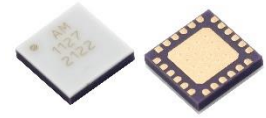


AM1127 – Amplifier

20 MHz to 6 GHz Gain Block

Description

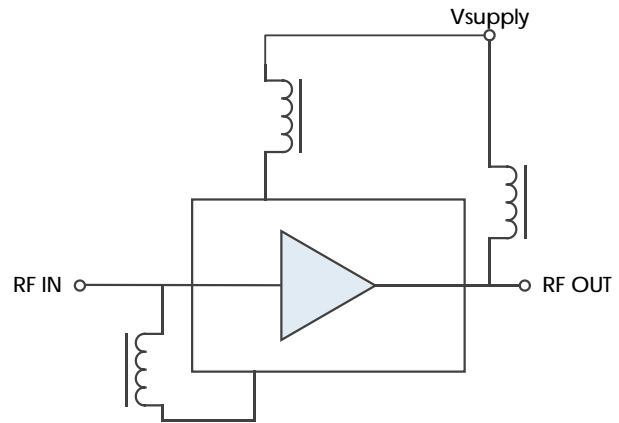
The AM1127 is a high dynamic range cascadable amplifier operating over the 20 MHz to 6.0 GHz frequency range. The device exhibits exceptional second and third order intercept performance as well as high P1dB and low noise figure. With only the need for one positive supply rail and packaged in a 4mm QFN, the AM1127 represents a compact total PCB footprint. Its high gain and linearity make the AM1127 an excellent choice for a receiver front end or transmitter backend.



Features

- 19 dB Gain
- +39 dBm OIP3
- +60 dBm OIP2
- +23 dBm P1dB
- 3.5 dB Noise Figure
- +3.0 to +6.0 V Supply Range
- 300mA Supply Current @ 6V
- 4mm QFN
- -40C to +85C Operation

Functional Diagram



Characteristic Performance

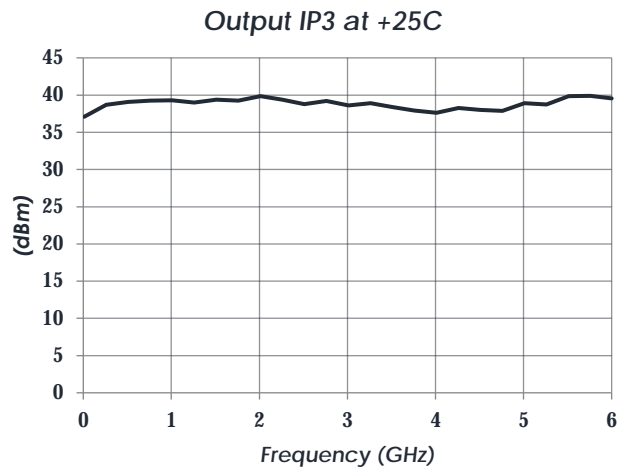
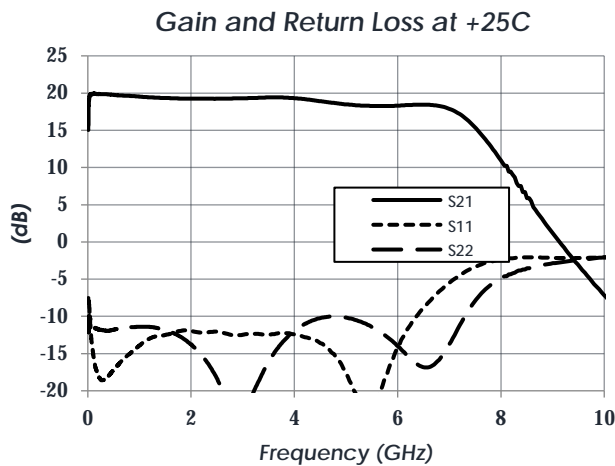


