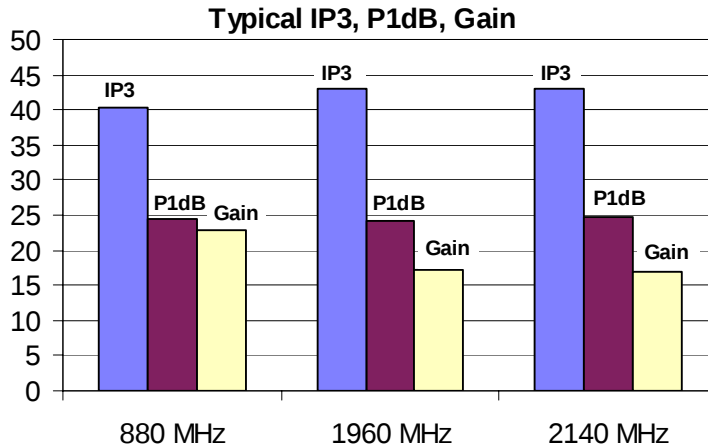




Product Description

Sirenza Microdevices' SXB-2089Z amplifier is a high linearity InGaP/GaAs Heterojunction Bipolar Transistor (HBT) MMIC housed in a low-cost, surface-mountable plastic package.

These amplifiers are specially designed for use as driver devices for infrastructure equipment in the 5-2500 MHz Cellular, ISM, WLL, PCS & W-CDMA applications. Its high linearity makes it an ideal choice for multi-carrier as well as digital applications.



SXB-2089Z

5-2500 MHz Medium Power InGaP/GaAs HBT Amplifier



Product Features

- High OIP3: +43dBm at 1960 MHz
- P1dB: 24dBm
- High Linearity/ACP Performance
- Robust 2000V ESD, Class 2
- SOT-89 package
- MSL 1 moisture rating

Applications

- PA Driver Amplifier
- IF Amplifier
- Cellular, PCS, ISM, WLL, W-CDMA

Symbol	Parameters	Units	Min.	Typ.	Max.
P_{1dB}	Output Power at 1 dB Compression	dBm	450 MHz		24
			880 MHz	23	24.5
			1960 MHz	23	24.5
			2140 MHz		24.5
S_{21}	Small Signal Gain	dBm	450 MHz		25
			880 MHz	21.5	23
			1960 MHz	15.5	17
			2140 MHz		17
S_{11}	Input VSWR		450 MHz		1.1
			880 MHz		1.4
			1960 MHz		1.6
			2140 MHz		1.3
NF	Noise Figure	dB	450 MHz		4.9
			880 MHz		4.5
			1960 MHz		4.7
			2140 MHz		4.2
OIP ₃	Third Order Intercept Point (Pout/tone = +11dBm, Tone spacing = 1MHz)	dBm	450 MHz		40
			880 MHz	38	41
			1960 MHz	40	43
			2140 MHz		43
ACP	Channel Power IS-95 at 450/880/1960MHz, -55dBc ACP WCDMA at 2140MHz, -50dBc ACP	dBm	450 MHz		16
			880 MHz		16.3
			1960 MHz		15.5
			2140 MHz		15.6
I_D	Device Current	mA	Vs = 8V Rbias = 20 Ohms Vdevice = 5.2V	120	135
$R_{TH, j-l}$	Thermal Resistance @ 85C (junction - lead)	°C/W		51.3	

Test Conditions: $T_a = 25^\circ\text{C}$ $Z_0 = 50\text{ Ohms}$

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<http://www.sirenza.com>

Absolute Maximum Ratings

Parameter	Absolute Limit
Max Device Current (I_{DQ})	190mA
Max Device Voltage (V_D)	6 V
Max. RF Input Power	+20 dBm
Max. Operating Dissipated Power (quiescent)	1.0 W
Max. Junction Temp. (T_J)	+150°C
Operating Temp. Range (T_L)	-40°C 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:

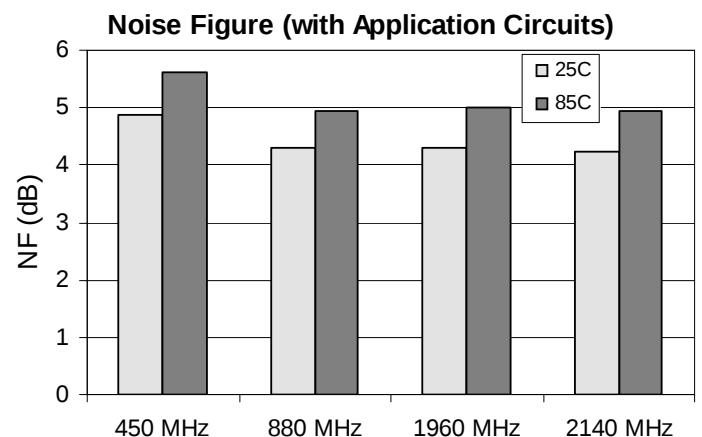
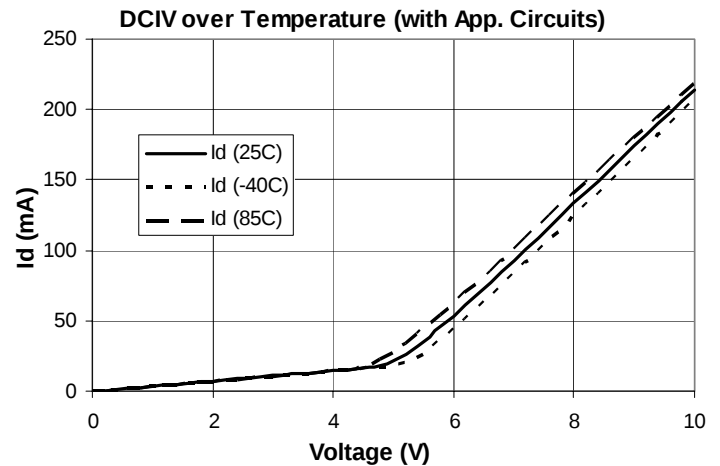
$$I_D V_D < (T_J - T_L) / R_{TH} \quad \text{J-I} \quad T_L = T_{LEAD}$$



