

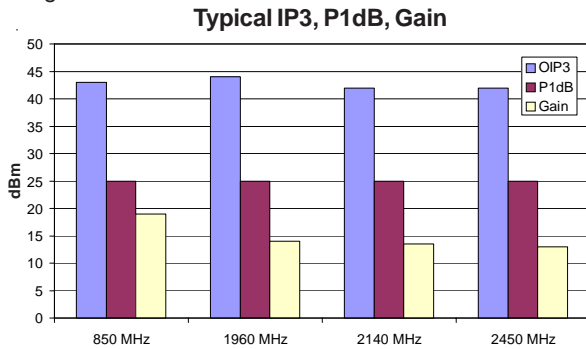


## Product Description

Sirenza Microdevices' SXA-389 amplifier is a high efficiency GaAs Heterojunction Bipolar Transistor (HBT) MMIC housed in low-cost surface-mountable plastic package. These HBT MMICs are fabricated using molecular beam epitaxial growth technology which produces reliable and consistent performance from wafer to wafer and lot to lot.

These amplifiers are specially designed for use as driver devices for infrastructure equipment in the 400-2500 MHz cellular, ISM, WLL, PCS, W-CDMA 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.



## SXA-389

## SXA-389Z



### 400-2500 MHz ¼ W Medium Power GaAs HBT Amplifier with Active Bias



## Product Features

- On-chip Active Bias Control, Single 5V Supply
- High Output 3rd Order Intercept: +42 to +44 dBm typ.
- High P1dB : +25 dBm typ.
- High Gain: +19 dB at 850 MHz
- High Efficiency: consumes only 600 mW
- Patented High Reliability GaAs HBT Technology
- Surface-Mountable Power Plastic Package

## Applications

- W-CDMA, PCS, Cellular Systems
- High Linearity IF Amplifiers
- Multi-Carrier Applications

Symbol	Parameters: Test Conditions: $Z_0 = 50 \text{ Ohms}$ , $T_a = 25^\circ\text{C}$		Units	Min.	Typ.	Max.
$P_{1dB}$	Output Power at 1dB Compression	f = 850 MHz f = 1960 MHz f = 2140 MHz f = 2450 MHz	dBm	24	25 25 25 25	
$S_{21}$	Small signal gain	f = 850 MHz f = 1960 MHz f = 2140 MHz f = 2450 MHz	dB	12.5	19 14 13.5 13	15
$S_{11}$	Input VSWR	f = 850 MHz f = 1960 MHz f = 2140 MHz f = 2450 MHz	-		1.3:1 1.4:1 1.3:1 1.1:1	
$OIP_3$	Output Third Order Intercept Point (Pout/Tone = +11 dBm, Tone spacing = 1 MHz)	f = 850 MHz f = 1960 MHz f = 2140 MHz f = 2450 MHz	dBm	39	43 44 42 42	
NF	Noise Figure	f = 850 MHz f = 1960 MHz f = 2140 MHz f = 2450 MHz	dB		4.7 5.5 6.0 6.0	
$I_b$	Device Current	$V_{cc} = 5V$	mA	90	115	122
$P_{DSS}$	Operating Dissipated Power		mW		575	610
$R_{\theta j-l}$	Thermal Resistance (junction - lead)		$^\circ\text{C/W}$		100	

