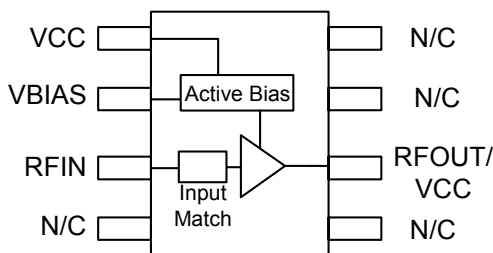


## Product Description

Sirenza Microdevices' SPA-1118 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.

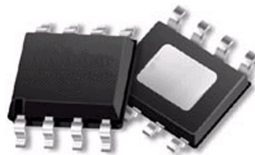
This product is specifically designed for use as a driver amplifier for infrastructure equipment in the 850 MHz band. Its high linearity makes it an ideal choice for wireless data and digital applications.



Preliminary

## SPA-1118

### 850 MHz 1 Watt Power Amplifier with Active Bias



### Product Features

- High Linearity Performance:
  - +48 dBm OIP3 Typ.
  - +23 dBm IS-95 Channel Power at -45 dBc ACP
- On-chip Active Bias Control
- Patented High Reliability GaAs HBT Technology
- Surface-Mountable Plastic Package

### Applications

- Multi-Carrier Applications
- AMPS, ISM 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	810		960
$P_{1dB}$	Output Power at 1dB Compression	dBm		29.5	
ACP	Adjacent Channel Power IS-95 @ $\pm 885 \text{ KHz}$ , $P_{OUT} = 21 \text{ dBm}$	dBc		-55.0	
$S_{21}$	Small Signal Gain	dB		17.0	
VSWR	Input VSWR	-		1.5:1	
$OIP_3$	Output Third Order Intercept Point * Power out per tone = +14 dBm	dBm		48.0	
NF	Noise Figure	dB		7.0	
$I_{CC}$	Device Current	mA		320	360
$R_{thj-c}$	Thermal Resistance (junction - case)	°C/W		40	

\* Optimal IP3 tune

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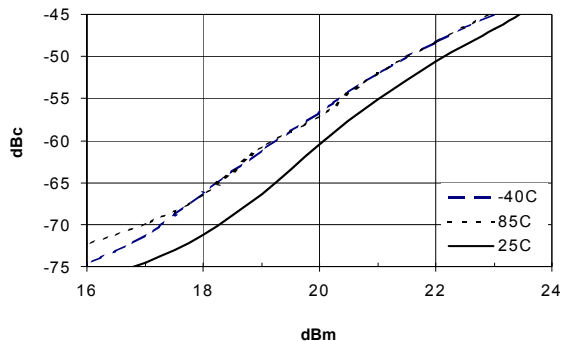
<http://www.sirenza.com>

EDS-101427 Rev F

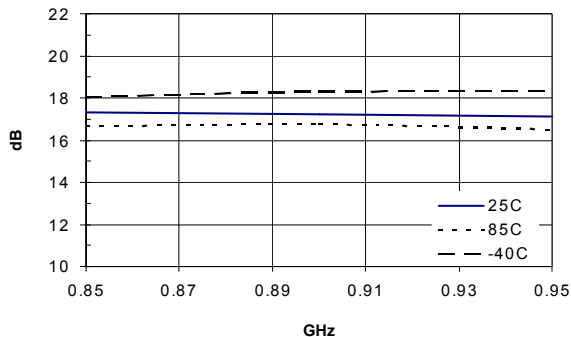
**850-950 MHz Application Circuit Data,  $I_{CC}=320$  mA,  $V_{CC}=5$  V**