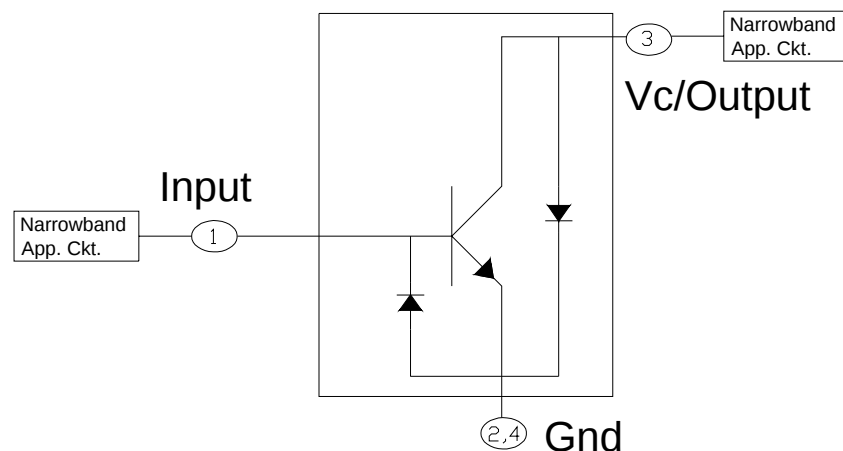
ESD Class 2, 2000V HBM

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

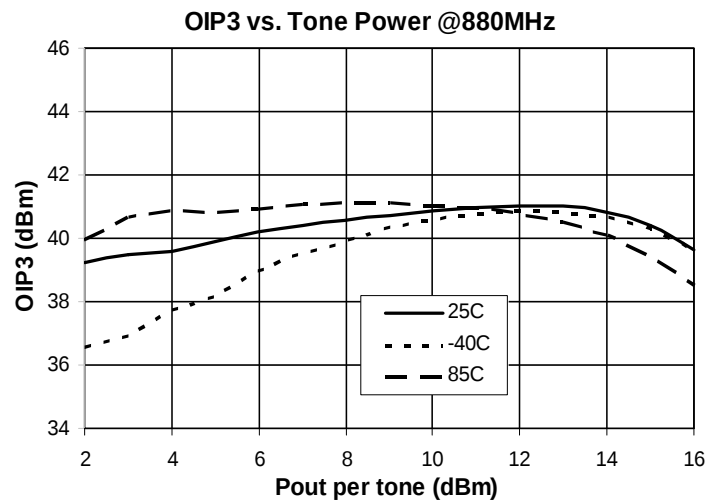
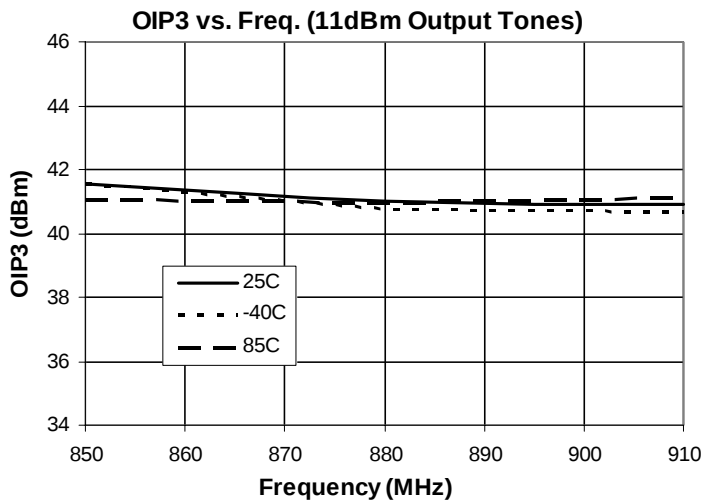
