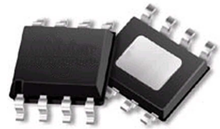
SXA-3318B

400-2500 MHz
Balanced ½ W Medium Power GaAs HBT Amplifier with Active Bias

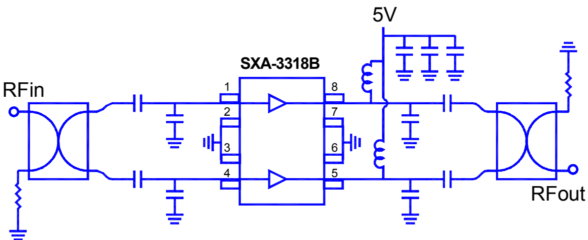


Product Description

Sirenza Microdevices' SXA-3318B amplifier is a high efficiency GaAs Heterojunction Bipolar Transistor (HBT) MMIC housed in a 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.

Its high linearity makes it an ideal choice for multi-carrier as well as digital applications.



Product Features

- On-chip Active Bias Control
- Balanced for excellent input/output VSWR and minimized reflections
- High OIP3 : +47 dBm typ.
- High P1dB : +28 dBm typ.
- Patented High Reliability GaAs HBT Technology
- Surface-Mountable Power Plastic Package

Applications

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

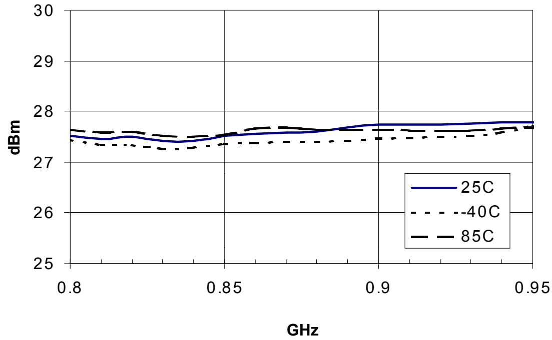
Symbol	Parameters: Test Conditions: Z_0 = 50 Ohms, Ta = 25°C		Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1dB Compression	f = 850 MHz f = 1960 MHz f = 2140 MHz	dBm	 27.0	27.5 28.0 28.0	
S_{21}	Small signal gain	f = 850 MHz f = 1960 MHz f = 2140 MHz	dB	 10.5	17.5 12.8 12.0	 13.5
S_{11},S_{22}	Input/Output VSWR	f = 850 MHz f = 1960 MHz f = 2140 MHz	-		1.3:1 1.2:1 1.2:1	
OIP_3	Output Third Order Intercept Point (Pout/Tone = +11 dBm, Tone spacing = 1 MHz)	f = 850 MHz f = 1960 MHz f = 2140 MHz	dBm	 45	47 47 48	
ACP	Adjacent Channel Power: IS-95 at P_{OUT} = 19 dBm IS-95 at P_{OUT} = 19 dBm W-CDMA at P_{OUT} = 18 dBm	f = 880 MHz f = 1960 MHz f = 2140 MHz	dBc		-55 -55 -50	
NF	Noise Figure	f = 850 MHz f = 1960 MHz f = 2140 MHz	dB		4.5 5.1 5.1	
I_D	Device Current (120 mA per amplifier)	Vcc = 5V	mA		240	
R_{th}, j-l	Thermal Resistance (junction - lead) per amplifier *Note: 2 amplifiers per packaged part		° C/W		70*	

Preliminary

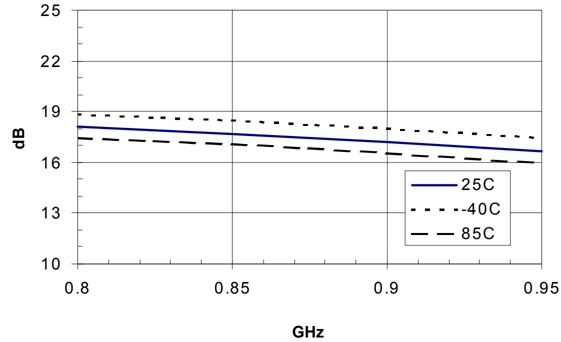
850 MHz Application Circuit Data, V_{CC}= 5V, I_D= 240mA

