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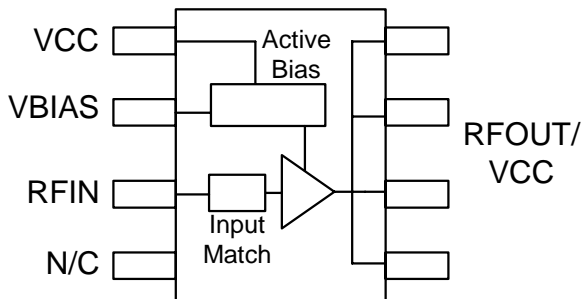
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sales@integrated-circuit.com

Product Description

Sirenza Microdevices' SPA-1218 is a high efficiency GaAs Heterojunction Bipolar Transistor (HBT) amplifier housed in a low-cost surface-mountable plastic package. These HBT amplifiers are fabricated using molecular beam epitaxial growth technology which produces reliable and consistent performance from wafer to wafer and lot to lot.

This product is specifically designed for use as a driver amplifier for infrastructure equipment in the 1960 MHz PCS band. Its high linearity makes it an ideal choice for multi-carrier and digital applications.



SPA-1218

1960 MHz 1 Watt Power Amplifier with Active Bias



Product Features

- High Linearity Performance:
 +21.3 dBm IS-95 Channel Power at -55 dBc ACP
 +48 dBm OIP3 Typ.
- On-chip Active Bias Control
- Patented High Reliability GaAs HBT Technology
- Surface-Mountable Plastic Package

Applications

- PCS Systems
- Multi-Carrier Applications

| Symbol | Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$, $V_{CC} = 5V$, Temp = 25°C | Units | Min. | Typ. | Max. |
|---------------|---|-------|------|-------|-------|
| f_0 | Frequency of Operation | MHz | 1930 | | 1990 |
| P_{1dB} | Output Power at 1dB-Compression ^[1,2] | dBm | | 29.0 | |
| ACP | Adjacent Channel Power ^[1] IS-95 @1960MHz, $\pm 885 \text{ KHz}$, $P_{OUT} = 21.3 \text{ dBm}$ | dBc | | -55.0 | -52.0 |
| S_{21} | Small Signal Gain ^[1,2] | dB | 11.5 | 12.5 | 13.5 |
| S_{11} | Input VSWR ^[1,2] | - | | 1.5:1 | |
| OIP_3 | Output Third Order Intercept Point ^[2] Power out per tone = +14 dBm | dBm | | 48.0 | |
| NF | Noise Figure ^[1,2] | dB | | 7.0 | |
| I_{CC} | Device Current ^[1,2] | mA | 275 | 310 | 330 |
| V_{CC} | Device Voltage ^[1,2] | V | 4.75 | 5.0 | 5.25 |
| $R_{th, j-l}$ | Thermal Resistance (junction - lead), $T_L = 85^\circ\text{C}$ | °C/W | | 35 | |