**IS-95 @ 880 MHz**

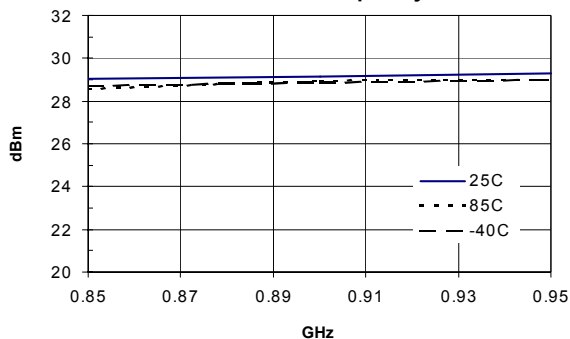
**Adj. Channel Pwr. vs. Channel Output Pwr.**



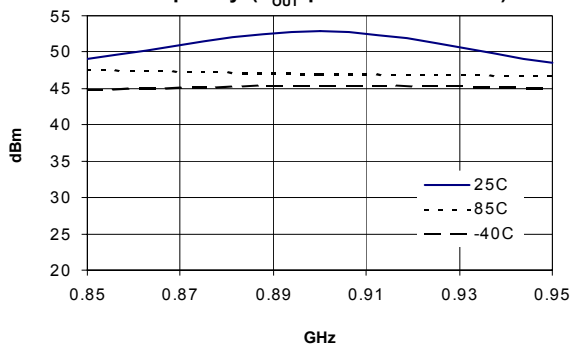
**Gain vs. Frequency**



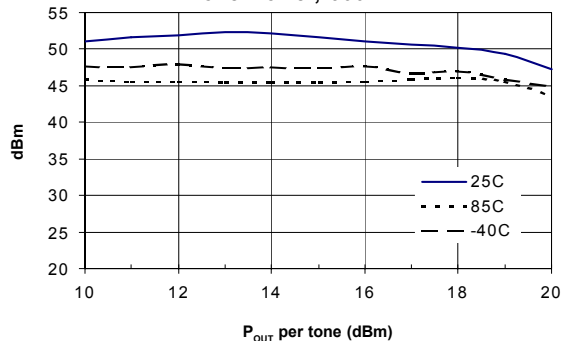
**P1dB vs. Frequency**



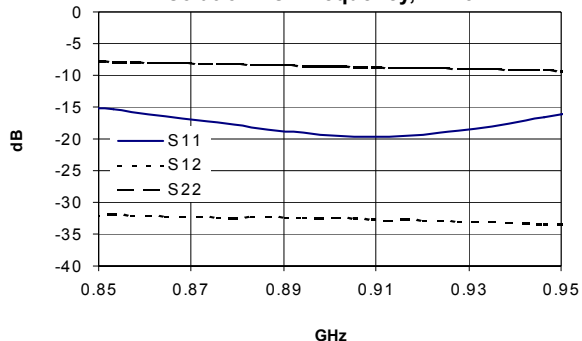
**Output Third Order Intercept vs. Frequency ( $P_{OUT}$  per tone = 14dBm)**



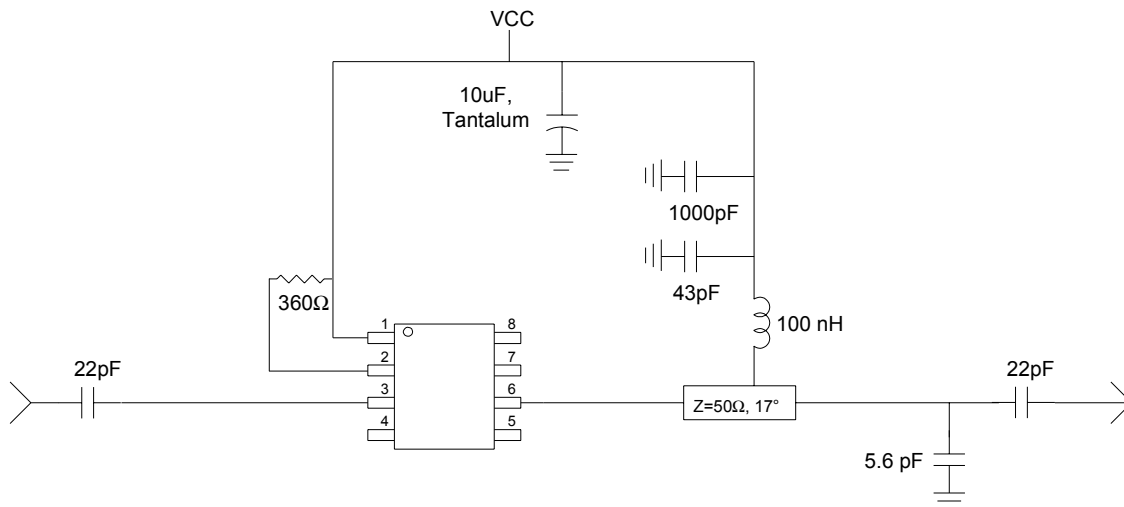
**Output Third Order Intercept vs. Tone Power, 900 MHz**