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EDS-102231 Rev D

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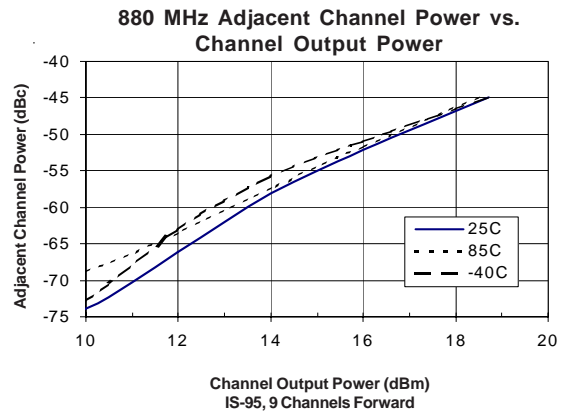
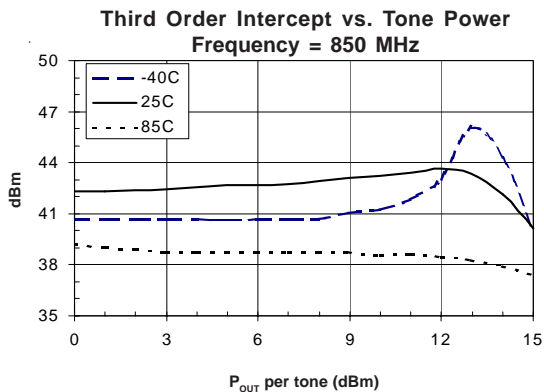
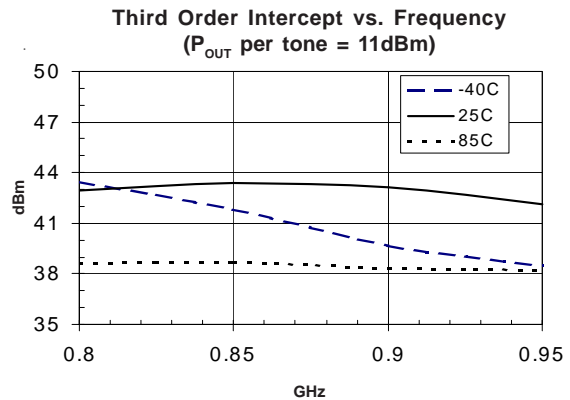
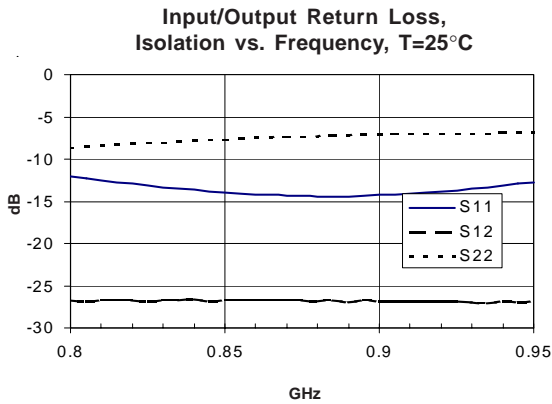
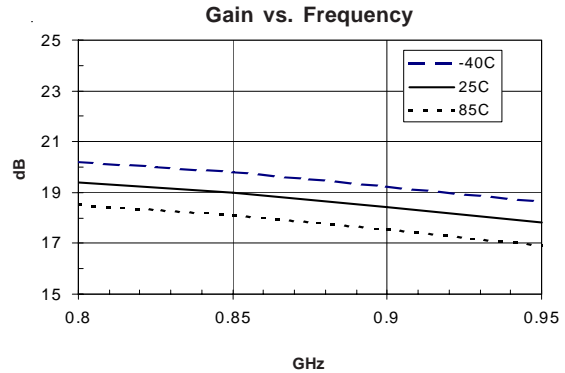
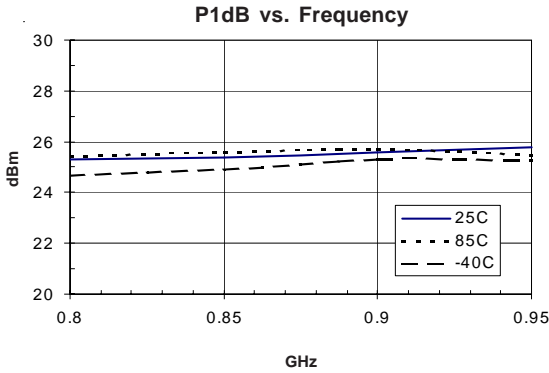
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**SXA-389 1/4 W GaAs HBT Amplifier**