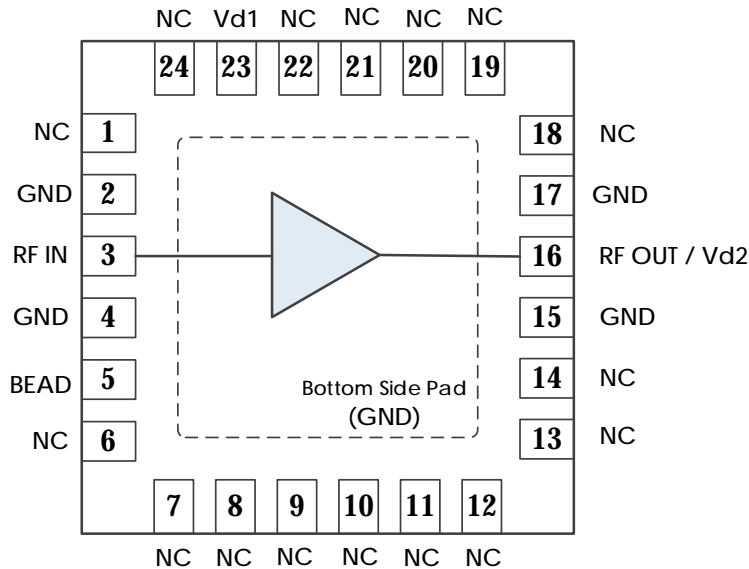
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Revision History

| Date | Revision Number | Notes |
|-------------------|-----------------|--|
| February 8, 2021 | 0 | Preliminary Release |
| August 2, 2021 | 1 | Initial Release |
| August 16, 2021 | 1.1 | Updated component list in Typical Application. |
| August 19, 2021 | 2 | Added Current Distribution |
| November 29, 2021 | 2.1 | Corrected Thermal Information |

Pin Layout and Definitions



| Pin Number | Pin Name | Pin Function |
|------------|--------------|--|
| 1 | NC | No Connect |
| 2 | GND | Ground - Common |
| 3 | RF IN | RF Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required |
| 4 | GND | Ground - Common |
| 5 | Bead | Connect to RF IN through external ferrite bead or large inductor |
| 6-14 | NC | No Connect |
| 15 | GND | Ground - Common |
| 16 | RF OUT / Vd2 | RF Output – 50 Ohms – DC Coupled. VD2 DC Power Input. External Bias Tee Required |
| 17 | GND | Ground - Common |
| 18-22 | NC | No Connect |
| 23 | Vd1 | DC Power Input |
| 24 | NC | No Connect |

*Note: NC pins may be grounded or left open

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Specifications

Absolute Maximum Ratings

| | Minimum | Maximum |
|--------------------------------|---------|---------|
| Supply Voltage | -0.3 V | +6.3 V |
| RF Input Power | | +20 dBm |
| Operating Junction Temperature | -40 C | +150 C |
| Storage Temperature Range | -55 C | +150 C |

Note: Any device operation beyond the Absolute Maximum Ratings may result in permanent damage to the device. The values listed in this table are extremes and do not imply functional operation of the device at these or any other conditions beyond what is listed under Recommended Operating Conditions. Any part subjected to conditions outside of what is recommended for an extended amount of time may suffer from reliability concerns.

Handling Information

| | Minimum | Maximum |
|---|---------|---------|
| Storage Temperature Range (Recommended) | -50 C | +125 C |
| Moisture Sensitivity Level | MSL 1 | |



Atlanta Micro products are electrostatic sensitive.
Follow safe handling practices to avoid damage

Recommended Operating Conditions

| | Minimum | Typical | Maximum |
|--------------------------------|---------|---------|---------|
| Supply Voltage | +3 V | +6 V | |
| Operating Case Temperature | -40 C | | +85 C |
| Operating Junction Temperature | -40 C | | +150 C |

Thermal Information

| | Thermal Resistance (°C / W) |
|---|-----------------------------|
| Junction to Case Thermal Resistance (θ_{JC}) | 32.1 |

AM1127 – Amplifier

20 MHz to 6 GHz Gain Block

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

| Parameter | Testing Conditions | Minimum | Typical | Maximum |
|-------------------|--------------------|---------|---------|---------|
| DC Supply Voltage | | +3 V | +6 V | +6 V |
| DC Supply Current | VDD = +6 V, Total | | 300 mA | |
| | VD1 Current | | 150 mA | |
| | VD2 Current | | 150 mA | |
| Power Dissipated | VDD = +6 V | | 1.8 W | |

