



Mini-Circuits

5 VOLT-SURFACE MOUNT

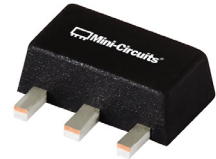
# Monolithic Amplifier

GVA-84+

50Ω DC-7 GHz

## THE BIG DEAL

- High Gain, 24 dB typ. at 100 MHz
- High Pout, P1dB 20.5 dBm typ. at 100 MHz
- High IP3, 37 dBm typ. at 100 MHz
- Ruggedized design
- Fixed 5V operation
- Unconditionally stable
- Excellent ESD Protection
- Transient protected, US patent 6,943,629



Generic photo used for illustration purposes only

CASE STYLE: DF782

**+RoHS Compliant**

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

**LTE Performance**

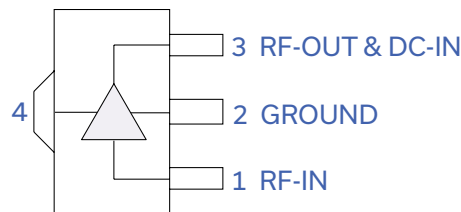
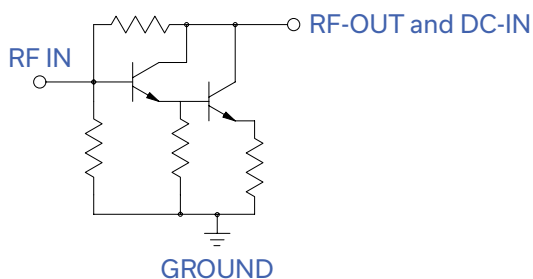
## APPLICATIONS

- Base station infrastructure
- Portable Wireless
- CATV & DBS
- MMDS & Wireless LAN
- LTE

## PRODUCT OVERVIEW

GVA-84+ (RoHS compliant) is a wideband amplifier offering high dynamic range. Lead finish is SnAgNi. It has repeatable performance from lot to lot and is enclosed in a SOT-89 package. It uses patented Transient Protected Darlington configuration and is fabricated using InGaP HBT technology.

## SIMPLIFIED SCHEMATIC AND PIN DESCRIPTION



| Function         | Pin Number | Description                                                                                                                                                                                                                                                                       |
|------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RF IN            | 1          | RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.                                                                                                                                                               |
| RF-OUT and DC-IN | 3          | RF output and bias pin. DC voltage is present on this pin; therefore a DC blocking capacitor is necessary for proper operation. An RF choke is needed to feed DC bias without loss of RF signal due to the bias connection, as shown in "Recommended Application Circuit", Fig. 2 |
| GND              | 2,4        | Connections to ground. Use via holes as shown in "Suggested Layout for PCB Design" to reduce ground path inductance for best performance.                                                                                                                                         |

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## Monolithic Amplifier

GVA-84+

ELECTRICAL SPECIFICATIONS<sup>(1)</sup> AT 25°C AND 5V, UNLESS NOTED

| Parameter                                                                              | Condition (GHz) | Min. | Typ.   | Max.  | Units |
|----------------------------------------------------------------------------------------|-----------------|------|--------|-------|-------|
| Frequency Range <sup>(2)</sup>                                                         |                 | DC   |        | 7     | GHz   |
| Gain                                                                                   | 0.1             | 22.9 | 24.1   | 25.3  | dB    |
|                                                                                        | 1.0             | —    | 21.7   | —     |       |
|                                                                                        | 2.0             | 17.4 | 18.4   | 19.9  |       |
|                                                                                        | 3.0             | —    | 16.0   | —     |       |
|                                                                                        | 4.0             | 13.8 | 14.6   | 16.3  |       |
|                                                                                        | 6.0             | —    | 12.5   | —     |       |
|                                                                                        | 7.0             | —    | 10.5   | —     |       |
| Magnitude of Gain Variation versus Temperature <sup>(3)</sup><br>(values are negative) | 0.1             | —    | 0.0004 | —     | dB/°C |
|                                                                                        | 1.0             | —    | 0.0021 | —     |       |
|                                                                                        | 2.0             | —    | 0.0032 | 0.006 |       |
|                                                                                        | 3.0             | —    | 0.0044 | —     |       |
|                                                                                        | 4.0             | —    | 0.0058 | —     |       |
|                                                                                        | 6.0             | —    | 0.0131 | —     |       |
|                                                                                        | 7.0             | —    | 0.0175 | —     |       |
| Input Return Loss                                                                      | 0.1             | —    | 22.9   | —     | dB    |
|                                                                                        | 1.0             | —    | 20.6   | —     |       |
|                                                                                        | 2.0             | 15.0 | 18.5   | —     |       |
|                                                                                        | 3.0             | —    | 18.1   | —     |       |
|                                                                                        | 4.0             | —    | 19.1   | —     |       |
|                                                                                        | 6.0             | —    | 17.9   | —     |       |
|                                                                                        | 7.0             | —    | 11.9   | —     |       |
| Output Return Loss                                                                     | 0.1             | —    | 23.3   | —     | dB    |
|                                                                                        | 1.0             | —    | 10.7   | —     |       |
|                                                                                        | 2.0             | 6.0  | 7.7    | —     |       |
|                                                                                        | 3.0             | —    | 7.1    | —     |       |
|                                                                                        | 4.0             | —    | 7.0    | —     |       |
|                                                                                        | 6.0             | —    | 6.3    | —     |       |
|                                                                                        | 7.0             | —    | 5.6    | —     |       |
| Reverse Isolation                                                                      | 2.0             |      | 26.5   |       | dB    |
| Output Power @1 dB compression                                                         | 0.1             | 19.4 | 20.4   | —     | dBm   |
|                                                                                        | 1.0             | 19.5 | 20.5   | —     |       |
|                                                                                        | 2.0             | 19.6 | 20.6   | —     |       |
|                                                                                        | 3.0             | —    | 21.0   | —     |       |
|                                                                                        | 4.0             | —    | 19.9   | —     |       |
|                                                                                        | 6.0             | —    | 17.0   | —     |       |
|                                                                                        | 7.0             | —    | 15.6   | —     |       |
| Saturated Output Power<br>(at 3dB compression)                                         | 0.1             |      | 21.7   |       | dBm   |
|                                                                                        | 1.0             |      | 22.3   |       |       |
|                                                                                        | 2.0             |      | 22.3   |       |       |
|                                                                                        | 3.0             |      | 22.2   |       |       |
|                                                                                        | 4.0             |      | 21.0   |       |       |
|                                                                                        | 6.0             |      | 18.9   |       |       |
|                                                                                        | 7.0             |      | 17.2   |       |       |
| Output IP3                                                                             | 0.1             | 33.0 | 36.7   | —     | dBm   |
|                                                                                        | 1.0             | 32.2 | 35.8   | —     |       |
|                                                                                        | 2.0             | 32.9 | 36.6   | —     |       |
|                                                                                        | 3.0             | —    | 35.8   | —     |       |
|                                                                                        | 4.0             | —    | 34.9   | —     |       |
|                                                                                        | 6.0             | —    | 33.0   | —     |       |
|                                                                                        | 7.0             | —    | 32.0   | —     |       |
| Noise Figure                                                                           | 0.1             | —    | 5.5    | 6.5   | dB    |
|                                                                                        | 1.0             | —    | 5.6    | —     |       |
|                                                                                        | 2.0             | —    | 5.5    | 6.5   |       |
|                                                                                        | 3.0             | —    | 5.5    | —     |       |
|                                                                                        | 4.0             | —    | 5.6    | 6.6   |       |
|                                                                                        | 6.0             | —    | 6.2    | —     |       |
|                                                                                        | 7.0             | —    | 6.8    | —     |       |
| Group Delay                                                                            | 2.0             |      | 94     |       | psec  |
| Device Operating Voltage                                                               |                 | 4.8  | 5.0    | 5.2   | V     |
| Device Operating Current                                                               |                 | 85   | 108    | 130   | mA    |
| Device Current Variation vs. Temperature                                               |                 |      | 61.8   |       | μA/°C |
| Device Current Variation vs Voltage                                                    |                 |      | 0.058  |       | mA/mV |
| Thermal Resistance, junction-to-ground lead                                            |                 |      | 64     |       | °C/W  |





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GVA-84+

## MAXIMUM RATINGS

| Parameter                           | Ratings        |
|-------------------------------------|----------------|
| Operating Temperature (ground lead) | -45°C to 85°C  |
| Storage Temperature                 | -65°C to 150°C |
| Operating Current at 5V             | 160mA          |
| Power Dissipation                   | 1W             |
| Input Power                         | 13 dBm         |
| DC Voltage on Pin 3                 | 5.8V           |

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

## CHARACTERIZATION TEST CIRCUIT

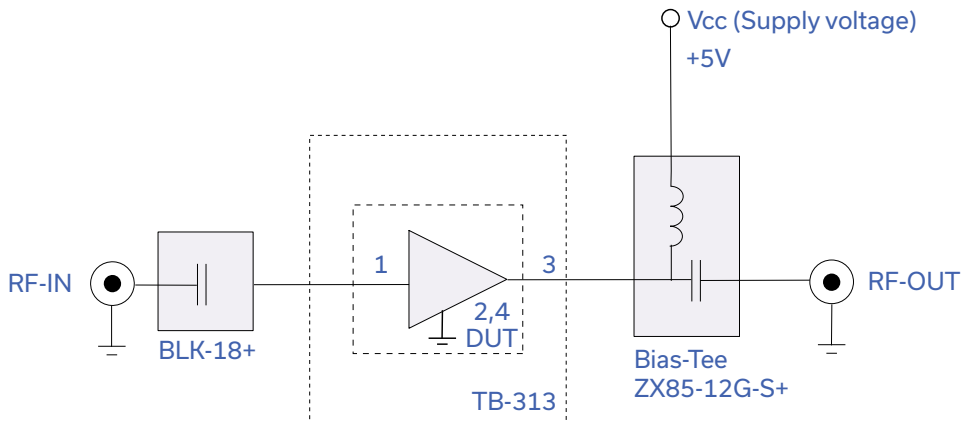


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Test Board TB-313)

Gain, Output power at 1dB compression (P1 dB) and output IP3 (OIP3) are measured using R&S Network Analyzer ZVA-24.  
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, 0 dBm/tone at output.



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# Monolithic Amplifier

**GVA-84+**

## RECOMMENDED APPLICATION CIRCUIT

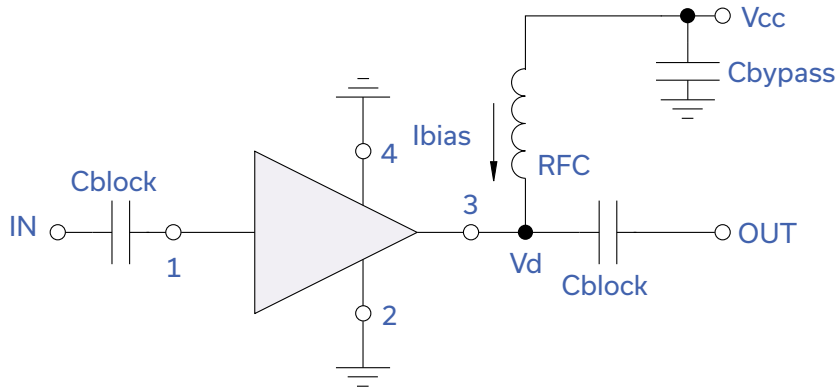
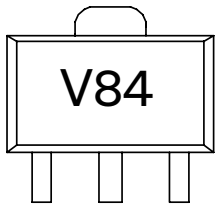


Fig 2. Test Board includes case, connectors, and components soldered to PCB.