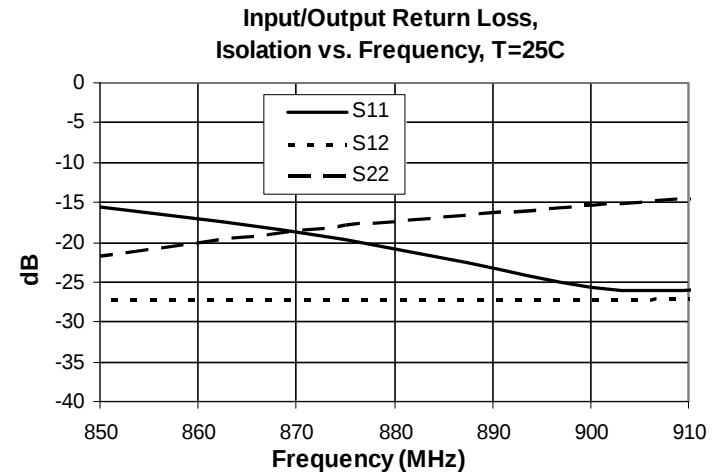
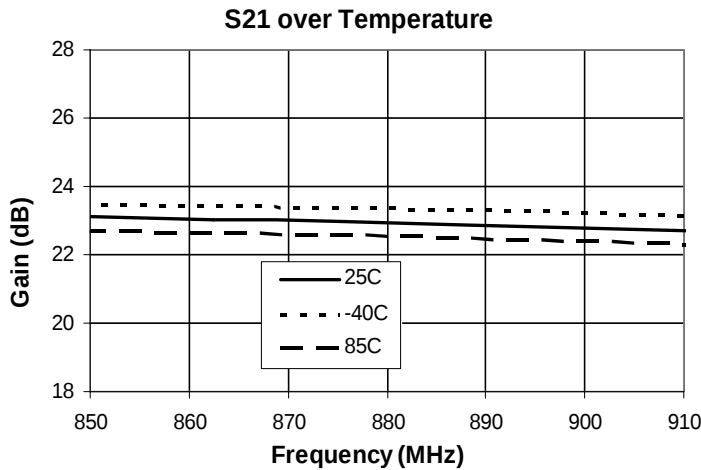
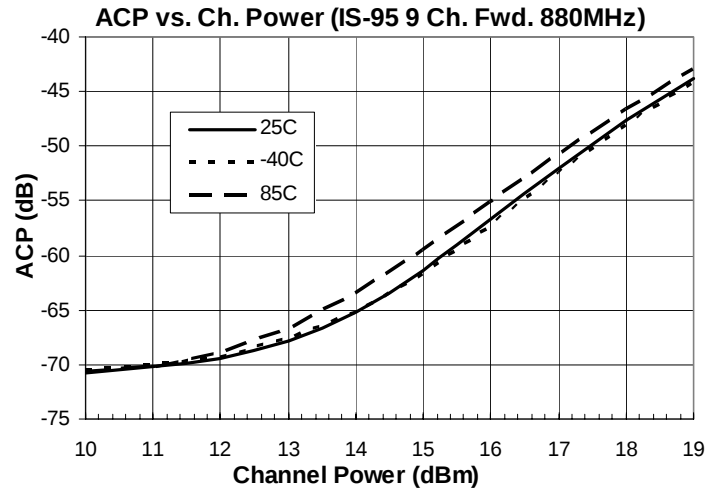
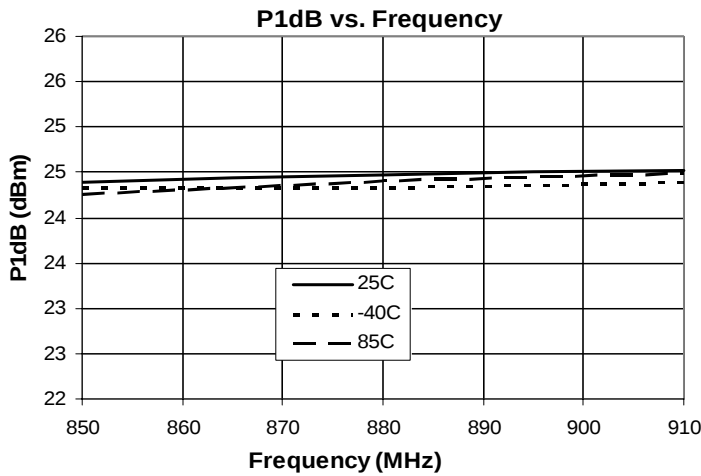
MSL (Moisture Sensitivity Level) Rating: Level 1



