

Product Features

- DC-4 GHz
- Single voltage supply
- Internally matched to 50 ohms
- Low Performance variation over temperature
- Transient Protected
- Aqueous washable
- Protected By US Patent 6,943,629



Generic photo used for illustration purposes only

ERA-4+

CASE STYLE: VV105

+RoHS Compliant

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

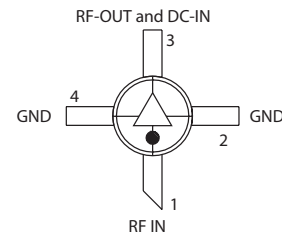
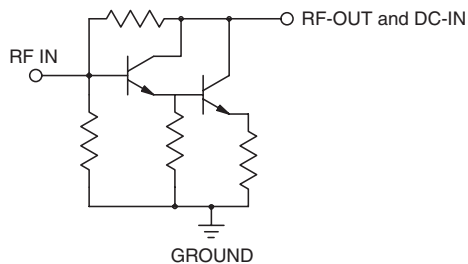
Typical Applications

- Cellular/ PCS/ 3G Base Station
- CATV, Cable Modem & DBS
- Fixed Wireless & WLAN
- Microwave Radio & Test Equipment

General Description

ERA-4+ (RoHS compliant) is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in a Micro-X package. ERA-4+ uses Darlington configuration and is fabricated using InGaP HBT technology. Expected MTTF is 170 years at 85°C case temperature.

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". |
| 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. |

Notes

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 B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
 C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Electrical Specifications⁽¹⁾ at 25°C and 65mA, unless noted

| Parameter | Condition (GHz) | Min. | Typ. | Max. | Units |
|--|-----------------|------|-------|------|-------|
| Frequency Range* | | DC | | 4 | GHz |
| Gain | 0.1 | 13.7 | 14.4 | 15 | dB |
| | 1.0 | — | 14.2 | — | |
| | 2.0 | 12.5 | 13 | 13.6 | |
| | 3.0 | — | 12 | — | |
| | 4.0 | 10.8 | 11.3 | 12.1 | |
| Magnitude of Gain Variation versus Temperature (values are negative) | 0.1 | — | .003 | .006 | dB/°C |
| | 1.0 | — | .0025 | .006 | |
| | 2.0 | — | .0031 | .006 | |
| | 3.0 | — | .0042 | .008 | |
| | 4.0 | — | .0051 | .01 | |
| Input Return Loss | 0.1 | | 35 | | dB |
| | 2.0 | | 30 | | |
| | 3.0 | | 21 | | |
| | 4.0 | | 21 | | |
| Output Return Loss | 0.1 | | 35 | | dB |
| | 2.0 | | 21 | | |
| | 3.0 | | 21 | | |
| | 4.0 | | 16 | | |
| Reverse Isolation | 2.0 | 18 | 23 | — | dB |
| Output Power @ 1 dB compression | 0.1 | — | 17.5 | — | dBm |
| | 1.0 | 15 | 17.3 | — | |
| | 2.0 | — | 16.1 | — | |
| | 3.0 | — | 14 | — | |
| | 4.0 | — | 11.7 | — | |
| Saturated Output Power (at 3dB compression) | 0.1 | | 17.8 | | dBm |
| | 2.0 | | 16.5 | | |
| Output IP3 | 0.1 | 32 | 36.1 | — | dBm |
| | 1.0 | 31 | 35 | — | |
| | 2.0 | 27 | 30.4 | — | |
| | 4.0 | — | 25 | — | |
| Noise Figure | 0.1 | — | 4 | 5 | dB |
| | 1.0 | — | 4.2 | 5.2 | |
| | 2.0 | — | 4.2 | 5.2 | |
| | 4.0 | — | 4.5 | 5.5 | |
| Group Delay | 2.0 | | 80 | | psec |
| Recommended Device Operating Current | | | 65 | | mA |
| Device Operating Voltage | | 4.3 | 4.6 | 4.9 | V |
| Device Voltage Variation vs. Temperature at 65mA | | | -2.9 | | mV/°C |
| Device Voltage Variation vs. Current at 25°C | | | 10.4 | | mV/mA |
| Thermal Resistance, junction-to-case ⁽²⁾ | | | 191 | | °C/W |

*Guaranteed specification DC-4 GHz. Low frequency cut off determined by external coupling capacitors.

Absolute Maximum Ratings

| Parameter | Ratings |
|--------------------------------------|----------------|
| Operating Temperature ⁽³⁾ | -45°C to 85°C |
| Storage Temperature | -65°C to 150°C |
| Operating Current | 85mA |
| Power Dissipation | 417mW |
| Input Power | 20 dBm |

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

⁽¹⁾Measured on Mini-Circuits test board TB-320

⁽²⁾Case is defined as ground leads.

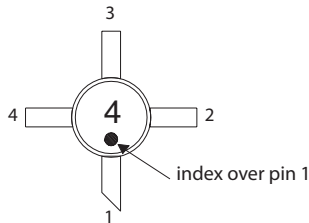
⁽³⁾Based on typical case temperature rise 5°C above ambient.

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Product Marking



Markings in addition to model number designation may appear for internal quality control purposes.

Additional Detailed Technical Information

Additional information is available on our web site. To access this information enter the model number on our web site home page.

Performance data, graphs, s-parameter data set (.zip file)

Case Style: VV105

Plastic micro-x, .085 body diameter, lead finish: matte-tin

Tape & Reel: F4

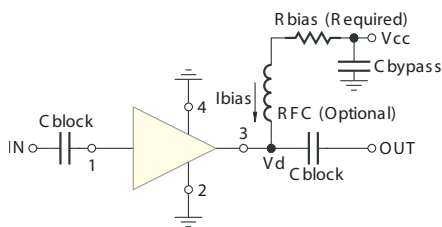
7" Reels with 20, 50, 100, 200, 500, 1K devices

Suggested Layout for PCB Design: PL-261

Evaluation Board: TB-431-4+

Environmental Ratings: ENV08T2

Recommended Application Circuit



| R BIAS | |
|--------|---|
| Vcc | "1%" Res. Values (ohms) for Optimum Biasing |
| 7 | 38.3 |
| 8 | 52.3 |
| 9 | 66.5 |
| 10 | 80.6 |
| 11 | 95.3 |
| 12 | 115 |
| 13 | 127 |
| 14 | 143 |
| 15 | 158 |
| 16 | 174 |
| 17 | 187 |
| 18 | 205 |
| 19 | 221 |
| 20 | 237 |

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ESD Rating

Human Body Model (HBM): Class 1A (250 v to < 500 v) in accordance with ANSI/ESD STM 5.1 - 2001

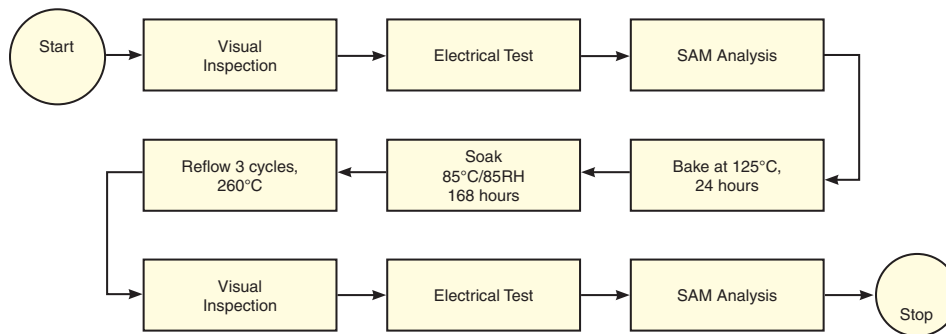
Machine Model (MM): Class M1 (< 100 v) in accordance with ANSI/ESD STM 5.2 - 1999

MSL Rating

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

| No. | Test Required | Condition | Standard | Quantity |
|-----|------------------------------|---|-----------------------------|----------|
| 1 | Visual Inspection | Low Power Microscope Magnification 40x | MIP-IN-0003 (MCT spec) | 45 units |
| 2 | Electrical Test | Room Temperature | SCD (MCL spec) | 45 units |
| 3 | SAM Analysis | Less than 10% growth in term of delamination | J-Std-020C (Jedec Standard) | 45 units |
| 4 | Moisture Sensitivity Level 1 | Bake at 125°C for 24 hours Soak at 85°C/85%RH for 168 hours Reflow 3 cycles at 260°C peak | J-Std-020C (Jedec Standard) | 45 units |