## PRODUCT MARKING



Marking may contain other features or characters for internal lot control



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

|                                                      |                                                                       |
|------------------------------------------------------|-----------------------------------------------------------------------|
| Performance Data                                     | Data Table                                                            |
|                                                      | Swept Graphs                                                          |
|                                                      | S-Parameter (S2P Files) Data Set (.zip file)                          |
| Case Style                                           | DF782 (SOT 89) Plastic package, exposed paddle lead finish: matte-tin |
| Tape & Reel<br>Standard quantities available on reel | F55<br>7" reels with 20, 50, 100, 200, 500 or 1K devices              |
| Suggested Layout for PCB Design                      | PL-255                                                                |
| Evaluation Board                                     | TB-410-84+                                                            |
| Environmental Ratings                                | ENV08T1                                                               |

#### ESD RATING

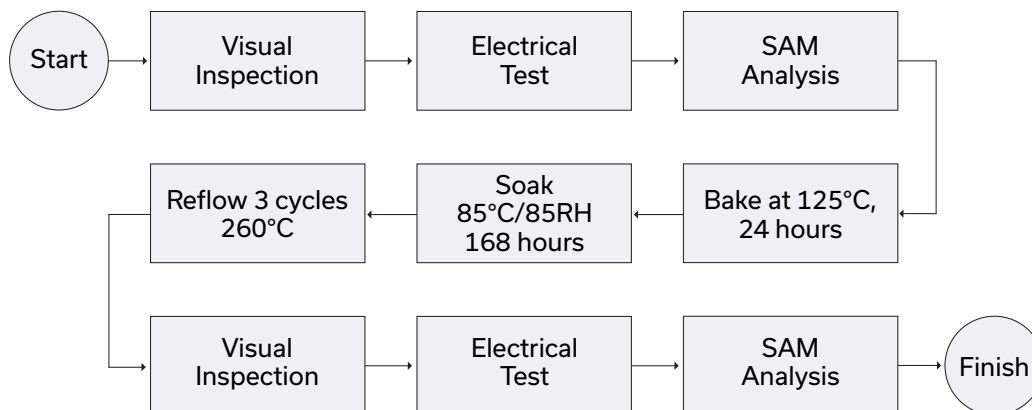
Human Body Model (HBM): Class 1C (1000v to < 2000v) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M2 (100V to < 200V) in accordance with ANSI/ESD STM 5.2 - 1999

#### MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDECJ-STD-020D

#### MSL TEST FLOW CHART



#### NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)

## Typical Performance Data

**NOTE: Use PDF Bookmarks to view DATA at required conditions  
or to view GRAPHS.**

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.00V, Icc=106mA @Temperature = +25degC

| FREQ  | Gain  | Isolation | Input<br>Return<br>Loss | Output<br>Return<br>Loss | Stability |       | IP3<br>Output | 1dB<br>Comp.<br>Output | FREQ  | Noise<br>Figure |
|-------|-------|-----------|-------------------------|--------------------------|-----------|-------|---------------|------------------------|-------|-----------------|
| (MHz) | (dB)  | (dB)      | (dB)                    | (dB)                     | K         | Delta | (dBm)         | (dBm)                  | (MHz) | (dB)            |
| 50    | 24.18 | 31.36     | 21.65                   | 24.37                    | 1.34      | 0.43  | 36.98         | 20.73                  | 50    | 5.53            |
| 100   | 24.11 | 31.36     | 21.72                   | 23.67                    | 1.35      | 0.43  | 36.83         | 20.77                  | 100   | 5.65            |
| 200   | 23.98 | 31.07     | 21.79                   | 20.65                    | 1.33      | 0.44  | 36.80         | 20.73                  | 200   | 5.65            |
| 400   | 23.62 | 30.73     | 21.59                   | 16.17                    | 1.32      | 0.44  | 36.48         | 20.89                  | 400   | 5.77            |
| 600   | 23.07 | 30.40     | 21.19                   | 13.38                    | 1.31      | 0.43  | 36.05         | 20.71                  | 600   | 5.70            |
| 800   | 22.44 | 29.97     | 20.64                   | 11.57                    | 1.31      | 0.42  | 36.17         | 20.74                  | 800   | 5.78            |
| 1000  | 21.77 | 29.47     | 20.14                   | 10.29                    | 1.30      | 0.42  | 36.37         | 20.77                  | 1000  | 5.73            |
| 1200  | 21.08 | 28.90     | 19.70                   | 9.36                     | 1.28      | 0.41  | 36.34         | 20.59                  | 1200  | 5.71            |
| 1400  | 20.41 | 28.38     | 19.28                   | 8.68                     | 1.27      | 0.41  | 36.37         | 20.60                  | 1400  | 5.73            |
| 1600  | 19.75 | 27.89     | 18.96                   | 8.17                     | 1.27      | 0.40  | 36.90         | 20.76                  | 1600  | 5.75            |
| 1800  | 19.12 | 27.33     | 18.76                   | 7.80                     | 1.26      | 0.40  | 37.15         | 20.73                  | 1800  | 5.69            |
| 2000  | 18.57 | 26.79     | 18.60                   | 7.50                     | 1.24      | 0.39  | 37.30         | 20.88                  | 2000  | 5.67            |
| 2200  | 18.02 | 26.31     | 18.65                   | 7.36                     | 1.24      | 0.39  | 37.15         | 21.00                  | 2200  | 5.66            |
| 2400  | 17.54 | 26.01     | 18.62                   | 7.23                     | 1.24      | 0.38  | 36.78         | 21.02                  | 2400  | 5.63            |
| 2600  | 17.10 | 25.53     | 18.65                   | 7.15                     | 1.23      | 0.37  | 36.47         | 21.08                  | 2600  | 5.59            |
| 2800  | 16.70 | 25.04     | 18.75                   | 7.12                     | 1.22      | 0.37  | 36.63         | 21.24                  | 2800  | 5.59            |
| 3000  | 16.34 | 24.75     | 18.76                   | 7.05                     | 1.22      | 0.37  | 36.53         | 21.18                  | 3000  | 5.70            |
| 3200  | 15.99 | 24.48     | 18.96                   | 7.09                     | 1.22      | 0.36  | 36.27         | 21.06                  | 3200  | 5.62            |
| 3400  | 15.73 | 24.11     | 18.90                   | 7.08                     | 1.21      | 0.36  | 36.28         | 20.92                  | 3400  | 5.70            |
| 3600  | 15.45 | 23.78     | 18.89                   | 7.04                     | 1.20      | 0.36  | 36.25         | 20.85                  | 3600  | 5.64            |
| 3800  | 15.20 | 23.55     | 19.03                   | 7.07                     | 1.20      | 0.36  | 35.37         | 20.59                  | 3800  | 5.77            |
| 4000  | 14.97 | 23.32     | 19.18                   | 7.09                     | 1.21      | 0.36  | 34.81         | 20.24                  | 4000  | 5.82            |
| 4200  | 14.73 | 23.13     | 19.27                   | 7.05                     | 1.21      | 0.36  | 34.94         | 20.08                  | 4200  | 6.09            |
| 4400  | 14.51 | 23.02     | 19.34                   | 7.00                     | 1.22      | 0.36  | 35.34         | 19.97                  | 4400  | 5.93            |
| 4600  | 14.33 | 22.84     | 19.13                   | 6.90                     | 1.22      | 0.36  | 35.00         | 19.83                  | 4600  | 5.93            |
| 4800  | 14.08 | 22.74     | 18.84                   | 6.76                     | 1.23      | 0.36  | 34.78         | 19.38                  | 4800  | 5.84            |
| 5000  | 13.90 | 22.80     | 18.86                   | 6.72                     | 1.26      | 0.36  | 34.75         | 19.02                  | 5000  | 6.04            |
| 5200  | 13.68 | 22.78     | 18.20                   | 6.56                     | 1.27      | 0.36  | 34.44         | 18.79                  | 5200  | 6.18            |
| 5400  | 13.44 | 22.73     | 17.65                   | 6.38                     | 1.28      | 0.36  | 34.15         | 18.55                  | 5400  | 6.30            |
| 5600  | 13.21 | 22.78     | 17.20                   | 6.22                     | 1.31      | 0.36  | 33.77         | 18.36                  | 5600  | 6.26            |
| 5800  | 12.94 | 22.83     | 16.26                   | 6.07                     | 1.34      | 0.35  | 34.05         | 18.10                  | 5800  | 6.18            |
| 6000  | 12.67 | 23.02     | 15.66                   | 5.98                     | 1.38      | 0.35  | 33.34         | 17.40                  | 6000  | 6.33            |
| 6200  | 12.29 | 23.16     | 14.85                   | 5.83                     | 1.44      | 0.34  | 33.51         | 15.61                  | 6500  | 6.30            |
| 6400  | 11.97 | 23.14     | 14.33                   | 5.76                     | 1.48      | 0.35  | 33.17         | 15.49                  | 7000  | 6.78            |
| 6600  | 11.53 | 23.32     | 13.52                   | 5.73                     | 1.56      | 0.34  | 32.42         | 15.67                  | 7500  | 6.99            |
| 6800  | 11.02 | 23.67     | 12.54                   | 5.57                     | 1.67      | 0.33  | 32.08         | 15.69                  | 8000  | 7.42            |
| 7000  | 10.48 | 23.58     | 11.89                   | 5.56                     | 1.74      | 0.34  | 32.01         | 15.58                  | 8500  | 8.07            |
| 7200  | 9.82  | 23.66     | 11.13                   | 5.59                     | 1.86      | 0.33  | 31.74         | 15.25                  | 9000  | 8.51            |
| 7500  | 8.76  | 23.41     | 10.29                   | 5.65                     | 2.01      | 0.33  | 31.65         | 13.94                  | 9500  | 9.06            |
| 8000  | 6.90  | 23.07     | 8.76                    | 5.63                     | 2.26      | 0.33  | 30.50         | 13.46                  | 10000 | 9.32            |

REV. X1

GVA-84+

110601

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

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## 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: Vd = 4.75V, Icc=92mA @Temperature = +25degC

| FREQ  | Gain  | Isolation | Input Return Loss | Output Return Loss | Stability |       | IP3 Output | 1dB Comp. Output | FREQ  | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|-------|------------|------------------|-------|--------------|
| (MHz) | (dB)  | (dB)      | (dB)              | (dB)               | K         | Delta | (dBm)      | (dBm)            | (MHz) | (dB)         |
| 50    | 24.01 | 30.66     | 23.55             | 22.45              | 1.29      | 0.46  | 34.47      | 19.75            | 50    | 5.39         |
| 100   | 23.94 | 30.94     | 23.43             | 21.88              | 1.33      | 0.44  | 34.28      | 19.78            | 100   | 5.51         |
| 200   | 23.80 | 30.69     | 23.32             | 19.66              | 1.31      | 0.45  | 34.34      | 19.73            | 200   | 5.51         |
| 400   | 23.46 | 30.71     | 22.93             | 15.79              | 1.33      | 0.43  | 34.14      | 19.80            | 400   | 5.62         |
| 600   | 22.92 | 30.33     | 22.08             | 13.18              | 1.32      | 0.42  | 33.91      | 19.66            | 600   | 5.55         |
| 800   | 22.29 | 29.85     | 21.27             | 11.43              | 1.30      | 0.42  | 34.24      | 19.66            | 800   | 5.68         |
| 1000  | 21.63 | 29.23     | 20.55             | 10.18              | 1.28      | 0.42  | 34.53      | 19.73            | 1000  | 5.60         |
| 1200  | 20.95 | 28.76     | 19.94             | 9.27               | 1.28      | 0.41  | 34.53      | 19.48            | 1200  | 5.58         |
| 1400  | 20.28 | 28.20     | 19.36             | 8.60               | 1.26      | 0.40  | 34.58      | 19.56            | 1400  | 5.61         |
| 1600  | 19.62 | 27.69     | 18.97             | 8.09               | 1.25      | 0.40  | 35.22      | 19.70            | 1600  | 5.63         |
| 1800  | 19.00 | 27.16     | 18.65             | 7.72               | 1.24      | 0.39  | 35.57      | 19.73            | 1800  | 5.56         |
| 2000  | 18.44 | 26.64     | 18.45             | 7.42               | 1.23      | 0.39  | 35.77      | 19.89            | 2000  | 5.51         |
| 2200  | 17.90 | 26.30     | 18.43             | 7.27               | 1.24      | 0.38  | 35.66      | 20.05            | 2200  | 5.52         |
| 2400  | 17.42 | 25.79     | 18.40             | 7.15               | 1.22      | 0.38  | 35.51      | 20.12            | 2400  | 5.45         |
| 2600  | 16.99 | 25.40     | 18.40             | 7.07               | 1.22      | 0.37  | 35.22      | 20.11            | 2600  | 5.46         |
| 2800  | 16.59 | 24.99     | 18.43             | 7.05               | 1.21      | 0.37  | 35.17      | 20.27            | 2800  | 5.45         |
| 3000  | 16.22 | 24.68     | 18.40             | 6.96               | 1.21      | 0.36  | 35.20      | 20.37            | 3000  | 5.53         |
| 3200  | 15.88 | 24.38     | 18.59             | 7.01               | 1.22      | 0.36  | 35.12      | 20.21            | 3200  | 5.49         |
| 3400  | 15.61 | 24.05     | 18.51             | 6.99               | 1.21      | 0.36  | 35.11      | 20.12            | 3400  | 5.58         |
| 3600  | 15.33 | 23.74     | 18.52             | 6.97               | 1.20      | 0.36  | 35.04      | 20.09            | 3600  | 5.48         |
| 3800  | 15.08 | 23.55     | 18.64             | 7.01               | 1.21      | 0.35  | 34.06      | 19.85            | 3800  | 5.63         |
| 4000  | 14.86 | 23.24     | 18.79             | 7.02               | 1.20      | 0.36  | 33.57      | 19.51            | 4000  | 5.64         |
| 4200  | 14.61 | 23.10     | 18.89             | 7.00               | 1.21      | 0.35  | 33.60      | 19.39            | 4200  | 5.91         |
| 4400  | 14.39 | 22.97     | 18.98             | 6.97               | 1.22      | 0.35  | 33.88      | 19.25            | 4400  | 5.74         |
| 4600  | 14.21 | 22.80     | 18.77             | 6.87               | 1.22      | 0.36  | 33.46      | 19.13            | 4600  | 5.78         |
| 4800  | 13.96 | 22.70     | 18.53             | 6.74               | 1.23      | 0.36  | 33.49      | 18.70            | 4800  | 5.69         |
| 5000  | 13.76 | 22.78     | 18.54             | 6.71               | 1.27      | 0.35  | 33.31      | 18.39            | 5000  | 5.87         |
| 5200  | 13.54 | 22.73     | 17.94             | 6.57               | 1.28      | 0.35  | 32.92      | 18.15            | 5200  | 6.01         |
| 5400  | 13.29 | 22.70     | 17.42             | 6.38               | 1.30      | 0.35  | 32.74      | 17.86            | 5400  | 6.11         |
| 5600  | 13.05 | 22.72     | 16.99             | 6.24               | 1.32      | 0.35  | 32.27      | 17.71            | 5600  | 6.08         |
| 5800  | 12.78 | 22.84     | 16.09             | 6.11               | 1.36      | 0.35  | 32.08      | 17.43            | 5800  | 6.01         |
| 6000  | 12.50 | 23.03     | 15.54             | 6.02               | 1.41      | 0.34  | 32.02      | 16.81            | 6000  | 6.14         |
| 6200  | 12.13 | 23.16     | 14.74             | 5.88               | 1.46      | 0.34  | 32.17      | 15.01            | 6500  | 6.15         |
| 6400  | 11.80 | 23.12     | 14.23             | 5.83               | 1.50      | 0.34  | 31.48      | 14.85            | 7000  | 6.57         |
| 6600  | 11.34 | 23.32     | 13.43             | 5.79               | 1.59      | 0.33  | 31.17      | 15.02            | 7500  | 6.79         |
| 6800  | 10.84 | 23.67     | 12.50             | 5.64               | 1.71      | 0.33  | 30.63      | 15.09            | 8000  | 7.19         |
| 7000  | 10.31 | 23.56     | 11.85             | 5.63               | 1.77      | 0.33  | 30.70      | 15.01            | 8500  | 7.84         |
| 7200  | 9.64  | 23.67     | 11.11             | 5.68               | 1.90      | 0.32  | 30.43      | 14.76            | 9000  | 8.28         |
| 7500  | 8.59  | 23.39     | 10.27             | 5.74               | 2.05      | 0.33  | 30.21      | 13.37            | 9500  | 8.88         |
| 8000  | 6.74  | 23.06     | 8.75              | 5.72               | 2.31      | 0.33  | 29.19      | 13.00            | 10000 | 8.98         |