Note: Tested in Balanced Configuration shown in Application Circuit, tuned for Output IP3

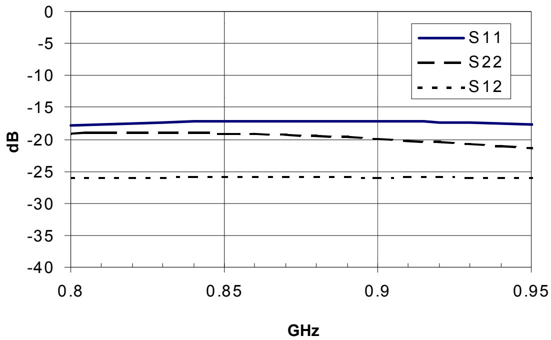
P1dB vs. Frequency



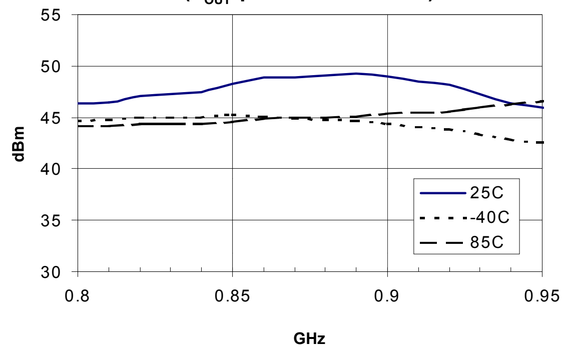
Gain vs. Frequency



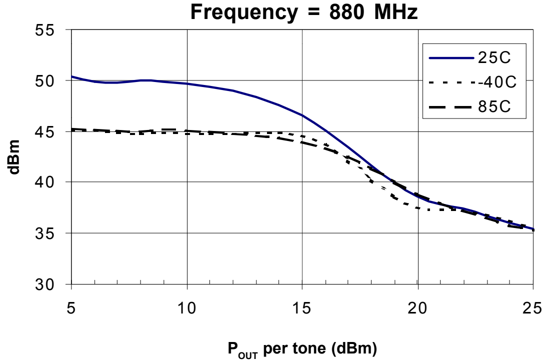
Input/Output Return Loss, Isolation vs. Frequency, T=25°C



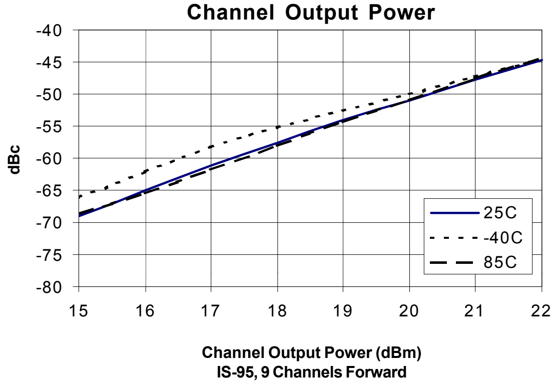
Third Order Intercept vs. Frequency (P_{OUT} per tone = 11dBm)



Third Order Intercept vs. Tone Power Frequency = 880 MHz



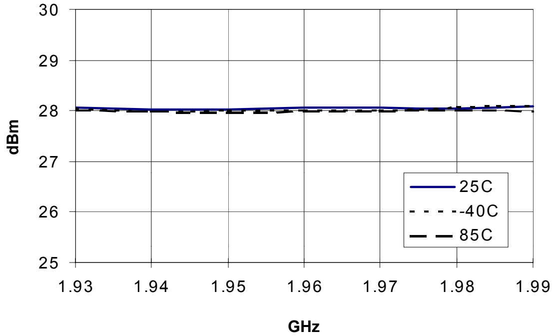
880 MHz Adjacent Channel Power vs. Channel Output Power