**850 MHz Application Circuit Data,  $V_{CC}=5V, I_D=120mA$**

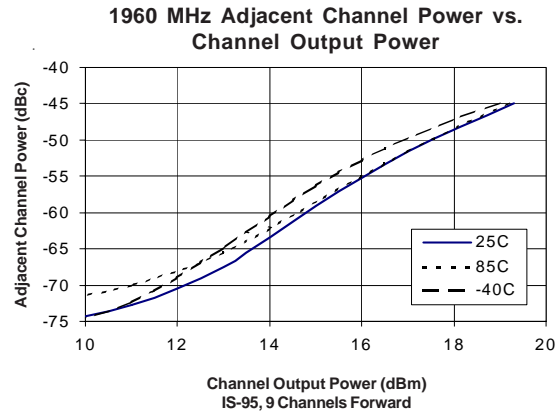
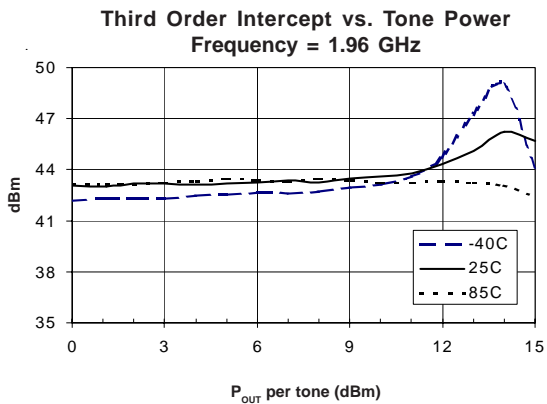
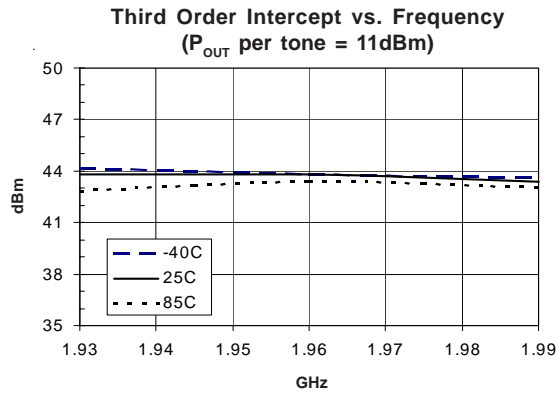
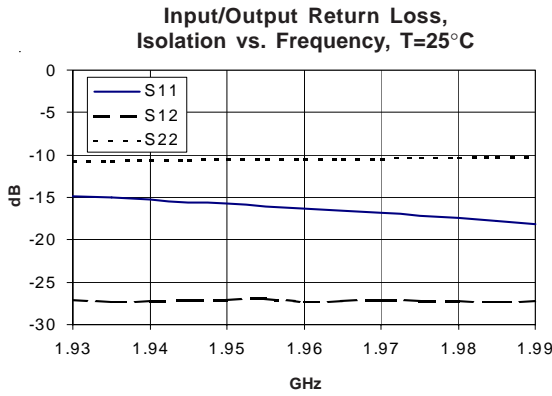
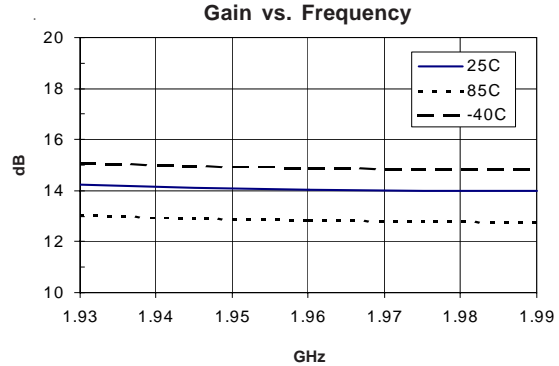
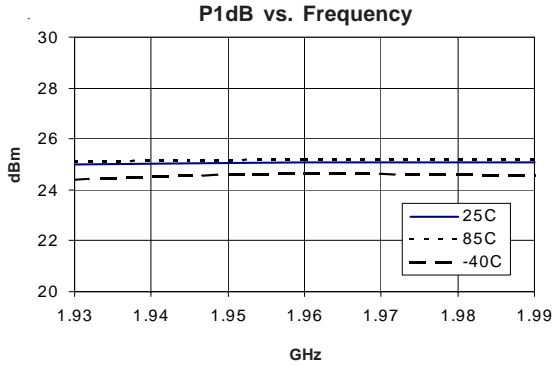
Note: Tuned for Output IP3





