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SXB-4089(Z)

400MHz to 2500MHz ½W MEDIUM POWER InGaP/GaAs HBT AMPLIFIER

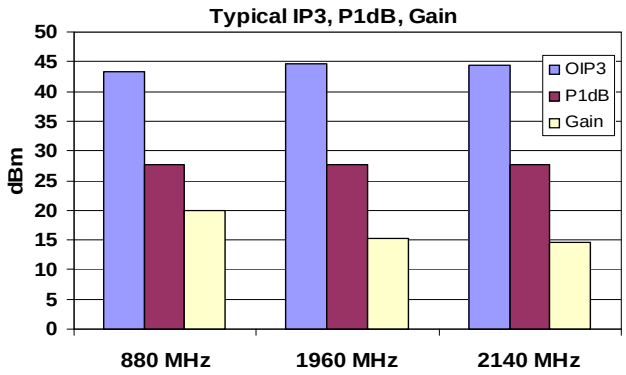
Package: SOT-89

Product Description

RFMD's SXB-4089 amplifier is a high efficiency InGaP/ GaAs Heterojunction Bipolar Transistor (HBT) MMIC housed in low-cost, surface-mountable plastic package.These amplifiers are specially designed for use as driver devices for infrastructure equipment in the 400MHz to 2500MHz cellular, ISM, WLL, PCS, WCDMA applications. Its high linearity makes it an ideal choice for multi-carrier as well as digital applications.

Optimum Technology Matching® Applied

- ✓ GaAs HBT
- GaAs MESFET
- ✓ InGaP HBT
- SiGe BiCMOS
- Si BiCMOS
- SiGe HBT
- GaAs pHEMT
- Si CMOS
- Si BJT
- GaN HEMT
- RF MEMS



Features

- Z-Part Number Available in RoHS Compliant, Pb-Free, and RFMD Green
- On-Chip Active Bias Control, Single 5V Supply
- High Output 3rd Order Intercept:
- +45dBm Typ.
- High P_{1dB}: +28dBm Typ.
- High Gain: +20dB at 880MHz
- Low Rth: 25°C/W Typ.
- Robust 2000V ESD, Class 2

Applications

- WCDMA, PCS, Cellular Systems
- Multi-Carrier Applications

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Small Signal Gain	18.0	20.0	22.0	dBm	880MHz
		15.0		dBm	1960MHz
	12.5	14.0	15.5	dBm	2140MHz
Output Power at 1dB Compression,		27.5		dBm	880MHz
		27.5		dBm	1960MHz
	26.0	27.5		dBm	2140MHz
Output Third Order Intercept Point	41.5	43.5		dBm	880MHz
		44.5		dBm	1960MHz
	42.5	44.5		dBm	2140MHz
Noise Figure		5.6		dB	880MHz
		3.3		dB	1960MHz
		3.3		dB	2140MHz
Input VSWR		1.3:1	2.0:1		880MHz
		1.3:1			1960MHz
		1.3:1			2140MHz
Device Operating Voltage	4.75	5.0	5.25	V	
Device Operating Current	235.0	265.0	295.0	mA	
Thermal Resistance		25.3		°C/W	junction to backside

Test Conditions: T_A=25°C, Z_O=50Ω, Measured in Application Circuit, P_{OUT} per tone=+11dBm, Tone Spacing=1MHz

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Absolute Maximum Ratings

Parameter	Rating	Unit
Max Device Current (I_D)	500	mA
Max Device Voltage (V_D)	6	V
Max RF Input Power	18	dBm
Max Dissipated Power	2	W
Max Junction Temperature (T_J)	165	°C
Operating Temperature Range (T_L)	-40 to + 85	°C
Max Storage Temperature	150	°C
ESD Rating - Human Body Model (HBM)	Class 2	
Moisture Sensitivity Level	MSL2	

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:

$I_D V_D < (T_J - T_L)/R_{TH}$, j-l and $T_L = T_{LEAD}$

Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EU Directive 2002/95/EC (at time of this document revision).