Simplified Device Schematic with ESD diodes

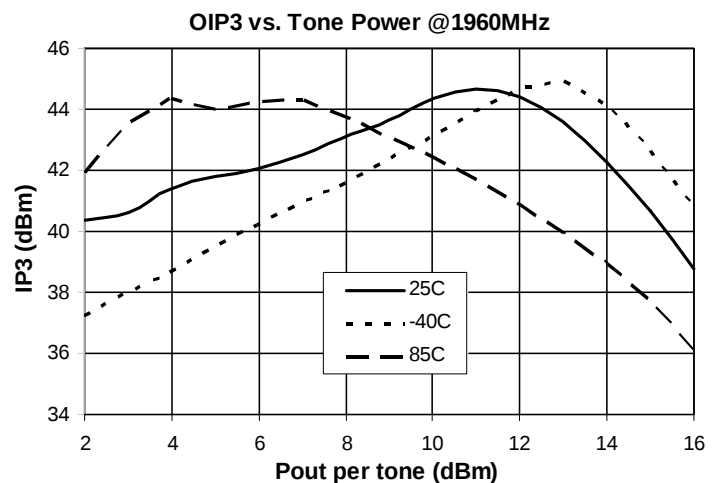
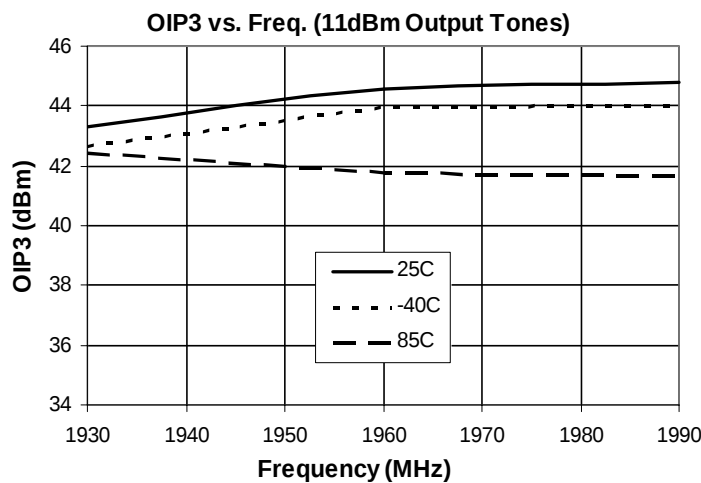
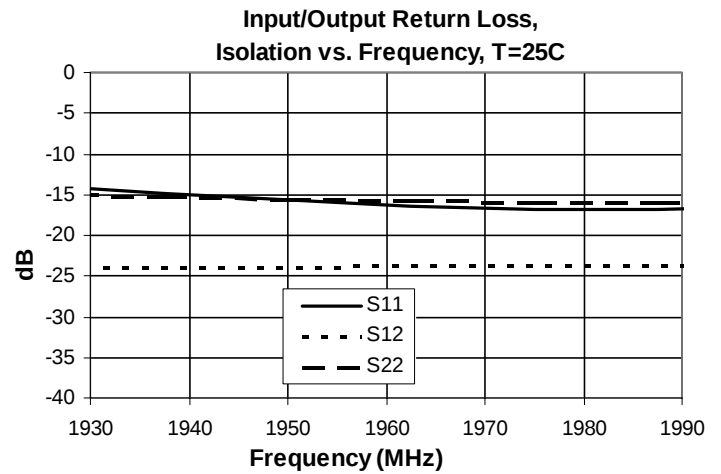
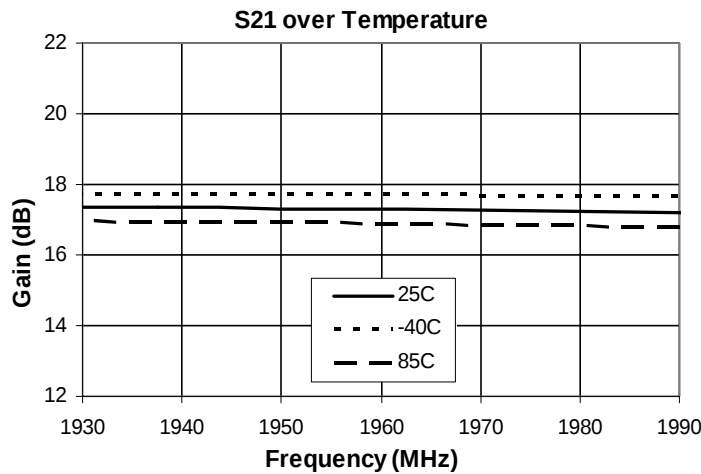
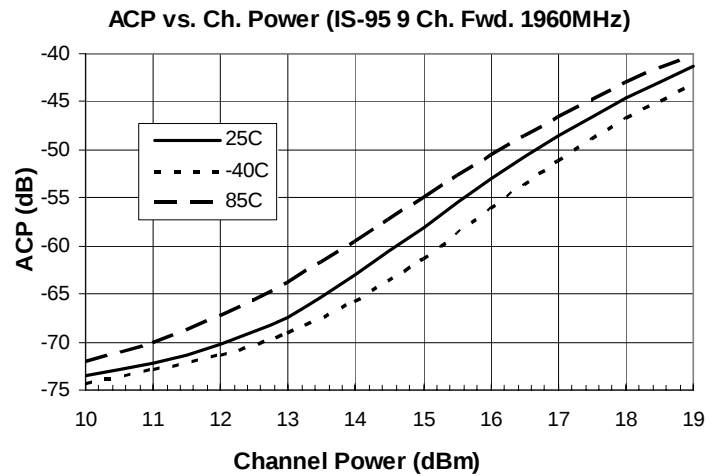
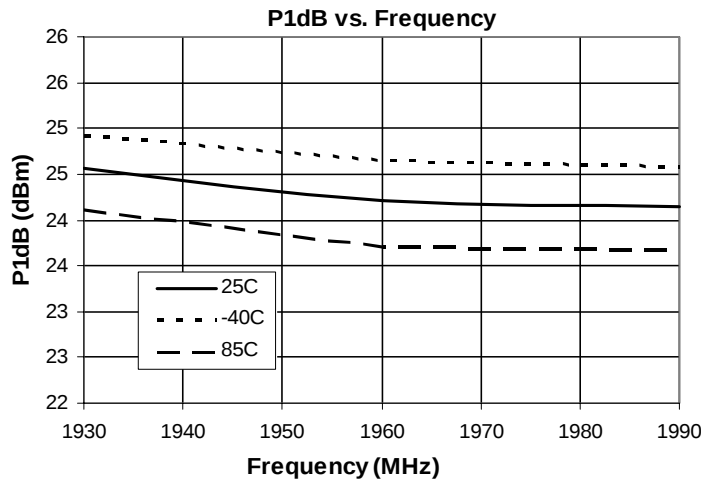