RF Performance

(T = 25 °C unless otherwise specified)

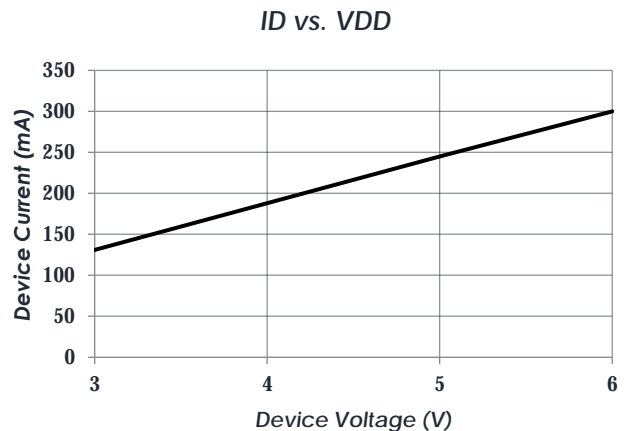
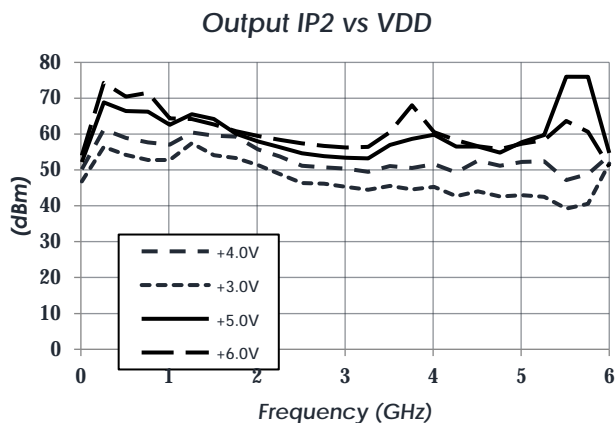
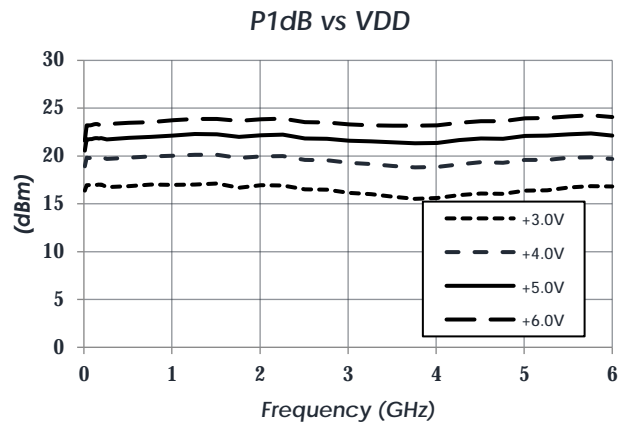
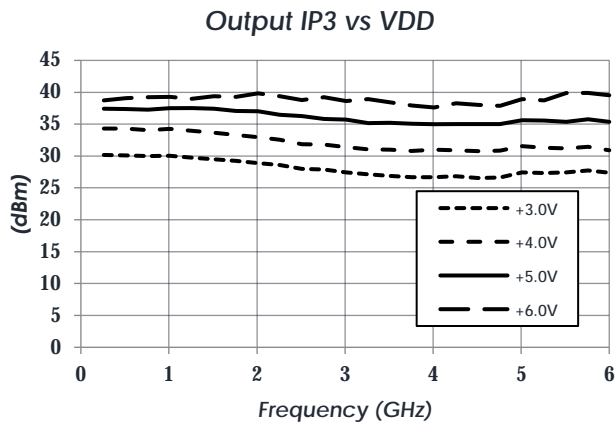
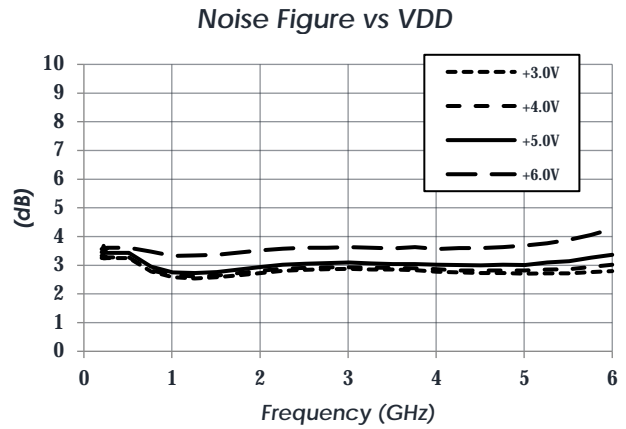
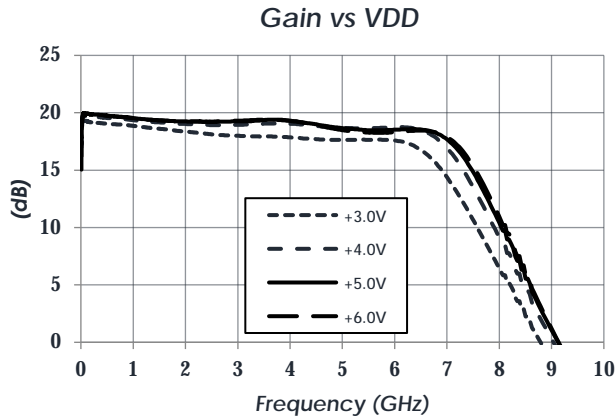
| Parameter | Testing Conditions | Minimum | Typical | Maximum |
|-----------------|--------------------|----------|---------|---------|
| Frequency Range | | 0.02 GHz | | 6 GHz |
| Gain | | | 19 dB | |
| Return Loss | | | -12 dB | |
| Output IP3 | | | +39 dBm | |
| Output P1dB | | | +23 dBm | |
| Output OIP2 | | | +60 dBm | |
| Noise Figure | | | 3.5 dB | |