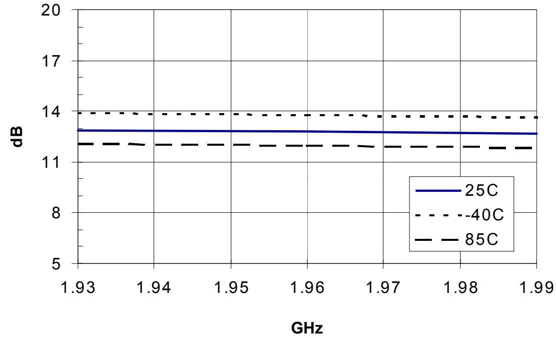
1960 MHz Application Circuit Data, V_{CC}= 5V, I_D= 240mA

Note: Tested in Balanced Configuration shown in Application Circuit, tuned for Output IP3

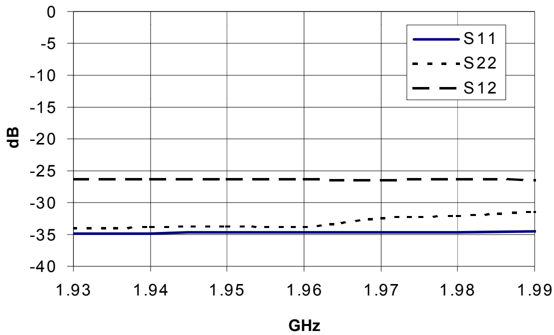
P1dB vs. Frequency



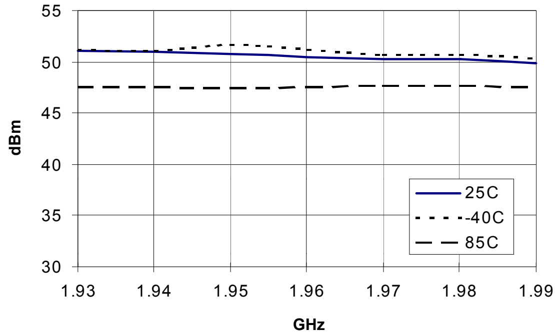
Gain vs. Frequency



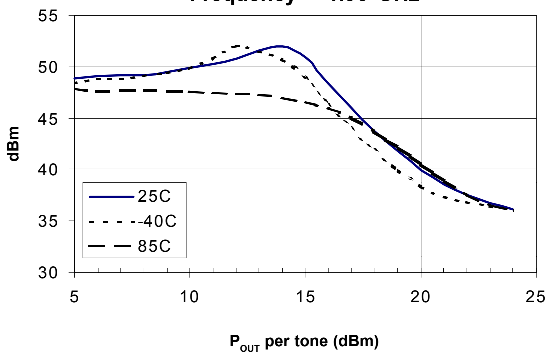
Input/Output Return Loss, Isolation vs. Frequency, T=25°C



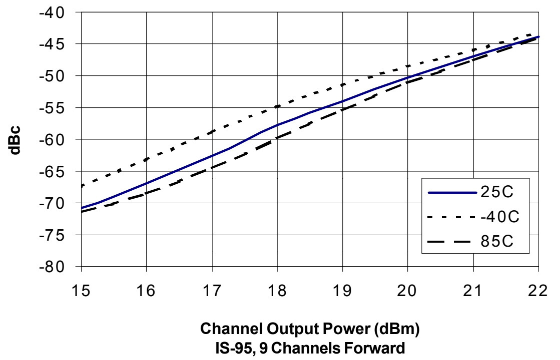
Third Order Intercept vs. Frequency (P_{OUT} per tone = 11dBm)