[1] Optimal ACP tune

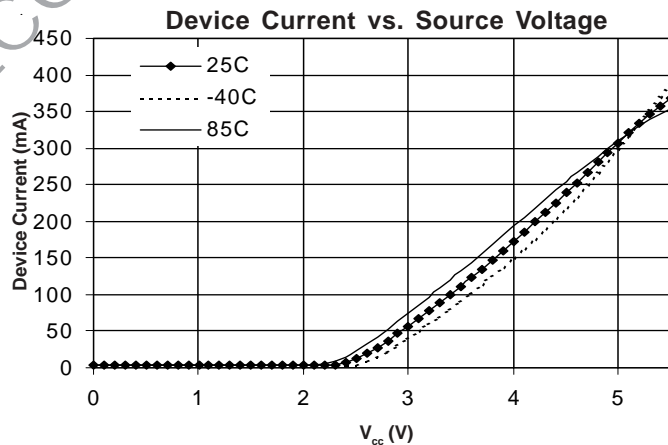
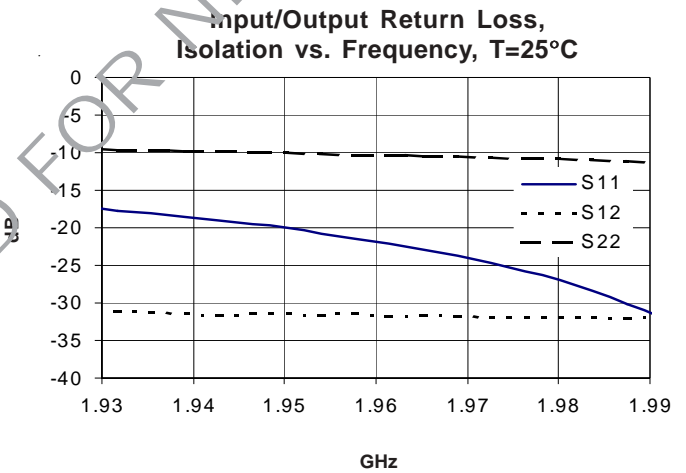
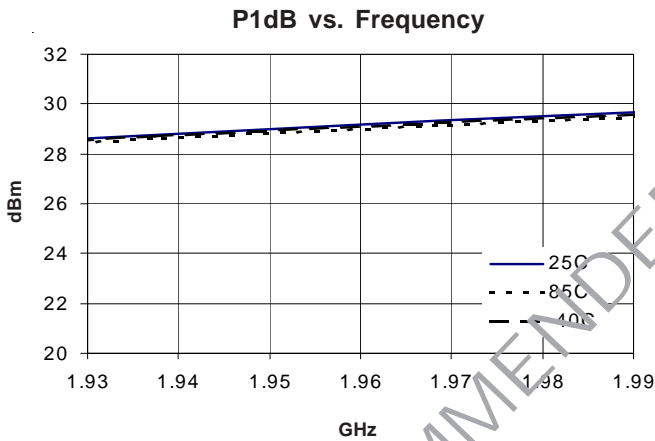
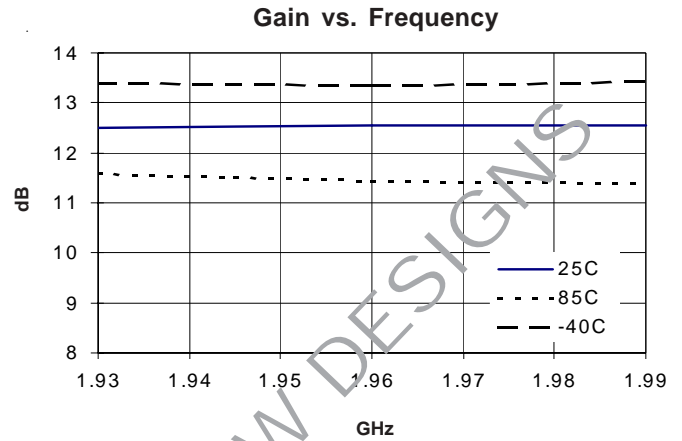
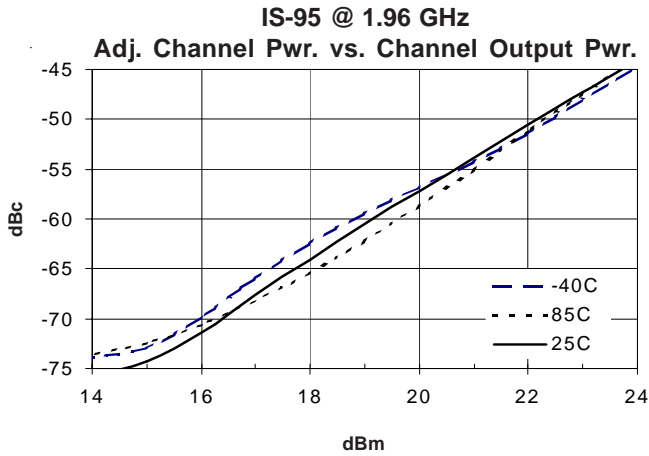
[2] Optimal IP3 tune

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SPA-1218 1960 MHz 1 Watt Power Amp.

