| 5400 | 14.49 | 22.28 | 12.77 | 14.87 | 1.29 | 0.88 | 16.25 | 4.19 | 2.67 |
| 5600 | 14.49 | 22.36 | 12.65 | 14.35 | 1.29 | 0.89 | 15.93 | 3.78 | 2.75 |
| 5800 | 14.40 | 22.27 | 12.67 | 13.68 | 1.28 | 0.88 | 15.45 | 3.60 | 2.72 |
| 6000 | 14.30 | 22.10 | 12.97 | 12.88 | 1.27 | 0.86 | 15.12 | 3.37 | 2.73 |

Note: Test data of Die packaged in industry standard SOT-89 package

Typical Performance Curves



Note: Test data of Die packaged in industry standard SOT-89 package

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 -40° to 105° C or -55° to 105° C or -45° to 105° C Ambient Environment | Refer to Individual Model Data Sheet |
| Storage Environment (Die) | -65° to 150°C | Individual Model Data Sheet |
| Storage Environment(Packaging) | -40° to 70°C and 40 to 60% humidity (In Factory Shipped Package) | |