Third Order Intercept vs. Tone Power Frequency = 1.96 GHz

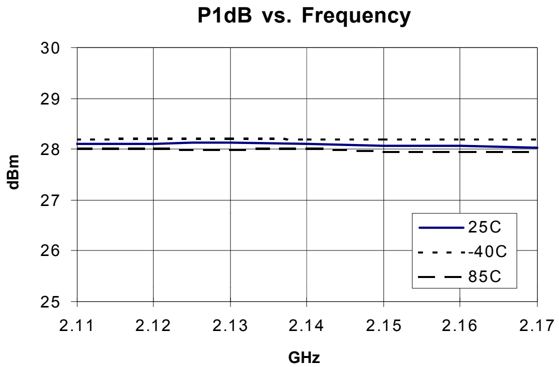


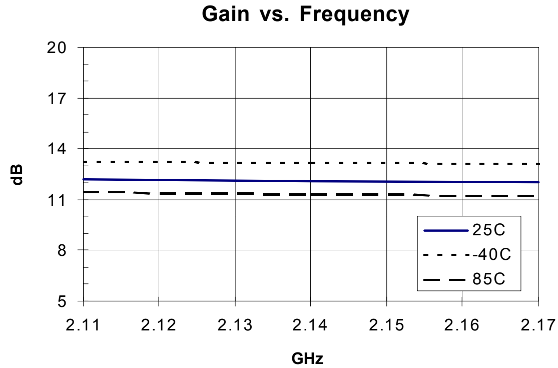
1960 MHz Adjacent Channel Power vs. Channel Output Power

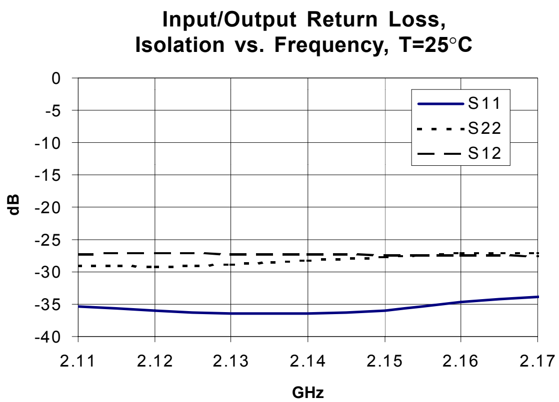


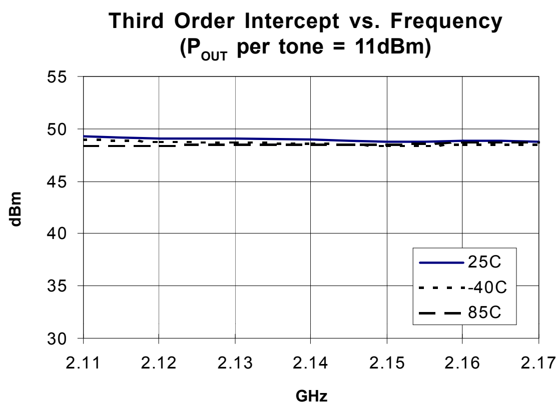
2140 MHz Application Circuit Data, V_{CC}= 5V, I_D= 240mA

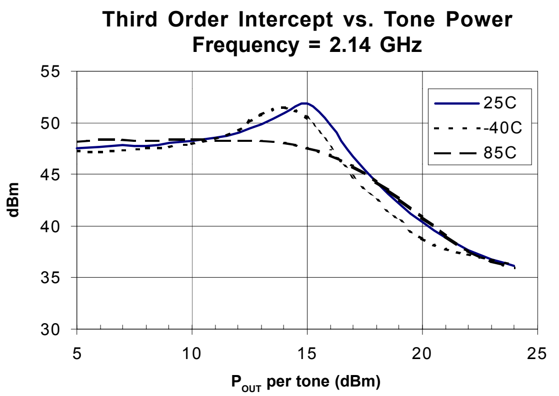
Note: Tested in Balanced Configuration shown in Application Circuit, tuned for Output IP3