AM1127 – Amplifier

20 MHz to 6 GHz Gain Block

Typical Performance

(VDD = +6.0V, T = 25 °C unless otherwise specified)

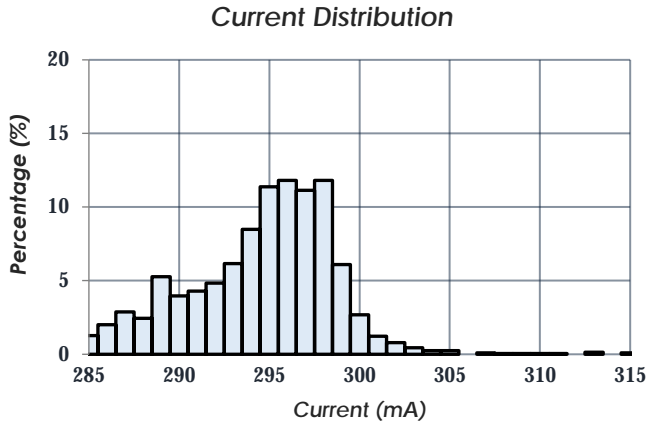
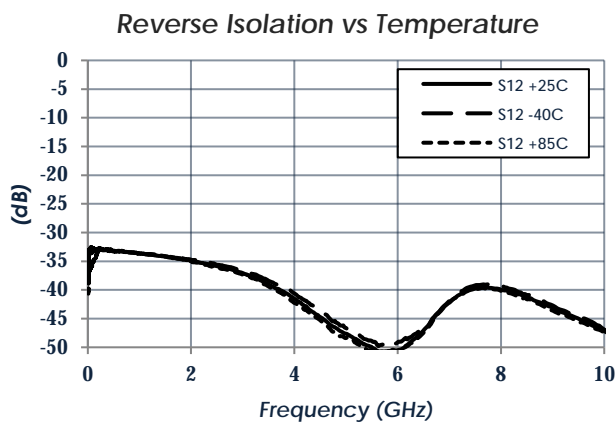
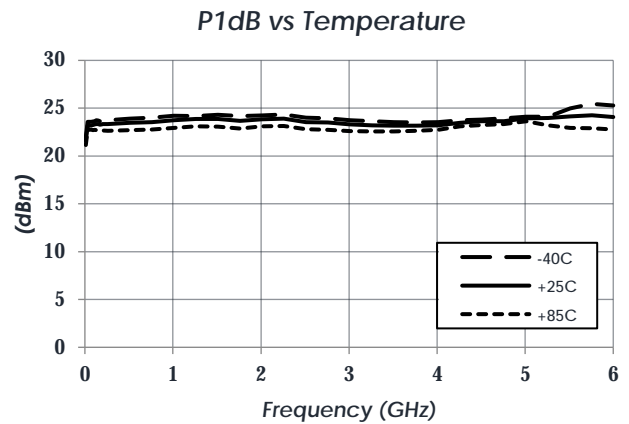
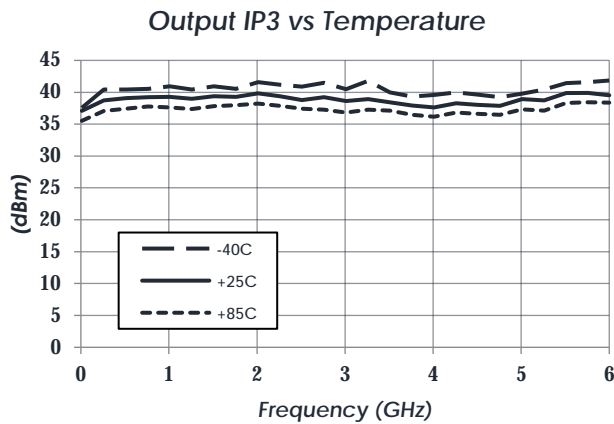
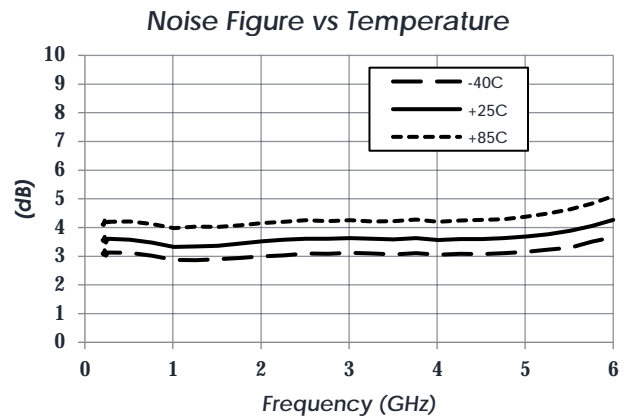
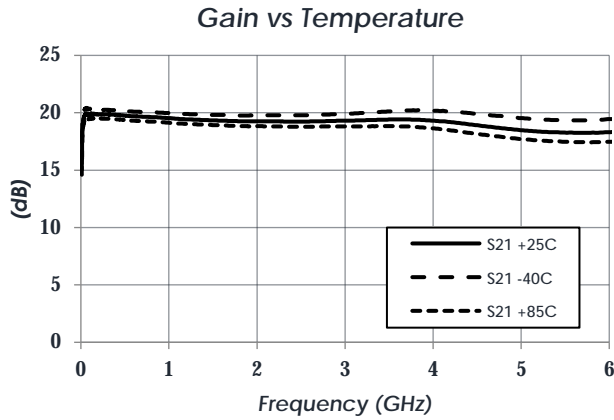


AM1127 – Amplifier

20 MHz to 6 GHz Gain Block



Typical Performance (continued)
 (VDD = +6.0V, T = 25 °C unless otherwise specified)