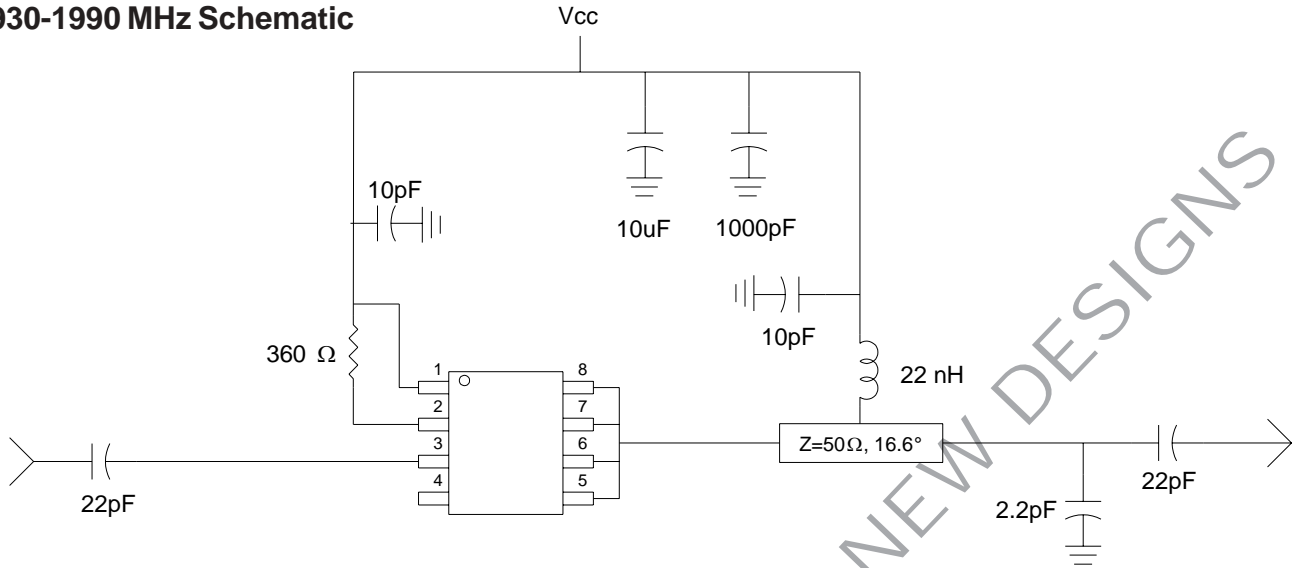
1960 MHz Application Circuit Data, $I_{CC}=320$ mA, $T=+25^{\circ}\text{C}$, $V_{CC}=5\text{V}$

Note: Tuned for ACP

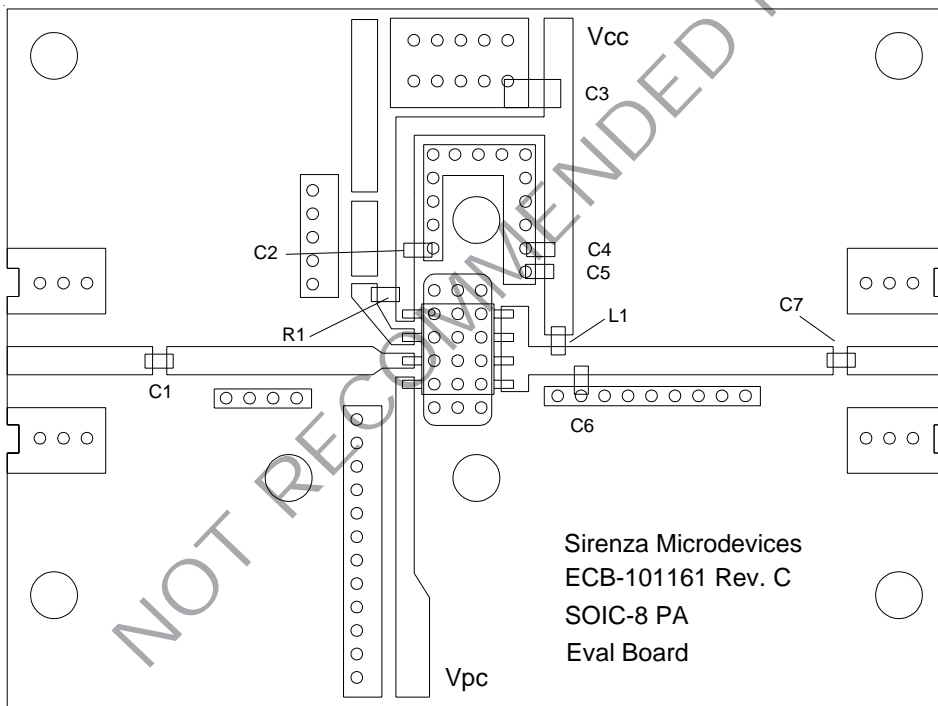


SPA-1218 1960 MHz 1 Watt Power Amp.

