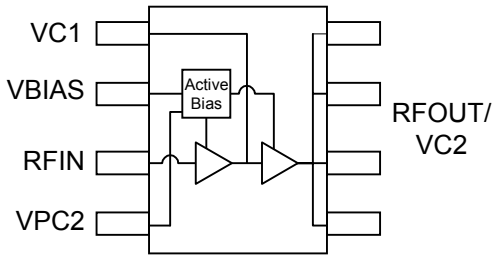


## Product Description

Sirenza Microdevices' SPA-2118 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 multi-carrier and digital applications.



## SPA-2118

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



### Product Features

- **High Linearity Performance:**
  - +20.7 dBm IS-95 CDMA Channel Power at -55 dBc ACP
  - +47 dBm typ. OIP3
- **On-chip Active Bias Control**
- **High Gain: 33 dB Typ.**
- **Patented High Reliability GaAsHBT Technology**
- **Surface-Mountable Plastic Package**

### Applications

- **IS-95 CDMA Systems**
- **Multi-Carrier Applications**
- **AMPS, ISM Applications**

Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$ Temp = 25°C, $V_{CC} = 5.0V$	Units	Min.	Typ.	Max.
$f_0$	Frequency of Operation	MHz	810	900	960
$P_{1dB}$	Output Power at 1dB Compression	dBm		29.0	
ACP	Adjacent Channel Power IS-95 @880 MHz, $\pm 885 \text{ KHz}$ offset, $P_{OUT} = 20.7 \text{ dBm}$	dBc		-55.0	-52.0
$S_{21}$	Small Signal Gain, 880 MHz	dB	31.5	33.0	34.5
VSWR	Input VSWR	-		1.5:1	
$OIP_3$	Output Third Order Intercept Point Power out per tone = +14 dBm	dBm		47.0	
NF	Noise Figure	dB		5.0	
$I_{CC}$	Device Current $I_{BIAS} = 10mA$ , $I_{C1} = 70mA$ , $I_{C2} = 320mA$	mA	360	400	425
$V_{CC}$	Device Voltage	V	4.75	5.0	5.25
$R_{th(j-l)}$	Thermal Resistance (junction - lead), $T_L = 85^\circ C$	$^\circ C/W$		31	