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## 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: Vd = 5.25V, Icc=121mA @Temperature = +25degC

| FREQ  | Gain  | Isolation | Input Return Loss | Output Return Loss | Stability |       | IP3 Output | 1dB Comp. Output | FREQ  | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|-------|------------|------------------|-------|--------------|
| (MHz) | (dB)  | (dB)      | (dB)              | (dB)               | K         | Delta | (dBm)      | (dBm)            | (MHz) | (dB)         |
| 50    | 24.30 | 31.09     | 20.87             | 26.72              | 1.31      | 0.45  | 39.25      | 21.50            | 50    | 5.65         |
| 100   | 24.23 | 30.81     | 20.63             | 25.17              | 1.28      | 0.47  | 39.11      | 21.55            | 100   | 5.77         |
| 200   | 24.09 | 31.45     | 20.75             | 21.34              | 1.36      | 0.43  | 38.96      | 21.53            | 200   | 5.78         |
| 400   | 23.74 | 31.14     | 20.72             | 16.43              | 1.35      | 0.43  | 38.46      | 21.65            | 400   | 5.88         |
| 600   | 23.18 | 30.63     | 20.46             | 13.52              | 1.33      | 0.43  | 37.68      | 21.51            | 600   | 5.83         |
| 800   | 22.55 | 30.13     | 20.16             | 11.67              | 1.32      | 0.42  | 37.47      | 21.52            | 800   | 5.92         |
| 1000  | 21.87 | 29.60     | 19.81             | 10.38              | 1.30      | 0.42  | 37.58      | 21.52            | 1000  | 5.87         |
| 1200  | 21.18 | 29.05     | 19.48             | 9.43               | 1.29      | 0.41  | 37.44      | 21.41            | 1200  | 5.86         |
| 1400  | 20.50 | 28.51     | 19.17             | 8.76               | 1.28      | 0.41  | 37.34      | 21.40            | 1400  | 5.88         |
| 1600  | 19.83 | 27.90     | 18.93             | 8.25               | 1.27      | 0.41  | 37.72      | 21.52            | 1600  | 5.88         |
| 1800  | 19.22 | 27.46     | 18.78             | 7.88               | 1.27      | 0.40  | 37.83      | 21.48            | 1800  | 5.82         |
| 2000  | 18.66 | 26.99     | 18.68             | 7.58               | 1.26      | 0.39  | 38.02      | 21.61            | 2000  | 5.77         |
| 2200  | 18.11 | 26.45     | 18.75             | 7.42               | 1.25      | 0.39  | 37.65      | 21.73            | 2200  | 5.80         |
| 2400  | 17.63 | 26.03     | 18.77             | 7.31               | 1.25      | 0.38  | 37.36      | 21.74            | 2400  | 5.75         |
| 2600  | 17.19 | 25.59     | 18.82             | 7.22               | 1.24      | 0.38  | 36.99      | 21.77            | 2600  | 5.73         |
| 2800  | 16.79 | 25.21     | 18.92             | 7.18               | 1.23      | 0.37  | 37.21      | 21.90            | 2800  | 5.75         |
| 3000  | 16.42 | 24.80     | 18.96             | 7.12               | 1.22      | 0.37  | 37.11      | 21.88            | 3000  | 5.83         |
| 3200  | 16.08 | 24.53     | 19.18             | 7.15               | 1.23      | 0.36  | 36.82      | 21.67            | 3200  | 5.77         |
| 3400  | 15.81 | 24.14     | 19.12             | 7.14               | 1.21      | 0.37  | 36.72      | 21.44            | 3400  | 5.86         |
| 3600  | 15.53 | 23.86     | 19.17             | 7.10               | 1.21      | 0.36  | 36.74      | 21.18            | 3600  | 5.78         |
| 3800  | 15.28 | 23.64     | 19.31             | 7.12               | 1.21      | 0.36  | 36.04      | 20.90            | 3800  | 5.91         |
| 4000  | 15.05 | 23.40     | 19.44             | 7.13               | 1.21      | 0.36  | 35.41      | 20.53            | 4000  | 5.96         |
| 4200  | 14.82 | 23.18     | 19.53             | 7.10               | 1.21      | 0.36  | 35.26      | 20.39            | 4200  | 6.26         |
| 4400  | 14.60 | 23.09     | 19.60             | 7.05               | 1.23      | 0.36  | 35.66      | 20.25            | 4400  | 6.08         |
| 4600  | 14.43 | 22.92     | 19.34             | 6.95               | 1.22      | 0.36  | 35.67      | 20.11            | 4600  | 6.09         |
| 4800  | 14.18 | 22.79     | 19.07             | 6.78               | 1.23      | 0.37  | 35.31      | 19.62            | 4800  | 6.00         |
| 5000  | 14.00 | 22.79     | 19.05             | 6.74               | 1.25      | 0.36  | 35.36      | 19.26            | 5000  | 6.20         |
| 5200  | 13.78 | 22.74     | 18.38             | 6.58               | 1.26      | 0.36  | 35.18      | 19.03            | 5200  | 6.36         |
| 5400  | 13.54 | 22.80     | 17.78             | 6.38               | 1.28      | 0.36  | 35.06      | 18.81            | 5400  | 6.48         |
| 5600  | 13.31 | 22.77     | 17.31             | 6.22               | 1.30      | 0.36  | 34.40      | 18.59            | 5600  | 6.44         |
| 5800  | 13.05 | 22.90     | 16.37             | 6.05               | 1.33      | 0.36  | 34.73      | 18.31            | 5800  | 6.38         |
| 6000  | 12.79 | 23.08     | 15.76             | 5.96               | 1.38      | 0.35  | 34.37      | 17.62            | 6000  | 6.52         |
| 6200  | 12.42 | 23.17     | 14.91             | 5.78               | 1.42      | 0.35  | 34.52      | 16.09            | 6500  | 6.53         |
| 6400  | 12.11 | 23.15     | 14.38             | 5.70               | 1.46      | 0.35  | 34.25      | 15.90            | 7000  | 6.99         |
| 6600  | 11.66 | 23.35     | 13.56             | 5.67               | 1.54      | 0.34  | 33.24      | 16.18            | 7500  | 7.21         |
| 6800  | 11.15 | 23.67     | 12.57             | 5.52               | 1.65      | 0.34  | 33.37      | 16.18            | 8000  | 7.64         |
| 7000  | 10.62 | 23.60     | 11.90             | 5.49               | 1.72      | 0.34  | 33.32      | 15.98            | 8500  | 8.28         |
| 7200  | 9.96  | 23.70     | 11.15             | 5.53               | 1.84      | 0.33  | 33.07      | 15.50            | 9000  | 8.77         |
| 7500  | 8.91  | 23.46     | 10.30             | 5.60               | 1.99      | 0.34  | 33.18      | 14.14            | 9500  | 9.34         |
| 8000  | 7.03  | 23.08     | 8.76              | 5.57               | 2.23      | 0.34  | 31.20      | 13.73            | 10000 | 9.56         |

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## 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: Vd = 5.00V, Icc=101mA @Temperature = -45degC