**1960 MHz Application Circuit Data,  $V_{CC} = 5V, I_D = 120mA$**

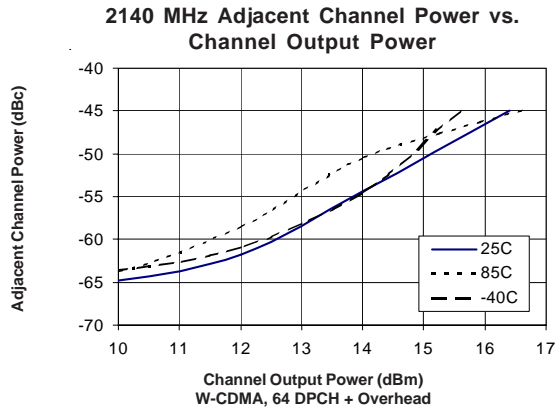
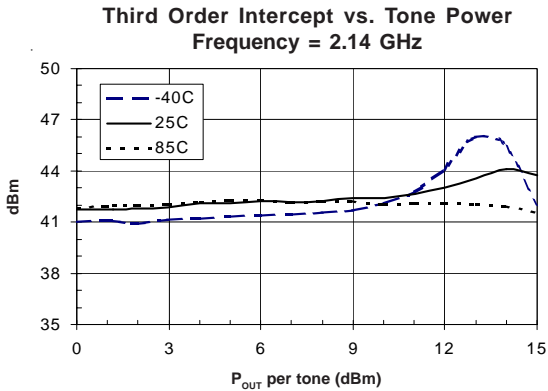
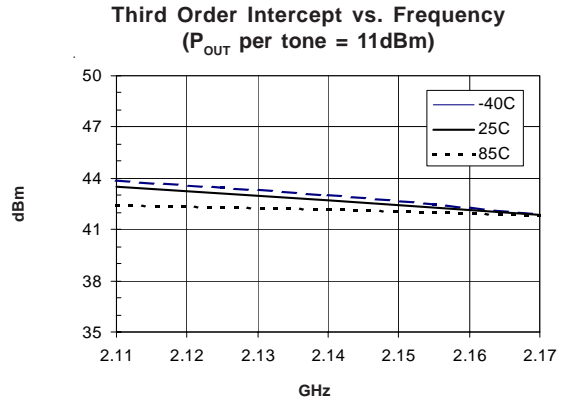
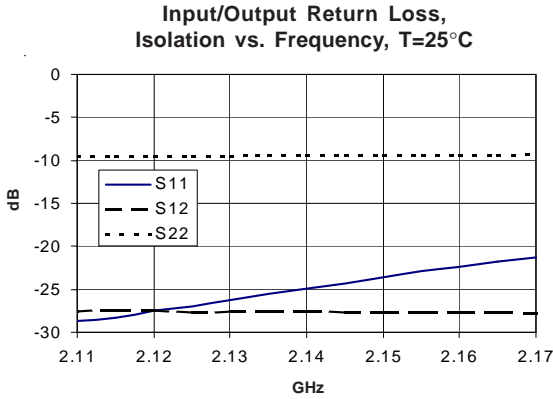
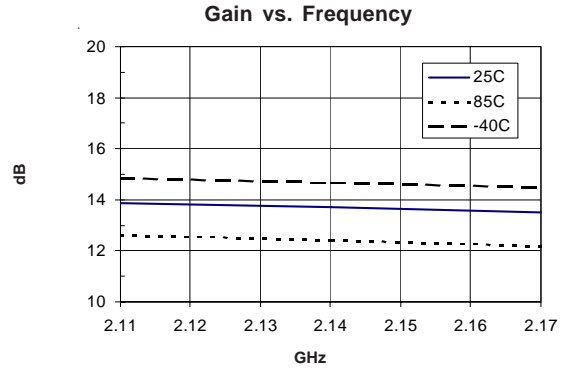
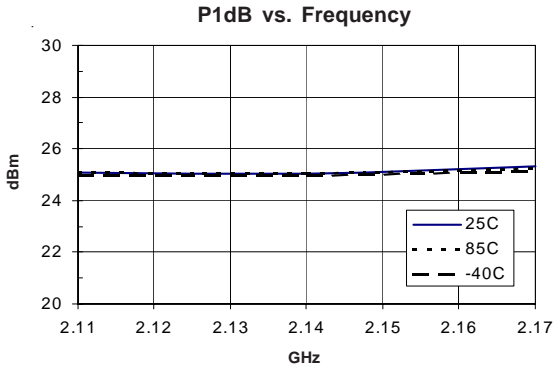
Note: Tuned for Output IP3