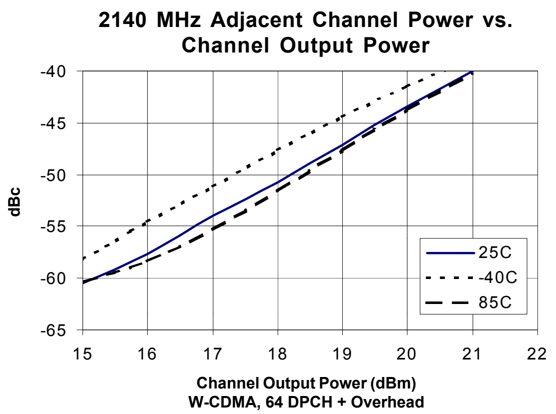




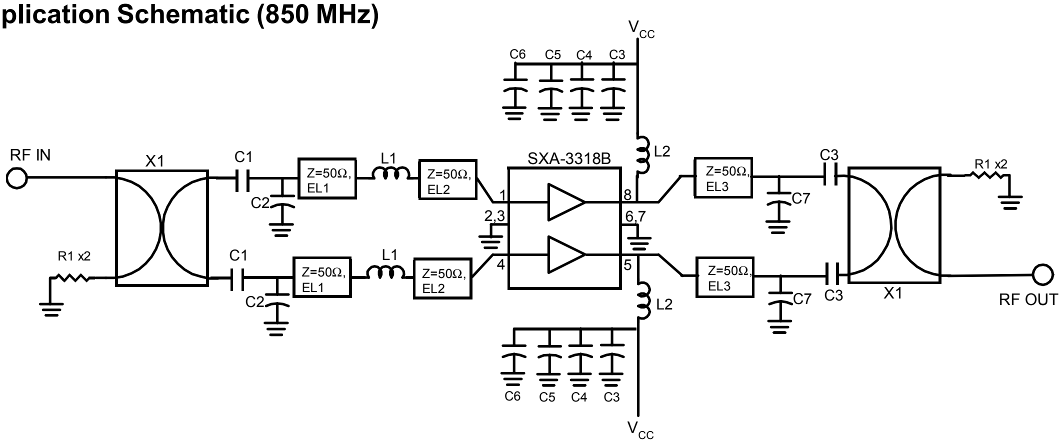








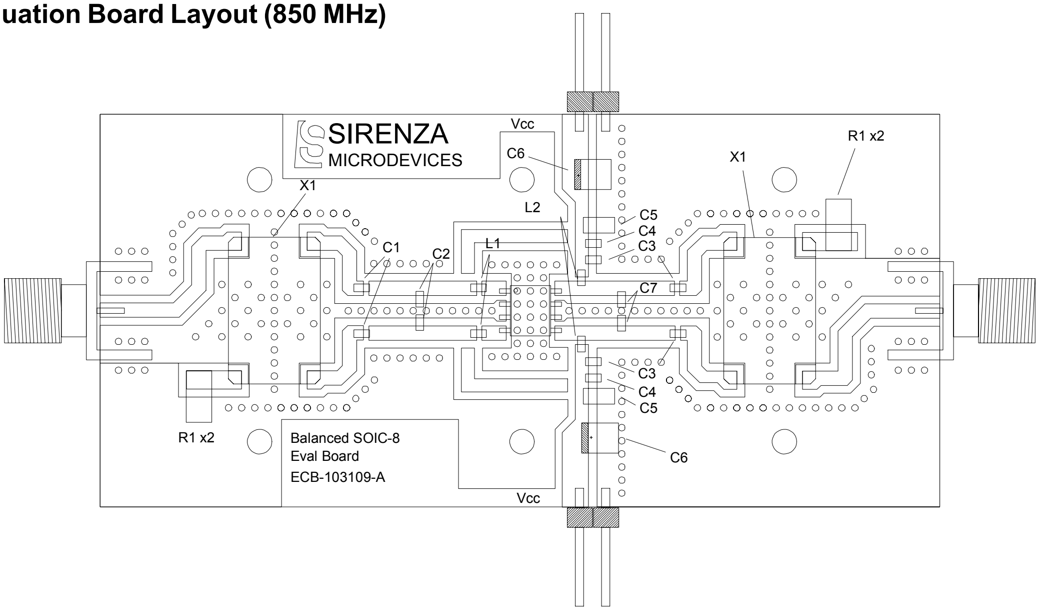
Application Schematic (850 MHz)