ACP Tune
1930-1990 MHz Schematic



1930-1990 MHz Evaluation Board Layout



| Ref. Des. | Value | Part Number |
|-----------|----------------|-----------------------|
| C1, C7 | 22pF, 5% | Rohm MCH18 series |
| C2 | 10pF, 5% | Rohm MCH18 series |
| C3 | 10uF, 10% | AVX TAJB106K020R |
| C4 | 1000pF, 5% | Rohm MCH18 series |
| C5 | 10pF, 5% | Rohm MCH18 series |
| C6 | 2.2pF, ±0.25pF | Rohm MCH18 series |
| L1 | 22nH, 5% | Toko LL1608-FS series |
| R1 | 360 Ohm, 5% | Rohm MCR03 series |

SPA-1218 1960 MHz 1 Watt Power Amp.

| Pin # | Function | Description | Device Schematic |
|------------|------------|---|------------------|
| 1 | Vcc | VCC is the supply voltage for the active bias network. Bypassing in the appropriate location as shown on application schematic is required for optimum RF performance. | |
| 2 | Vbias | Vbias is the bias control pin for the active bias network. Device current is set by the current into this pin. Recommended configuration is shown in the Application Schematic. Bypassing in the appropriate location as shown on application schematic is required for optimum RF performance. | |
| 3 | RF In | RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation. | |
| 4 | N/C | No connection | |
| 5, 6, 7, 8 | RF Out/Vcc | RF output and bias pin. Bias should be supplied to this pin through an external RF choke. Because DC biasing is present on this pin, a DC blocking capacitor should be used in most applications (see application schematic). The supply side of the bias network should be well bypassed. An output matching network is necessary for optimum performance. | |
| EPAD | Gnd | Exposed area on the bottom side of the package needs to be soldered to the ground plane of the board for thermal and RF performance. Several vias should be located under the EPAD as shown in the recommended land pattern (page 7). | |

Absolute Maximum Ratings

| Parameter (Ta = 25°C) | Absolute Limit |
|---|----------------|
| Max. Supply Current (I_{cc}) at V_{cc} typ. | 750 mA |
| Max. Device Voltage (V_{cc}) at I_{cc} typ. | 6.0 V |
| Max. RF Input Power | 29 dBm |
| Max. Junction Temp. (T_j) | +160 °C |
| Max. Storage Temp. | +150 °C |

Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

Bias Conditions should also satisfy the following expression:

$$I_{cc} V_{cc} (\max) < (T_j - T_L) R_{th,j-l}$$



Caution: ESD sensitive

Appropriate precautions in handling, packaging and testing devices must be observed.

The Moisture Sensitivity Level rating for this device is level 1 (MSL-1) based on the JEDEC 22-A113 standard classification. No special moisture packaging/handling is required during storage, shipment, or installation of the devices.