| FREQ  | Gain  | Isolation | Input<br>Return<br>Loss | Output<br>Return<br>Loss | Stability |       | IP3<br>Output | 1dB<br>Comp.<br>Output | FREQ  | Noise<br>Figure |
|-------|-------|-----------|-------------------------|--------------------------|-----------|-------|---------------|------------------------|-------|-----------------|
| (MHz) | (dB)  | (dB)      | (dB)                    | (dB)                     | K         | Delta | (dBm)         | (dBm)                  | (MHz) | (dB)            |
| 50    | 24.17 | 31.37     | 22.32                   | 23.56                    | 1.35      | 0.43  | 36.76         | 19.39                  | 50    | 4.90            |
| 100   | 24.11 | 31.15     | 22.84                   | 21.96                    | 1.33      | 0.44  | 36.50         | 19.41                  | 100   | 5.01            |
| 200   | 23.99 | 31.13     | 23.08                   | 19.94                    | 1.34      | 0.44  | 36.49         | 19.30                  | 200   | 4.98            |
| 400   | 23.67 | 30.79     | 21.49                   | 16.36                    | 1.32      | 0.44  | 36.36         | 19.36                  | 400   | 5.08            |
| 600   | 23.15 | 30.52     | 20.93                   | 13.44                    | 1.32      | 0.43  | 35.99         | 19.17                  | 600   | 5.02            |
| 800   | 22.55 | 29.90     | 20.71                   | 11.62                    | 1.29      | 0.43  | 36.13         | 19.18                  | 800   | 5.14            |
| 1000  | 21.91 | 29.37     | 20.36                   | 10.36                    | 1.28      | 0.43  | 36.46         | 19.22                  | 1000  | 5.04            |
| 1200  | 21.25 | 28.87     | 19.68                   | 9.48                     | 1.27      | 0.42  | 36.54         | 18.88                  | 1200  | 5.00            |
| 1400  | 20.59 | 28.31     | 19.21                   | 8.73                     | 1.25      | 0.42  | 36.67         | 19.02                  | 1400  | 5.04            |
| 1600  | 19.94 | 27.79     | 18.94                   | 8.20                     | 1.24      | 0.42  | 37.31         | 19.16                  | 1600  | 5.05            |
| 1800  | 19.34 | 27.29     | 18.60                   | 7.78                     | 1.23      | 0.41  | 37.73         | 19.24                  | 1800  | 4.99            |
| 2000  | 18.80 | 26.70     | 18.70                   | 7.49                     | 1.21      | 0.41  | 38.26         | 19.40                  | 2000  | 4.94            |
| 2200  | 18.24 | 26.41     | 18.73                   | 7.33                     | 1.23      | 0.40  | 38.29         | 19.58                  | 2200  | 4.95            |
| 2400  | 17.78 | 25.90     | 18.84                   | 7.13                     | 1.21      | 0.40  | 38.07         | 19.66                  | 2400  | 4.89            |
| 2600  | 17.30 | 25.65     | 19.43                   | 7.12                     | 1.23      | 0.39  | 37.47         | 19.69                  | 2600  | 4.84            |
| 2800  | 16.92 | 25.28     | 19.60                   | 7.02                     | 1.23      | 0.38  | 37.70         | 19.85                  | 2800  | 4.85            |
| 3000  | 16.63 | 24.68     | 19.64                   | 6.89                     | 1.18      | 0.39  | 37.38         | 20.22                  | 3000  | 4.95            |
| 3200  | 16.29 | 24.43     | 20.43                   | 6.97                     | 1.20      | 0.38  | 37.43         | 20.37                  | 3200  | 4.88            |
| 3400  | 16.02 | 24.09     | 20.21                   | 6.88                     | 1.18      | 0.38  | 37.62         | 20.40                  | 3400  | 4.95            |
| 3600  | 15.81 | 23.68     | 19.90                   | 6.84                     | 1.16      | 0.39  | 37.41         | 20.43                  | 3600  | 4.85            |
| 3800  | 15.51 | 23.46     | 20.01                   | 6.92                     | 1.17      | 0.39  | 36.56         | 20.23                  | 3800  | 4.97            |
| 4000  | 15.37 | 23.28     | 20.45                   | 6.98                     | 1.17      | 0.38  | 35.80         | 19.98                  | 4000  | 4.99            |
| 4200  | 15.13 | 23.00     | 20.39                   | 6.88                     | 1.16      | 0.39  | 36.17         | 19.87                  | 4200  | 5.28            |
| 4400  | 14.92 | 22.95     | 20.25                   | 6.74                     | 1.17      | 0.39  | 36.46         | 19.68                  | 4400  | 5.10            |
| 4600  | 14.73 | 22.72     | 20.59                   | 6.46                     | 1.15      | 0.39  | 36.45         | 19.62                  | 4600  | 5.11            |
| 4800  | 14.55 | 22.58     | 20.02                   | 6.30                     | 1.15      | 0.39  | 36.00         | 19.37                  | 4800  | 4.96            |
| 5000  | 14.39 | 22.63     | 20.69                   | 6.19                     | 1.17      | 0.39  | 35.66         | 19.14                  | 5000  | 5.16            |
| 5200  | 14.19 | 22.56     | 20.00                   | 6.03                     | 1.17      | 0.39  | 35.48         | 18.89                  | 5200  | 5.26            |
| 5400  | 14.03 | 22.53     | 19.47                   | 5.82                     | 1.17      | 0.39  | 35.29         | 18.59                  | 5400  | 5.44            |
| 5600  | 13.88 | 22.54     | 19.79                   | 5.64                     | 1.18      | 0.40  | 34.56         | 18.50                  | 5600  | 5.40            |
| 5800  | 13.70 | 22.45     | 18.19                   | 5.53                     | 1.19      | 0.40  | 34.26         | 18.32                  | 5800  | 5.28            |
| 6000  | 13.52 | 22.67     | 17.12                   | 5.34                     | 1.21      | 0.39  | 33.90         | 17.83                  | 6000  | 5.39            |
| 6200  | 13.28 | 22.71     | 16.17                   | 5.19                     | 1.23      | 0.39  | 33.52         | 16.40                  | 6500  | 5.35            |
| 6400  | 12.98 | 22.68     | 14.77                   | 5.01                     | 1.24      | 0.40  | 33.34         | 16.11                  | 7000  | 5.82            |
| 6600  | 12.57 | 22.97     | 13.69                   | 4.93                     | 1.30      | 0.39  | 33.51         | 16.20                  | 7500  | 5.96            |
| 6800  | 12.10 | 23.34     | 12.59                   | 4.61                     | 1.37      | 0.39  | 33.35         | 16.16                  | 8000  | 6.57            |
| 7000  | 11.66 | 23.12     | 11.85                   | 4.57                     | 1.39      | 0.40  | 32.94         | 16.10                  | 8500  | 7.05            |
| 7200  | 11.02 | 23.45     | 11.11                   | 4.53                     | 1.50      | 0.38  | 31.91         | 15.79                  | 9000  | 7.50            |
| 7500  | 10.01 | 23.03     | 10.47                   | 4.59                     | 1.60      | 0.39  | 30.91         | 14.51                  | 9500  | 8.09            |
| 8000  | 8.22  | 22.47     | 9.01                    | 4.74                     | 1.77      | 0.38  | 30.99         | 14.58                  | 10000 | 8.32            |

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## 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: Vd = 4.75V, Icc=88mA @Temperature = -45degC

| FREQ  | Gain  | Isolation | Input<br>Return<br>Loss | Output<br>Return<br>Loss | Stability |       | IP3<br>Output | 1dB<br>Comp.<br>Output | FREQ  | Noise<br>Figure |
|-------|-------|-----------|-------------------------|--------------------------|-----------|-------|---------------|------------------------|-------|-----------------|
| (MHz) | (dB)  | (dB)      | (dB)                    | (dB)                     | K         | Delta | (dBm)         | (dBm)                  | (MHz) | (dB)            |
| 50    | 24.02 | 30.92     | 23.85                   | 21.46                    | 1.31      | 0.45  | 34.14         | 17.94                  | 50    | 4.80            |
| 100   | 23.95 | 31.12     | 24.52                   | 20.46                    | 1.34      | 0.43  | 33.89         | 18.01                  | 100   | 4.93            |
| 200   | 23.84 | 30.80     | 24.66                   | 19.09                    | 1.32      | 0.44  | 33.92         | 17.80                  | 200   | 4.91            |
| 400   | 23.53 | 30.58     | 22.61                   | 15.98                    | 1.31      | 0.44  | 33.96         | 17.85                  | 400   | 5.02            |
| 600   | 23.01 | 30.22     | 21.77                   | 13.22                    | 1.30      | 0.43  | 33.78         | 17.66                  | 600   | 4.94            |
| 800   | 22.42 | 29.81     | 21.31                   | 11.46                    | 1.29      | 0.42  | 34.15         | 17.68                  | 800   | 5.04            |
| 1000  | 21.78 | 29.22     | 20.84                   | 10.24                    | 1.27      | 0.42  | 34.52         | 17.74                  | 1000  | 4.97            |
| 1200  | 21.12 | 28.70     | 19.95                   | 9.37                     | 1.26      | 0.42  | 34.65         | 17.32                  | 1200  | 4.94            |
| 1400  | 20.46 | 28.14     | 19.38                   | 8.61                     | 1.24      | 0.42  | 34.89         | 17.51                  | 1400  | 4.97            |
| 1600  | 19.82 | 27.58     | 19.00                   | 8.11                     | 1.23      | 0.42  | 35.66         | 17.66                  | 1600  | 4.97            |
| 1800  | 19.22 | 27.14     | 18.61                   | 7.69                     | 1.22      | 0.41  | 36.11         | 17.81                  | 1800  | 4.89            |
| 2000  | 18.67 | 26.61     | 18.64                   | 7.40                     | 1.21      | 0.41  | 36.54         | 18.00                  | 2000  | 4.86            |
| 2200  | 18.12 | 26.16     | 18.62                   | 7.24                     | 1.21      | 0.40  | 36.85         | 18.21                  | 2200  | 4.87            |
| 2400  | 17.66 | 25.82     | 18.65                   | 7.04                     | 1.21      | 0.39  | 36.74         | 18.42                  | 2400  | 4.80            |
| 2600  | 17.19 | 25.54     | 19.23                   | 7.03                     | 1.22      | 0.38  | 35.70         | 18.38                  | 2600  | 4.75            |
| 2800  | 16.81 | 25.17     | 19.34                   | 6.94                     | 1.22      | 0.38  | 35.73         | 18.57                  | 2800  | 4.75            |
| 3000  | 16.51 | 24.57     | 19.31                   | 6.81                     | 1.17      | 0.38  | 35.70         | 18.94                  | 3000  | 4.83            |
| 3200  | 16.18 | 24.33     | 20.11                   | 6.89                     | 1.19      | 0.38  | 35.65         | 18.97                  | 3200  | 4.78            |
| 3400  | 15.90 | 24.00     | 19.86                   | 6.81                     | 1.18      | 0.38  | 35.76         | 19.08                  | 3400  | 4.85            |
| 3600  | 15.69 | 23.59     | 19.55                   | 6.75                     | 1.15      | 0.39  | 35.44         | 19.27                  | 3600  | 4.74            |
| 3800  | 15.40 | 23.41     | 19.65                   | 6.84                     | 1.17      | 0.38  | 34.92         | 19.00                  | 3800  | 4.87            |
| 4000  | 15.25 | 23.22     | 20.04                   | 6.90                     | 1.16      | 0.38  | 34.01         | 18.73                  | 4000  | 4.84            |
| 4200  | 15.01 | 22.98     | 20.01                   | 6.81                     | 1.16      | 0.38  | 34.39         | 18.72                  | 4200  | 5.17            |
| 4400  | 14.79 | 22.87     | 19.91                   | 6.69                     | 1.17      | 0.38  | 34.48         | 18.55                  | 4400  | 5.01            |
| 4600  | 14.61 | 22.70     | 20.21                   | 6.40                     | 1.15      | 0.39  | 34.24         | 18.48                  | 4600  | 4.99            |
| 4800  | 14.43 | 22.55     | 19.72                   | 6.26                     | 1.15      | 0.39  | 33.89         | 18.18                  | 4800  | 4.85            |
| 5000  | 14.26 | 22.58     | 20.38                   | 6.16                     | 1.17      | 0.38  | 33.68         | 17.98                  | 5000  | 5.05            |
| 5200  | 14.05 | 22.54     | 19.71                   | 6.01                     | 1.18      | 0.39  | 33.09         | 17.75                  | 5200  | 5.14            |
| 5400  | 13.88 | 22.46     | 19.21                   | 5.80                     | 1.18      | 0.39  | 32.93         | 17.41                  | 5400  | 5.32            |
| 5600  | 13.73 | 22.53     | 19.55                   | 5.65                     | 1.19      | 0.39  | 32.45         | 17.27                  | 5600  | 5.27            |
| 5800  | 13.54 | 22.43     | 17.98                   | 5.54                     | 1.20      | 0.40  | 31.97         | 17.15                  | 5800  | 5.18            |
| 6000  | 13.35 | 22.64     | 16.94                   | 5.36                     | 1.22      | 0.39  | 31.69         | 16.70                  | 6000  | 5.23            |
| 6200  | 13.11 | 22.68     | 16.01                   | 5.24                     | 1.24      | 0.39  | 31.29         | 15.73                  | 6500  | 5.23            |
| 6400  | 12.80 | 22.67     | 14.68                   | 5.06                     | 1.26      | 0.40  | 31.10         | 15.43                  | 7000  | 5.68            |
| 6600  | 12.39 | 22.94     | 13.61                   | 4.98                     | 1.33      | 0.38  | 31.02         | 15.52                  | 7500  | 5.80            |
| 6800  | 11.92 | 23.35     | 12.54                   | 4.67                     | 1.39      | 0.38  | 30.65         | 15.48                  | 8000  | 6.39            |
| 7000  | 11.47 | 23.10     | 11.83                   | 4.64                     | 1.42      | 0.39  | 30.33         | 15.44                  | 8500  | 6.89            |
| 7200  | 10.83 | 23.44     | 11.06                   | 4.59                     | 1.53      | 0.38  | 29.63         | 15.10                  | 9000  | 7.31            |
| 7500  | 9.82  | 22.99     | 10.46                   | 4.68                     | 1.63      | 0.38  | 29.44         | 13.78                  | 9500  | 7.88            |
| 8000  | 8.04  | 22.46     | 8.99                    | 4.80                     | 1.80      | 0.38  | 29.03         | 14.01                  | 10000 | 8.06            |