880 MHz Application Circuit Data, $I_D=135mA$, $T=+25C$, $R_{Bias}=20\text{ Ohm}$, $V_S=8V$



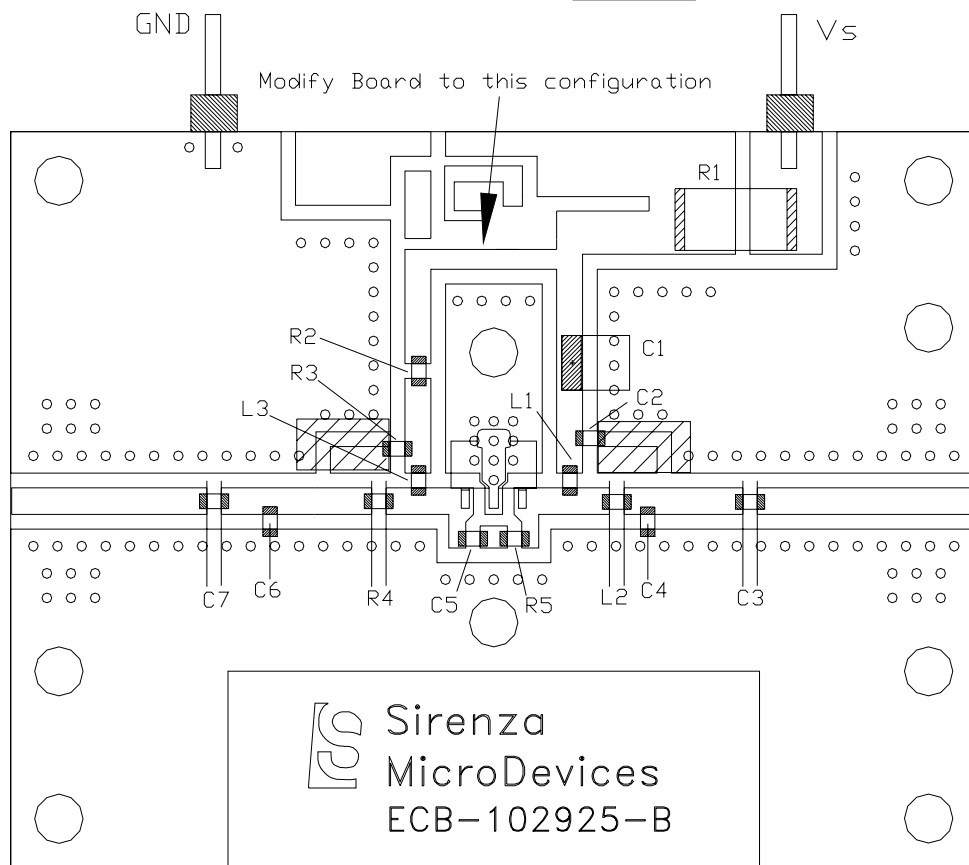
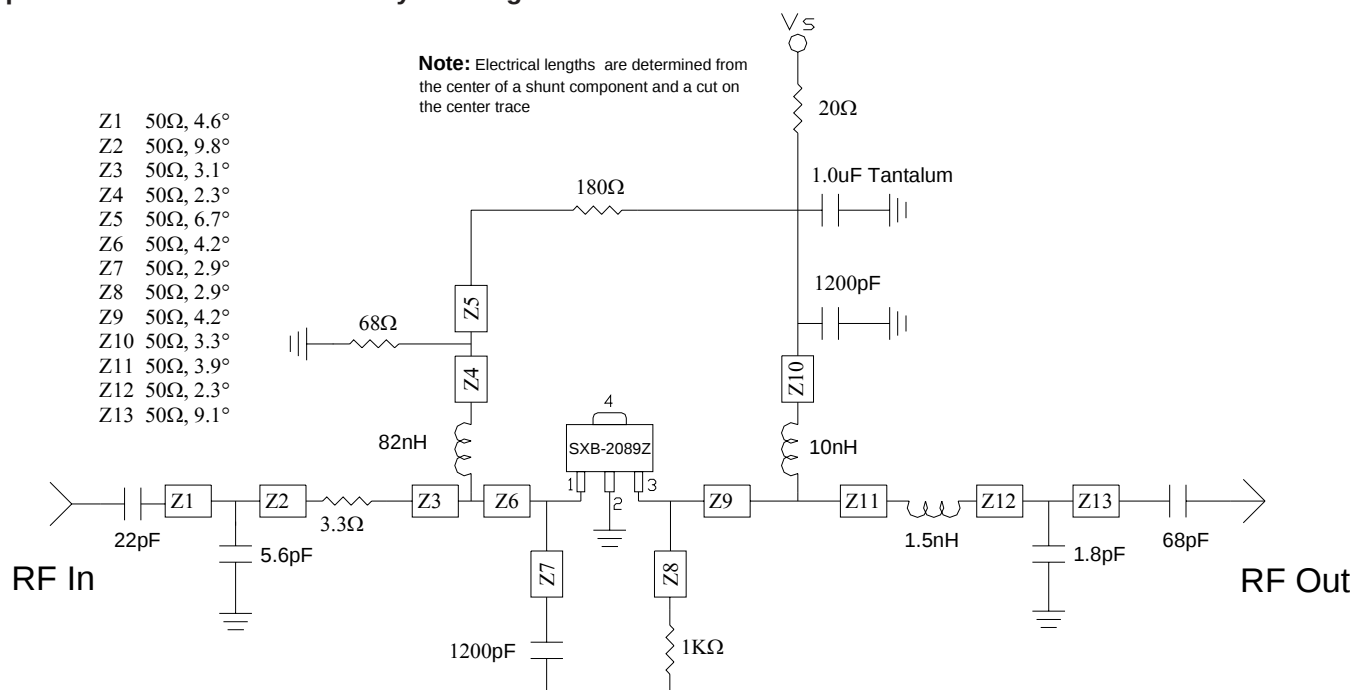
450 MHz & 2140MHz Application Circuits available in Application Note AN-078 at www.sirenza.com