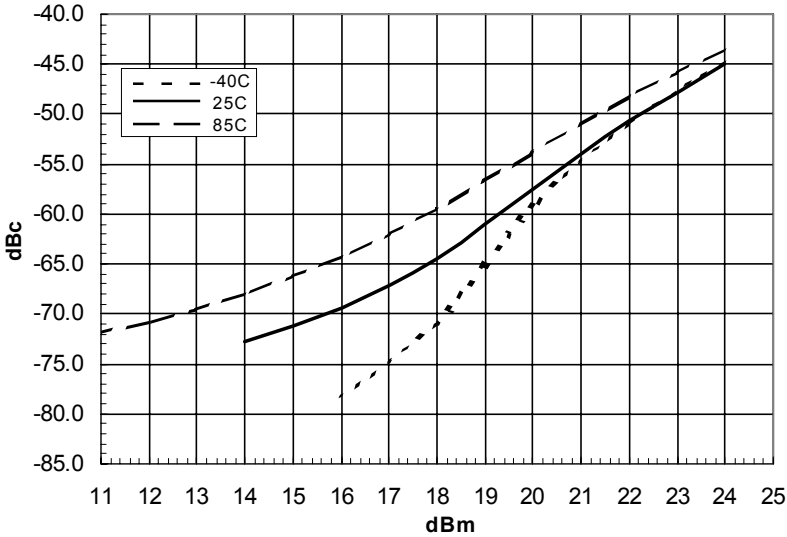
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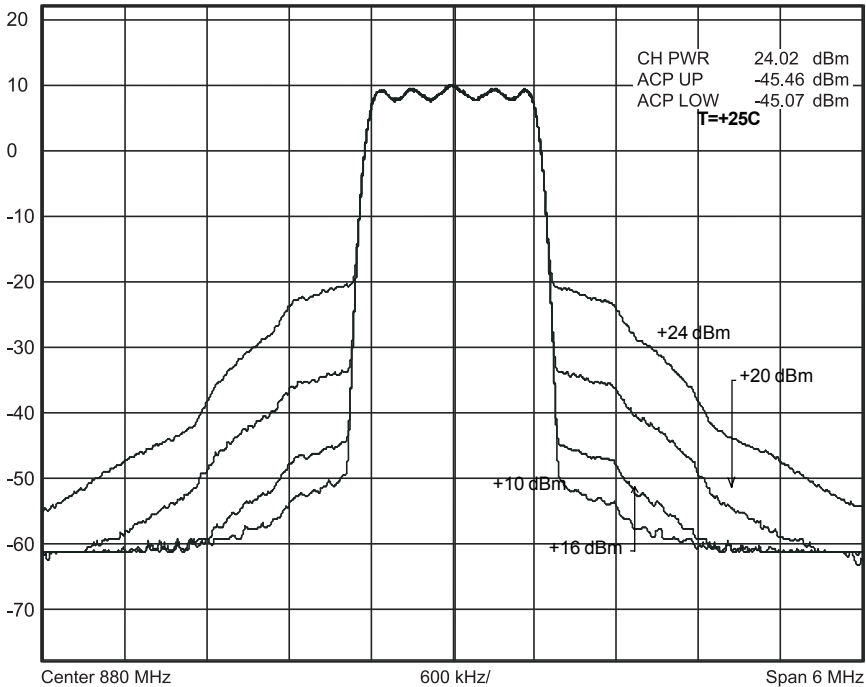
**SPA-2118 850 MHz 1 Watt Power Amp.**

**850-950 MHz Application Circuit Data, I<sub>cc</sub>=400mA, V<sub>cc</sub>=5V, IS-95, 9 Channels Forward**

**880 MHz Adjacent Channel Power vs. Channel Output Power**

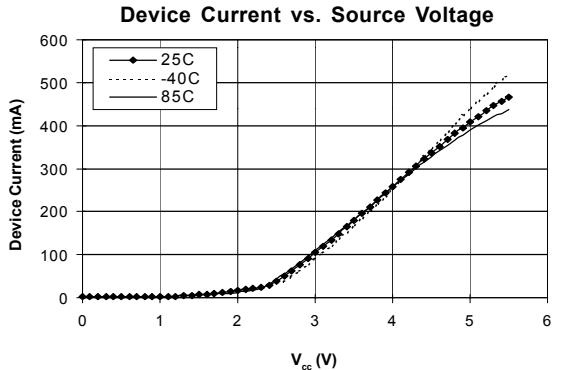
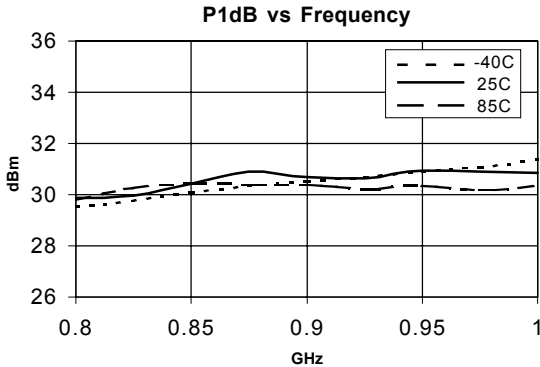
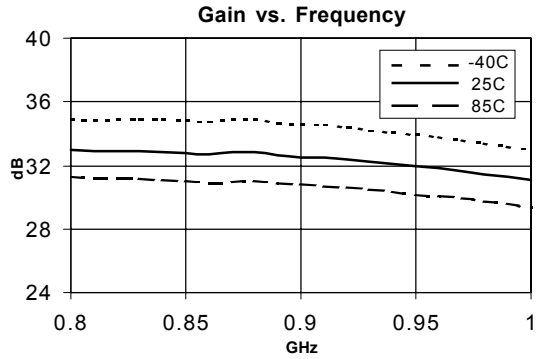
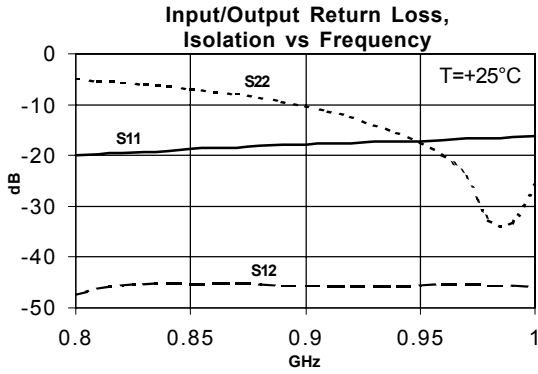