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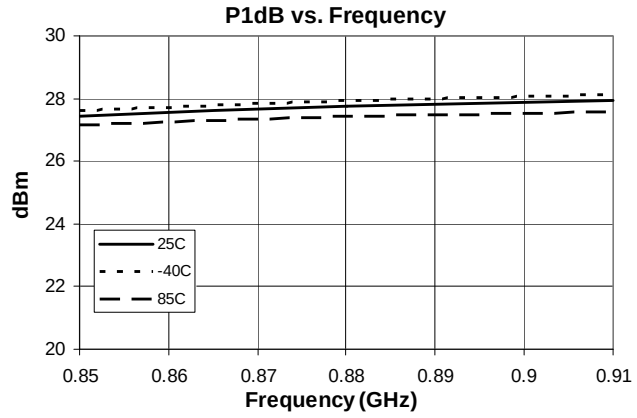
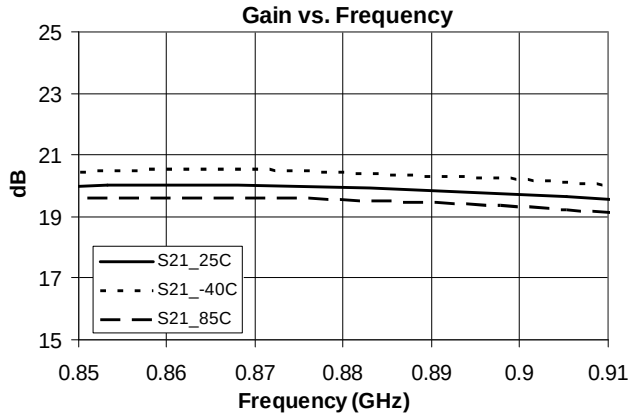
880 MHz Application Circuit Data, V_{cc}=5V, I_D=270mA





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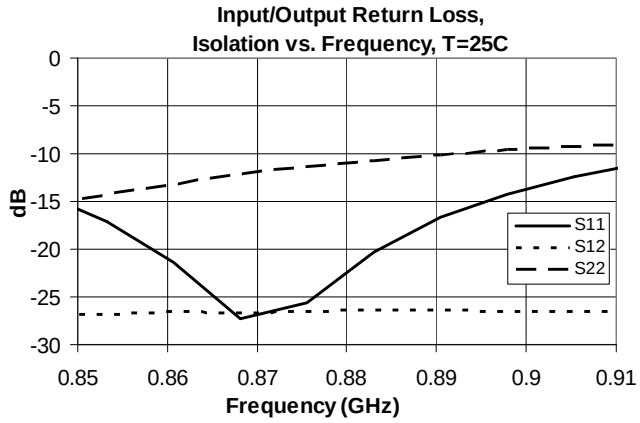
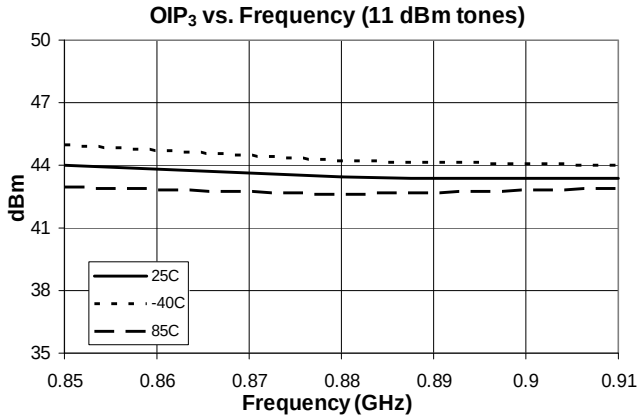
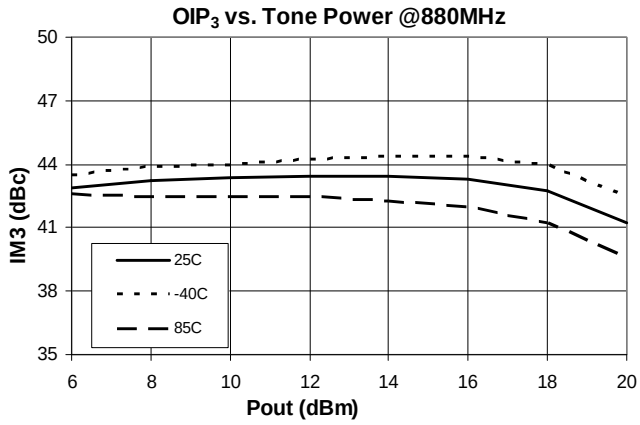
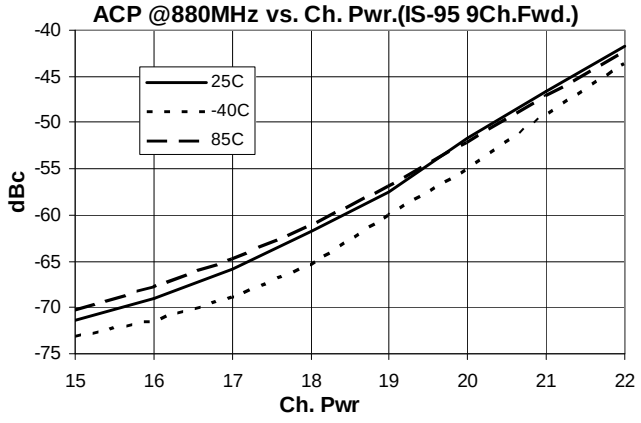
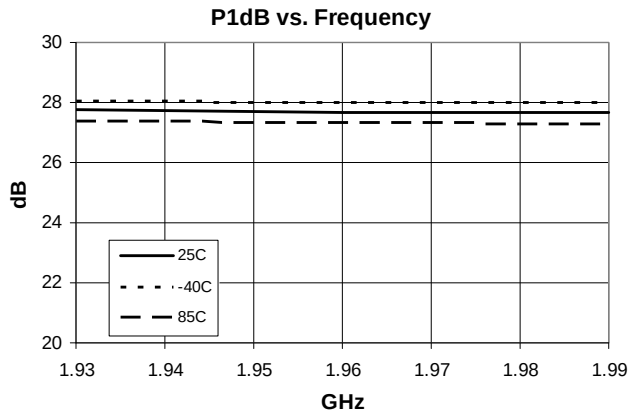