1960 MHz Application Circuit Data, $I_D=135mA$, $T=+25C$, $R_{Bias}=20\text{ Ohm}$, $V_S=8V$



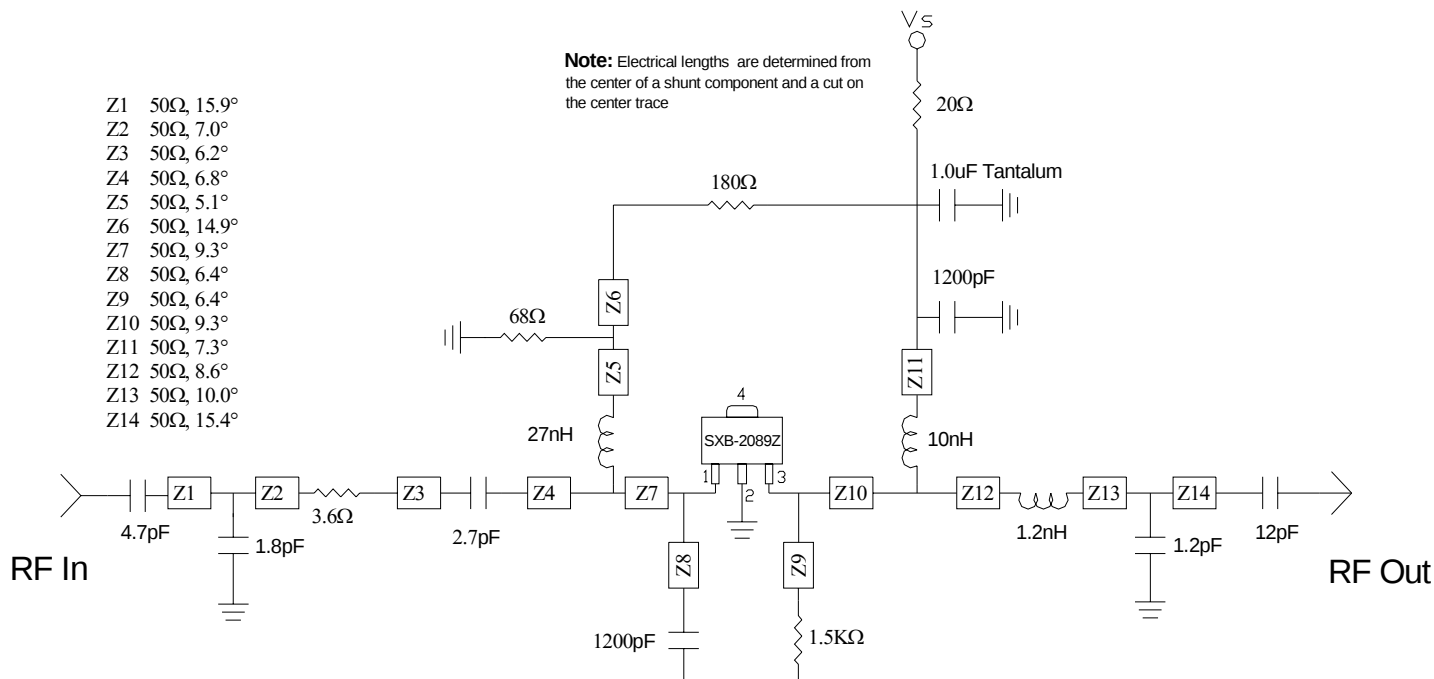
450 MHz & 2140MHz Application Circuits available in Application Note AN-078 at www.sirenza.com