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## 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: Vd = 5.25V, Icc=115mA @Temperature = -45degC

| FREQ  | Gain  | Isolation | Input Return Loss | Output Return Loss | Stability |       | IP3 Output | 1dB Comp. Output | FREQ  | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|-------|------------|------------------|-------|--------------|
| (MHz) | (dB)  | (dB)      | (dB)              | (dB)               | K         | Delta | (dBm)      | (dBm)            | (MHz) | (dB)         |
| 50    | 24.29 | 32.49     | 21.09             | 24.75              | 1.46      | 0.38  | 38.90      | 20.00            | 50    | 5.01         |
| 100   | 24.22 | 31.58     | 21.78             | 23.25              | 1.36      | 0.42  | 38.62      | 20.05            | 100   | 5.15         |
| 200   | 24.10 | 31.61     | 21.86             | 20.71              | 1.38      | 0.42  | 38.54      | 19.96            | 200   | 5.08         |
| 400   | 23.78 | 31.01     | 20.69             | 16.62              | 1.33      | 0.43  | 38.26      | 20.05            | 400   | 5.21         |
| 600   | 23.25 | 30.61     | 20.29             | 13.58              | 1.32      | 0.43  | 37.67      | 19.85            | 600   | 5.12         |
| 800   | 22.65 | 30.10     | 20.21             | 11.72              | 1.30      | 0.43  | 37.62      | 19.87            | 800   | 5.23         |
| 1000  | 22.01 | 29.61     | 20.06             | 10.45              | 1.29      | 0.42  | 37.95      | 19.88            | 1000  | 5.15         |
| 1200  | 21.35 | 29.07     | 19.47             | 9.57               | 1.28      | 0.42  | 38.01      | 19.62            | 1200  | 5.13         |
| 1400  | 20.68 | 28.43     | 19.04             | 8.80               | 1.26      | 0.42  | 38.24      | 19.83            | 1400  | 5.15         |
| 1600  | 20.04 | 27.92     | 18.86             | 8.29               | 1.25      | 0.42  | 38.93      | 20.02            | 1600  | 5.15         |
| 1800  | 19.43 | 27.37     | 18.57             | 7.86               | 1.24      | 0.42  | 39.43      | 20.07            | 1800  | 5.08         |
| 2000  | 18.89 | 26.85     | 18.70             | 7.57               | 1.23      | 0.41  | 39.77      | 20.17            | 2000  | 5.05         |
| 2200  | 18.33 | 26.43     | 18.78             | 7.40               | 1.23      | 0.41  | 39.71      | 20.39            | 2200  | 5.05         |
| 2400  | 17.87 | 25.99     | 18.93             | 7.20               | 1.22      | 0.40  | 39.52      | 20.42            | 2400  | 4.99         |
| 2600  | 17.39 | 25.60     | 19.56             | 7.19               | 1.23      | 0.39  | 38.74      | 20.47            | 2600  | 4.96         |
| 2800  | 17.01 | 25.34     | 19.74             | 7.10               | 1.23      | 0.39  | 38.82      | 20.56            | 2800  | 4.98         |
| 3000  | 16.72 | 24.69     | 19.83             | 6.96               | 1.18      | 0.39  | 39.03      | 20.81            | 3000  | 5.04         |
| 3200  | 16.38 | 24.49     | 20.64             | 7.06               | 1.20      | 0.39  | 38.47      | 21.33            | 3200  | 5.00         |
| 3400  | 16.11 | 24.13     | 20.45             | 6.96               | 1.18      | 0.39  | 39.01      | 21.20            | 3400  | 5.09         |
| 3600  | 15.90 | 23.75     | 20.12             | 6.89               | 1.16      | 0.39  | 39.02      | 21.16            | 3600  | 4.94         |
| 3800  | 15.59 | 23.54     | 20.27             | 6.98               | 1.17      | 0.39  | 37.98      | 20.95            | 3800  | 5.06         |
| 4000  | 15.45 | 23.32     | 20.73             | 7.05               | 1.17      | 0.39  | 37.21      | 20.43            | 4000  | 5.09         |
| 4200  | 15.22 | 23.07     | 20.67             | 6.93               | 1.16      | 0.39  | 37.76      | 20.31            | 4200  | 5.40         |
| 4400  | 15.01 | 22.95     | 20.52             | 6.80               | 1.17      | 0.39  | 38.51      | 20.11            | 4400  | 5.22         |
| 4600  | 14.83 | 22.77     | 20.82             | 6.50               | 1.15      | 0.40  | 38.39      | 20.05            | 4600  | 5.22         |
| 4800  | 14.65 | 22.63     | 20.27             | 6.35               | 1.15      | 0.40  | 38.08      | 19.80            | 4800  | 5.09         |
| 5000  | 14.49 | 22.65     | 20.90             | 6.23               | 1.16      | 0.39  | 38.07      | 19.55            | 5000  | 5.28         |
| 5200  | 14.30 | 22.56     | 20.19             | 6.06               | 1.17      | 0.40  | 37.82      | 19.28            | 5200  | 5.41         |
| 5400  | 14.13 | 22.56     | 19.64             | 5.83               | 1.17      | 0.40  | 37.88      | 19.01            | 5400  | 5.58         |
| 5600  | 13.99 | 22.57     | 19.92             | 5.66               | 1.18      | 0.40  | 36.98      | 18.90            | 5600  | 5.55         |
| 5800  | 13.81 | 22.51     | 18.31             | 5.54               | 1.19      | 0.41  | 36.31      | 18.74            | 5800  | 5.43         |
| 6000  | 13.65 | 22.67     | 17.20             | 5.33               | 1.20      | 0.40  | 35.99      | 18.20            | 6000  | 5.49         |
| 6200  | 13.41 | 22.74     | 16.21             | 5.18               | 1.22      | 0.40  | 36.08      | 17.01            | 6500  | 5.51         |
| 6400  | 13.11 | 22.71     | 14.80             | 4.99               | 1.23      | 0.41  | 35.90      | 16.76            | 7000  | 5.98         |
| 6600  | 12.71 | 23.03     | 13.74             | 4.90               | 1.29      | 0.39  | 36.40      | 16.85            | 7500  | 6.12         |
| 6800  | 12.24 | 23.42     | 12.61             | 4.57               | 1.35      | 0.39  | 35.37      | 16.80            | 8000  | 6.71         |
| 7000  | 11.81 | 23.14     | 11.87             | 4.53               | 1.38      | 0.41  | 35.36      | 16.72            | 8500  | 7.23         |
| 7200  | 11.17 | 23.47     | 11.12             | 4.48               | 1.48      | 0.39  | 33.81      | 16.42            | 9000  | 7.64         |
| 7500  | 10.15 | 23.05     | 10.48             | 4.56               | 1.57      | 0.39  | 33.32      | 15.04            | 9500  | 8.29         |
| 8000  | 8.36  | 22.48     | 9.02              | 4.69               | 1.74      | 0.39  | 32.48      | 15.04            | 10000 | 8.52         |

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## 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: Vd = 5.00V, Icc=109mA @Temperature = +85degC

| FREQ  | Gain  | Isolation | Input Return Loss | Output Return Loss | Stability |       | IP3 Output | 1dB Comp. Output | FREQ  | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|-------|------------|------------------|-------|--------------|
| (MHz) | (dB)  | (dB)      | (dB)              | (dB)               | K         | Delta | (dBm)      | (dBm)            | (MHz) | (dB)         |
| 50    | 24.12 | 31.28     | 21.72             | 24.85              | 1.34      | 0.43  | 37.04      | 20.75            | 50    | 5.97         |
| 100   | 24.05 | 30.81     | 21.39             | 24.29              | 1.30      | 0.45  | 36.88      | 20.80            | 100   | 6.10         |
| 200   | 23.91 | 31.03     | 20.94             | 20.96              | 1.33      | 0.44  | 36.87      | 20.74            | 200   | 6.08         |
| 400   | 23.52 | 30.83     | 21.70             | 15.82              | 1.33      | 0.43  | 36.26      | 20.89            | 400   | 6.22         |
| 600   | 22.96 | 30.49     | 21.46             | 13.22              | 1.33      | 0.42  | 35.62      | 20.71            | 600   | 6.16         |
| 800   | 22.31 | 29.94     | 21.18             | 11.43              | 1.31      | 0.41  | 35.49      | 20.75            | 800   | 6.28         |
| 1000  | 21.63 | 29.41     | 20.77             | 10.24              | 1.30      | 0.41  | 35.54      | 20.78            | 1000  | 6.21         |
| 1200  | 20.93 | 28.80     | 20.36             | 9.36               | 1.29      | 0.41  | 35.32      | 20.63            | 1200  | 6.18         |
| 1400  | 20.24 | 28.32     | 19.77             | 8.69               | 1.28      | 0.40  | 35.10      | 20.61            | 1400  | 6.21         |
| 1600  | 19.58 | 27.77     | 19.34             | 8.19               | 1.27      | 0.39  | 35.39      | 20.75            | 1600  | 6.26         |
| 1800  | 18.94 | 27.28     | 18.77             | 7.82               | 1.27      | 0.39  | 35.40      | 20.70            | 1800  | 6.20         |
| 2000  | 18.38 | 26.76     | 18.41             | 7.53               | 1.25      | 0.38  | 35.28      | 20.82            | 2000  | 6.14         |
| 2200  | 17.80 | 26.38     | 18.20             | 7.41               | 1.26      | 0.37  | 34.93      | 20.90            | 2200  | 6.15         |
| 2400  | 17.31 | 25.95     | 17.94             | 7.27               | 1.26      | 0.36  | 34.63      | 20.92            | 2400  | 6.12         |
| 2600  | 16.85 | 25.53     | 17.90             | 7.25               | 1.25      | 0.36  | 34.42      | 20.94            | 2600  | 6.11         |
| 2800  | 16.42 | 25.14     | 17.95             | 7.25               | 1.25      | 0.35  | 34.51      | 21.03            | 2800  | 6.12         |
| 3000  | 16.06 | 24.71     | 17.57             | 7.11               | 1.23      | 0.35  | 34.24      | 20.98            | 3000  | 6.22         |
| 3200  | 15.69 | 24.47     | 17.82             | 7.21               | 1.25      | 0.34  | 34.01      | 20.77            | 3200  | 6.16         |
| 3400  | 15.40 | 24.17     | 17.73             | 7.21               | 1.24      | 0.34  | 33.98      | 20.58            | 3400  | 6.25         |
| 3600  | 15.13 | 23.83     | 17.68             | 7.18               | 1.23      | 0.34  | 33.71      | 20.49            | 3600  | 6.20         |
| 3800  | 14.83 | 23.61     | 17.92             | 7.31               | 1.25      | 0.34  | 33.10      | 20.16            | 3800  | 6.35         |
| 4000  | 14.62 | 23.40     | 17.96             | 7.39               | 1.26      | 0.33  | 32.49      | 19.71            | 4000  | 6.37         |
| 4200  | 14.35 | 23.18     | 18.20             | 7.41               | 1.27      | 0.34  | 32.67      | 19.55            | 4200  | 6.66         |
| 4400  | 14.13 | 23.11     | 18.12             | 7.41               | 1.29      | 0.33  | 32.42      | 19.42            | 4400  | 6.51         |
| 4600  | 13.89 | 22.88     | 17.84             | 7.29               | 1.29      | 0.34  | 32.26      | 19.18            | 4600  | 6.50         |
| 4800  | 13.62 | 22.81     | 17.40             | 7.20               | 1.30      | 0.34  | 32.00      | 18.62            | 4800  | 6.45         |
| 5000  | 13.38 | 22.88     | 17.12             | 7.14               | 1.34      | 0.33  | 32.07      | 18.22            | 5000  | 6.68         |
| 5200  | 13.13 | 22.95     | 16.59             | 7.08               | 1.38      | 0.33  | 31.51      | 18.01            | 5200  | 6.79         |
| 5400  | 12.79 | 22.92     | 15.86             | 6.90               | 1.41      | 0.33  | 31.07      | 17.75            | 5400  | 6.92         |
| 5600  | 12.51 | 22.98     | 15.70             | 6.83               | 1.45      | 0.32  | 30.88      | 17.57            | 5600  | 6.88         |
| 5800  | 12.19 | 23.08     | 15.03             | 6.74               | 1.50      | 0.32  | 30.62      | 17.29            | 5800  | 6.80         |
| 6000  | 11.82 | 23.32     | 14.46             | 6.67               | 1.58      | 0.31  | 30.29      | 16.60            | 6000  | 7.02         |
| 6200  | 11.42 | 23.46     | 14.08             | 6.58               | 1.66      | 0.30  | 30.42      | 14.82            | 6500  | 7.04         |
| 6400  | 10.97 | 23.57     | 13.63             | 6.53               | 1.75      | 0.30  | 29.79      | 14.87            | 7000  | 7.46         |
| 6600  | 10.48 | 23.81     | 13.21             | 6.51               | 1.88      | 0.29  | 29.54      | 15.14            | 7500  | 7.68         |
| 6800  | 9.94  | 24.19     | 12.27             | 6.36               | 2.04      | 0.28  | 29.74      | 15.14            | 8000  | 8.23         |
| 7000  | 9.38  | 23.71     | 11.82             | 6.54               | 2.08      | 0.29  | 29.38      | 14.76            | 8500  | 8.84         |
| 7200  | 8.73  | 24.18     | 10.86             | 6.46               | 2.29      | 0.29  | 29.13      | 14.27            | 9000  | 9.26         |
| 7500  | 7.66  | 23.98     | 10.07             | 6.57               | 2.50      | 0.29  | 29.09      | 12.99            | 9500  | 9.94         |
| 8000  | 5.76  | 23.12     | 8.75              | 6.59               | 2.70      | 0.29  | 28.51      | 12.11            | 10000 | 10.15        |