MSL Test Flow Chart



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Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=65mA, Vd = 4.43V @Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | | | (dBm) | (dBm) | (dB) |
| 10.00 | 14.40 | 19.25 | 37.18 | 41.43 | 1.16 | 0.67 | 36.22 | 17.20 | 4.14 |
| 50.00 | 14.43 | 19.03 | 36.69 | 46.36 | 1.14 | 0.65 | 36.22 | 17.86 | 4.14 |
| 100.00 | 14.39 | 19.05 | 36.16 | 46.38 | 1.15 | 0.66 | 36.24 | 17.79 | 4.12 |
| 200.00 | 14.36 | 19.04 | 35.72 | 41.57 | 1.15 | 0.66 | 35.94 | 17.65 | 4.11 |
| 300.00 | 14.31 | 19.00 | 37.35 | 39.24 | 1.15 | 0.66 | 35.97 | 17.59 | 4.23 |
| 400.00 | 14.27 | 19.06 | 38.28 | 36.48 | 1.16 | 0.67 | 35.30 | 17.74 | 4.29 |
| 500.00 | 14.22 | 19.06 | 38.35 | 34.16 | 1.16 | 0.67 | 35.09 | 17.79 | 4.25 |
| 600.00 | 14.18 | 19.01 | 37.72 | 32.02 | 1.16 | 0.67 | 34.70 | 17.56 | 4.27 |
| 700.00 | 14.13 | 19.05 | 35.95 | 30.18 | 1.16 | 0.68 | 34.34 | 17.54 | 4.22 |
| 800.00 | 14.08 | 19.06 | 34.38 | 28.51 | 1.17 | 0.68 | 34.26 | 17.51 | 4.18 |
| 900.00 | 14.03 | 19.07 | 32.37 | 27.13 | 1.17 | 0.69 | 34.04 | 17.69 | 4.24 |
| 1000.00 | 13.97 | 19.09 | 30.85 | 26.09 | 1.18 | 0.69 | 33.56 | 17.25 | 4.27 |
| 1100.00 | 13.91 | 19.09 | 29.60 | 25.04 | 1.18 | 0.69 | 33.53 | 17.40 | 4.22 |
| 1200.00 | 13.86 | 19.12 | 28.62 | 24.23 | 1.18 | 0.70 | 33.45 | 17.38 | 4.23 |
| 1300.00 | 13.80 | 19.15 | 27.56 | 23.50 | 1.19 | 0.70 | 33.22 | 17.33 | 4.26 |
| 1400.00 | 13.73 | 19.16 | 26.74 | 22.75 | 1.20 | 0.71 | 32.86 | 16.95 | 4.23 |
| 1500.00 | 13.67 | 19.22 | 25.94 | 22.27 | 1.20 | 0.72 | 32.43 | 16.82 | 4.23 |
| 1600.00 | 13.61 | 19.22 | 25.45 | 21.78 | 1.21 | 0.72 | 32.35 | 16.75 | 4.32 |
| 1700.00 | 13.54 | 19.25 | 24.80 | 21.30 | 1.22 | 0.72 | 32.12 | 16.72 | 4.23 |
| 1800.00 | 13.47 | 19.29 | 24.51 | 21.02 | 1.22 | 0.73 | 31.59 | 16.39 | 4.33 |
| 1900.00 | 13.40 | 19.32 | 23.98 | 20.69 | 1.23 | 0.74 | 31.58 | 16.27 | 4.33 |
| 2000.00 | 13.33 | 19.35 | 23.62 | 20.42 | 1.24 | 0.74 | 31.38 | 16.20 | 4.27 |
| 2250.00 | 13.15 | 19.44 | 22.98 | 20.00 | 1.26 | 0.75 | 30.01 | 15.35 | 4.29 |
| 2500.00 | 12.97 | 19.56 | 22.38 | 19.72 | 1.29 | 0.77 | 29.17 | 15.11 | 4.35 |
| 2750.00 | 12.77 | 19.66 | 21.92 | 19.64 | 1.32 | 0.78 | 28.63 | 14.72 | 4.32 |
| 3000.00 | 12.57 | 19.82 | 21.33 | 19.87 | 1.39 | 0.82 | 27.68 | 14.00 | 4.33 |
| 3250.00 | 12.38 | 19.96 | 20.80 | 19.79 | 1.44 | 0.83 | 26.63 | 13.28 | 4.40 |
| 3500.00 | 12.15 | 20.13 | 20.46 | 20.27 | 1.48 | 0.84 | 26.14 | 12.83 | 4.48 |
| 3750.00 | 11.97 | 20.27 | 19.68 | 20.47 | 1.53 | 0.86 | 25.76 | 12.24 | 4.58 |
| 4000.00 | 11.77 | 20.45 | 18.80 | 20.39 | 1.58 | 0.87 | 24.81 | 11.81 | 4.56 |
| 4250.00 | 11.56 | 20.64 | 18.37 | 20.47 | 1.66 | 0.89 | 24.09 | 11.26 | 4.57 |
| 4500.00 | 11.31 | 20.99 | 16.59 | 20.05 | 1.68 | 0.90 | 23.79 | 11.04 | 4.64 |
| 4750.00 | 11.11 | 21.00 | 15.62 | 19.81 | 1.75 | 0.92 | 23.31 | 10.59 | 4.72 |
| 5000.00 | 10.87 | 21.23 | 15.35 | 19.93 | 1.89 | 0.93 | 22.18 | 9.96 | 4.81 |
| 5250.00 | 10.59 | 21.78 | 13.99 | 19.99 | 1.90 | 0.95 | 21.92 | 9.38 | 4.95 |
| 5500.00 | 10.48 | 21.79 | 13.92 | 20.75 | 2.10 | 0.97 | 22.14 | 9.31 | 5.12 |
| 5750.00 | 10.25 | 22.60 | 12.61 | 19.96 | 2.10 | 0.99 | 21.14 | 8.79 | 5.15 |
| 6000.00 | 10.09 | 22.61 | 11.98 | 19.28 | 2.15 | 1.00 | 20.49 | 8.31 | 5.41 |
| 6250.00 | 9.85 | 22.74 | 11.36 | 18.56 | 2.20 | 1.01 | 20.64 | 8.24 | 5.45 |
| 6500.00 | 9.58 | 22.82 | 10.85 | 18.33 | 2.33 | 1.03 | 20.49 | 8.32 | 5.57 |
| 6750.00 | 9.52 | 23.42 | 10.41 | 17.21 | 2.32 | 1.04 | 19.52 | 8.03 | 5.63 |
| 7000.00 | 9.29 | 23.32 | 10.08 | 16.52 | 2.40 | 1.05 | 19.14 | 7.36 | 5.90 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=52mA, Vd = 4.32V @ Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.28 | 18.78 | 38.26 | 39.52 | 1.14 | 0.64 | 32.76 | 15.94 | 4.04 |
| 50.00 | 14.31 | 18.96 | 32.85 | 36.65 | 1.15 | 0.66 | 32.60 | 16.33 | 4.04 |
| 100.00 | 14.28 | 18.95 | 32.60 | 37.13 | 1.15 | 0.66 | 32.61 | 16.16 | 4.06 |
| 200.00 | 14.24 | 18.94 | 32.08 | 35.80 | 1.15 | 0.66 | 32.35 | 16.06 | 4.08 |
| 300.00 | 14.20 | 18.94 | 33.42 | 36.41 | 1.15 | 0.66 | 32.55 | 16.00 | 4.13 |
| 400.00 | 14.16 | 18.95 | 34.64 | 35.86 | 1.16 | 0.67 | 32.24 | 16.14 | 4.20 |
| 500.00 | 14.11 | 18.95 | 35.55 | 34.80 | 1.16 | 0.67 | 32.32 | 16.28 | 4.20 |
| 600.00 | 14.07 | 18.95 | 36.85 | 33.12 | 1.16 | 0.68 | 32.30 | 16.10 | 4.17 |
| 700.00 | 14.02 | 18.96 | 37.14 | 31.45 | 1.17 | 0.68 | 32.15 | 16.01 | 4.14 |
| 800.00 | 13.97 | 18.97 | 36.82 | 29.75 | 1.17 | 0.68 | 32.04 | 16.10 | 4.12 |
| 900.00 | 13.92 | 18.98 | 35.01 | 28.26 | 1.17 | 0.69 | 31.92 | 16.18 | 4.15 |
| 1000.00 | 13.87 | 19.00 | 33.19 | 27.14 | 1.18 | 0.69 | 31.48 | 15.65 | 4.17 |
| 1100.00 | 13.81 | 19.01 | 31.94 | 26.04 | 1.18 | 0.70 | 31.62 | 15.94 | 4.11 |
| 1200.00 | 13.75 | 19.03 | 30.70 | 25.16 | 1.19 | 0.70 | 31.77 | 15.97 | 4.12 |
| 1300.00 | 13.70 | 19.05 | 29.46 | 24.39 | 1.19 | 0.71 | 31.51 | 15.95 | 4.20 |
| 1400.00 | 13.63 | 19.07 | 28.47 | 23.59 | 1.20 | 0.71 | 31.22 | 15.75 | 4.13 |
| 1500.00 | 13.57 | 19.13 | 27.50 | 23.03 | 1.21 | 0.72 | 31.22 | 15.93 | 4.13 |
| 1600.00 | 13.51 | 19.14 | 26.96 | 22.53 | 1.21 | 0.72 | 30.97 | 15.86 | 4.17 |
| 1700.00 | 13.44 | 19.16 | 26.14 | 21.99 | 1.22 | 0.73 | 30.82 | 15.85 | 4.14 |
| 1800.00 | 13.37 | 19.19 | 25.83 | 21.68 | 1.23 | 0.73 | 30.45 | 15.66 | 4.24 |
| 1900.00 | 13.30 | 19.25 | 25.19 | 21.34 | 1.24 | 0.74 | 30.40 | 15.48 | 4.19 |
| 2000.00 | 13.23 | 19.24 | 24.68 | 21.00 | 1.24 | 0.74 | 29.96 | 15.29 | 4.20 |
| 2250.00 | 13.05 | 19.36 | 23.88 | 20.58 | 1.27 | 0.76 | 28.84 | 14.66 | 4.16 |
| 2500.00 | 12.87 | 19.46 | 23.10 | 20.29 | 1.29 | 0.77 | 28.10 | 14.37 | 4.22 |
| 2750.00 | 12.67 | 19.56 | 22.53 | 20.19 | 1.32 | 0.79 | 27.53 | 13.91 | 4.24 |
| 3000.00 | 12.47 | 19.74 | 21.65 | 20.40 | 1.40 | 0.82 | 26.63 | 13.20 | 4.16 |
| 3250.00 | 12.28 | 19.89 | 21.03 | 20.34 | 1.44 | 0.83 | 25.62 | 12.48 | 4.29 |