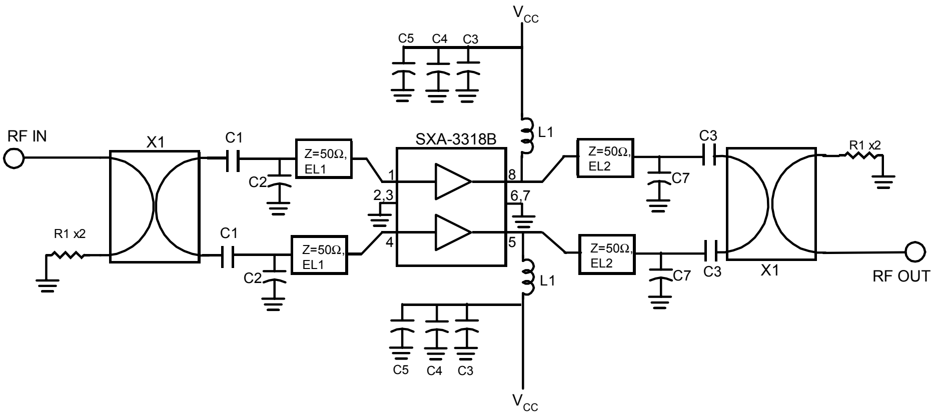
Ref. Des.	Vendor Series	850 MHz
C1, C3	Rohm MCH18	47pF, 5%
C2	Rohm MCH18	3.9pF, ±0.25pF
C4	Rohm MCH18	1000pF, 5%
C5	Rohm TAJB104KLRH	0.1uF, 10%
C6	Rohm TAJB106K020R	10uF, 10%
C7	Rohm MCH18	3.3pF, ±0.25pF
L1	Toko LL1608-FS	1.2nH, ±0.3nH

Ref. Des.	Vendor Series	850 MHz
L2	Toko LL1608-FS	33nH, 5%
EL1	50 Ohms	9.9°
EL2	50 Ohms	4.4°
EL3	50 Ohms	11°
X1	Sirenza Coupler	AH03L
R1	Rohm MCR100J	100 Ohm, 5%

Evaluation Board Layout (850 MHz)



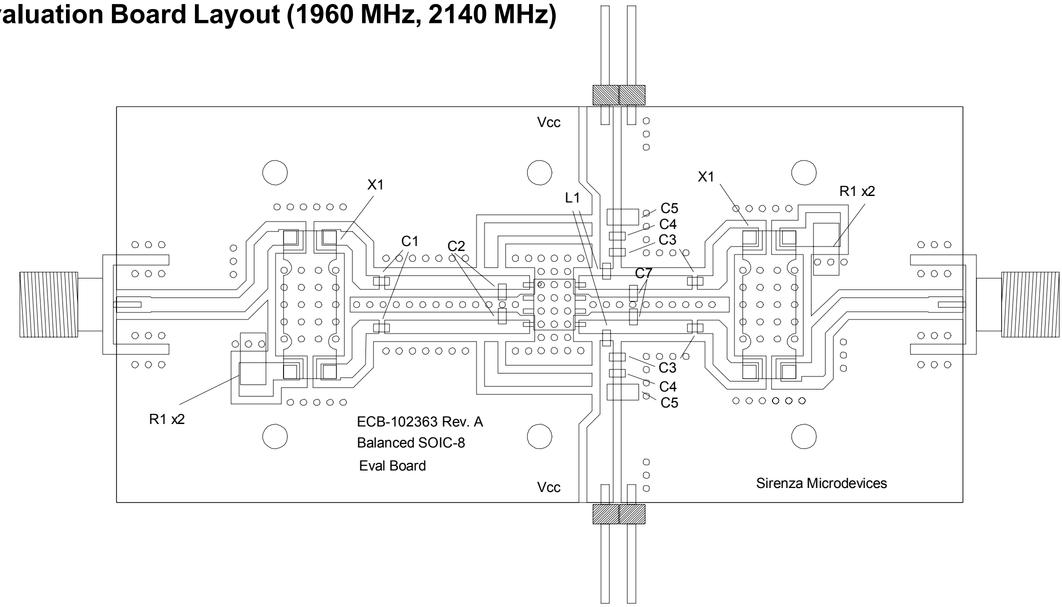
Application Schematic (1960 MHz, 2140 MHz)

