

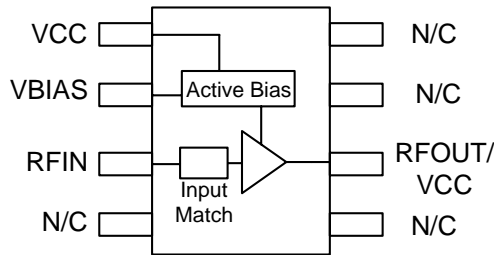


## Product Description

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.

The matte tin finish on Sirenza's lead-free package utilizes a post annealing process to mitigate tin whisker formation and is RoHS compliant per EU Directive 2002/95. This package is also manufactured with green molding compounds that contain no antimony trioxide nor halogenated fire retardants.



## SPA-1118

**SPA-1118Z**  RoHS Compliant & Green Package

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



## Product Features

- Now available in Lead Free, RoHS Compliant, & Green Packaging
- High Linearity Performance:
  - +21 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

- Multi-Carrier Applications
- AMPS, ISM Applications

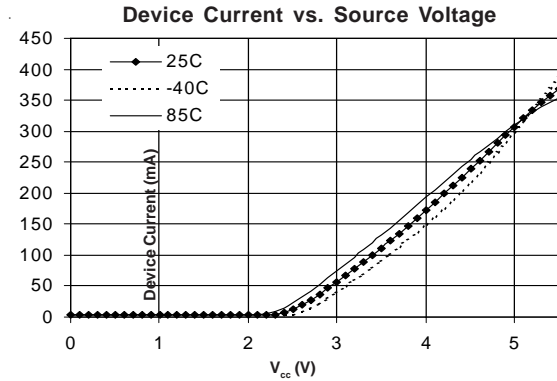
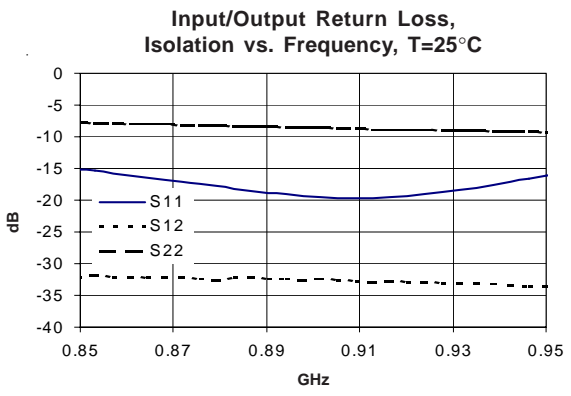
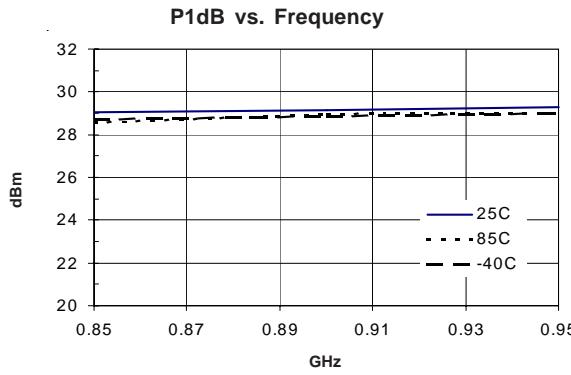
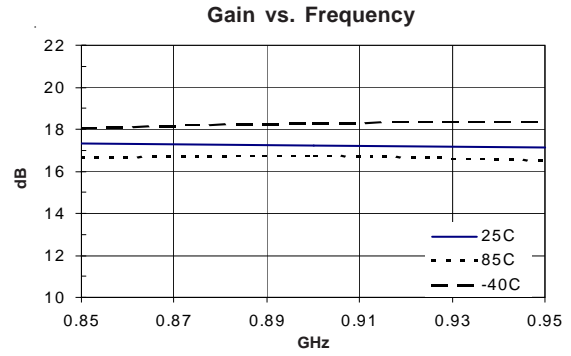
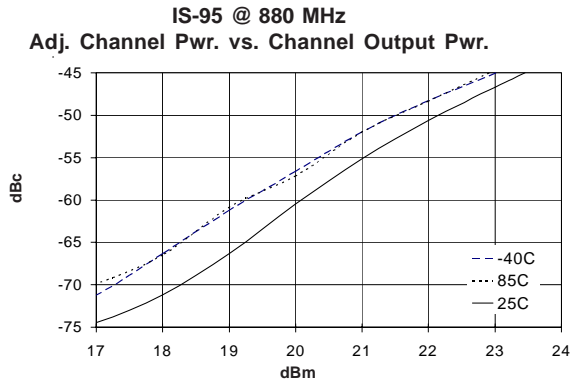
Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}, V_{CC} = 5V, \text{Temp} = 25^\circ\text{C}$	Units	Min.	Typ.	Max.
$f_0$	Frequency of Operation	MHz	810		960
$P_{1dB}$	Output Power at 1dB Compression	dBm		29.5	
ACP	Adjacent Channel Power IS-95 @ 880 MHz, $\pm 885 \text{ KHz}$ , $P_{OUT} = 21 \text{ dBm}$	dBc		-57.0	-54.0
$S_{21}$	Small Signal Gain, 880 MHz	dB	16.2	17.2	18.2
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		7.5	
$I_{CC}$	Device Current	mA	275	310	330
$V_{CC}$	Device Voltage	V	4.75	5.0	5.25
$R_{th,j-l}$	Thermal Resistance (junction - lead) , $T_L = 85^\circ\text{C}$	$^\circ\text{C/W}$		35	