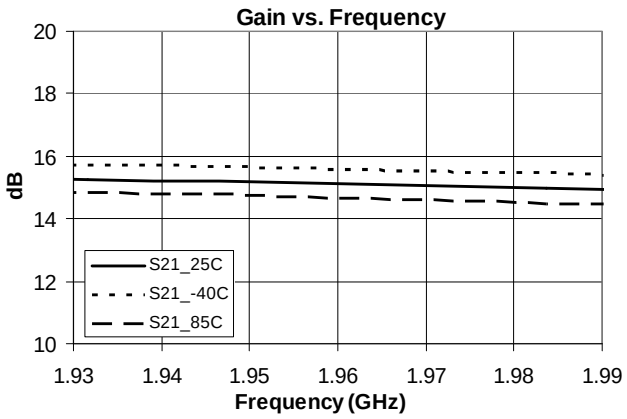


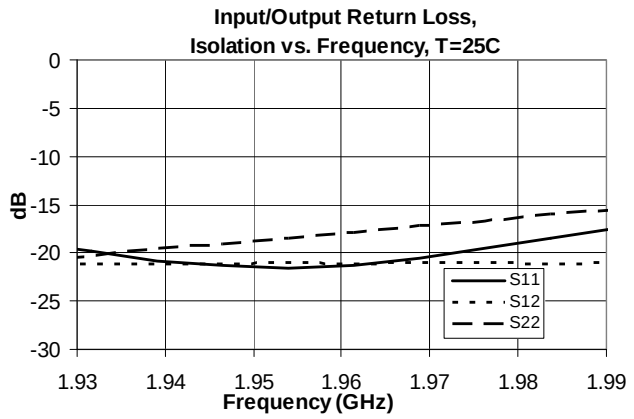


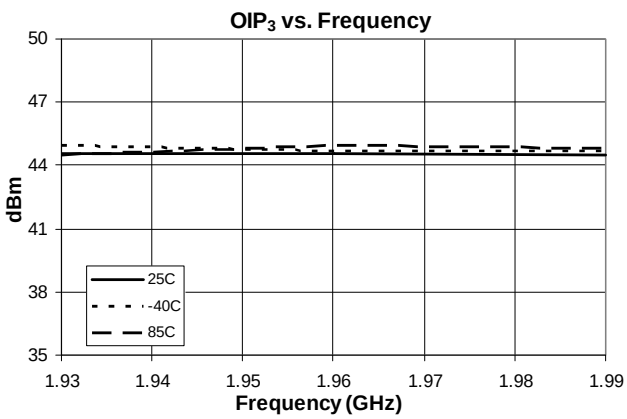


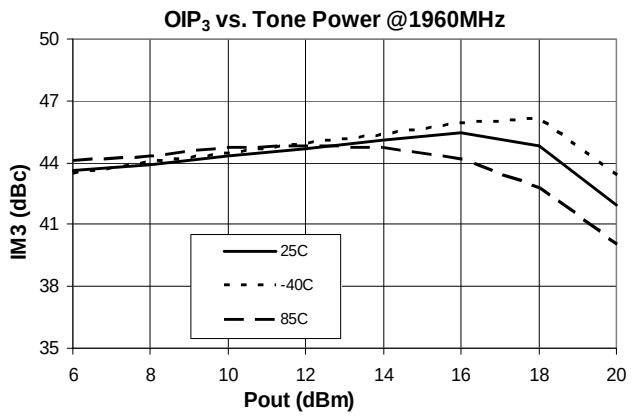
1960 MHz Application Circuit Data, V_{CC}=5V, I_D=270mA

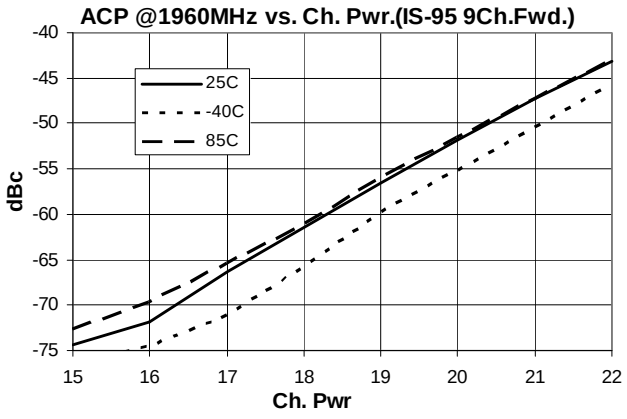