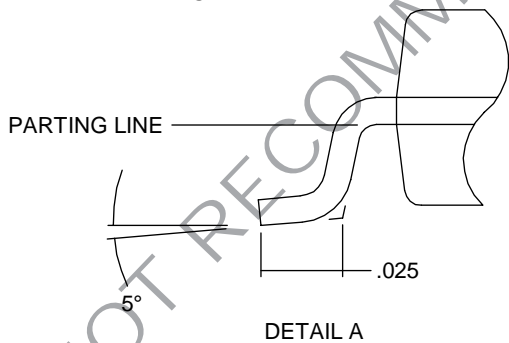
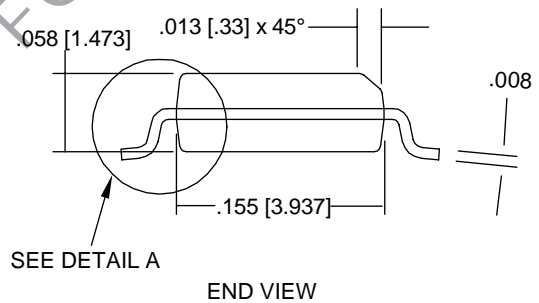
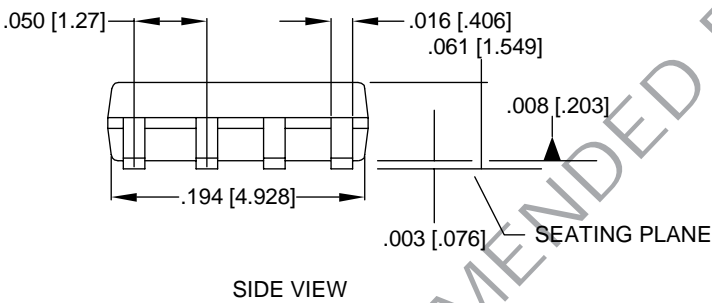
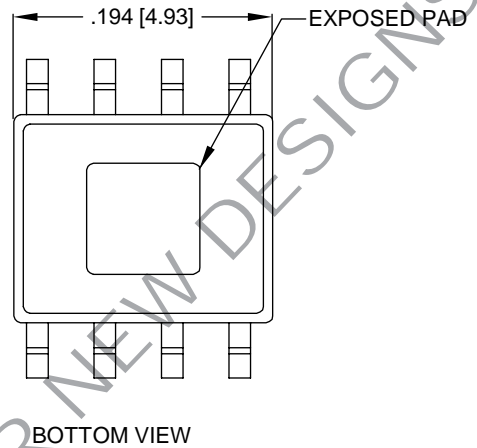
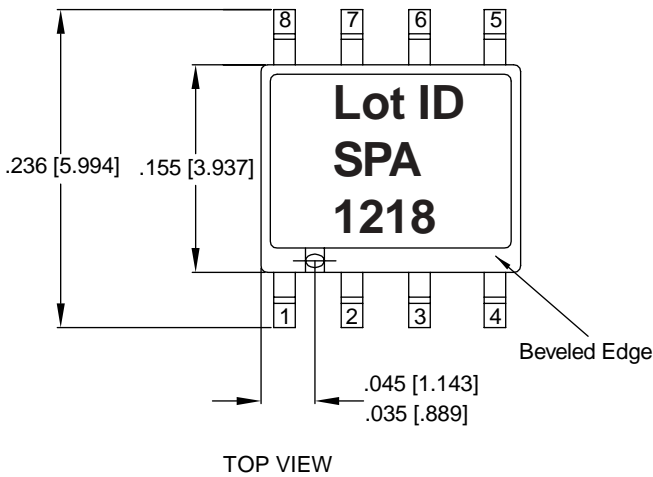
SPA-1218 1960 MHz 1 Watt Power Amp.

Part Number Ordering Information

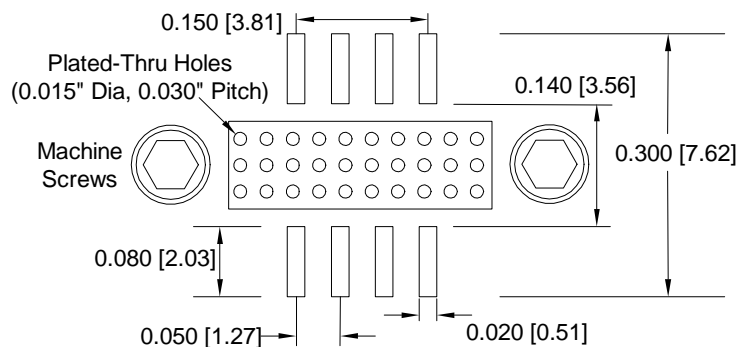
| Part Number | Devices Per Reel | Reel Size |
|-------------|------------------|-----------|
| SPA-1218 | 500 | 7" |

Package Outline Drawing

(See SMDI MPO-101644 for tolerances, available on our website)



Recommended Land Pattern



Note: DIMENSIONS ARE IN INCHES [MM]