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

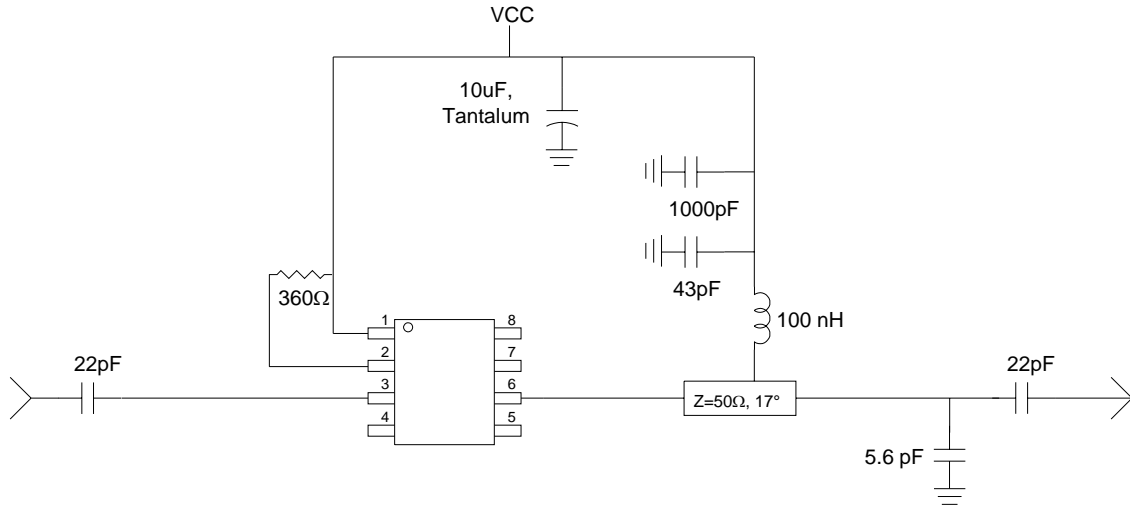
**850-950 MHz Application Circuit Data,  $I_{CC}=320\text{ mA}$ ,  $V_{CC}=5\text{V}$**



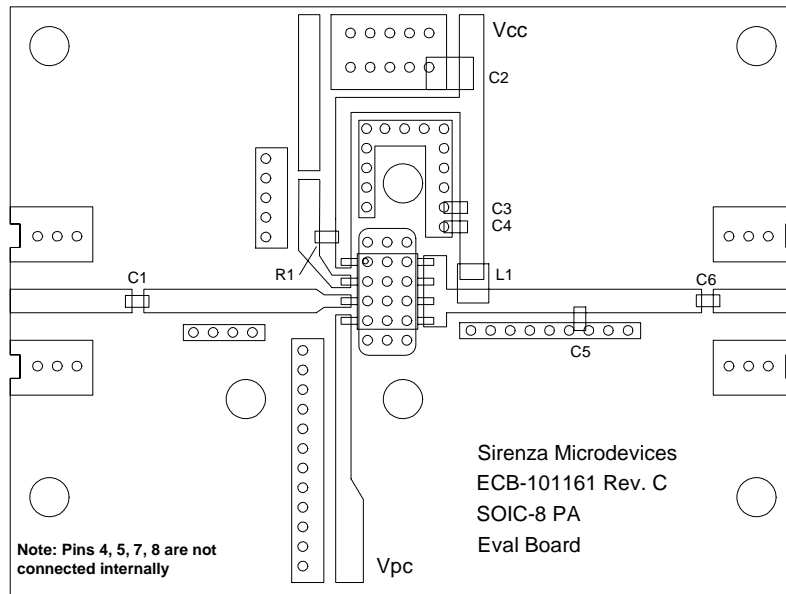


**SPA-1118 850 MHz 1 Watt Power Amp.**

**850 - 950 MHz Schematic**



**850 - 950 MHz Evaluation Board Layout**



Ref. Des.	Value	Part Number
C1, C6	22pF, 5%	Rohm MCH18 series
C2	10uF, 10%	AVX TAJB106K020R
C3	1000pF, 5%	Rohm MCH18 series
C4	43pF, 5%	Rohm MCH18 series
C5	5.6pF, ±0.5pF	Rohm MCH18 series
L1	100nH, 5%	Coilcraft 1008HQ series
R1	360 Ohm, 5%	Rohm MCR03 series