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## 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: Vd = 4.75V, Icc=94mA @Temperature = +85degC

| FREQ  | Gain  | Isolation | Input Return Loss | Output Return Loss | Stability |       | IP3 Output | 1dB Comp. Output | FREQ  | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|-------|------------|------------------|-------|--------------|
| (MHz) | (dB)  | (dB)      | (dB)              | (dB)               | K         | Delta | (dBm)      | (dBm)            | (MHz) | (dB)         |
| 50    | 23.93 | 31.24     | 24.08             | 22.20              | 1.36      | 0.43  | 34.63      | 19.79            | 50    | 5.83         |
| 100   | 23.87 | 30.74     | 23.17             | 22.26              | 1.31      | 0.45  | 34.49      | 19.81            | 100   | 5.97         |
| 200   | 23.72 | 30.90     | 22.46             | 20.02              | 1.34      | 0.43  | 34.55      | 19.76            | 200   | 5.97         |
| 400   | 23.35 | 30.43     | 23.05             | 15.47              | 1.31      | 0.44  | 34.11      | 19.84            | 400   | 6.09         |
| 600   | 22.80 | 30.17     | 22.42             | 13.01              | 1.31      | 0.42  | 33.73      | 19.69            | 600   | 6.05         |
| 800   | 22.16 | 29.64     | 21.79             | 11.29              | 1.29      | 0.42  | 33.89      | 19.72            | 800   | 6.17         |
| 1000  | 21.48 | 29.13     | 21.15             | 10.14              | 1.28      | 0.41  | 34.04      | 19.78            | 1000  | 6.09         |
| 1200  | 20.79 | 28.68     | 20.55             | 9.26               | 1.28      | 0.40  | 33.93      | 19.55            | 1200  | 6.07         |
| 1400  | 20.11 | 28.02     | 19.82             | 8.60               | 1.26      | 0.40  | 33.81      | 19.58            | 1400  | 6.10         |
| 1600  | 19.45 | 27.55     | 19.27             | 8.11               | 1.25      | 0.39  | 34.25      | 19.74            | 1600  | 6.13         |
| 1800  | 18.82 | 27.08     | 18.64             | 7.72               | 1.25      | 0.38  | 34.36      | 19.73            | 1800  | 6.08         |
| 2000  | 18.26 | 26.63     | 18.20             | 7.45               | 1.24      | 0.38  | 34.35      | 19.86            | 2000  | 6.01         |
| 2200  | 17.69 | 26.19     | 17.97             | 7.32               | 1.24      | 0.37  | 34.10      | 19.98            | 2200  | 6.05         |
| 2400  | 17.19 | 25.77     | 17.68             | 7.19               | 1.24      | 0.36  | 33.87      | 20.02            | 2400  | 5.99         |
| 2600  | 16.73 | 25.45     | 17.61             | 7.18               | 1.25      | 0.35  | 33.18      | 20.04            | 2600  | 6.00         |
| 2800  | 16.31 | 25.08     | 17.64             | 7.17               | 1.25      | 0.35  | 33.19      | 20.16            | 2800  | 6.01         |
| 3000  | 15.95 | 24.62     | 17.24             | 7.03               | 1.22      | 0.34  | 33.10      | 20.10            | 3000  | 6.09         |
| 3200  | 15.58 | 24.39     | 17.47             | 7.13               | 1.24      | 0.34  | 32.93      | 19.94            | 3200  | 6.03         |
| 3400  | 15.29 | 24.07     | 17.36             | 7.14               | 1.24      | 0.33  | 33.02      | 19.81            | 3400  | 6.10         |
| 3600  | 15.01 | 23.72     | 17.30             | 7.12               | 1.22      | 0.33  | 32.68      | 19.76            | 3600  | 6.05         |
| 3800  | 14.71 | 23.53     | 17.58             | 7.24               | 1.25      | 0.33  | 31.94      | 19.45            | 3800  | 6.22         |
| 4000  | 14.51 | 23.32     | 17.61             | 7.34               | 1.25      | 0.33  | 31.46      | 19.00            | 4000  | 6.23         |
| 4200  | 14.23 | 23.18     | 17.85             | 7.37               | 1.27      | 0.33  | 31.64      | 18.90            | 4200  | 6.50         |
| 4400  | 14.01 | 23.04     | 17.78             | 7.39               | 1.29      | 0.33  | 31.59      | 18.72            | 4400  | 6.33         |
| 4600  | 13.77 | 22.82     | 17.54             | 7.27               | 1.29      | 0.34  | 31.31      | 18.51            | 4600  | 6.36         |
| 4800  | 13.49 | 22.80     | 17.12             | 7.19               | 1.31      | 0.33  | 31.01      | 17.92            | 4800  | 6.31         |
| 5000  | 13.25 | 22.87     | 16.89             | 7.15               | 1.35      | 0.33  | 30.79      | 17.55            | 5000  | 6.51         |
| 5200  | 12.98 | 22.93     | 16.35             | 7.09               | 1.39      | 0.32  | 30.62      | 17.38            | 5200  | 6.64         |
| 5400  | 12.65 | 22.93     | 15.69             | 6.93               | 1.43      | 0.32  | 30.14      | 17.07            | 5400  | 6.75         |
| 5600  | 12.37 | 22.98     | 15.52             | 6.88               | 1.47      | 0.32  | 29.92      | 16.82            | 5600  | 6.71         |
| 5800  | 12.04 | 23.08     | 14.86             | 6.80               | 1.52      | 0.31  | 29.63      | 16.52            | 5800  | 6.66         |
| 6000  | 11.66 | 23.35     | 14.36             | 6.75               | 1.61      | 0.30  | 29.40      | 15.86            | 6000  | 6.83         |
| 6200  | 11.26 | 23.45     | 13.98             | 6.67               | 1.69      | 0.29  | 29.89      | 14.32            | 6500  | 6.83         |
| 6400  | 10.80 | 23.59     | 13.56             | 6.61               | 1.79      | 0.29  | 29.39      | 14.37            | 7000  | 7.30         |
| 6600  | 10.32 | 23.79     | 13.14             | 6.61               | 1.92      | 0.28  | 29.41      | 14.67            | 7500  | 7.45         |
| 6800  | 9.78  | 24.24     | 12.24             | 6.46               | 2.09      | 0.28  | 29.09      | 14.67            | 8000  | 8.00         |
| 7000  | 9.21  | 23.73     | 11.78             | 6.64               | 2.13      | 0.29  | 28.67      | 14.48            | 8500  | 8.63         |
| 7200  | 8.57  | 24.20     | 10.85             | 6.56               | 2.35      | 0.28  | 28.25      | 14.00            | 9000  | 9.07         |
| 7500  | 7.50  | 23.94     | 10.06             | 6.67               | 2.54      | 0.28  | 28.61      | 12.75            | 9500  | 9.73         |
| 8000  | 5.62  | 23.08     | 8.73              | 6.69               | 2.74      | 0.29  | 27.75      | 11.74            | 10000 | 9.87         |

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## 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: Vd = 5.25V, Icc=125mA @Temperature = +85degC

| FREQ  | Gain  | Isolation | Input<br>Return<br>Loss | Output<br>Return<br>Loss | Stability |       | IP3<br>Output | 1dB<br>Comp.<br>Output | FREQ  | Noise<br>Figure |
|-------|-------|-----------|-------------------------|--------------------------|-----------|-------|---------------|------------------------|-------|-----------------|
| (MHz) | (dB)  | (dB)      | (dB)                    | (dB)                     | K         | Delta | (dBm)         | (dBm)                  | (MHz) | (dB)            |
| 50    | 24.25 | 30.88     | 20.42                   | 27.05                    | 1.29      | 0.46  | 39.10         | 21.50                  | 50    | 6.08            |
| 100   | 24.18 | 31.29     | 20.47                   | 26.23                    | 1.34      | 0.44  | 39.01         | 21.53                  | 100   | 6.22            |
| 200   | 24.02 | 31.27     | 19.93                   | 21.51                    | 1.35      | 0.43  | 38.87         | 21.49                  | 200   | 6.20            |
| 400   | 23.65 | 30.91     | 20.74                   | 16.05                    | 1.33      | 0.43  | 38.03         | 21.65                  | 400   | 6.34            |
| 600   | 23.06 | 30.53     | 20.80                   | 13.39                    | 1.33      | 0.42  | 37.13         | 21.48                  | 600   | 6.29            |
| 800   | 22.42 | 30.10     | 20.70                   | 11.53                    | 1.32      | 0.41  | 36.70         | 21.50                  | 800   | 6.39            |
| 1000  | 21.73 | 29.61     | 20.48                   | 10.35                    | 1.32      | 0.41  | 36.65         | 21.50                  | 1000  | 6.34            |
| 1200  | 21.03 | 28.92     | 20.22                   | 9.43                     | 1.29      | 0.41  | 36.30         | 21.36                  | 1200  | 6.32            |
| 1400  | 20.34 | 28.47     | 19.71                   | 8.76                     | 1.29      | 0.40  | 36.03         | 21.36                  | 1400  | 6.37            |
| 1600  | 19.66 | 27.89     | 19.33                   | 8.27                     | 1.28      | 0.39  | 36.15         | 21.42                  | 1600  | 6.39            |
| 1800  | 19.04 | 27.41     | 18.85                   | 7.89                     | 1.28      | 0.39  | 36.12         | 21.36                  | 1800  | 6.34            |
| 2000  | 18.45 | 26.83     | 18.52                   | 7.61                     | 1.26      | 0.38  | 35.97         | 21.51                  | 2000  | 6.26            |
| 2200  | 17.89 | 26.42     | 18.31                   | 7.47                     | 1.26      | 0.38  | 35.52         | 21.58                  | 2200  | 6.29            |
| 2400  | 17.39 | 25.94     | 18.10                   | 7.34                     | 1.25      | 0.37  | 35.13         | 21.54                  | 2400  | 6.25            |
| 2600  | 16.94 | 25.53     | 18.12                   | 7.32                     | 1.25      | 0.36  | 34.90         | 21.62                  | 2600  | 6.25            |
| 2800  | 16.50 | 25.29     | 18.15                   | 7.33                     | 1.27      | 0.35  | 34.92         | 21.66                  | 2800  | 6.27            |
| 3000  | 16.15 | 24.78     | 17.78                   | 7.19                     | 1.24      | 0.35  | 34.65         | 21.61                  | 3000  | 6.38            |
| 3200  | 15.77 | 24.58     | 18.05                   | 7.27                     | 1.26      | 0.34  | 34.26         | 21.31                  | 3200  | 6.31            |
| 3400  | 15.47 | 24.15     | 17.96                   | 7.27                     | 1.24      | 0.34  | 34.32         | 21.10                  | 3400  | 6.41            |
| 3600  | 15.21 | 23.91     | 17.86                   | 7.24                     | 1.24      | 0.34  | 34.10         | 20.99                  | 3600  | 6.34            |
| 3800  | 14.90 | 23.68     | 18.14                   | 7.37                     | 1.26      | 0.34  | 33.49         | 20.62                  | 3800  | 6.51            |
| 4000  | 14.69 | 23.44     | 18.19                   | 7.45                     | 1.26      | 0.34  | 32.79         | 20.16                  | 4000  | 6.55            |
| 4200  | 14.42 | 23.24     | 18.43                   | 7.46                     | 1.27      | 0.34  | 32.81         | 19.99                  | 4200  | 6.80            |
| 4400  | 14.21 | 23.12     | 18.31                   | 7.45                     | 1.28      | 0.34  | 32.84         | 19.84                  | 4400  | 6.65            |
| 4600  | 13.97 | 22.92     | 18.00                   | 7.32                     | 1.28      | 0.34  | 32.48         | 19.61                  | 4600  | 6.67            |
| 4800  | 13.70 | 22.80     | 17.54                   | 7.22                     | 1.30      | 0.34  | 32.18         | 19.05                  | 4800  | 6.61            |
| 5000  | 13.47 | 22.89     | 17.25                   | 7.16                     | 1.33      | 0.34  | 31.98         | 18.65                  | 5000  | 6.84            |
| 5200  | 13.21 | 22.97     | 16.71                   | 7.09                     | 1.37      | 0.33  | 31.69         | 18.44                  | 5200  | 6.99            |
| 5400  | 12.88 | 22.94     | 15.94                   | 6.90                     | 1.40      | 0.33  | 31.26         | 18.23                  | 5400  | 7.10            |
| 5600  | 12.62 | 22.97     | 15.78                   | 6.81                     | 1.44      | 0.33  | 30.91         | 18.02                  | 5600  | 7.07            |
| 5800  | 12.29 | 23.09     | 15.08                   | 6.72                     | 1.49      | 0.32  | 30.69         | 17.67                  | 5800  | 7.00            |
| 6000  | 11.92 | 23.33     | 14.50                   | 6.65                     | 1.57      | 0.31  | 30.72         | 17.00                  | 6000  | 7.21            |
| 6200  | 11.52 | 23.43     | 14.10                   | 6.54                     | 1.64      | 0.31  | 30.31         | 15.30                  | 6500  | 7.22            |
| 6400  | 11.07 | 23.60     | 13.65                   | 6.48                     | 1.74      | 0.30  | 30.18         | 15.34                  | 7000  | 7.69            |
| 6600  | 10.58 | 23.82     | 13.21                   | 6.47                     | 1.86      | 0.29  | 29.72         | 15.61                  | 7500  | 7.91            |
| 6800  | 10.05 | 24.22     | 12.26                   | 6.31                     | 2.02      | 0.29  | 29.41         | 15.48                  | 8000  | 8.46            |
| 7000  | 9.48  | 23.75     | 11.81                   | 6.50                     | 2.06      | 0.30  | 29.23         | 14.98                  | 8500  | 9.09            |
| 7200  | 8.82  | 24.23     | 10.86                   | 6.40                     | 2.28      | 0.29  | 29.27         | 14.48                  | 9000  | 9.51            |
| 7500  | 7.76  | 23.95     | 10.07                   | 6.52                     | 2.46      | 0.29  | 29.28         | 13.16                  | 9500  | 10.19           |
| 8000  | 5.85  | 23.16     | 8.74                    | 6.55                     | 2.68      | 0.29  | 28.10         | 12.37                  | 10000 | 10.47           |

