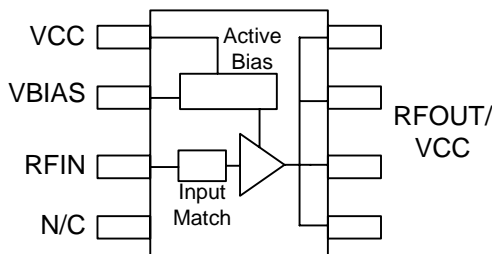


## Product Description

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

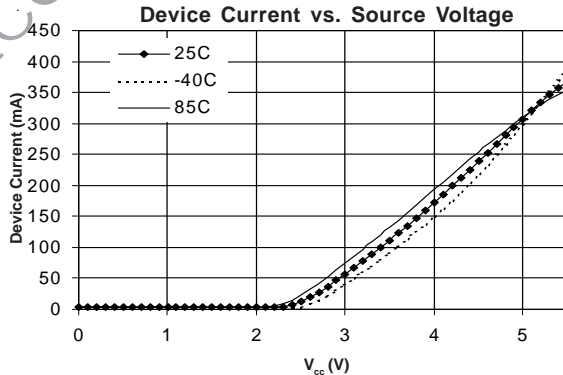
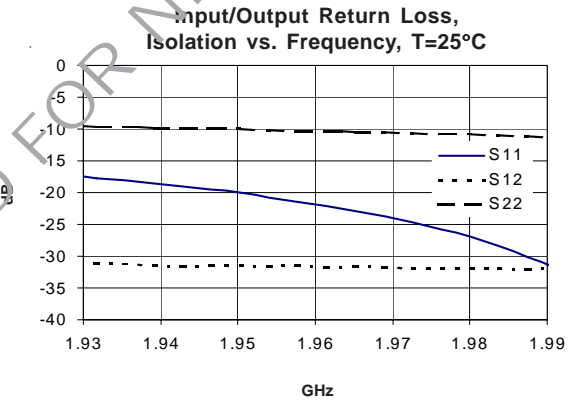
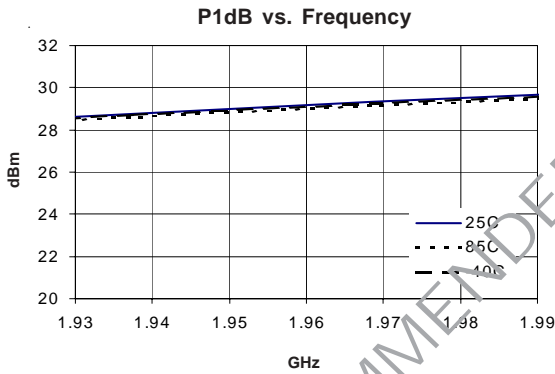
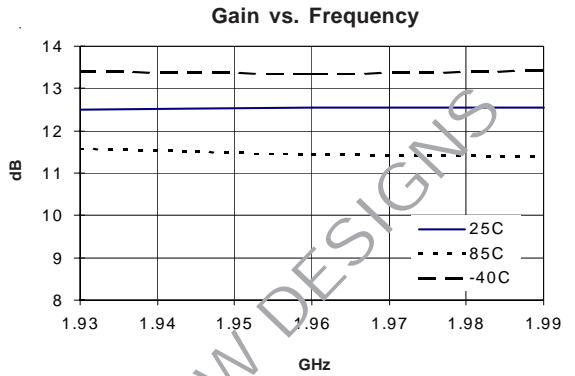
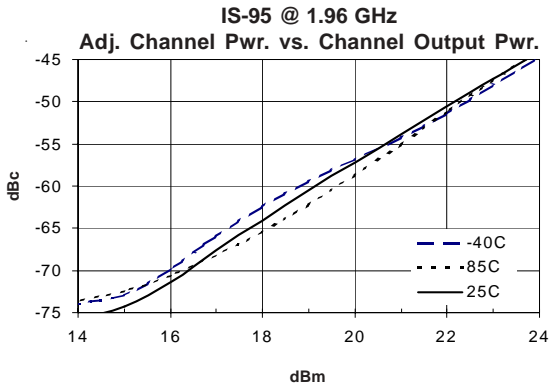
[1] Optimal ACP tune