| 3500.00 | 12.05 | 20.07 | 20.56 | 20.82 | 1.48 | 0.85 | 25.12 | 12.03 | 4.36 |
| 3750.00 | 11.87 | 20.20 | 19.69 | 21.05 | 1.53 | 0.86 | 24.74 | 11.46 | 4.43 |
| 4000.00 | 11.67 | 20.41 | 18.80 | 20.95 | 1.59 | 0.88 | 23.90 | 11.03 | 4.38 |
| 4250.00 | 11.45 | 20.60 | 18.30 | 21.03 | 1.68 | 0.89 | 23.16 | 10.49 | 4.45 |
| 4500.00 | 11.20 | 20.98 | 16.50 | 20.62 | 1.70 | 0.91 | 22.81 | 10.23 | 4.45 |
| 4750.00 | 11.00 | 20.99 | 15.49 | 20.36 | 1.78 | 0.92 | 22.29 | 9.79 | 4.57 |
| 5000.00 | 10.74 | 21.24 | 15.19 | 20.49 | 1.91 | 0.94 | 21.23 | 9.15 | 4.67 |
| 5250.00 | 10.47 | 21.76 | 13.80 | 20.47 | 1.92 | 0.95 | 20.96 | 8.58 | 4.71 |
| 5500.00 | 10.34 | 21.79 | 13.66 | 21.21 | 2.12 | 0.97 | 21.07 | 8.46 | 4.94 |
| 5750.00 | 10.11 | 22.59 | 12.34 | 20.24 | 2.14 | 0.99 | 20.11 | 7.98 | 4.99 |
| 6000.00 | 9.94 | 22.68 | 11.70 | 19.42 | 2.18 | 1.01 | 19.38 | 7.49 | 5.21 |
| 6250.00 | 9.69 | 22.76 | 11.08 | 18.63 | 2.25 | 1.02 | 19.57 | 7.43 | 5.24 |
| 6500.00 | 9.41 | 22.91 | 10.54 | 18.23 | 2.37 | 1.04 | 19.42 | 7.50 | 5.35 |
| 6750.00 | 9.33 | 23.50 | 10.10 | 17.03 | 2.38 | 1.05 | 18.37 | 7.24 | 5.44 |
| 7000.00 | 9.09 | 23.45 | 9.74 | 16.28 | 2.45 | 1.06 | 17.96 | 6.57 | 5.72 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=78mA, Vd = 4.55V @ Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.45 | 18.78 | 46.11 | 40.97 | 1.13 | 0.63 | 38.38 | 17.72 | 4.27 |
| 50.00 | 14.50 | 19.10 | 41.33 | 50.48 | 1.14 | 0.65 | 39.09 | 18.41 | 4.23 |
| 100.00 | 14.47 | 19.07 | 40.04 | 47.52 | 1.14 | 0.65 | 38.99 | 18.30 | 4.24 |
| 200.00 | 14.43 | 19.10 | 39.11 | 42.76 | 1.15 | 0.66 | 38.54 | 18.20 | 4.19 |
| 300.00 | 14.39 | 19.07 | 40.77 | 38.38 | 1.15 | 0.66 | 38.64 | 18.28 | 4.28 |
| 400.00 | 14.34 | 19.10 | 40.41 | 34.97 | 1.15 | 0.67 | 37.27 | 18.54 | 4.40 |
| 500.00 | 14.29 | 19.09 | 38.42 | 32.96 | 1.16 | 0.67 | 36.67 | 18.63 | 4.45 |
| 600.00 | 14.25 | 19.10 | 36.75 | 30.88 | 1.16 | 0.67 | 35.27 | 18.41 | 4.31 |
| 700.00 | 14.20 | 19.10 | 34.25 | 29.18 | 1.16 | 0.68 | 35.39 | 18.40 | 4.34 |
| 800.00 | 14.15 | 19.11 | 32.70 | 27.64 | 1.17 | 0.68 | 35.47 | 18.30 | 4.29 |
| 900.00 | 14.10 | 19.13 | 30.83 | 26.35 | 1.17 | 0.68 | 35.01 | 18.50 | 4.32 |
| 1000.00 | 14.04 | 19.15 | 29.44 | 25.36 | 1.17 | 0.69 | 34.66 | 18.19 | 4.37 |
| 1100.00 | 13.98 | 19.17 | 28.34 | 24.40 | 1.18 | 0.69 | 34.62 | 18.18 | 4.31 |
| 1200.00 | 13.93 | 19.19 | 27.39 | 23.63 | 1.18 | 0.70 | 34.35 | 18.08 | 4.38 |
| 1300.00 | 13.87 | 19.19 | 26.54 | 22.97 | 1.19 | 0.70 | 33.97 | 18.00 | 4.36 |
| 1400.00 | 13.80 | 19.22 | 25.75 | 22.24 | 1.19 | 0.71 | 33.54 | 17.49 | 4.29 |
| 1500.00 | 13.74 | 19.27 | 25.02 | 21.78 | 1.20 | 0.71 | 33.04 | 17.26 | 4.31 |
| 1600.00 | 13.67 | 19.28 | 24.58 | 21.32 | 1.21 | 0.72 | 32.82 | 17.20 | 4.39 |
| 1700.00 | 13.61 | 19.31 | 24.00 | 20.86 | 1.21 | 0.72 | 32.82 | 17.17 | 4.32 |
| 1800.00 | 13.53 | 19.34 | 23.70 | 20.61 | 1.22 | 0.73 | 32.44 | 16.79 | 4.42 |
| 1900.00 | 13.46 | 19.39 | 23.27 | 20.28 | 1.23 | 0.74 | 32.26 | 16.69 | 4.40 |
| 2000.00 | 13.40 | 19.39 | 22.89 | 20.01 | 1.24 | 0.74 | 32.14 | 16.68 | 4.39 |
| 2250.00 | 13.22 | 19.50 | 22.35 | 19.60 | 1.26 | 0.75 | 30.61 | 15.80 | 4.38 |
| 2500.00 | 13.03 | 19.60 | 21.81 | 19.36 | 1.29 | 0.77 | 29.84 | 15.63 | 4.40 |
| 2750.00 | 12.84 | 19.70 | 21.45 | 19.28 | 1.32 | 0.78 | 29.41 | 15.24 | 4.45 |
| 3000.00 | 12.63 | 19.85 | 21.03 | 19.51 | 1.39 | 0.81 | 28.34 | 14.58 | 4.34 |
| 3250.00 | 12.45 | 19.99 | 20.55 | 19.43 | 1.44 | 0.83 | 27.40 | 13.93 | 4.54 |
| 3500.00 | 12.22 | 20.20 | 20.32 | 19.88 | 1.47 | 0.84 | 26.86 | 13.50 | 4.63 |
| 3750.00 | 12.05 | 20.28 | 19.61 | 20.08 | 1.52 | 0.86 | 26.43 | 12.94 | 4.73 |
| 4000.00 | 11.85 | 20.49 | 18.80 | 19.98 | 1.57 | 0.87 | 25.60 | 12.52 | 4.64 |
| 4250.00 | 11.64 | 20.68 | 18.38 | 20.08 | 1.66 | 0.89 | 24.88 | 11.93 | 4.73 |
| 4500.00 | 11.40 | 21.03 | 16.63 | 19.69 | 1.68 | 0.90 | 24.59 | 11.73 | 4.72 |
| 4750.00 | 11.21 | 21.03 | 15.68 | 19.45 | 1.74 | 0.91 | 24.01 | 11.27 | 4.86 |
| 5000.00 | 10.96 | 21.24 | 15.45 | 19.56 | 1.87 | 0.93 | 22.92 | 10.62 | 5.00 |
| 5250.00 | 10.69 | 21.74 | 14.13 | 19.70 | 1.87 | 0.94 | 22.72 | 10.07 | 5.08 |
| 5500.00 | 10.59 | 21.77 | 14.13 | 20.40 | 2.08 | 0.96 | 22.93 | 10.00 | 5.25 |
| 5750.00 | 10.37 | 22.57 | 12.83 | 19.81 | 2.07 | 0.98 | 22.00 | 9.52 | 5.36 |
| 6000.00 | 10.22 | 22.57 | 12.20 | 19.20 | 2.12 | 0.99 | 21.31 | 9.03 | 5.57 |
| 6250.00 | 9.99 | 22.67 | 11.59 | 18.55 | 2.18 | 1.01 | 21.55 | 8.95 | 5.58 |
| 6500.00 | 9.73 | 22.81 | 11.13 | 18.47 | 2.29 | 1.02 | 21.41 | 9.05 | 5.79 |
| 6750.00 | 9.67 | 23.35 | 10.69 | 17.40 | 2.29 | 1.03 | 20.39 | 8.75 | 5.87 |
| 7000.00 | 9.45 | 23.28 | 10.40 | 16.79 | 2.35 | 1.04 | 20.04 | 8.06 | 6.12 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=65mA, Vd = 4.64V @Temperature = -45degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.49 | 18.94 | 36.65 | 41.53 | 1.13 | 0.64 | 37.28 | 17.74 | 3.55 |
| 50.00 | 14.52 | 19.05 | 31.82 | 38.95 | 1.14 | 0.65 | 37.27 | 18.20 | 3.52 |
| 100.00 | 14.49 | 19.02 | 30.82 | 37.17 | 1.14 | 0.65 | 37.22 | 18.06 | 3.51 |
| 200.00 | 14.46 | 19.04 | 30.60 | 34.34 | 1.14 | 0.65 | 36.76 | 17.89 | 3.45 |
| 300.00 | 14.43 | 19.07 | 36.91 | 35.98 | 1.15 | 0.66 | 36.71 | 17.83 | 3.54 |
| 400.00 | 14.40 | 19.05 | 37.88 | 35.26 | 1.15 | 0.66 | 36.14 | 17.98 | 3.60 |
| 500.00 | 14.36 | 19.04 | 37.61 | 33.43 | 1.15 | 0.66 | 35.77 | 18.07 | 3.58 |
| 600.00 | 14.32 | 19.05 | 38.08 | 31.23 | 1.15 | 0.66 | 35.27 | 17.87 | 3.56 |
| 700.00 | 14.27 | 19.04 | 34.92 | 30.03 | 1.15 | 0.67 | 34.88 | 17.82 | 3.53 |
| 800.00 | 14.23 | 19.02 | 35.21 | 28.46 | 1.15 | 0.67 | 34.78 | 17.84 | 3.51 |
| 900.00 | 14.19 | 19.04 | 32.90 | 27.39 | 1.16 | 0.67 | 34.60 | 18.00 | 3.50 |
| 1000.00 | 14.14 | 19.06 | 30.80 | 26.42 | 1.16 | 0.68 | 34.37 | 17.53 | 3.54 |
| 1100.00 | 14.08 | 19.05 | 29.83 | 25.35 | 1.16 | 0.68 | 34.45 | 17.74 | 3.47 |