Application Schematic & Assembly Drawing 880MHz Circuit



Bill of Materials

C1	TAJB105KLRH	Rohm	1.0uF
C2,C5	MCH185C122KK	Rohm	1200pF
C3	MCH185A680JK	Rohm	68pF
C4	MCH185A1R8CK	Rohm	1.8pF
C6	MCH185A5R6DK	Rohm	5.6pF
C7	MCH185A220JK	Rohm	22pF
L1	LL1608-FS10NJ	Toko	10nH
L2	LL1608-FS1N5S	Toko	1.5nH
L3	LL1608-FSR82NJ	Toko	82nH
R1	20Ω 2515	res (1%)	
R2	180Ω 0603	res (5%)	
R3	68Ω 0603	res (5%)	
R4	3.3Ω 0603	res (5%)	
R5	1KΩ 0603	res (5%)	
Connectors	2x PSF-S01-1mm	GigaLane	Co
Heat sink	EEF-101407		
PCB	ECB-102925-B		

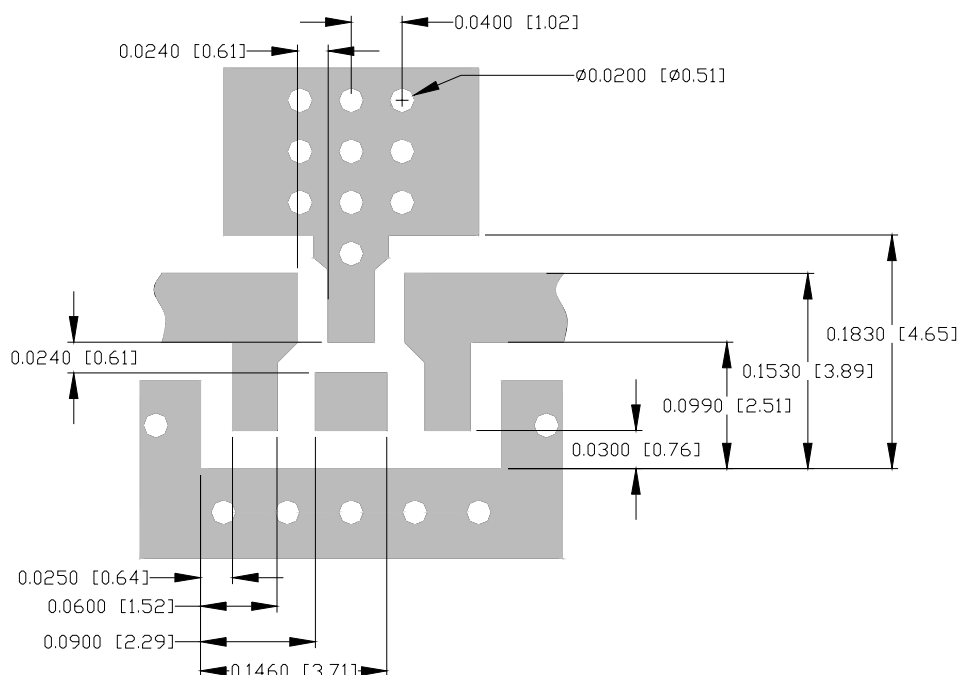
Application Schematic & Assembly Drawing 1960MHz Circuit

Bill of Materials

C1	TAJB105KLRH	Rohm	1.0uF
C2,C5	MCH185C122KK	Rohm	1200pF
C3	MCH185A120JK	Rohm	12pF
C4	MCH185A1R2CK	Rohm	1.2pF
C6	MCH185A1R8CK	Rohm	1.8pF
C7	MCH185A4R7CK	Rohm	4.7pF
C8	MCH185A2R7CK	Rohm	2.7pF
L1	LL1608-FS10NJ	Toko	10nH
L2	LL1608-FS1N2S	Toko	1.2nH
L3	LL1608-FS270JK	Toko	27nH
R1	20Ω 2512	res	(1%)
R2	180Ω 0603	res	(5%)
R3	68Ω 0603	res	(5%)
R4	3.6Ω 0603	res	(5%)
R5	1.5KΩ 0603	res	(5%)
Connectors	2x PSF-S01-1mm GigaLane Co.		
Heat sink	EEF-101407		
PCB	ECB-102925-B		

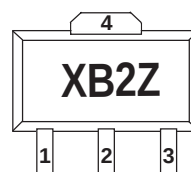
Sirenza
MicroDevices
ECB-102925-B

Suggested PCB Pad Layout

Dimensions in inches [millimeters]



Pin #	Function	Description
1	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor and matching components chosen for the frequency of operation.
2,4	GND	Connection to ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible.
3	RF OUT/ BIAS	RF output pin. This pin requires the use of an external DC blocking capacitor, choke and matching components as shown in the Application Schematic.

Package Marking

Part Number Ordering Information

Part Number	Reel Size	Devices / Reel
SXB-2089Z	7"	1000

Package Dimensions

 (Refer to Application Note AN075 at www.sirenza.com)