[2] Optimal IP3 tune

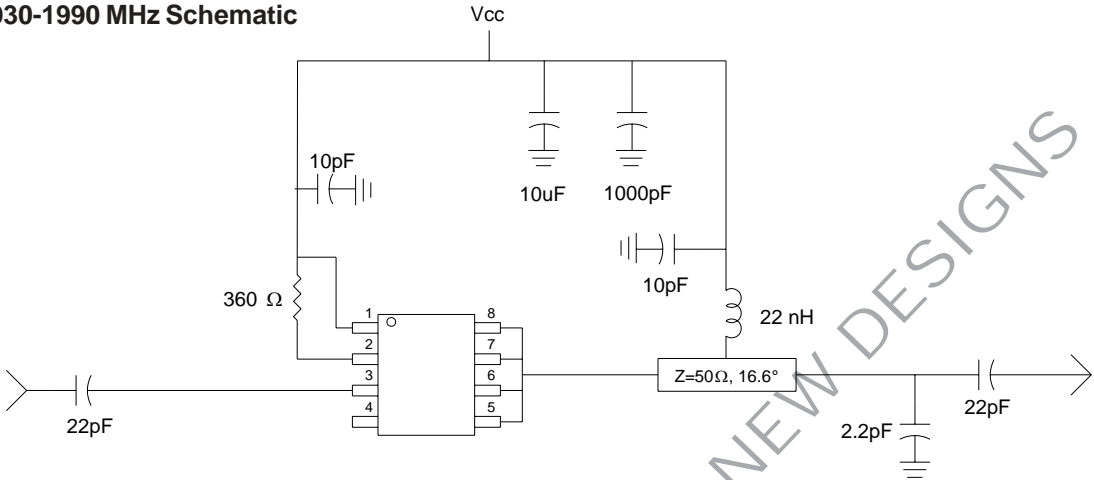
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**1960 MHz Application Circuit Data,  $I_{CC}=320$  mA,  $T=+25^{\circ}\text{C}$ ,  $V_{CC}=5\text{V}$**

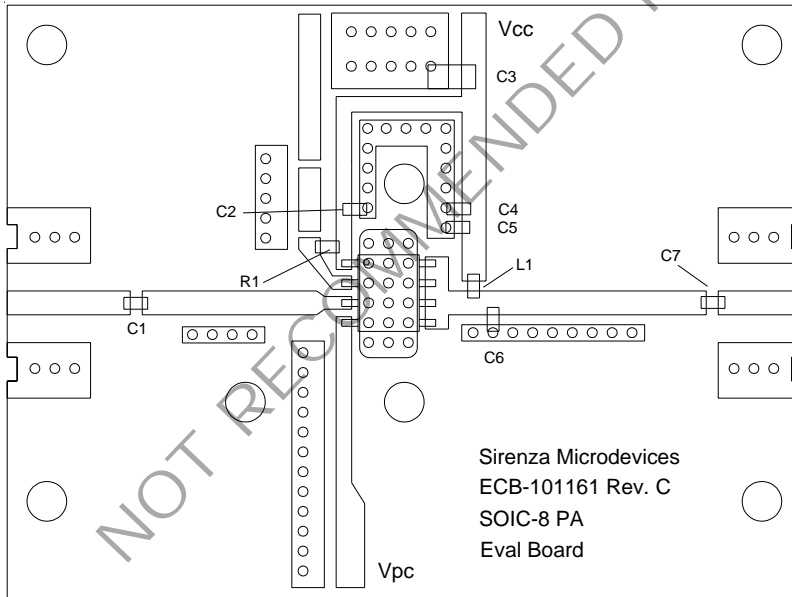
Note: Tuned for ACP



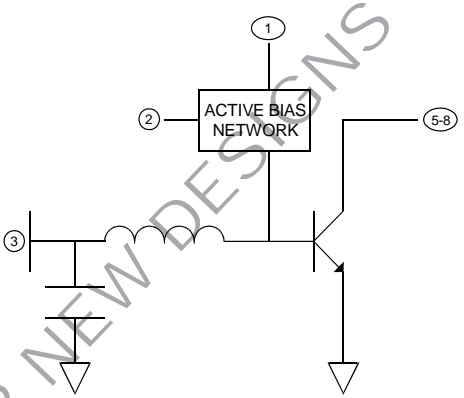
**ACP Tune  
1930-1990 MHz Schematic**



**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

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



#### 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.

Parameter (Ta = 25°C)	Absolute Limit
Max. Supply Current (I <sub>cc</sub> ) at V <sub>cc</sub> typ.	750 mA
Max. Device Voltage (V <sub>cc</sub> ) at I <sub>cc</sub> typ.	6.0 V
Max. RF Input Power	29 dBm
Max. Junction Temp. (T <sub>J</sub> )	+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:

$$I_{cc} V_{cc} (\max) < (T_J - T_L) / R_{\theta jL}$$

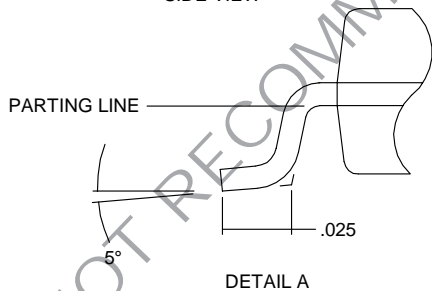
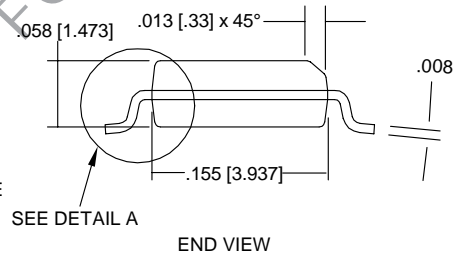
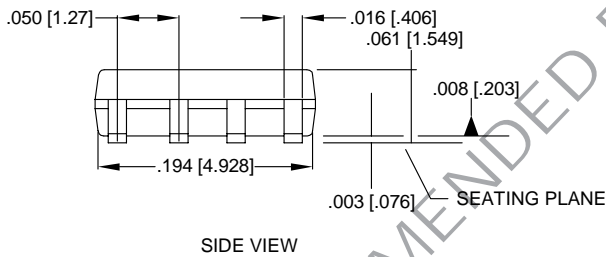
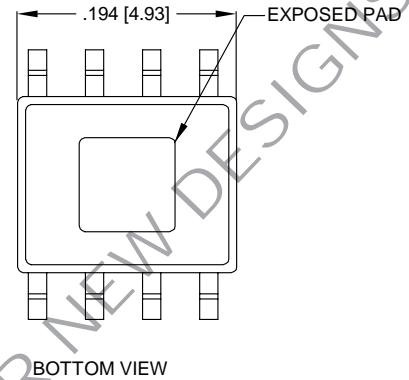
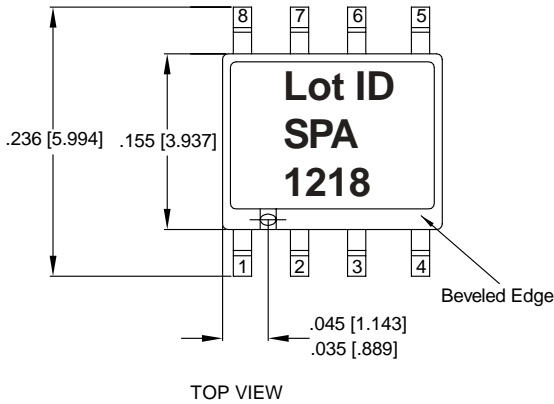
## SPA-1218 1960 MHz 1 Watt Power Amp.

### Part Number Ordering Information

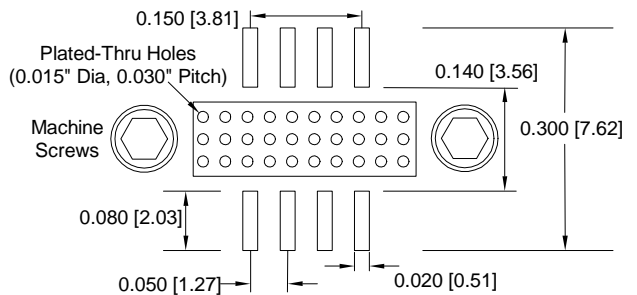
Part Number	Devices Per Reel	Reel Size
SPA-1218	500	7"

### Package Outline Drawing

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



### Recommended Land Pattern



**Note:** DIMENSIONS ARE IN INCHES [MM]