| 1200.00 | 14.03 | 19.06 | 28.15 | 24.29 | 1.17 | 0.68 | 34.16 | 17.79 | 3.53 |
| 1300.00 | 13.98 | 19.08 | 27.18 | 23.32 | 1.17 | 0.69 | 34.07 | 17.75 | 3.51 |
| 1400.00 | 13.92 | 19.11 | 25.94 | 22.66 | 1.18 | 0.69 | 33.70 | 17.50 | 3.44 |
| 1500.00 | 13.86 | 19.13 | 24.99 | 21.88 | 1.18 | 0.70 | 33.54 | 17.48 | 3.52 |
| 1600.00 | 13.80 | 19.15 | 24.18 | 21.31 | 1.19 | 0.70 | 33.47 | 17.38 | 3.52 |
| 1700.00 | 13.74 | 19.17 | 23.70 | 20.74 | 1.19 | 0.71 | 33.19 | 17.37 | 3.48 |
| 1800.00 | 13.67 | 19.21 | 23.34 | 20.32 | 1.20 | 0.71 | 32.88 | 16.99 | 3.57 |
| 1900.00 | 13.60 | 19.23 | 22.84 | 19.96 | 1.21 | 0.72 | 32.74 | 16.87 | 3.55 |
| 2000.00 | 13.53 | 19.28 | 22.18 | 19.33 | 1.22 | 0.72 | 32.48 | 16.79 | 3.52 |
| 2250.00 | 13.37 | 19.34 | 21.18 | 18.79 | 1.23 | 0.73 | 31.34 | 16.09 | 3.48 |
| 2500.00 | 13.20 | 19.45 | 21.08 | 18.86 | 1.26 | 0.75 | 30.63 | 15.89 | 3.57 |
| 2750.00 | 13.01 | 19.54 | 21.12 | 19.28 | 1.28 | 0.77 | 30.07 | 15.43 | 3.50 |
| 3000.00 | 12.84 | 19.63 | 21.95 | 19.75 | 1.34 | 0.80 | 29.22 | 14.79 | 3.42 |
| 3250.00 | 12.64 | 19.78 | 21.12 | 19.96 | 1.38 | 0.81 | 28.12 | 14.04 | 3.60 |
| 3500.00 | 12.46 | 19.90 | 21.00 | 20.04 | 1.42 | 0.83 | 27.58 | 13.59 | 3.62 |
| 3750.00 | 12.26 | 20.09 | 19.94 | 19.79 | 1.46 | 0.84 | 27.30 | 12.97 | 3.72 |
| 4000.00 | 12.06 | 20.25 | 19.04 | 19.74 | 1.50 | 0.85 | 26.34 | 12.61 | 3.71 |
| 4250.00 | 11.91 | 20.39 | 17.61 | 19.83 | 1.55 | 0.87 | 25.49 | 12.02 | 3.71 |
| 4500.00 | 11.73 | 20.64 | 16.77 | 19.32 | 1.60 | 0.88 | 25.49 | 11.82 | 3.74 |
| 4750.00 | 11.51 | 20.80 | 15.48 | 18.55 | 1.70 | 0.90 | 24.80 | 11.39 | 3.84 |
| 5000.00 | 11.15 | 21.19 | 14.39 | 17.92 | 1.73 | 0.91 | 23.47 | 10.70 | 3.88 |
| 5250.00 | 10.96 | 21.30 | 13.26 | 17.83 | 1.75 | 0.93 | 23.45 | 10.19 | 4.03 |
| 5500.00 | 10.79 | 21.33 | 12.78 | 18.89 | 1.86 | 0.95 | 23.61 | 10.11 | 4.08 |
| 5750.00 | 10.68 | 21.93 | 12.36 | 19.20 | 1.94 | 0.97 | 22.41 | 9.62 | 4.16 |
| 6000.00 | 10.56 | 22.27 | 11.24 | 18.02 | 1.91 | 0.99 | 21.78 | 9.11 | 4.37 |
| 6250.00 | 10.24 | 22.07 | 11.27 | 18.18 | 2.03 | 1.00 | 22.22 | 9.20 | 4.41 |
| 6500.00 | 10.00 | 22.45 | 11.54 | 18.84 | 2.17 | 1.01 | 22.05 | 9.29 | 4.59 |
| 6750.00 | 9.82 | 22.88 | 10.95 | 17.73 | 2.11 | 1.02 | 20.61 | 9.07 | 4.58 |
| 7000.00 | 10.06 | 23.08 | 11.05 | 17.22 | 2.20 | 1.02 | 20.49 | 8.44 | 4.85 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id= 52mA; Vd= 4.52V; @ Temperature = -45 deg C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.40 | 19.40 | 34.71 | 35.79 | 1.17 | 0.68 | 33.64 | 16.33 | 3.45 |
| 50.00 | 14.42 | 18.97 | 29.71 | 34.32 | 1.14 | 0.65 | 33.35 | 16.46 | 3.45 |
| 100.00 | 14.39 | 19.04 | 28.86 | 33.18 | 1.15 | 0.66 | 33.28 | 16.26 | 3.44 |
| 200.00 | 14.36 | 18.96 | 28.70 | 31.46 | 1.14 | 0.65 | 33.05 | 16.10 | 3.40 |
| 300.00 | 14.33 | 18.96 | 33.44 | 34.65 | 1.14 | 0.66 | 33.27 | 16.09 | 3.50 |
| 400.00 | 14.30 | 18.96 | 35.27 | 36.02 | 1.15 | 0.66 | 32.97 | 16.24 | 3.53 |
| 500.00 | 14.26 | 18.97 | 35.95 | 34.70 | 1.15 | 0.66 | 33.05 | 16.43 | 3.55 |
| 600.00 | 14.23 | 18.93 | 38.17 | 32.42 | 1.15 | 0.66 | 32.97 | 16.25 | 3.47 |
| 700.00 | 14.18 | 18.94 | 36.88 | 31.33 | 1.15 | 0.67 | 32.74 | 16.15 | 3.41 |
| 800.00 | 14.14 | 18.96 | 37.47 | 29.65 | 1.16 | 0.67 | 32.69 | 16.27 | 3.37 |
| 900.00 | 14.10 | 18.95 | 34.86 | 28.39 | 1.16 | 0.67 | 32.71 | 16.32 | 3.42 |
| 1000.00 | 14.05 | 18.96 | 32.66 | 27.40 | 1.16 | 0.68 | 32.32 | 15.73 | 3.44 |
| 1100.00 | 14.00 | 18.99 | 31.74 | 26.19 | 1.17 | 0.68 | 32.20 | 16.05 | 3.41 |
| 1200.00 | 13.95 | 19.00 | 29.75 | 25.08 | 1.17 | 0.69 | 32.45 | 16.15 | 3.46 |
| 1300.00 | 13.89 | 19.00 | 28.80 | 24.04 | 1.17 | 0.69 | 32.31 | 16.15 | 3.42 |
| 1400.00 | 13.83 | 19.05 | 27.26 | 23.38 | 1.18 | 0.70 | 32.20 | 16.03 | 3.34 |
| 1500.00 | 13.78 | 19.06 | 26.18 | 22.52 | 1.18 | 0.70 | 32.24 | 16.34 | 3.37 |
| 1600.00 | 13.71 | 19.08 | 25.28 | 21.90 | 1.19 | 0.70 | 32.04 | 16.21 | 3.38 |
| 1700.00 | 13.66 | 19.09 | 24.73 | 21.29 | 1.19 | 0.71 | 31.91 | 16.26 | 3.38 |
| 1800.00 | 13.59 | 19.13 | 24.33 | 20.83 | 1.20 | 0.71 | 31.60 | 16.10 | 3.50 |
| 1900.00 | 13.52 | 19.17 | 23.67 | 20.47 | 1.21 | 0.72 | 31.49 | 15.91 | 3.44 |
| 2000.00 | 13.45 | 19.21 | 22.97 | 19.79 | 1.22 | 0.72 | 30.99 | 15.67 | 3.42 |
| 2250.00 | 13.29 | 19.29 | 21.83 | 19.24 | 1.24 | 0.74 | 30.29 | 15.31 | 3.37 |
| 2500.00 | 13.12 | 19.37 | 21.58 | 19.30 | 1.26 | 0.75 | 29.56 | 15.03 | 3.47 |
| 2750.00 | 12.94 | 19.45 | 21.60 | 19.76 | 1.28 | 0.77 | 29.01 | 14.59 | 3.45 |
| 3000.00 | 12.77 | 19.57 | 22.24 | 20.24 | 1.35 | 0.80 | 28.19 | 13.95 | 3.37 |
| 3250.00 | 12.56 | 19.75 | 21.31 | 20.44 | 1.38 | 0.81 | 27.11 | 13.24 | 3.46 |
| 3500.00 | 12.38 | 19.86 | 21.13 | 20.52 | 1.42 | 0.83 | 26.64 | 12.77 | 3.52 |
| 3750.00 | 12.19 | 20.04 | 20.08 | 20.28 | 1.47 | 0.84 | 26.36 | 12.13 | 3.58 |
| 4000.00 | 11.98 | 20.23 | 19.09 | 20.19 | 1.50 | 0.85 | 25.47 | 11.78 | 3.54 |
| 4250.00 | 11.82 | 20.35 | 17.64 | 20.22 | 1.55 | 0.87 | 24.62 | 11.21 | 3.61 |
| 4500.00 | 11.64 | 20.58 | 16.69 | 19.79 | 1.61 | 0.88 | 24.53 | 11.08 | 3.60 |
| 4750.00 | 11.41 | 20.78 | 15.53 | 18.97 | 1.71 | 0.91 | 23.90 | 10.56 | 3.69 |
| 5000.00 | 11.08 | 21.16 | 14.37 | 18.46 | 1.74 | 0.92 | 22.60 | 9.92 | 3.75 |
| 5250.00 | 10.90 | 21.29 | 13.26 | 17.95 | 1.78 | 0.93 | 22.57 | 9.34 | 3.84 |
| 5500.00 | 10.65 | 21.35 | 12.62 | 19.33 | 1.88 | 0.96 | 22.80 | 9.27 | 3.94 |
| 5750.00 | 10.59 | 21.92 | 12.14 | 19.64 | 1.96 | 0.98 | 21.53 | 8.80 | 4.11 |
| 6000.00 | 10.43 | 22.31 | 11.05 | 18.23 | 1.95 | 1.00 | 20.76 | 8.30 | 4.23 |
| 6250.00 | 10.13 | 22.18 | 11.02 | 18.57 | 2.05 | 1.01 | 21.22 | 8.45 | 4.25 |
| 6500.00 | 9.88 | 22.44 | 11.42 | 18.79 | 2.15 | 1.01 | 20.96 | 8.49 | 4.46 |
| 6750.00 | 9.80 | 22.81 | 10.56 | 17.45 | 2.15 | 1.03 | 19.60 | 8.25 | 4.36 |
| 7000.00 | 9.88 | 23.17 | 10.65 | 17.13 | 2.26 | 1.04 | 19.38 | 7.80 | 4.53 |