REV. X1

GVA-84+

110601

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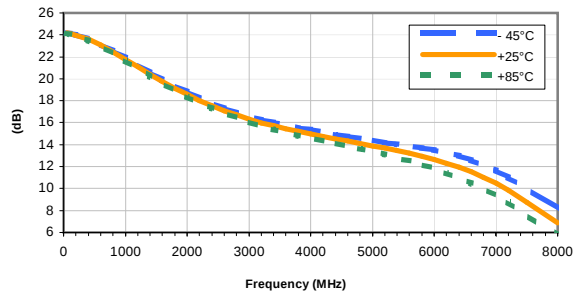
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## Typical Performance Curves

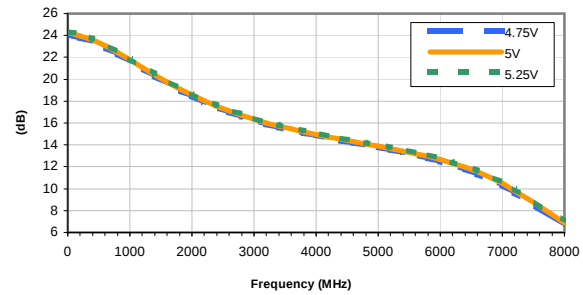
**GAIN vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -25dBm,  $V_d = 5.00V$



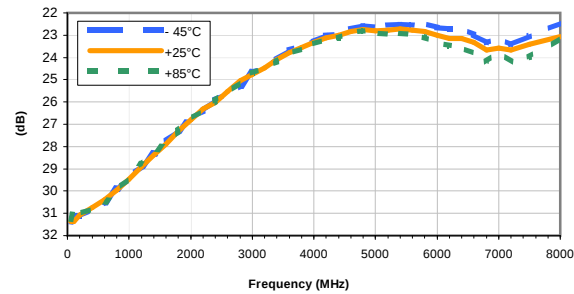
**GAIN vs. DEVICE VOLTAGE**

INPUT POWER = -25dBm, Temperature = +25°C



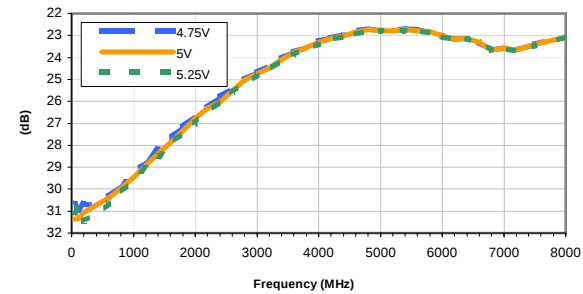
**ISOLATION vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -25dBm,  $V_d = 5.00V$



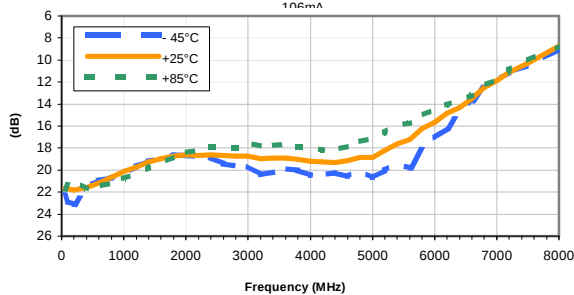
**ISOLATION vs. DEVICE VOLTAGE**

INPUT POWER = -25dBm, Temperature = +25°C



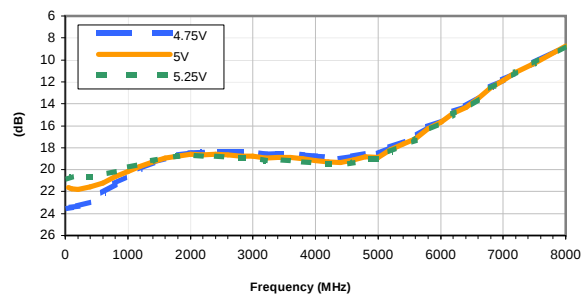
**INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -25dBm,  $V_d = 5.00V$   
106mA



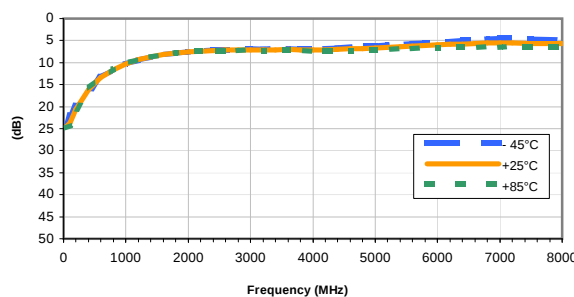
**INPUT RETURN LOSS vs. DEVICE VOLTAGE**

INPUT POWER = -25dBm, Temperature = +25°C



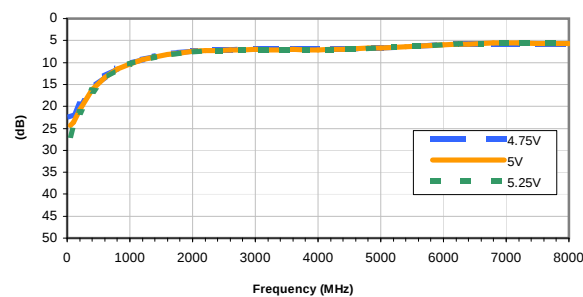
**OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -25dBm,  $V_d = 5.00V$



**OUTPUT RETURN LOSS vs. DEVICE VOLTAGE**

INPUT POWER = -25dBm, Temperature = +25°C



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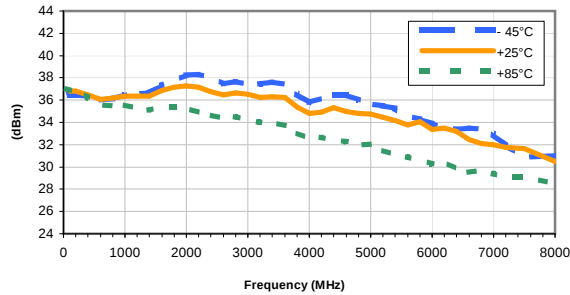
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## Typical Performance Curves

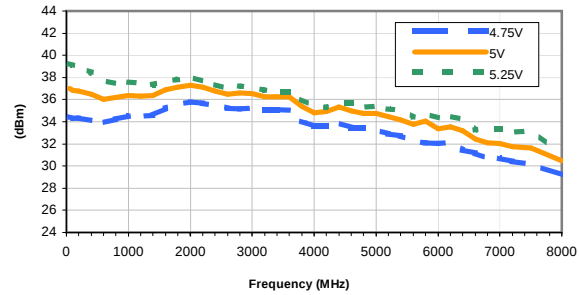
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE

INPUT POWER = -25dBm, Vd = 5.00V



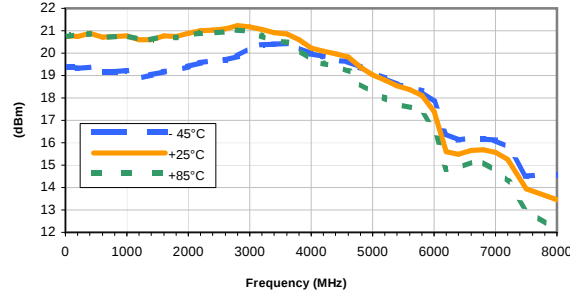
OUTPUT IP-3 vs. DEVICE VOLTAGE

INPUT POWER = -25dBm, Temperature = +25°C



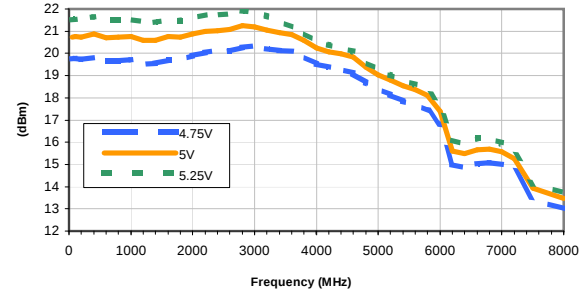
OUTPUT POWER at 1dB Compression vs. FREQUENCY & TEMPERATURE

Vd = 5.00V



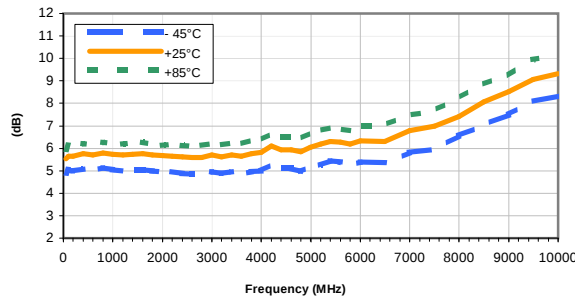
OUTPUT POWER at 1dB Compression vs. DEVICE VOLTAGE

Temperature = +25°C



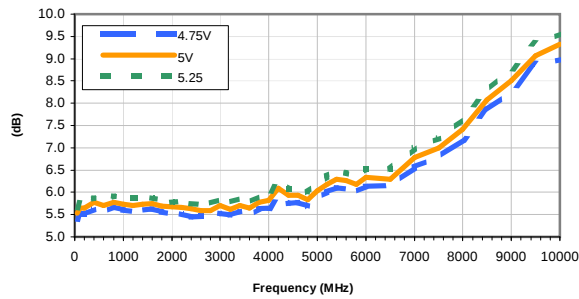
Noise Figure vs. FREQUENCY & TEMPERATURE

Vd = 5.00V

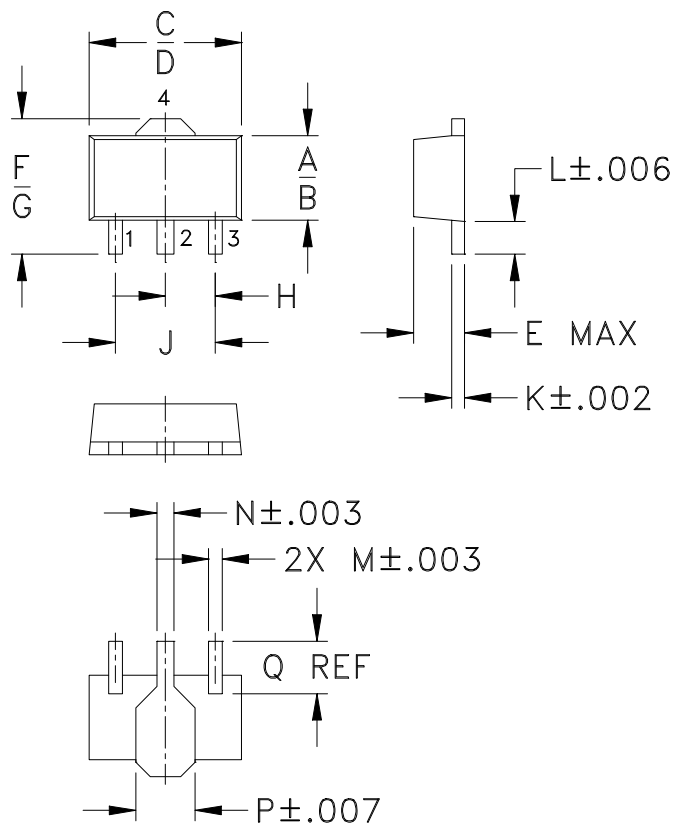


Noise Figure vs. DEVICE VOLTAGE

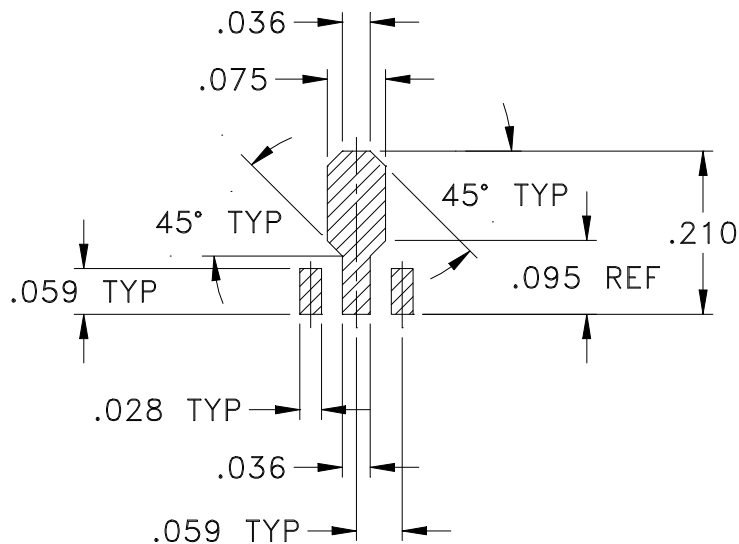
Temperature = +25°C



### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE # | A              | B              | C              | D              | E              | F              | G              | H              | J              | K              | L              | M              |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| DF782  | .102<br>(2.59) | .090<br>(2.29) | .181<br>(4.60) | .173<br>(4.39) | .063<br>(1.60) | .167<br>(4.24) | .155<br>(3.94) | .059<br>(1.50) | .118<br>(3.00) | .015<br>(0.38) | .041<br>(1.04) | .016<br>(0.41) |

| CASE # | N              | P              | Q              | WT. GRAM |
|--------|----------------|----------------|----------------|----------|
| DF782  | .019<br>(0.48) | .065<br>(1.65) | .062<br>(1.57) | .2       |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3Pl.  $\pm .005$