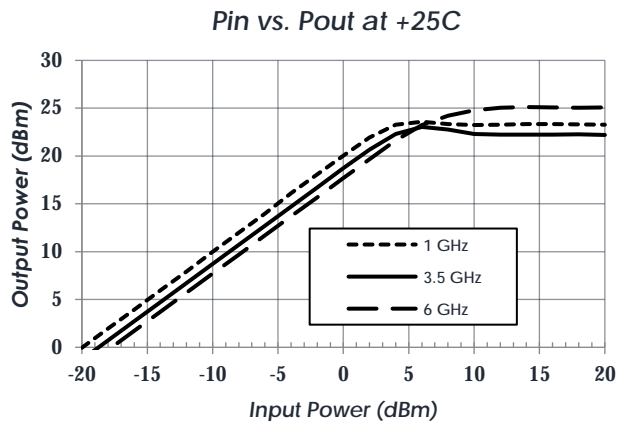
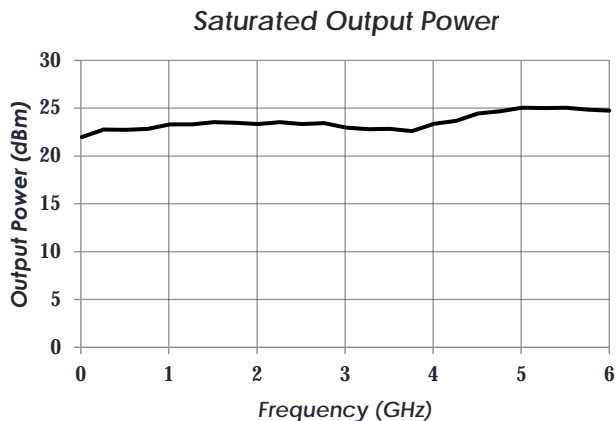
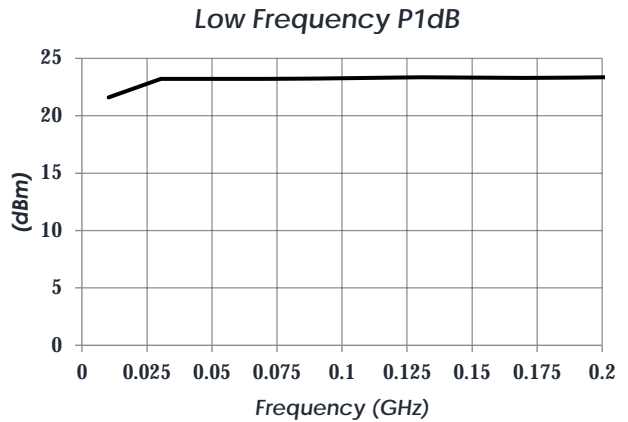
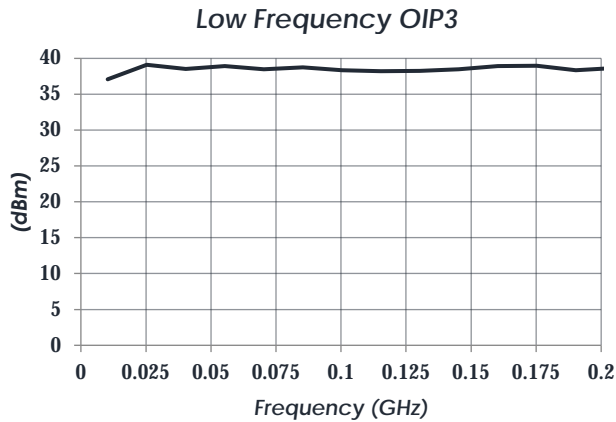
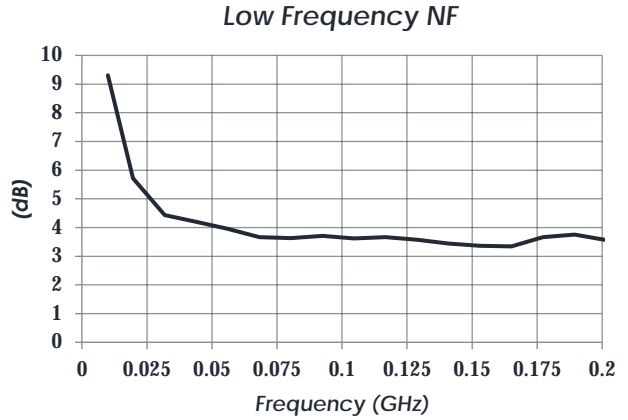
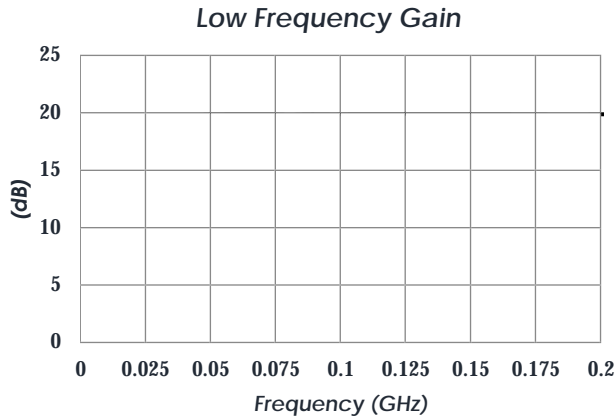