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=78mA, Vd = 4.74V @Temperature = -45degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.53 | 18.76 | 50.30 | 40.98 | 1.12 | 0.62 | 39.04 | 18.29 | 3.68 |
| 50.00 | 14.58 | 19.13 | 33.72 | 45.70 | 1.14 | 0.65 | 39.90 | 18.99 | 3.64 |
| 100.00 | 14.55 | 19.07 | 32.02 | 41.55 | 1.14 | 0.65 | 39.87 | 18.88 | 3.59 |
| 200.00 | 14.52 | 19.11 | 32.14 | 36.57 | 1.14 | 0.65 | 39.41 | 18.75 | 3.58 |
| 300.00 | 14.49 | 19.09 | 40.22 | 35.40 | 1.14 | 0.65 | 39.41 | 18.78 | 3.67 |
| 400.00 | 14.46 | 19.11 | 38.67 | 34.04 | 1.15 | 0.66 | 38.07 | 19.02 | 3.72 |
| 500.00 | 14.42 | 19.07 | 37.13 | 32.17 | 1.15 | 0.66 | 37.37 | 19.10 | 3.77 |
| 600.00 | 14.38 | 19.08 | 36.76 | 30.06 | 1.15 | 0.66 | 35.89 | 18.87 | 3.63 |
| 700.00 | 14.33 | 19.09 | 33.51 | 29.06 | 1.15 | 0.66 | 36.22 | 18.86 | 3.62 |
| 800.00 | 14.29 | 19.09 | 33.43 | 27.68 | 1.15 | 0.67 | 35.95 | 18.79 | 3.68 |
| 900.00 | 14.25 | 19.08 | 31.38 | 26.65 | 1.16 | 0.67 | 35.58 | 19.03 | 3.63 |
| 1000.00 | 14.20 | 19.08 | 29.57 | 25.80 | 1.16 | 0.67 | 35.52 | 18.65 | 3.71 |
| 1100.00 | 14.14 | 19.10 | 28.76 | 24.77 | 1.16 | 0.68 | 35.63 | 18.73 | 3.58 |
| 1200.00 | 14.09 | 19.12 | 27.06 | 23.77 | 1.17 | 0.68 | 35.04 | 18.70 | 3.67 |
| 1300.00 | 14.04 | 19.13 | 26.24 | 22.83 | 1.17 | 0.69 | 35.04 | 18.61 | 3.62 |
| 1400.00 | 13.98 | 19.16 | 25.09 | 22.21 | 1.18 | 0.69 | 34.66 | 18.22 | 3.55 |
| 1500.00 | 13.92 | 19.19 | 24.26 | 21.48 | 1.18 | 0.70 | 34.22 | 17.99 | 3.58 |
| 1600.00 | 13.85 | 19.19 | 23.49 | 20.92 | 1.19 | 0.70 | 34.31 | 17.91 | 3.64 |
| 1700.00 | 13.80 | 19.23 | 23.04 | 20.37 | 1.19 | 0.71 | 33.99 | 17.88 | 3.61 |
| 1800.00 | 13.72 | 19.24 | 22.72 | 19.96 | 1.20 | 0.71 | 33.53 | 17.48 | 3.66 |
| 1900.00 | 13.66 | 19.29 | 22.26 | 19.64 | 1.21 | 0.72 | 33.65 | 17.35 | 3.60 |
| 2000.00 | 13.59 | 19.34 | 21.64 | 18.99 | 1.21 | 0.72 | 33.14 | 17.38 | 3.61 |
| 2250.00 | 13.42 | 19.39 | 20.77 | 18.51 | 1.23 | 0.73 | 31.91 | 16.58 | 3.61 |
| 2500.00 | 13.25 | 19.49 | 20.65 | 18.57 | 1.26 | 0.75 | 31.31 | 16.43 | 3.69 |
| 2750.00 | 13.07 | 19.57 | 20.76 | 19.02 | 1.28 | 0.76 | 30.73 | 16.01 | 3.66 |
| 3000.00 | 12.90 | 19.69 | 21.70 | 19.53 | 1.34 | 0.80 | 29.83 | 15.42 | 3.59 |
| 3250.00 | 12.71 | 19.84 | 20.90 | 19.70 | 1.37 | 0.81 | 28.90 | 14.73 | 3.73 |
| 3500.00 | 12.52 | 19.95 | 20.84 | 19.73 | 1.42 | 0.83 | 28.26 | 14.30 | 3.79 |
| 3750.00 | 12.32 | 20.15 | 19.80 | 19.52 | 1.46 | 0.84 | 27.97 | 13.70 | 3.81 |
| 4000.00 | 12.13 | 20.30 | 18.92 | 19.48 | 1.49 | 0.85 | 27.13 | 13.34 | 3.78 |
| 4250.00 | 11.97 | 20.42 | 17.56 | 19.43 | 1.54 | 0.87 | 26.33 | 12.72 | 3.83 |
| 4500.00 | 11.79 | 20.65 | 16.66 | 19.02 | 1.59 | 0.88 | 26.10 | 12.57 | 3.87 |
| 4750.00 | 11.57 | 20.81 | 15.52 | 17.98 | 1.69 | 0.90 | 25.48 | 12.12 | 4.01 |
| 5000.00 | 11.24 | 21.21 | 14.46 | 17.80 | 1.72 | 0.91 | 24.17 | 11.40 | 4.07 |
| 5250.00 | 11.03 | 21.30 | 13.17 | 17.39 | 1.73 | 0.92 | 24.19 | 10.92 | 4.17 |
| 5500.00 | 10.88 | 21.29 | 12.89 | 18.67 | 1.83 | 0.95 | 24.53 | 10.86 | 4.29 |
| 5750.00 | 10.77 | 21.84 | 12.64 | 18.82 | 1.93 | 0.96 | 23.28 | 10.35 | 4.35 |
| 6000.00 | 10.66 | 22.30 | 11.37 | 17.81 | 1.88 | 0.98 | 22.63 | 9.90 | 4.52 |
| 6250.00 | 10.38 | 22.02 | 11.58 | 18.05 | 2.00 | 0.99 | 23.14 | 9.95 | 4.57 |
| 6500.00 | 10.14 | 22.36 | 11.85 | 18.57 | 2.13 | 1.00 | 22.86 | 10.05 | 4.74 |
| 6750.00 | 9.97 | 22.79 | 11.10 | 17.98 | 2.09 | 1.02 | 21.56 | 9.80 | 4.68 |
| 7000.00 | 10.15 | 23.02 | 11.16 | 17.80 | 2.17 | 1.02 | 21.35 | 9.28 | 4.99 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=65mA, Vd = 4.26V @Temperature = +85degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.31 | 18.80 | 38.62 | 44.01 | 1.14 | 0.64 | 36.04 | 17.17 | 4.60 |
| 50.00 | 14.34 | 18.97 | 41.76 | 51.25 | 1.15 | 0.66 | 35.79 | 17.53 | 4.63 |
| 100.00 | 14.31 | 18.98 | 44.26 | 39.80 | 1.15 | 0.66 | 35.71 | 17.41 | 4.61 |
| 200.00 | 14.27 | 18.98 | 41.59 | 42.05 | 1.15 | 0.66 | 35.41 | 17.29 | 4.58 |
| 300.00 | 14.22 | 19.00 | 42.05 | 39.31 | 1.16 | 0.67 | 35.40 | 17.24 | 4.70 |
| 400.00 | 14.17 | 19.00 | 41.50 | 37.62 | 1.16 | 0.67 | 34.84 | 17.42 | 4.79 |
| 500.00 | 14.12 | 19.00 | 38.39 | 35.85 | 1.16 | 0.67 | 34.54 | 17.44 | 4.81 |
| 600.00 | 14.08 | 19.04 | 40.39 | 32.47 | 1.17 | 0.68 | 34.25 | 17.19 | 4.83 |
| 700.00 | 14.02 | 19.01 | 37.63 | 30.79 | 1.17 | 0.68 | 33.43 | 17.17 | 4.82 |
| 800.00 | 13.97 | 19.06 | 36.36 | 29.43 | 1.17 | 0.69 | 33.44 | 17.10 | 4.78 |
| 900.00 | 13.92 | 19.05 | 34.28 | 28.09 | 1.18 | 0.69 | 33.28 | 17.29 | 4.82 |
| 1000.00 | 13.86 | 19.07 | 33.19 | 27.07 | 1.18 | 0.70 | 32.95 | 16.89 | 4.81 |
| 1100.00 | 13.80 | 19.08 | 32.14 | 25.94 | 1.19 | 0.70 | 32.74 | 16.97 | 4.80 |
| 1200.00 | 13.74 | 19.11 | 30.84 | 25.05 | 1.19 | 0.71 | 32.41 | 16.91 | 4.87 |
| 1300.00 | 13.67 | 19.16 | 29.80 | 24.27 | 1.20 | 0.71 | 32.24 | 16.84 | 4.87 |
| 1400.00 | 13.61 | 19.16 | 28.72 | 23.55 | 1.21 | 0.72 | 31.77 | 16.40 | 4.82 |
| 1500.00 | 13.54 | 19.20 | 28.02 | 22.98 | 1.21 | 0.72 | 31.38 | 16.23 | 4.83 |
| 1600.00 | 13.47 | 19.21 | 27.30 | 22.44 | 1.22 | 0.73 | 31.24 | 16.12 | 4.86 |
| 1700.00 | 13.40 | 19.26 | 26.37 | 21.87 | 1.23 | 0.73 | 31.07 | 16.09 | 4.84 |
| 1800.00 | 13.33 | 19.28 | 25.89 | 21.52 | 1.24 | 0.74 | 30.61 | 15.71 | 4.87 |
| 1900.00 | 13.25 | 19.33 | 25.34 | 21.19 | 1.25 | 0.75 | 30.43 | 15.54 | 4.93 |
| 2000.00 | 13.17 | 19.38 | 25.03 | 20.82 | 1.26 | 0.75 | 30.21 | 15.49 | 4.90 |
| 2250.00 | 12.99 | 19.49 | 23.89 | 20.36 | 1.28 | 0.77 | 28.70 | 14.59 | 4.89 |
| 2500.00 | 12.79 | 19.60 | 23.48 | 20.22 | 1.31 | 0.78 | 27.98 | 14.39 | 5.07 |
| 2750.00 | 12.58 | 19.73 | 22.95 | 20.08 | 1.35 | 0.80 | 27.41 | 13.98 | 4.99 |
| 3000.00 | 12.38 | 19.88 | 21.97 | 20.34 | 1.43 | 0.83 | 26.49 | 13.26 | 4.94 |
| 3250.00 | 12.15 | 20.03 | 21.29 | 20.45 | 1.48 | 0.84 | 25.51 | 12.58 | 5.09 |
| 3500.00 | 11.94 | 20.24 | 20.62 | 20.83 | 1.53 | 0.86 | 25.01 | 12.11 | 5.16 |
| 3750.00 | 11.71 | 20.43 | 19.25 | 20.53 | 1.59 | 0.87 | 24.52 | 11.53 | 5.28 |
| 4000.00 | 11.48 | 20.62 | 18.15 | 20.67 | 1.64 | 0.89 | 23.75 | 11.16 | 5.22 |
| 4250.00 | 11.26 | 20.81 | 17.57 | 20.95 | 1.74 | 0.91 | 23.03 | 10.56 | 5.37 |
| 4500.00 | 11.02 | 21.18 | 16.02 | 20.90 | 1.77 | 0.92 | 22.56 | 10.27 | 5.37 |
| 4750.00 | 10.79 | 21.24 | 15.52 | 20.02 | 1.91 | 0.93 | 22.16 | 9.84 | 5.51 |
| 5000.00 | 10.40 | 21.66 | 14.81 | 20.84 | 2.02 | 0.95 | 21.37 | 9.26 | 5.61 |
| 5250.00 | 10.23 | 22.08 | 13.60 | 20.39 | 2.04 | 0.97 | 20.79 | 8.54 | 5.74 |
| 5500.00 | 9.99 | 22.08 | 12.83 | 20.43 | 2.11 | 0.99 | 20.69 | 8.31 | 5.87 |
| 5750.00 | 9.83 | 22.38 | 12.73 | 20.99 | 2.35 | 1.00 | 20.13 | 7.93 | 6.01 |
| 6000.00 | 9.64 | 23.27 | 11.82 | 18.89 | 2.32 | 1.01 | 19.54 | 7.35 | 6.18 |
| 6250.00 | 9.44 | 23.11 | 11.29 | 17.62 | 2.36 | 1.02 | 19.44 | 7.36 | 6.25 |
| 6500.00 | 9.14 | 23.12 | 11.29 | 18.47 | 2.77 | 1.04 | 19.28 | 7.50 | 6.34 |
| 6750.00 | 9.07 | 24.55 | 10.06 | 15.82 | 2.50 | 1.05 | 18.52 | 7.26 | 6.52 |
| 7000.00 | 8.90 | 23.83 | 9.66 | 15.24 | 2.51 | 1.06 | 18.11 | 6.57 | 6.79 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Id=52mA, Vd = 4.13V @Temperature = +85degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.19 | 18.65 | 34.30 | 32.36 | 1.13 | 0.64 | 32.42 | 15.89 | 4.52 |
| 50.00 | 14.21 | 18.88 | 35.59 | 37.75 | 1.15 | 0.66 | 32.18 | 16.14 | 4.52 |
| 100.00 | 14.18 | 18.91 | 36.46 | 37.42 | 1.15 | 0.66 | 32.28 | 16.08 | 4.52 |
| 200.00 | 14.14 | 18.90 | 35.75 | 39.83 | 1.15 | 0.67 | 32.09 | 15.91 | 4.53 |
| 300.00 | 14.10 | 18.90 | 35.35 | 37.98 | 1.16 | 0.67 | 32.16 | 15.83 | 4.62 |
| 400.00 | 14.05 | 18.90 | 36.49 | 37.32 | 1.16 | 0.67 | 31.84 | 15.95 | 4.76 |
| 500.00 | 14.00 | 18.90 | 35.33 | 35.64 | 1.16 | 0.68 | 31.90 | 16.06 | 4.66 |
| 600.00 | 13.96 | 18.91 | 37.46 | 33.12 | 1.17 | 0.68 | 31.87 | 15.86 | 4.75 |
| 700.00 | 13.90 | 18.92 | 38.33 | 31.89 | 1.17 | 0.69 | 31.56 | 15.78 | 4.72 |
| 800.00 | 13.85 | 18.93 | 38.26 | 30.65 | 1.17 | 0.69 | 31.44 | 15.82 | 4.68 |
| 900.00 | 13.80 | 18.96 | 37.44 | 29.19 | 1.18 | 0.69 | 31.30 | 15.92 | 4.70 |
| 1000.00 | 13.74 | 18.98 | 36.16 | 28.18 | 1.19 | 0.70 | 30.91 | 15.43 | 4.73 |
| 1100.00 | 13.68 | 19.01 | 35.50 | 27.01 | 1.19 | 0.71 | 30.89 | 15.67 | 4.71 |
| 1200.00 | 13.62 | 19.01 | 34.00 | 26.07 | 1.20 | 0.71 | 30.85 | 15.68 | 4.74 |
| 1300.00 | 13.56 | 19.03 | 32.56 | 25.24 | 1.20 | 0.71 | 30.64 | 15.66 | 4.75 |
| 1400.00 | 13.50 | 19.06 | 31.18 | 24.49 | 1.21 | 0.72 | 30.42 | 15.40 | 4.69 |
| 1500.00 | 13.43 | 19.10 | 30.35 | 23.89 | 1.22 | 0.73 | 30.13 | 15.45 | 4.74 |
| 1600.00 | 13.36 | 19.12 | 29.40 | 23.27 | 1.22 | 0.73 | 30.00 | 15.34 | 4.78 |
| 1700.00 | 13.29 | 19.16 | 28.22 | 22.72 | 1.23 | 0.74 | 29.76 | 15.29 | 4.73 |
| 1800.00 | 13.22 | 19.18 | 27.60 | 22.33 | 1.24 | 0.74 | 29.48 | 15.01 | 4.85 |
| 1900.00 | 13.15 | 19.22 | 26.89 | 21.94 | 1.25 | 0.75 | 29.26 | 14.83 | 4.82 |
| 2000.00 | 13.06 | 19.29 | 26.53 | 21.51 | 1.26 | 0.75 | 28.79 | 14.68 | 4.75 |
| 2250.00 | 12.89 | 19.40 | 25.05 | 21.06 | 1.29 | 0.77 | 27.60 | 13.93 | 4.79 |
| 2500.00 | 12.69 | 19.50 | 24.36 | 20.87 | 1.32 | 0.78 | 26.84 | 13.62 | 4.88 |
| 2750.00 | 12.48 | 19.65 | 23.70 | 20.75 | 1.35 | 0.80 | 26.42 | 13.21 | 4.86 |
| 3000.00 | 12.27 | 19.81 | 22.36 | 20.94 | 1.43 | 0.83 | 25.46 | 12.47 | 4.83 |
| 3250.00 | 12.06 | 19.97 | 21.53 | 21.21 | 1.49 | 0.85 | 24.53 | 11.79 | 4.93 |
| 3500.00 | 11.81 | 20.17 | 20.77 | 21.39 | 1.54 | 0.86 | 23.94 | 11.29 | 5.00 |
| 3750.00 | 11.61 | 20.38 | 19.33 | 21.19 | 1.60 | 0.88 | 23.43 | 10.69 | 5.09 |
| 4000.00 | 11.36 | 20.56 | 18.14 | 21.26 | 1.66 | 0.89 | 22.72 | 10.35 | 5.09 |
| 4250.00 | 11.14 | 20.77 | 17.50 | 21.69 | 1.75 | 0.91 | 22.11 | 9.77 | 5.18 |
| 4500.00 | 10.89 | 21.11 | 15.88 | 21.47 | 1.79 | 0.92 | 21.57 | 9.41 | 5.18 |
| 4750.00 | 10.65 | 21.19 | 15.53 | 20.95 | 1.94 | 0.94 | 21.14 | 9.03 | 5.30 |
| 5000.00 | 10.25 | 21.64 | 14.50 | 21.71 | 2.04 | 0.96 | 20.33 | 8.40 | 5.49 |
| 5250.00 | 10.09 | 22.09 | 13.31 | 20.50 | 2.06 | 0.97 | 19.76 | 7.66 | 5.55 |
| 5500.00 | 9.87 | 22.09 | 12.60 | 20.55 | 2.16 | 0.99 | 19.70 | 7.47 | 5.65 |
| 5750.00 | 9.68 | 22.47 | 12.59 | 21.51 | 2.38 | 1.01 | 19.08 | 7.10 | 5.86 |
| 6000.00 | 9.52 | 23.28 | 11.60 | 18.90 | 2.35 | 1.02 | 18.47 | 6.57 | 5.96 |
| 6250.00 | 9.27 | 23.13 | 10.93 | 17.58 | 2.39 | 1.03 | 18.31 | 6.56 | 6.08 |
| 6500.00 | 8.92 | 23.11 | 11.21 | 18.46 | 2.84 | 1.04 | 18.20 | 6.65 | 6.19 |
| 6750.00 | 8.89 | 24.61 | 9.83 | 15.87 | 2.55 | 1.06 | 17.44 | 6.53 | 6.28 |
| 7000.00 | 8.68 | 23.87 | 9.54 | 15.23 | 2.62 | 1.07 | 17.01 | 5.81 | 6.56 |