**IS-95 CDMA at 880 MHz**



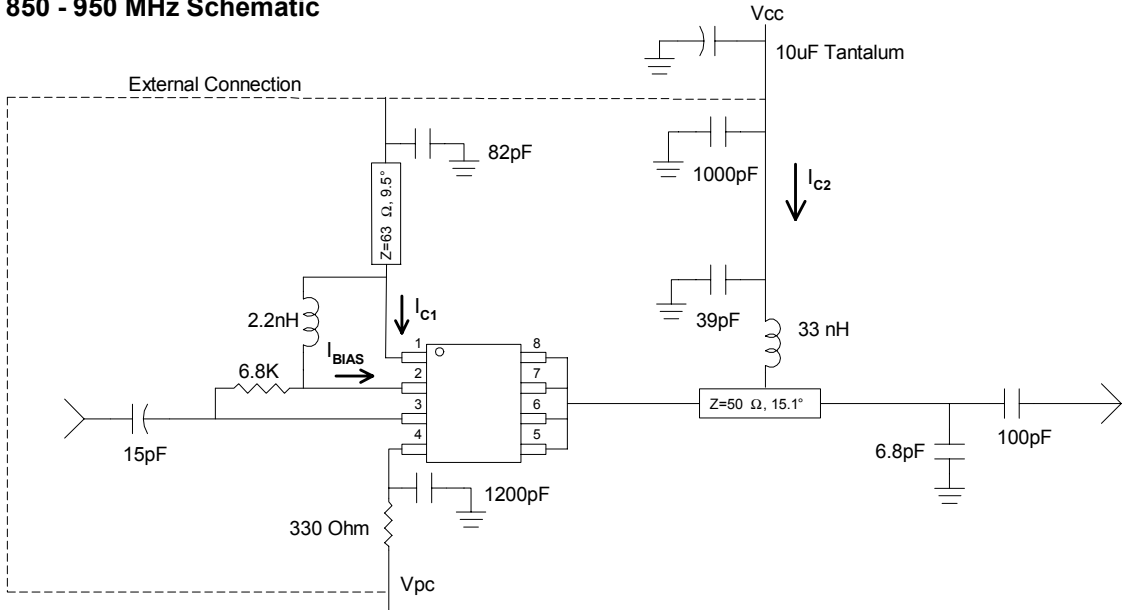
**SPA-2118 850 MHz 1 Watt Power Amp.**

**850-950 MHz Application Circuit Data,  $I_{CC}=400\text{mA}$ ,  $V_{CC}=5\text{V}$**

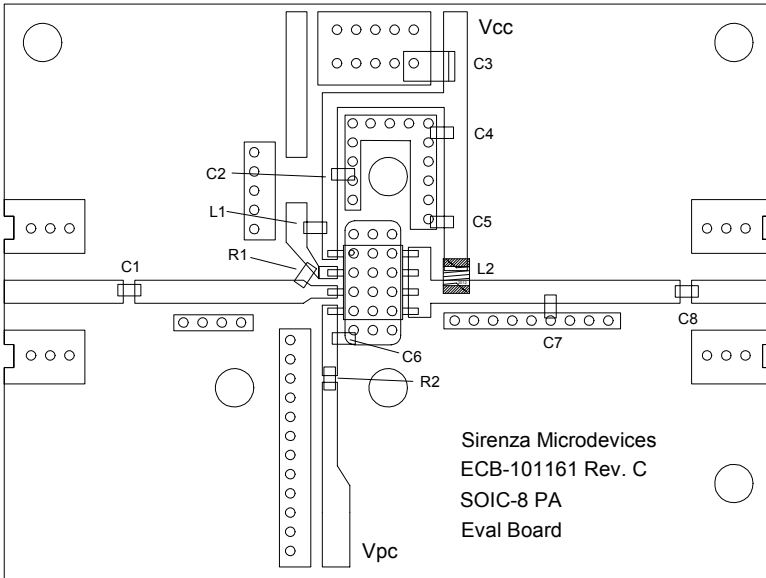


**SPA-2118 850 MHz 1 Watt Power Amp.**

**850 - 950 MHz Schematic**



**850 - 950 MHz Evaluation Board Layout**

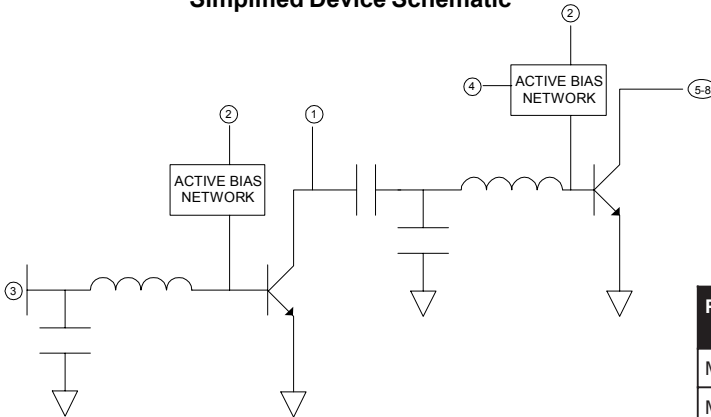


Ref. Des.	Value	Part Number
C1	15pF, 5%	Rohm MCH18 series
C2	82pF, 5%	Rohm MCH18 series
C3	10uF, 10%	AVX TAJB106K020R
C4	1000pF, 5%	Rohm MCH18 series
C5	39pF, 5%	Rohm MCH18 series
C6	1200pF, 5%	Rohm MCH18 series
C7	6.8pF, ±0.5pF	Rohm MCH18 series
C8	100pF, 5%	Rohm MCH18 series
L1	2.2nH, ±0.3nH	Toko LL1608-FS series
L2	33nH, 5%	Coilcraft 1008HQ series
R1	6.8K Ohm, 5%	Rohm MCR03 series
R2	330 Ohm, 5%	Rohm MCR03 series

**SPA-2118 850 MHz 1 Watt Power Amp.**

Pin #	Function	Description
1	Vc1	VC1 is the supply voltage for the first stage transistor. The configuration as shown on application schematic is required for optimum RF performance.
2	Vbias	Vbias is the bias control pin for the active bias network. Recommended configuration is shown in the Application Schematic.
3	RF In	RF input pin. This pin requires the use of an external DC blocking capacitor as shown in the Application Schematic.
4	Vpc2	Vpc2 is the bias control pin for the active bias network for the second stage. The recommended configuration is shown in the Application Schematic.
5, 6, 7, 8	RF Out/Vc2	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 6).