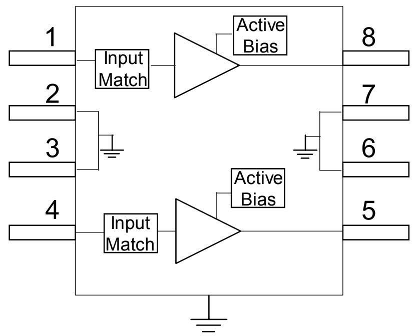


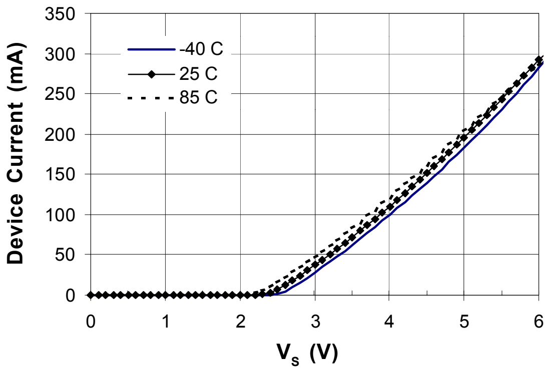
Ref. Des.	Vendor Series	1960 MHz	2140 MHz
C1, C3	Rohm MCH18	22pF, 5%	22pF, 5%
C2	Rohm MCH18	1.2pF, ±0.25pF	1.2pF, ±0.25pF
C4	Rohm MCH18	1000pF, 5%	1000pF, 5%
C5	Rohm TAJB104KLRH	0.1uF, 10%	0.1uF, 10%
C7	Rohm MCH18	1.0pF, ±0.25pF	1.0pF, ±0.25pF

Ref. Des.	Vendor Series	1960 MHz	2140 MHz
L1	Toko LL1608-FS	18nH, 5%	18nH, 5%
EL1	50 Ohms	10.1°	11°
EL2	50 Ohms	20.9°	22.8°
X1	Sirenza Coupler	AM03M	AM03M
R1	Rohm MCR100J	100 Ohm, 5%	100 Ohm, 5%

Evaluation Board Layout (1960 MHz, 2140 MHz)



Pin #	Function	Description	Device Schematic
1, 4	RF In	RF input pin. This pin requires the use of an external DC blocking capacitor.	
2, 3, 6, 7	GND	Connection to ground. Use via holes to reduce lead inductance. Place vias as close to ground leads as possible.	
5, 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 8).	



Absolute Maximum Ratings

Parameter	Absolute Limit
Max. Supply Current (I_D) per amplifier (2 amplifiers per packaged part)	240 mA
Max. Device Voltage (V_{CC})	6.0 V
Max. Power Dissipation per amplifier (2 amplifiers per packaged part)	1500 mW
Max. RF Input Power per amplifier (2 amplifiers per packaged part)	100 mW
Max. Junction Temp. (T_J)	+160 ºC
Operating Lead Temp. (T_L)	-40 to +85 ºC
Max. Storage Temp.	+150 ºC

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.

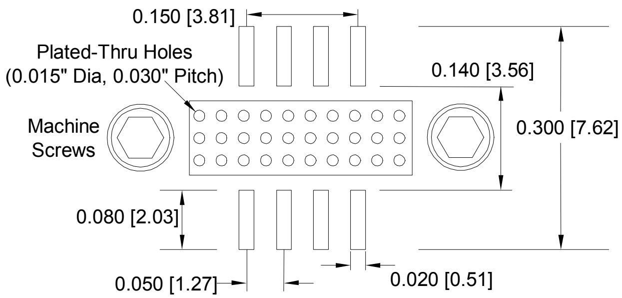
Bias Conditions should also satisfy the following expression:

$$I_D V_{CC} (max) < (T_J - T_L)/R_{th}j\text{-}l$$

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

Moisture Sensitivity Level: Level 1 (MSL-1)
No special moisture packaging/handling is required during storage, shipment, or installation of the devices.