### Notes:

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



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

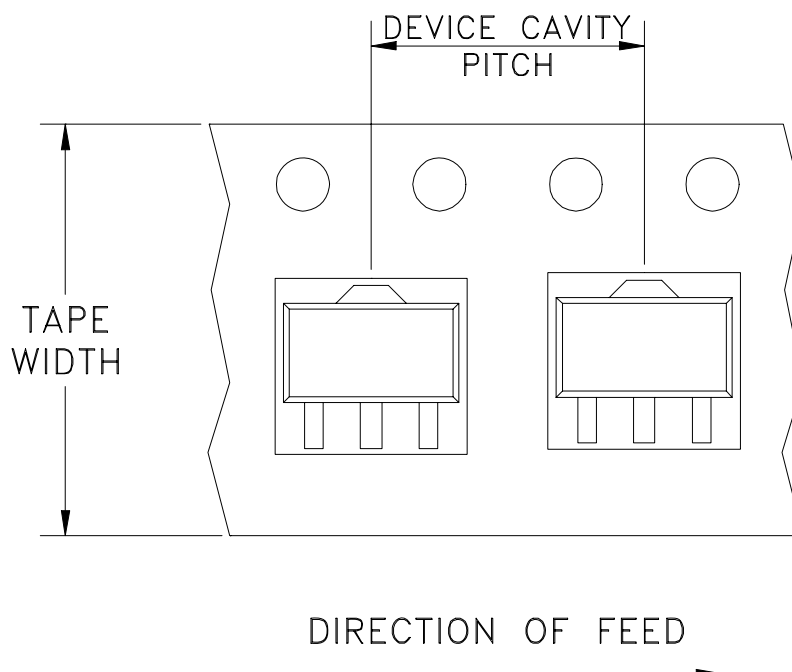
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# Tape & Reel Packaging TR-F55

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel                            |      |
|-------------------|----------------------------|----------------------|---------------------------------------------|------|
| 12                | 8                          | 7                    | Small<br>quantity<br>standard<br>(see note) | 20   |
|                   |                            |                      |                                             | 50   |
|                   |                            |                      |                                             | 100  |
|                   |                            |                      |                                             | 200  |
|                   |                            |                      |                                             | 500  |
|                   |                            |                      | Standard                                    | 1000 |

Note: Please consult individual model data sheet to determine device per reel availability.

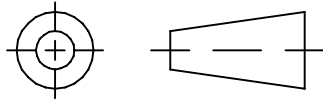
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



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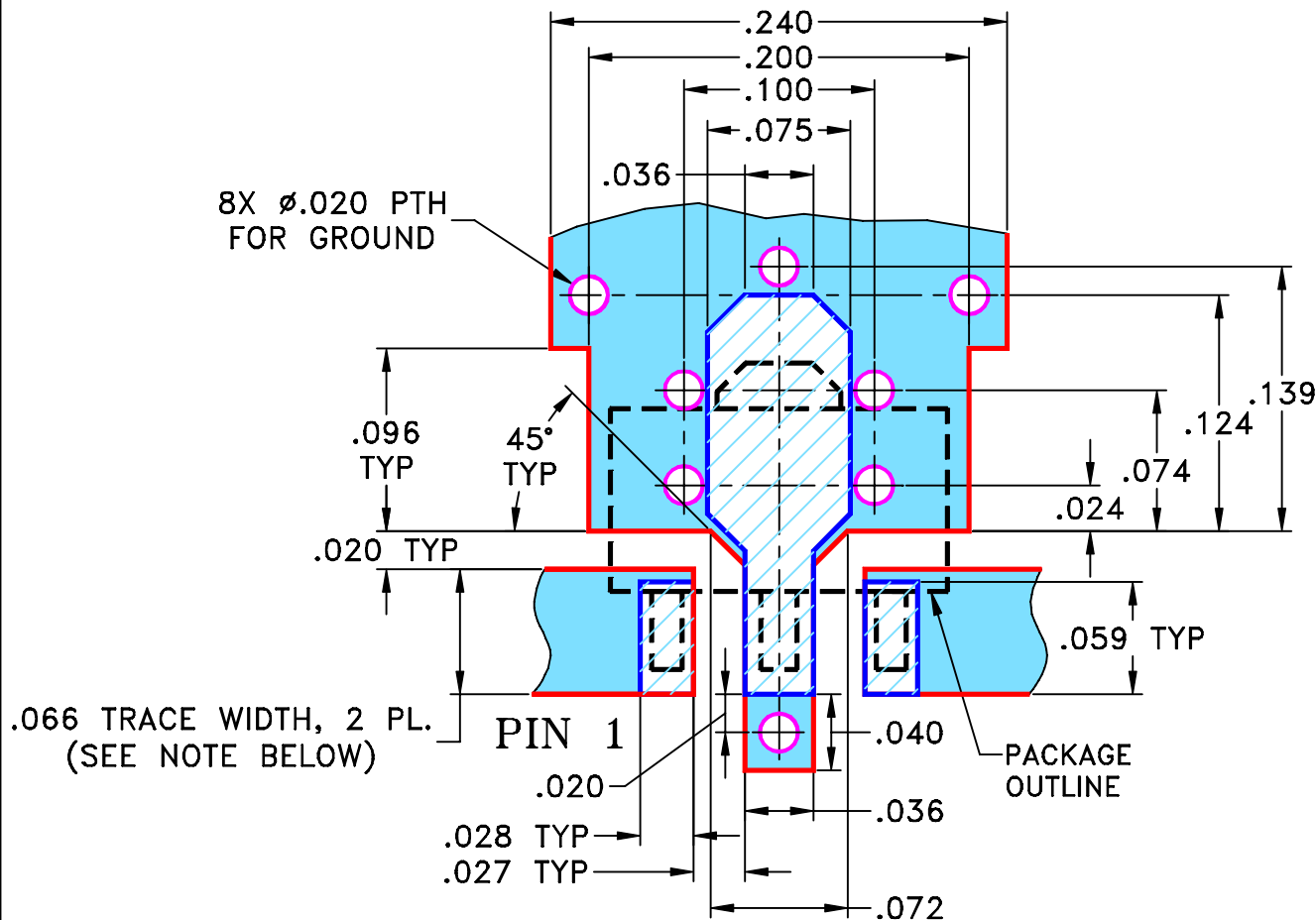
## THIRD ANGLE PROJECTION



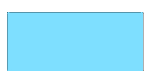
## REVISIONS

| REV | ECN No. | DESCRIPTION                             | DATE     | DR  | AUTH |
|-----|---------|-----------------------------------------|----------|-----|------|
| OR  | M108433 | NEW RELEASE                             | 11/14/06 | PW  | IG   |
| A   | M124803 | "04AM03" WAS "mz", MODIFIED TB IN TITLE | 10/23/09 | MMG | DJ   |
|     |         |                                         |          |     |      |
|     |         |                                         |          |     |      |

**SUGGESTED MOUNTING CONFIGURATION  
FOR DF782 CASE STYLE, "04AM03" PIN CONNECTION**



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.030'' \pm .002''$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. 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

PW

11/14/06

TOLERANCES ON:

CHECKED

IL

11/14/06

2 PL DECIMALS  $\pm .005$ 

APPROVED

IG

11/14/06

3 PL DECIMALS  $\pm$ ANGLES  $\pm$ FRACTIONS  $\pm$ 

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ASHEETA1.DWG REV:A DATE:01/12/95



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Brooklyn NY 11235

PL, 04AM03, DF782, GVA, TB-410-XX+

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-255

REV:

A

FILE:

98PL255

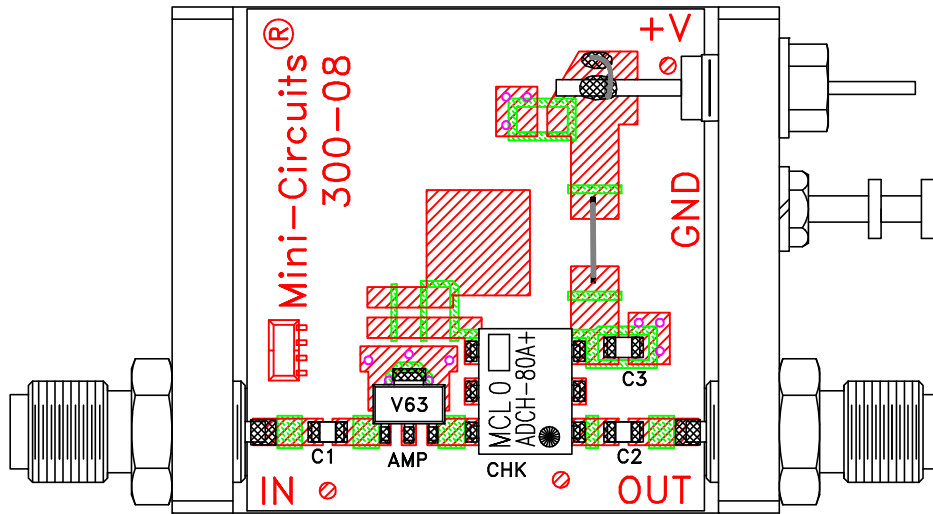
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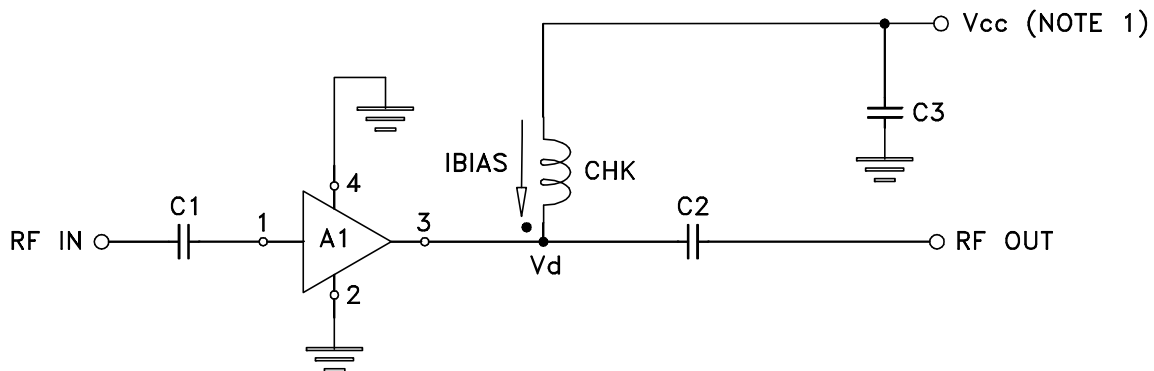
SHEET:

1 OF 1

# Evaluation Board and Circuit



TB-410-84+



| COMPONENT   | VALUE                   |
|-------------|-------------------------|
| A1          | GVA-84+                 |
| C1 (NOTE 4) | 2400 pF                 |
| C2 (NOTE 4) | 2400 pF                 |
| C3 (bypass) | 0.1 uF                  |
| CHK         | Mini-Circuits ADCH-80A+ |

Schematic Diagram

## NOTE:

1. Vcc voltage:  $+5 \pm 0.2V$ .
2. SMA Female connectors.
3. PCB material: Rogers R04350 or equivalent, dielectric constant=3.5, dielectric thickness=.030 inch.
4. Capacitors, C1 & C2 should be free of resonance up to the highest frequency specified.

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| Specification                  | Test/Inspection Condition                                                                                                      | Reference/Spec                                                  |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Operating Temperature          | -40° to 85°C or -45° to 85°C<br>Ambient Environment                                                                            | Individual Model Data Sheet                                     |
| Storage Temperature            | -55° to 100° C or -65° to 150°<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           |
| Mechanical Shock               | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only                                                                               | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Vibration (Variable Frequency) | 50g peak                                                                                                                       | MIL-STD-883, Method 2007, Condition B                           |
| Autoclave                      | 15 psig, 100% RH, 121°C, 96 hours                                                                                              | JESD22-A102, Condition C                                        |
| HAST                           | 130°C, 85% RH, 96 hours                                                                                                        | JESD22-A110                                                     |
| Solderability                  | 10X Magnification                                                                                                              | J-STD-002, Para 4.2.5, Test S, 95% Coverage                     |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 240°C peak<br>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<br>Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak                                 | J-STD-020                                                       |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + | MIL-STD-202, Method 215                                         |



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| Specification | Test/Inspection Condition        | Reference/Spec |
|---------------|----------------------------------|----------------|
|               | monoethanolamine at 63°C to 70°C |                |