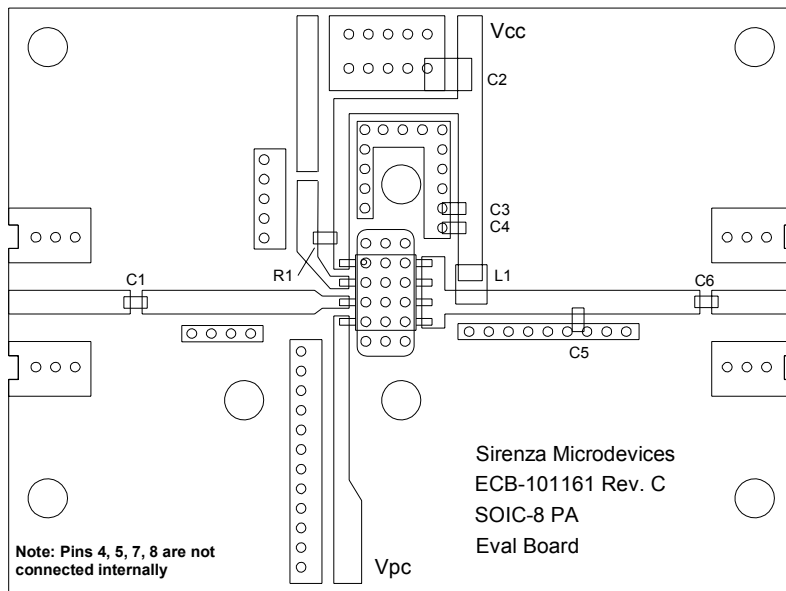
**Input/Output Return Loss, Isolation vs. Frequency,  $T=25^{\circ}\text{C}$**



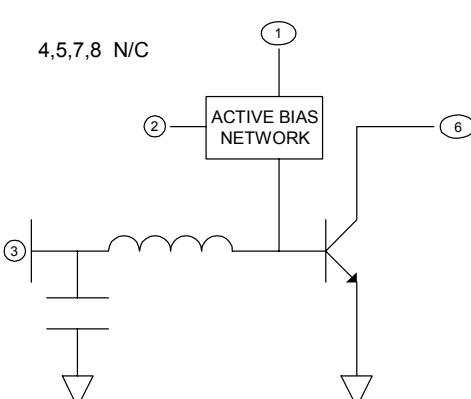
## 850 - 950 MHz Schematic



## 850 - 950 MHz Evaluation Board Layout



Ref. Des.	Value	Part Number
C1, C6	22pF	Rohm MCH18 series
C2	10uF	AVX TAJB106K020R
C3	1000pF	Rohm MCH18 series
C4	43pF	Rohm MCH18 series
C5	5.6pF	Rohm MCH18 series
L1	100nH	Coilcraft 1008HQ series
R1	360 Ohm	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, 5	N/C	No connection	
6	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.	
7, 8	N/C	No connection	
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 5).	