Recommended Land Pattern



Part Number Ordering Information

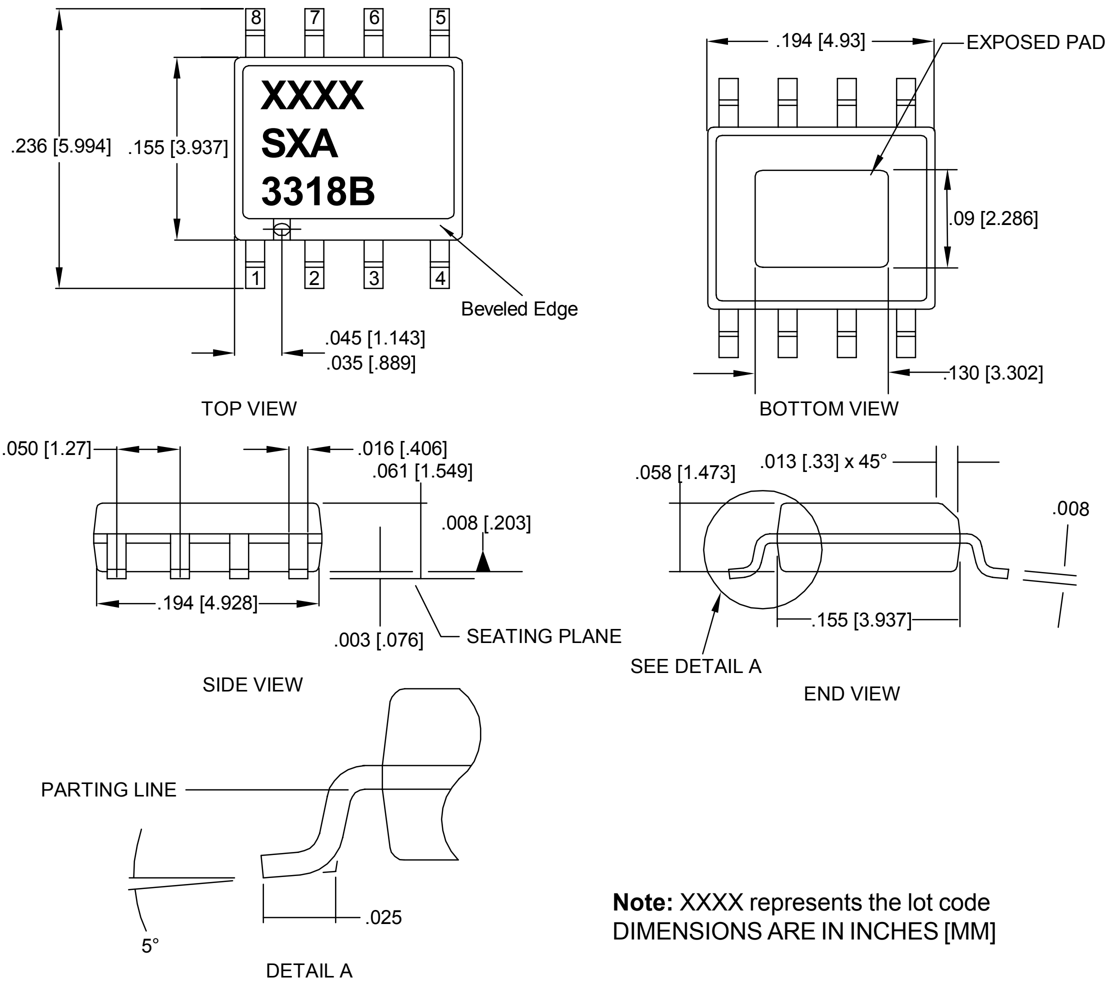
Part Number	Devices Per Reel	Reel Size
SXA-3318B	500	7"

Part Symbolization

The part will be symbolized with a "SXA3318B" designator on the top surface of the package.

Package Outline Drawing

(See SMDI MPO-101644 for tolerances)



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