**SPA-1118 850 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, 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 (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	24 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:  

$$I_{CC} V_{CC} (max) < (T_J - T_L) / R_{th(j-c)}$$



**Caution: ESD sensitive**

Appropriate precautions in handling, packaging and testing devices must be

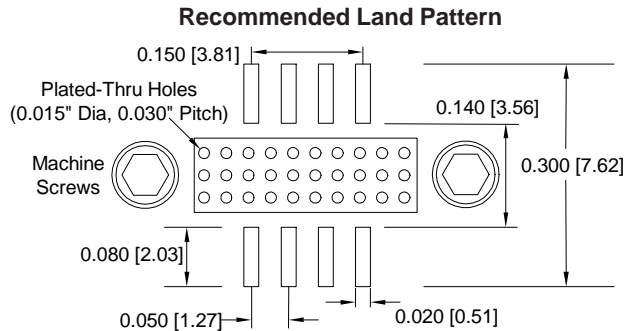
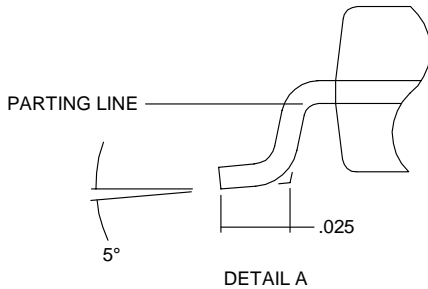
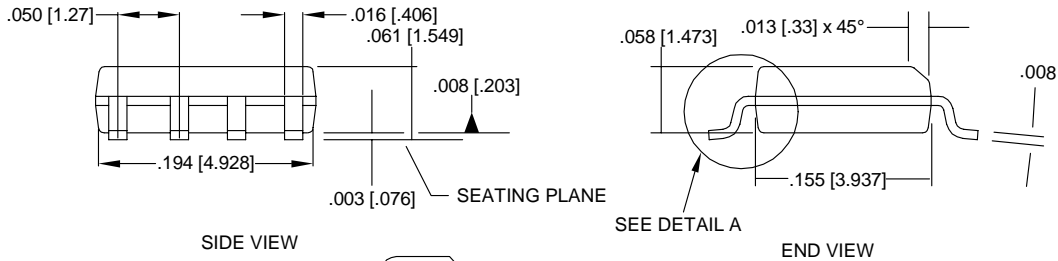
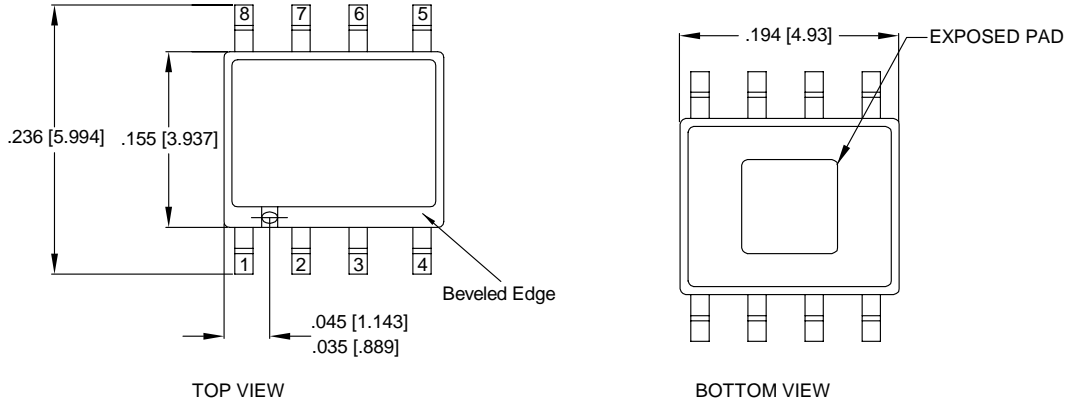
The Moisture Sensitivity Level rating for this device is level 1 (MSL-1) based on the JEDEC 22-A113 standard classification. No special moisture packaging/handling is required during storage, shipment, or installation of the devices.



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

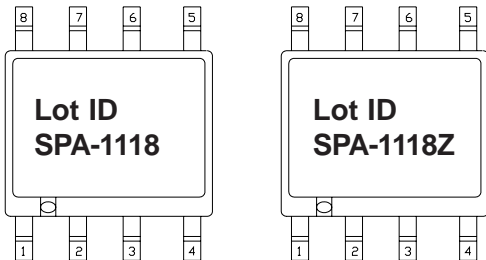
**Package Outline Drawing**

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



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

**Part Identification Marking**



**Part Number Ordering Information**

Part Number	Reel Size	Devices/Reel
SPA-1118	7"	500
SPA-1118Z	7"	500

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