**2140 MHz Application Circuit Data,  $V_{CC}=5V, I_D=120mA$**

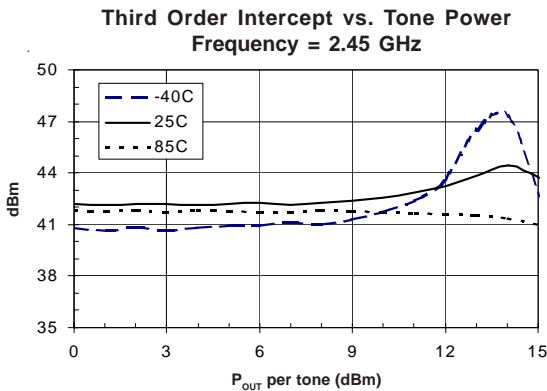
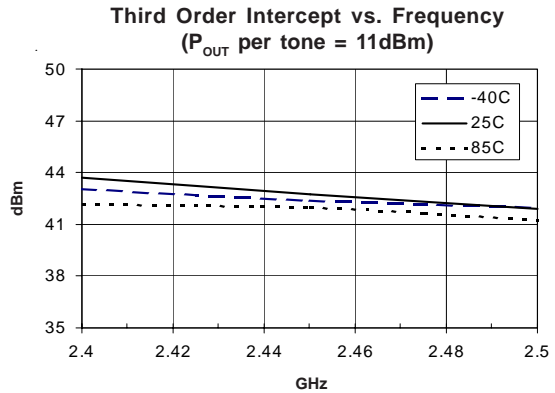
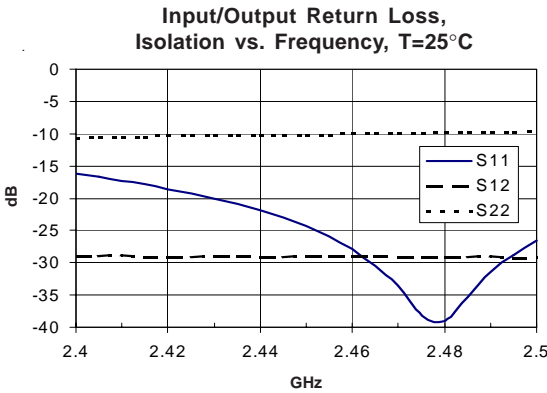
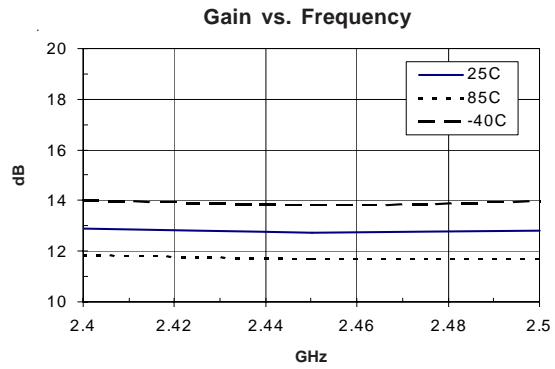
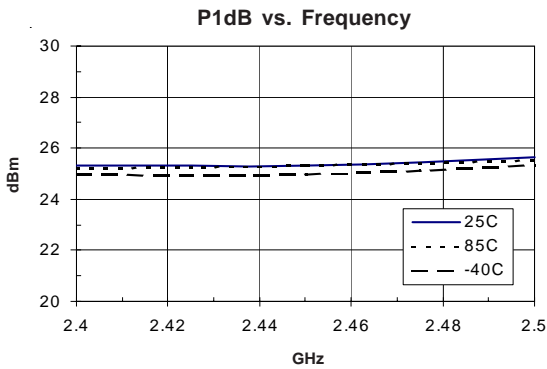
Note: Tuned for Output IP3