MMIC Amplifier

ERA-4+

Typical Performance Data

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

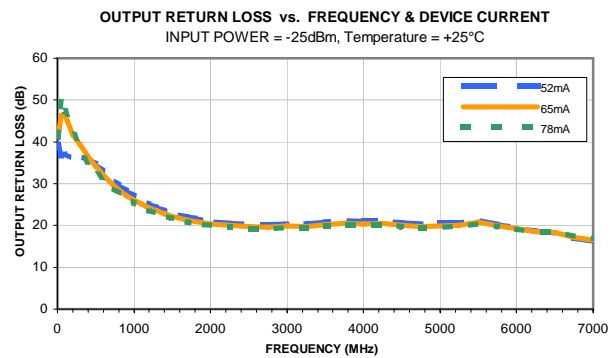
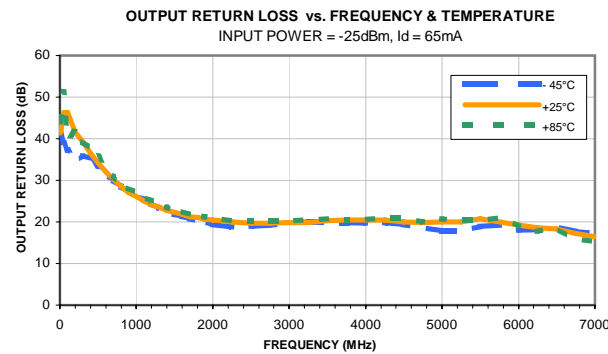
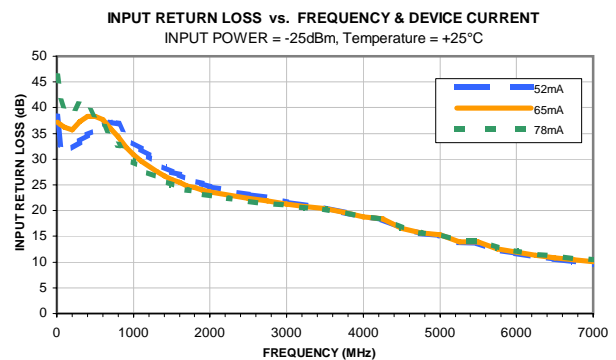
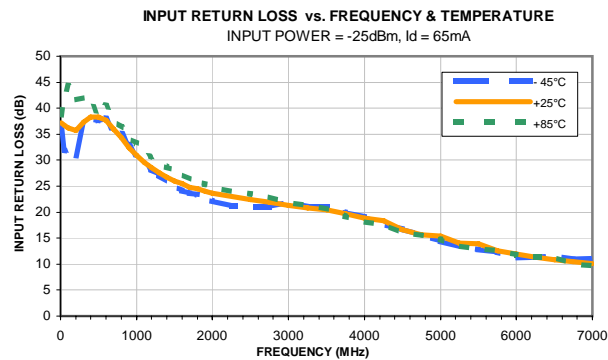
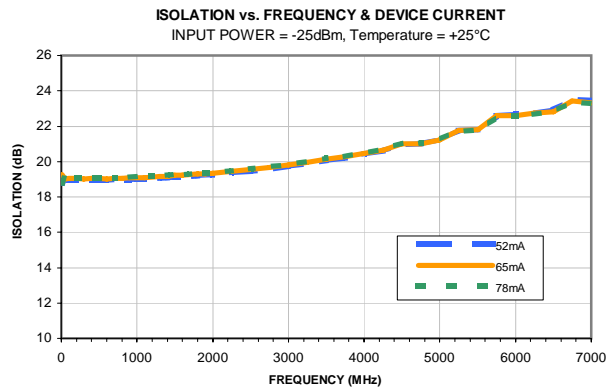
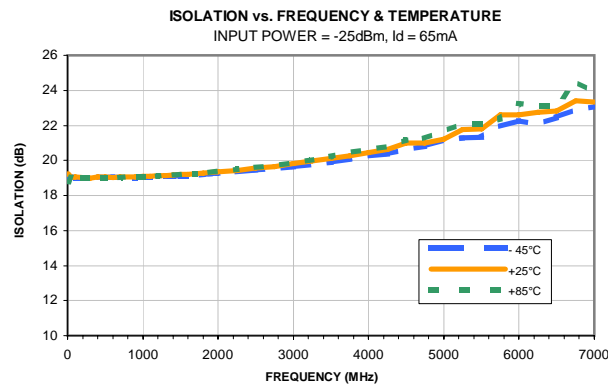
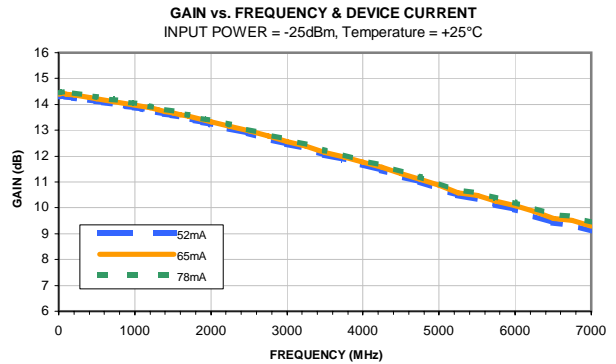
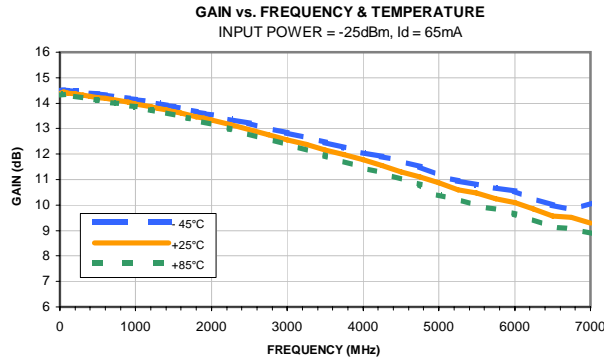
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