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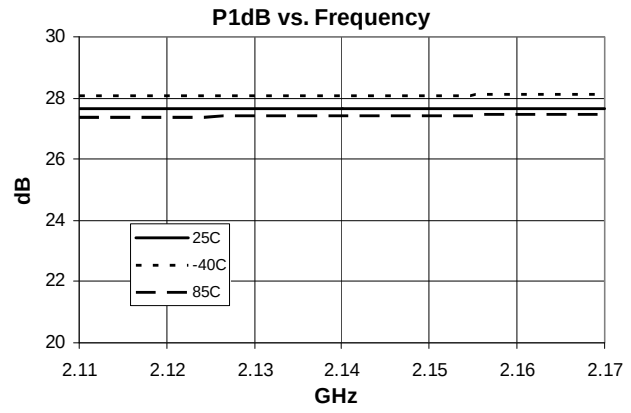
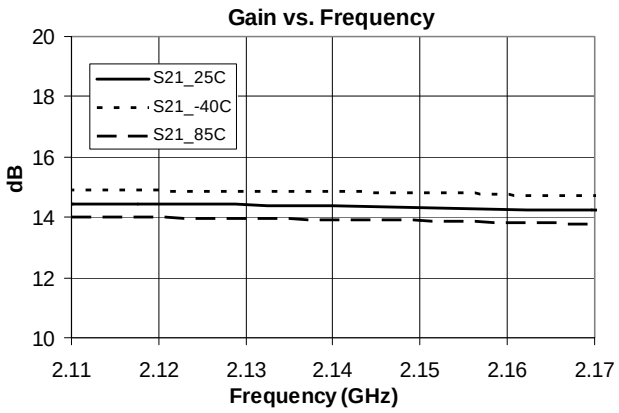
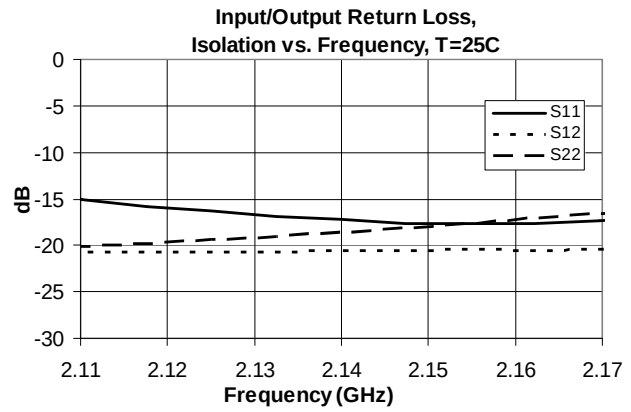
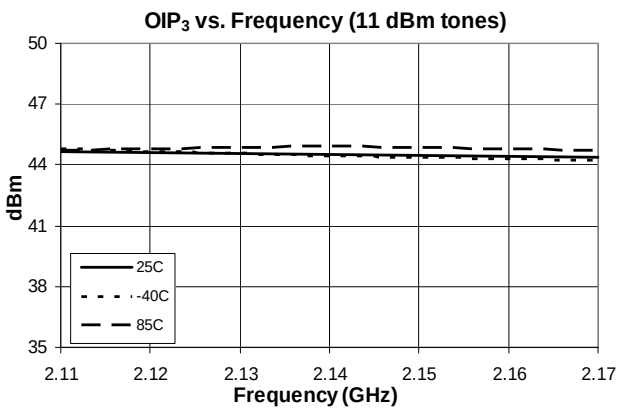
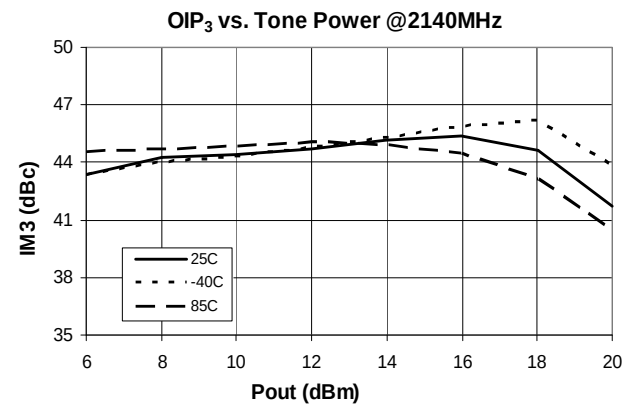
2140 MHz Application Circuit Data, V_{CC}=5V, I_D=270mA