### Absolute Maximum Ratings

Parameter	Absolute Limit
Max. Supply Current ( $I_{cc}$ )	750 mA
Max. Device Voltage ( $V_{cc}$ )	6.0 V
Max. Power Dissipation	4.0 W
Max. RF Input Power	250 mW
Max. Junction Temp. ( $T_j$ )	+160 °C
Operating Lead Temp. ( $T_L$ )	-40 to +85 °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:

$$I_{cc} V_{cc} (\max) < (T_j - T_L) / R_{thj-l}$$



### Caution: ESD sensitive

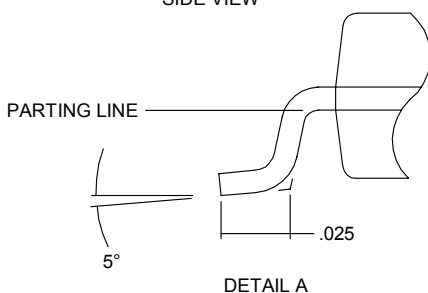
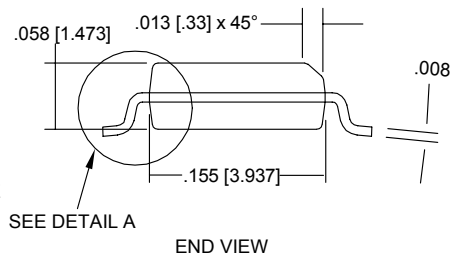
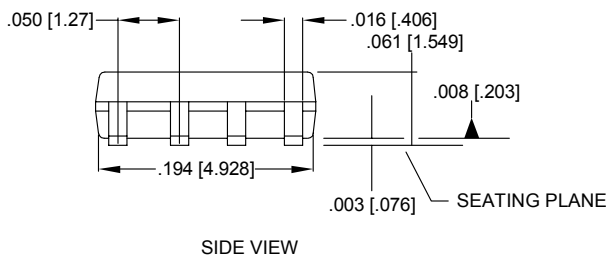
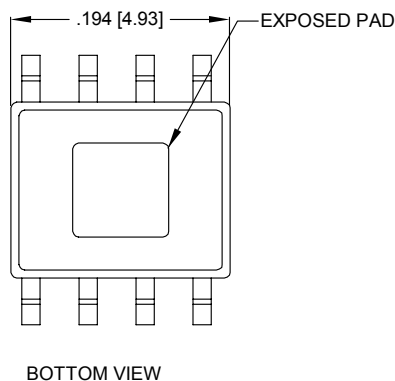
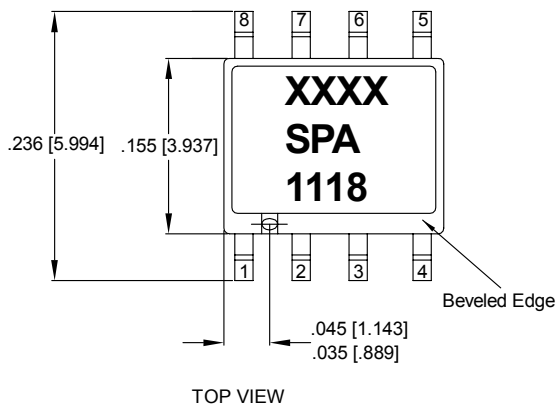
Appropriate precautions in handling, packaging and testing devices must be observed.

**SPA-1118 850 MHz 1 Watt Power Amp.**

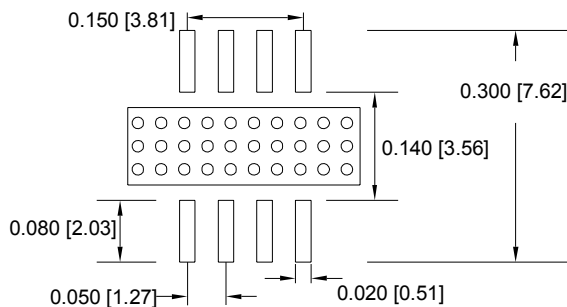
**Part Number Ordering Information**

Part Number	Devices Per Reel	Reel Size
SPA-1118	500	7"

**Package Outline Drawing**



**Recommended Land Pattern**



**Note:** XXXX represents the lot code  
DIMENSIONS ARE IN INCHES [MM]