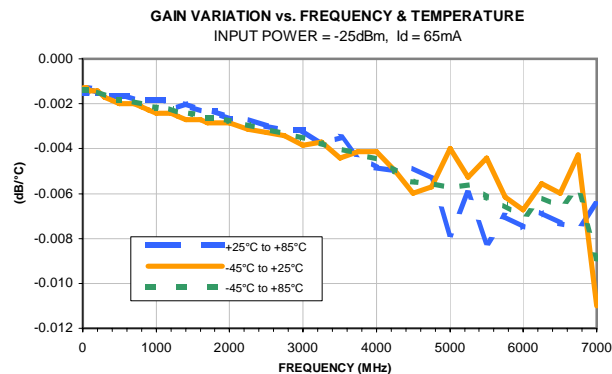
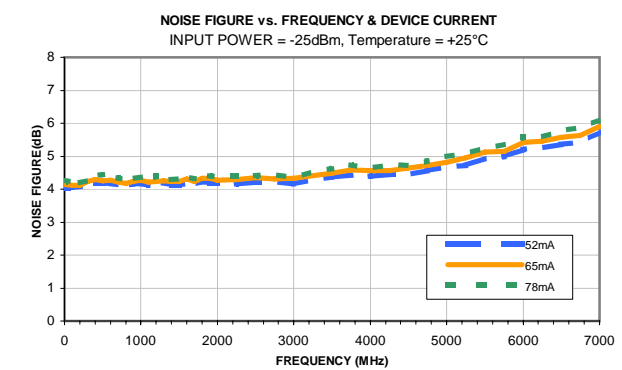
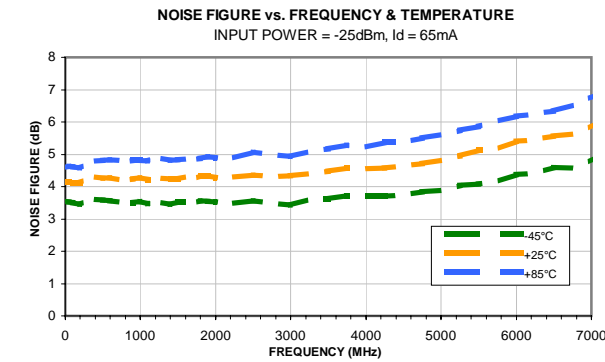
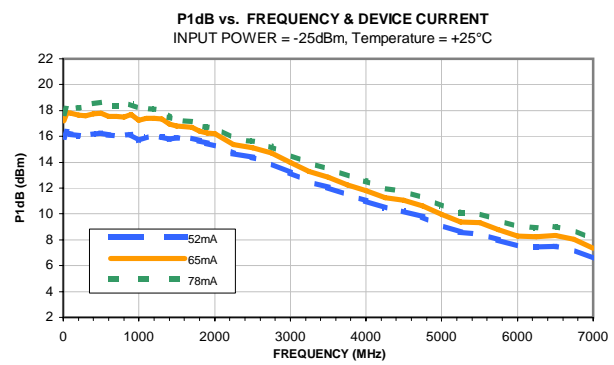
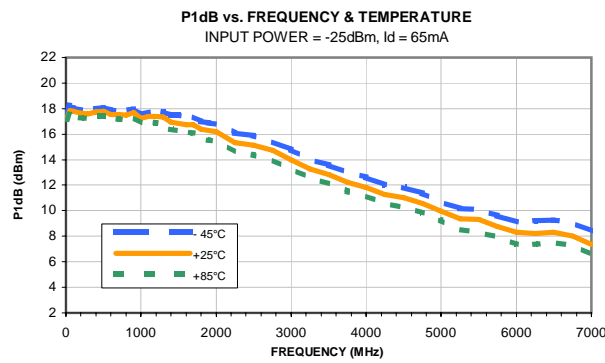
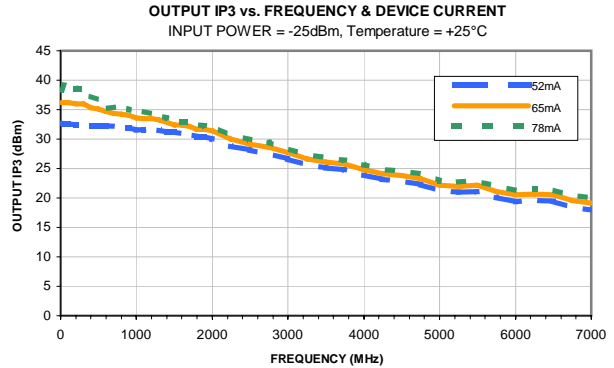
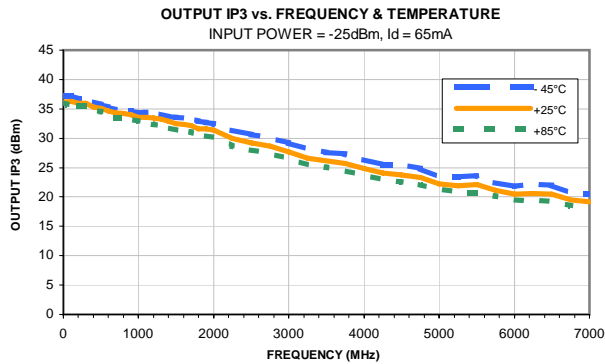
TEST CONDITIONS: Id=78mA, Vd = 4.40V @Temperature = +85degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---------|-------|-----------|-------------------|--------------------|-----------|-------|-------------|------------------|--------------|
| | | | | | K | Delta | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 10.00 | 14.41 | 19.01 | 39.31 | 40.90 | 1.14 | 0.65 | 38.29 | 17.30 | 4.74 |
| 50.00 | 14.42 | 19.04 | 47.21 | 45.42 | 1.15 | 0.66 | 38.93 | 17.85 | 4.76 |
| 100.00 | 14.39 | 19.10 | 50.80 | 37.79 | 1.15 | 0.66 | 39.20 | 17.79 | 4.78 |
| 200.00 | 14.34 | 19.06 | 43.72 | 38.02 | 1.15 | 0.66 | 38.59 | 17.67 | 4.73 |
| 300.00 | 14.30 | 19.07 | 49.08 | 36.71 | 1.15 | 0.67 | 38.10 | 17.74 | 4.95 |
| 400.00 | 14.25 | 19.07 | 41.47 | 35.31 | 1.16 | 0.67 | 37.29 | 18.02 | 4.94 |
| 500.00 | 14.20 | 19.08 | 38.48 | 34.03 | 1.16 | 0.68 | 36.35 | 18.13 | 5.03 |
| 600.00 | 14.15 | 19.07 | 38.69 | 31.24 | 1.16 | 0.68 | 35.32 | 17.88 | 4.98 |
| 700.00 | 14.09 | 19.10 | 35.47 | 29.63 | 1.17 | 0.68 | 35.27 | 17.85 | 4.93 |
| 800.00 | 14.04 | 19.11 | 34.11 | 28.40 | 1.17 | 0.69 | 34.86 | 17.76 | 4.88 |
| 900.00 | 13.99 | 19.11 | 32.24 | 27.14 | 1.18 | 0.69 | 34.60 | 17.95 | 4.94 |
| 1000.00 | 13.93 | 19.13 | 31.22 | 26.17 | 1.18 | 0.70 | 34.11 | 17.69 | 4.98 |
| 1100.00 | 13.87 | 19.15 | 30.30 | 25.12 | 1.19 | 0.70 | 33.72 | 17.62 | 4.95 |
| 1200.00 | 13.81 | 19.18 | 29.16 | 24.32 | 1.19 | 0.71 | 33.42 | 17.50 | 4.92 |
| 1300.00 | 13.74 | 19.20 | 28.29 | 23.60 | 1.20 | 0.71 | 33.14 | 17.40 | 4.97 |
| 1400.00 | 13.68 | 19.22 | 27.27 | 22.87 | 1.20 | 0.72 | 32.60 | 16.86 | 4.96 |
| 1500.00 | 13.61 | 19.25 | 26.72 | 22.39 | 1.21 | 0.72 | 31.87 | 16.65 | 4.97 |
| 1600.00 | 13.54 | 19.28 | 26.13 | 21.86 | 1.22 | 0.73 | 31.83 | 16.55 | 4.98 |
| 1700.00 | 13.47 | 19.30 | 25.27 | 21.31 | 1.23 | 0.73 | 31.75 | 16.51 | 4.99 |
| 1800.00 | 13.40 | 19.36 | 24.87 | 20.99 | 1.24 | 0.74 | 31.22 | 16.13 | 5.10 |
| 1900.00 | 13.32 | 19.37 | 24.40 | 20.69 | 1.24 | 0.74 | 31.06 | 15.97 | 5.07 |
| 2000.00 | 13.24 | 19.44 | 24.15 | 20.32 | 1.26 | 0.75 | 30.82 | 15.94 | 5.06 |
| 2250.00 | 13.06 | 19.53 | 23.19 | 19.91 | 1.28 | 0.76 | 29.39 | 15.04 | 5.04 |
| 2500.00 | 12.86 | 19.65 | 22.80 | 19.76 | 1.31 | 0.78 | 28.63 | 14.89 | 5.34 |
| 2750.00 | 12.65 | 19.78 | 22.42 | 19.65 | 1.34 | 0.79 | 27.99 | 14.53 | 5.14 |
| 3000.00 | 12.45 | 19.91 | 21.57 | 19.92 | 1.42 | 0.83 | 27.13 | 13.82 | 5.11 |
| 3250.00 | 12.23 | 20.07 | 20.95 | 20.04 | 1.47 | 0.84 | 26.18 | 13.20 | 5.25 |
| 3500.00 | 12.00 | 20.26 | 20.44 | 20.36 | 1.52 | 0.86 | 25.61 | 12.74 | 5.34 |
| 3750.00 | 11.79 | 20.45 | 19.11 | 20.18 | 1.58 | 0.87 | 25.12 | 12.18 | 5.47 |
| 4000.00 | 11.57 | 20.65 | 18.13 | 20.29 | 1.64 | 0.89 | 24.35 | 11.76 | 5.40 |
| 4250.00 | 11.34 | 20.84 | 17.44 | 20.67 | 1.72 | 0.90 | 23.71 | 11.19 | 5.53 |
| 4500.00 | 11.12 | 21.20 | 16.01 | 20.55 | 1.76 | 0.92 | 23.28 | 10.90 | 5.55 |
| 4750.00 | 10.89 | 21.25 | 15.50 | 19.87 | 1.89 | 0.93 | 22.84 | 10.52 | 5.78 |
| 5000.00 | 10.48 | 21.63 | 14.91 | 20.68 | 2.01 | 0.95 | 22.00 | 9.87 | 5.88 |
| 5250.00 | 10.32 | 22.15 | 13.75 | 20.24 | 2.02 | 0.96 | 21.55 | 9.18 | 5.97 |
| 5500.00 | 10.10 | 22.06 | 13.08 | 20.18 | 2.10 | 0.98 | 21.47 | 8.97 | 6.10 |
| 5750.00 | 9.95 | 22.39 | 12.85 | 21.53 | 2.29 | 1.00 | 20.86 | 8.59 | 6.24 |
| 6000.00 | 9.78 | 23.11 | 11.99 | 19.45 | 2.27 | 1.01 | 20.27 | 8.07 | 6.39 |
| 6250.00 | 9.57 | 22.98 | 11.36 | 17.98 | 2.31 | 1.02 | 20.20 | 8.06 | 6.48 |
| 6500.00 | 9.26 | 23.02 | 11.60 | 18.98 | 2.71 | 1.03 | 20.13 | 8.18 | 6.61 |
| 6750.00 | 9.21 | 24.41 | 10.14 | 16.12 | 2.42 | 1.05 | 19.31 | 7.94 | 6.74 |
| 7000.00 | 9.08 | 23.68 | 9.83 | 15.38 | 2.46 | 1.05 | 18.90 | 7.29 | 6.99 |

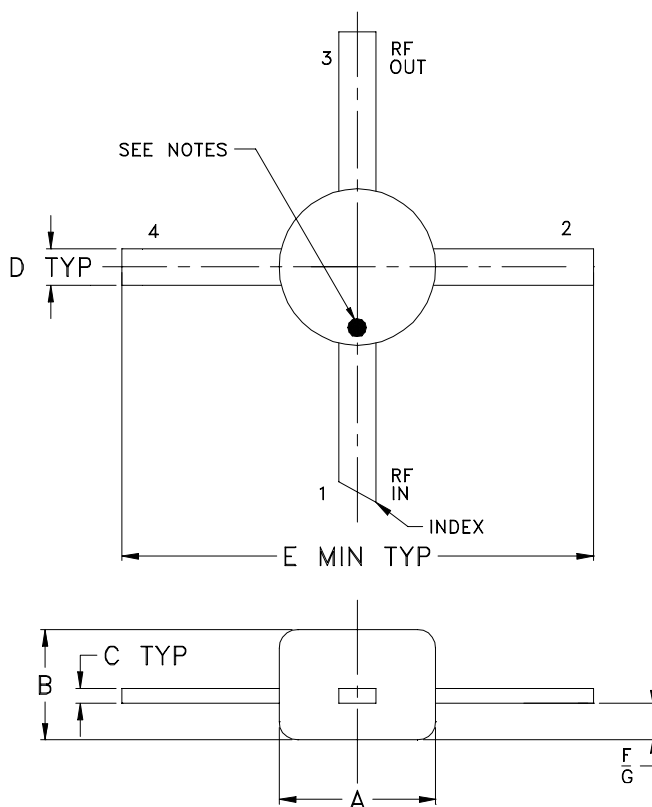
Typical Performance Curves



Typical Performance Curves



Outline Dimensions



| CASE# | A | B | C | D | E | F | G | WT.GRAMS |
|-------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| VV105 | .085 (2.16) | .060 (1.52) | .008 (0.20) | .020 (0.51) | .250 (6.35) | .012 (0.30) | .025 (0.64) | .015 |