**2450 MHz Application Circuit Data,  $V_{CC}=5V$ ,  $I_D=120mA$**

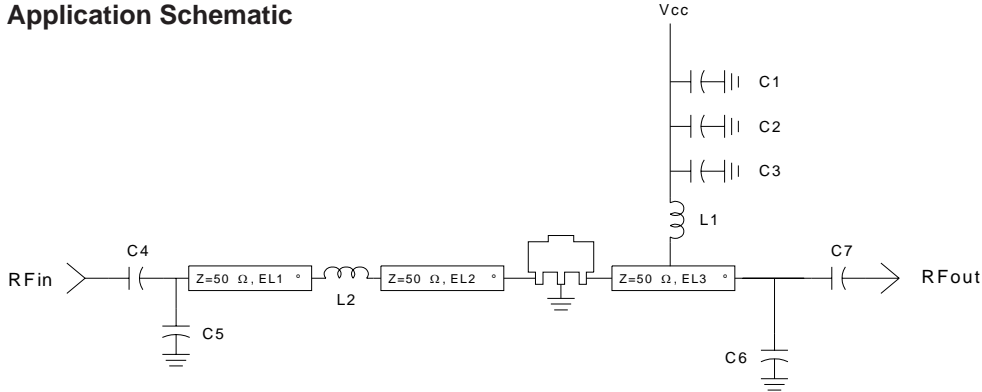
Note: Tuned for Output IP3





**SXA-389 1/4 W GaAs HBT Amplifier**

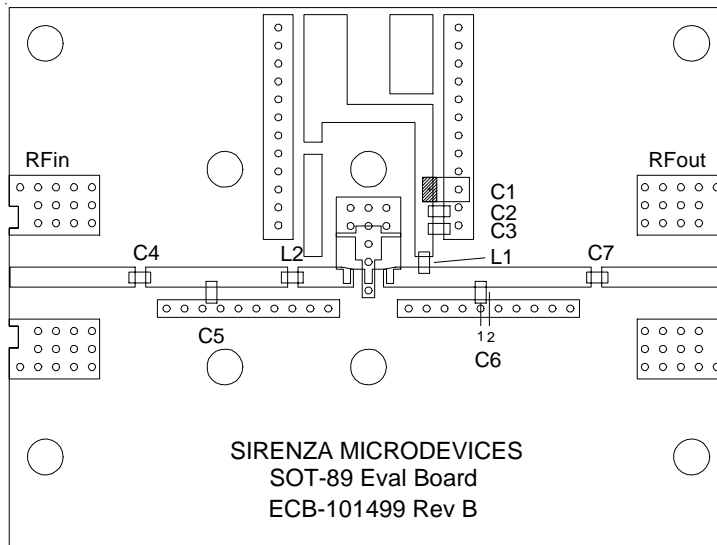
**Application Schematic**



Ref. Des.	Vendor Series	850 MHz	1960 MHz	2140 MHz	2450 MHz
C1	Matsuo 267M3502104K	0.1uF 10%	0.1uF 10%	0.1uF 10%	0.1uF 10%
C2	Rohm MCH18	1000pF 5%	1000pF 5%	1000pF 5%	1000pF 5%
C3, C7	Rohm MCH18	47pF 5%	22pF 5%	22pF 5%	22pF 5%
C4	Rohm MCH18	47pF 5%	22pF 5%	22pF 5%	1.2pF ±0.25pF
C5	Rohm MCH18	3.9pF ±0.25pF	-	-	-
C6	Rohm MCH18	3.9pF ±0.25pF	0.5pF ±0.25pF	0.5pF ±0.25pF	0.5pF ±0.25pF

Ref. Des.	Vendor Series	850 MHz	1960 MHz	2140 MHz	2450 MHz
C6 Position		2	1	1	1
L1	Toko LL1608-FS	33nH 5%	18nH 5%	18nH 5%	15nH 5%
L2	Toko LL1608-FS	1.2nH ±0.3nH	thru	thru	thru
EL1		9.7	-	-	-
EL2		5.6	-	-	-
EL3		13.2	28.7	31.4	35.9

**Evaluation Board Layout**





**SXA-389 1/4 W GaAs HBT Amplifier**

**Absolute Maximum Ratings**

Parameter	Absolute Limit
Max. Supply Current ( $I_b$ )	240 mA