**Simplified Device Schematic**



**Absolute Maximum Ratings**

Parameter (Ta = 25°C)	Absolute Limit
Max. Supply Current (I <sub>c1</sub> ) at V <sub>cc</sub> typ.	150 mA
Max. Supply Current (I <sub>c2</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	10 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:

$$I_{cc} V_{cc} (\max) < (T_j - T_L) R_{\theta j-L}$$



**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.

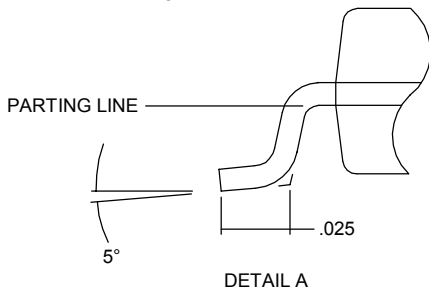
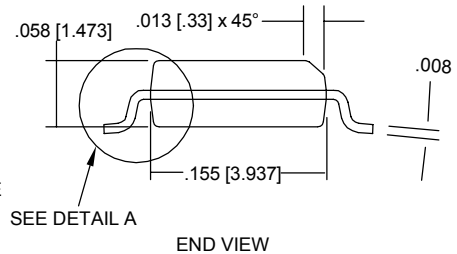
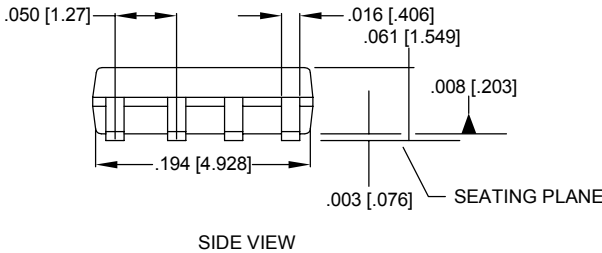
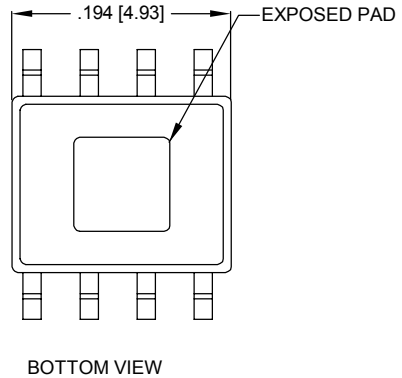
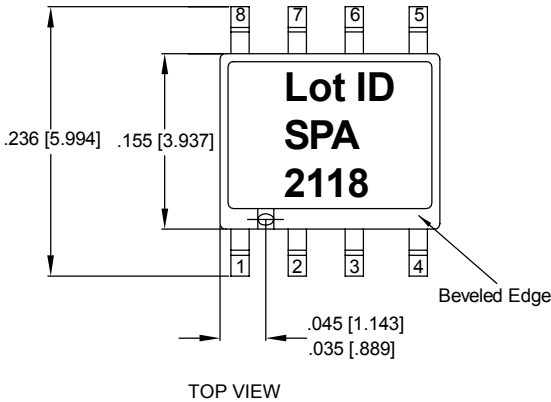
**SPA-2118 850 MHz 1 Watt Power Amp.**

**Part Number Ordering Information**

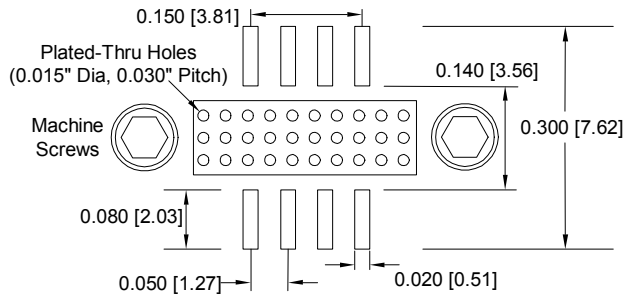
Part Number	Devices Per Reel	Reel Size
SPA-2118	500	7"

**Package Outline Drawing**

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



**Recommended Land Pattern**



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

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