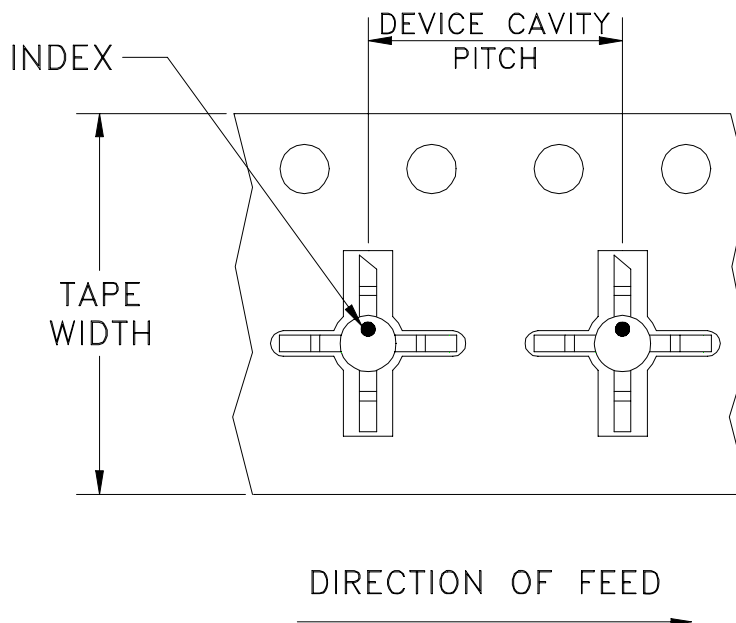
Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .03$; 3 Pl. $\pm .015$

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier.
For RoHS-5 Case Styles: Tin-Lead plate.
- RF input termination (1) identified by one or both of the following at factory option:
 - diagonally cut termination, which be 45° (ref) in either direction;
 - orientation mark on the case. Model dash number is identified by color dot or alphanumeric code on case. See specification data sheet.
- Special Tolerances: Termination width $\pm .005$ inch, termination thickness $\pm .003$ inch.

Tape & Reel Packaging TR-F4

DEVICE ORIENTATION IN T&R



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



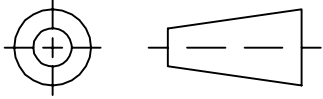
INTERNET <http://www.minicircuits.com>

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Mini-Circuits ISO 9001 & ISO 14001 Certified

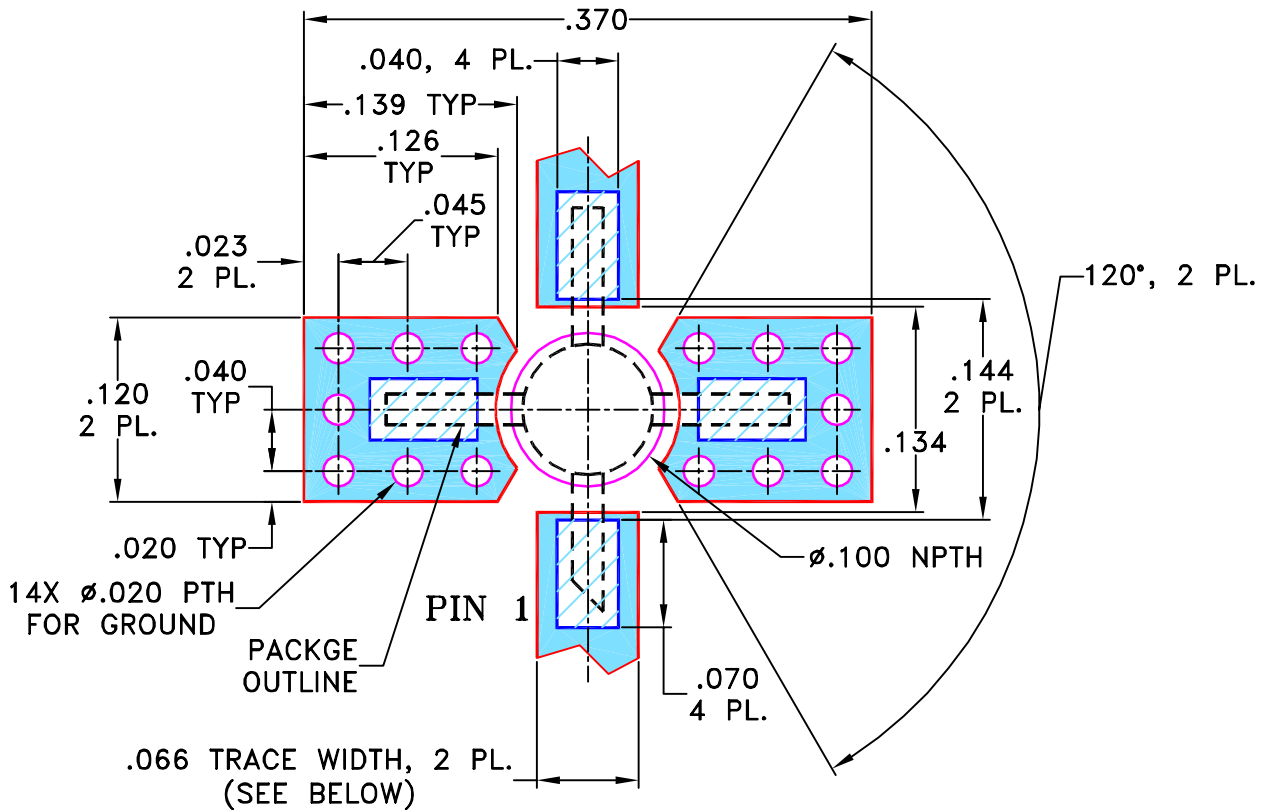
THIRD ANGLE PROJECTION



REVISIONS

| REV OR | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|--------|---------|-------------|----------|----|------|
| | M109082 | NEW RELEASE | 12/29/06 | AV | IG |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR VV105 CASE STYLE, "cb" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ± | DRAWN | AV 12/28/06 |
| | CHECKED | IL 12/29/06 |
| | APPROVED | IG 12/29/06 |

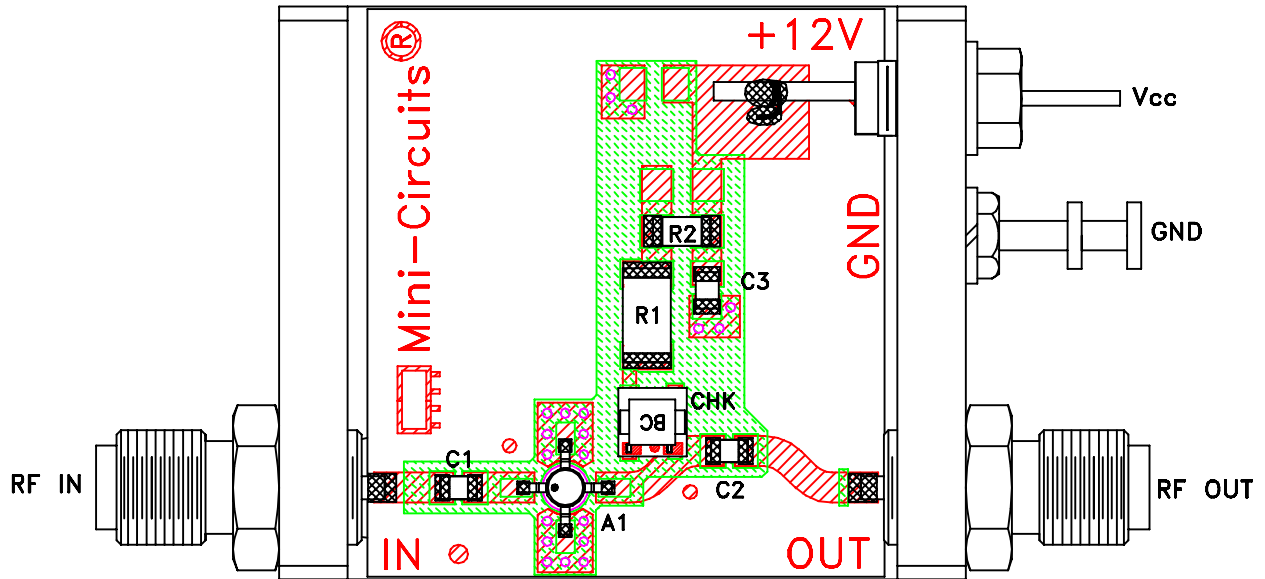
Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL, cb, VV105, ERA, TB-431-X+

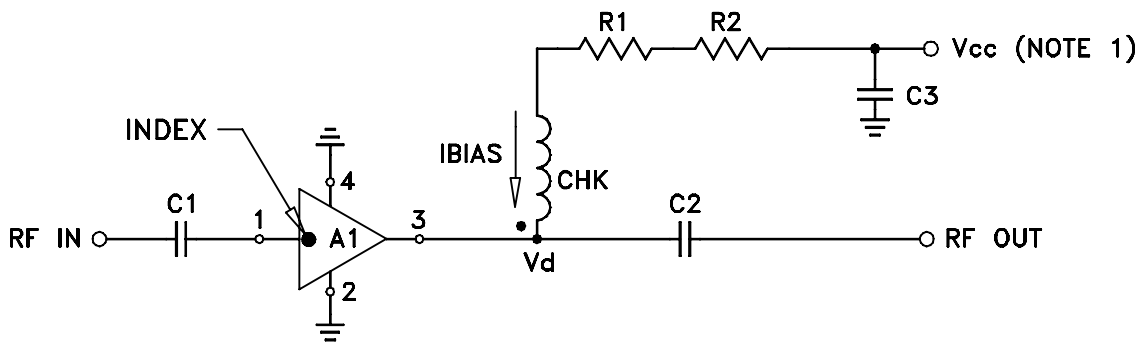
Mini-Circuits®
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| | | | |
|------------------|---------------------|--------------------------|------------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-261 | REV: OR |
| FILE: 98PL261 | SCALE: 8:1 | SHEET: 1 OF 1 | |

Evaluation Board and Circuit



TB-431-4+




| COMPONENT | VALUE |
|-------------|------------------------|
| A1 | ERA-4(+) |
| C1 (NOTE 4) | 2400 pF |
| C2 (NOTE 4) | 2400 pF |
| C3 (bypass) | 0.1 uF |
| R1 | 115 Ohms, 0.75W |
| R2 | 0 Ohm, 0.25W |
| CHK | Mini-Circuits TCCH-80+ |

Schematic Diagram

NOTE:

1. Vcc voltage: $+12 \pm 0.2V$.
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.

 **Mini-Circuits®**

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification | Test/Inspection Condition | Reference/Spec |
|--------------------------------|--|---|
| Operating Temperature | -45° to 85°C or -40° to 85°C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -65° to 150° C 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 Pb-Free Process: 260°C peak | J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1 |
| Moisture Sensitivity: Level 1 | Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak | J-STD-020 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + | MIL-STD-202, Method 215 |



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|----------------------|----------------------------------|-----------------------|
| | monoethanolamine at 63°C to 70°C | |