AM1127 – Amplifier

20 MHz to 6 GHz Gain Block

Typical Performance (continued)

(VDD = +6.0V, T = 25 °C unless otherwise specified)

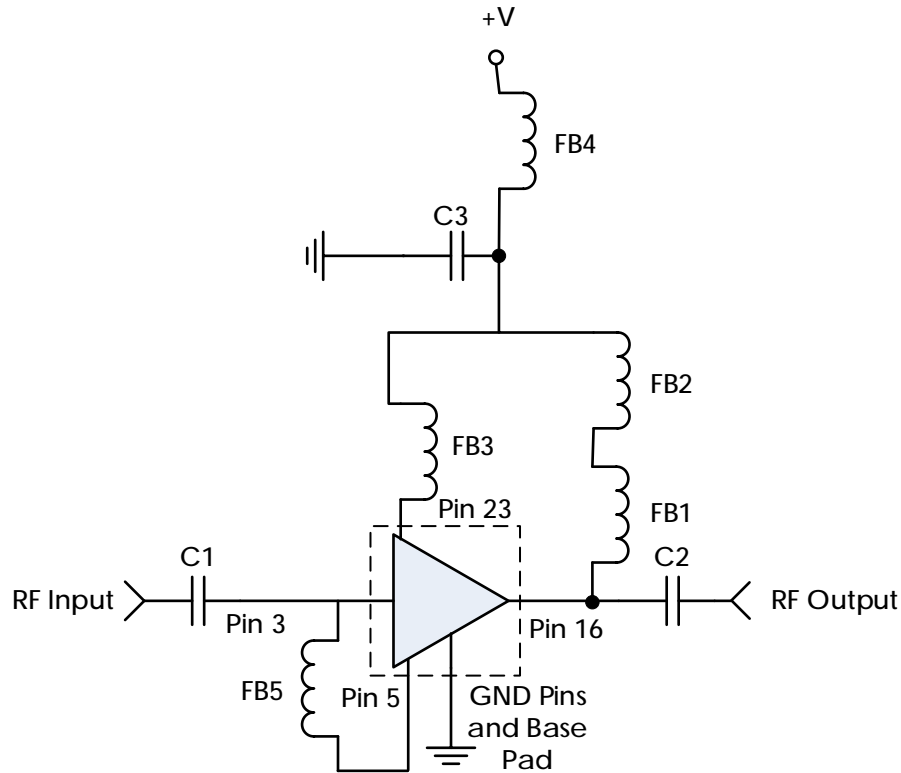


AM1127 – Amplifier

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Typical Application



Recommended Component List (or equivalent):

| Part | Value | Part Number | Manufacturer |
|---------------|--------|-------------------|--------------|
| C1, C2 | 0.1 uF | 0402BB104KW106 | Passive Plus |
| C3 | 0.1 uF | GRM155R71C104KA88 | Murata |
| FB1, FB2, FB3 | - | MMZ1005A182ET000 | TDK |
| FB4 | - | MMZ1005S102HT000 | TDK |
| FB5 | - | MMZ1005A222E | TDK |