Max. Device Voltage ( $V_{cc}$ )	6.0 V
Max. Power Dissipation	1500 mW
Max. RF Input Power	100 mW
Max. Junction Temp. ( $T_j$ )	+165 °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:  
 $I_b V_{cc} (max) < (T_j - T_{j0}) / R_{\theta j-c}$



**ESD: Class 1B (Passes 500V ESD Pulse)**  
 Appropriate precautions in handling, packaging and testing devices must be observed.

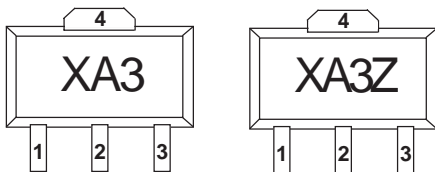
**Part Number Ordering Information**

Part Number	Devices Per Reel	Reel Size
SXA-389	1000	7"
SXA-389B	1000	7"

**Pin Description**

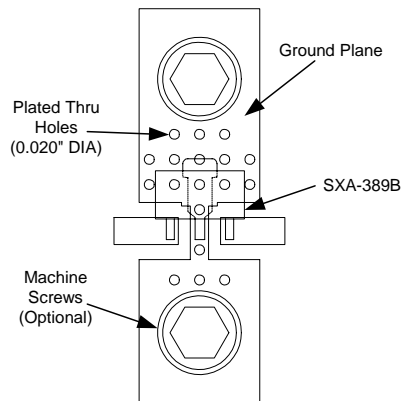
Pin #	Function	Description
1	Base	Base Pin
2	GND & Emitter	Connection to ground. Use via holes to reduce lead inductance. Place vias as close to ground leads as possible.
3	Collector	Collector Pin
4	GND & Emitter	Same as Pin 2

**Part Identification Marking**



**See Application Note AN-075  
 for Package Outline Drawing**

**Recommended Mounting Configuration for  
 Optimum RF and Thermal Performance**



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