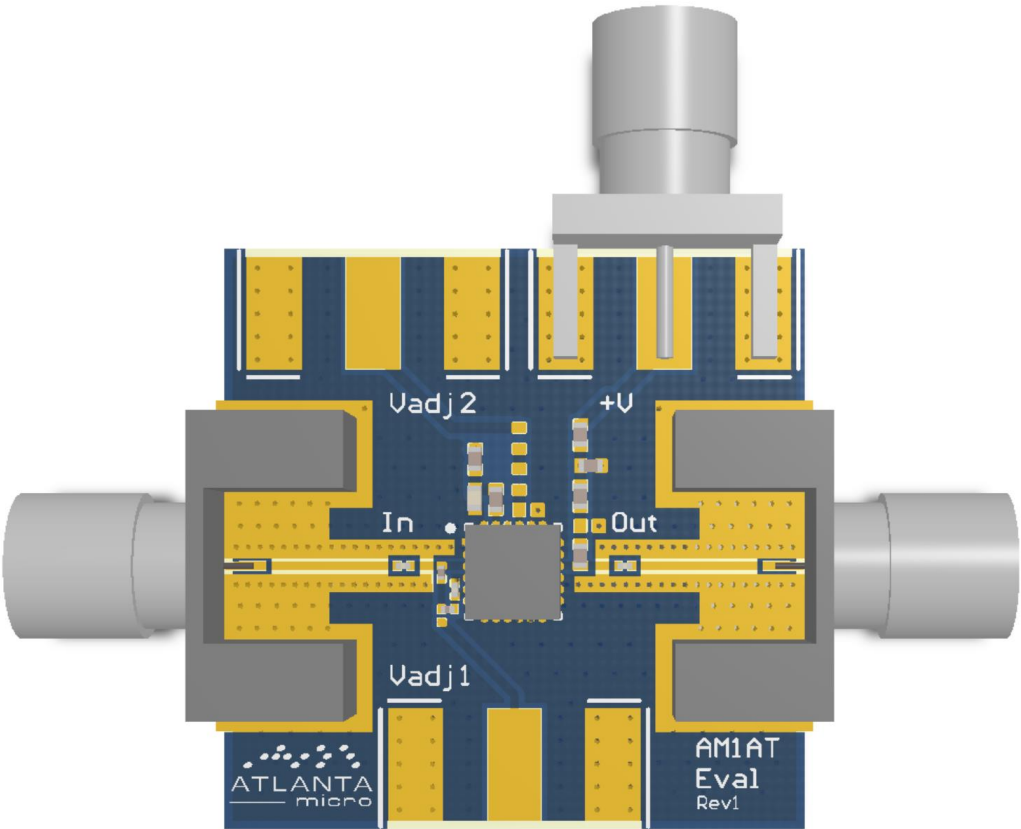
Notes:

1. NC pins may be grounded or left open
2. DC blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance
3. FB1 and FB2 choke gives best low frequency performance extension without a capacitor to ground
 - a. Low frequency performance may be improved by replacing FB1 and FB2 with a different bead, inductor, or bias tee.

AM1127 – Amplifier

20 MHz to 6 GHz Gain Block

Evaluation PC Board



Related Parts

| Part Number | Description |
|-------------|------------------------------|
| AM1018C | 0.02 GHz to 6 GHz Gain Block |
| AM1025B | 0.02 GHz to 3 GHz Gain Block |
| AM1084-1 | DC to 6 GHz Gain Block |
| AM1090-1 | DC to 6 GHz Gain Block |

Component Compliance Information

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| Substance List | Allowable Maximum Concentration |
|---------------------------------------|---------------------------------|
| Lead (Pb) | <1000 PPM (0.1% by weight) |
| Mercury (Hg) | <1000 PPM (0.1% by weight) |
| Cadmium (Cd) | <75 PPM (0.0075% by weight) |
| Hexavalent Chromium (CrVI) | <1000 PPM (0.1% by weight) |
| Polybrominated Biphenyls (PBB) | <1000 PPM (0.1% by weight) |
| Polybrominated Diphenyl ethers (PBDE) | <1000 PPM (0.1% by weight) |
| Decabromodiphenyl Deca BDE | <1000 PPM (0.1% by weight) |
| Bis (2-ethylhexyl) Phthalate (DEHP) | <1000 PPM (0.1% by weight) |
| Butyl Benzyl Phthalate (BBP) | <1000 PPM (0.1% by weight) |
| Dibutyl Phthalate (DBP) | <1000 PPM (0.1% by weight) |
| Diisobutyl Phthalate (DIBP) | <1000 PPM (0.1% by weight) |

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