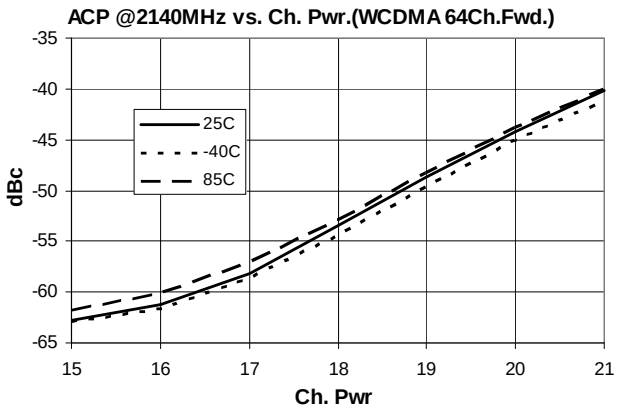






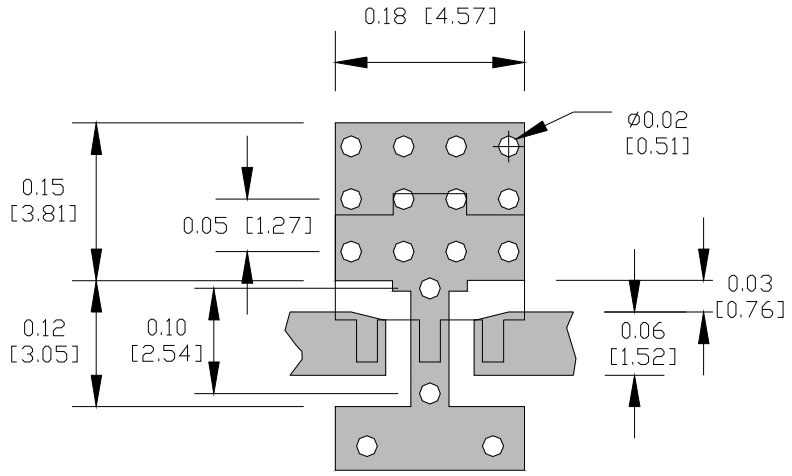






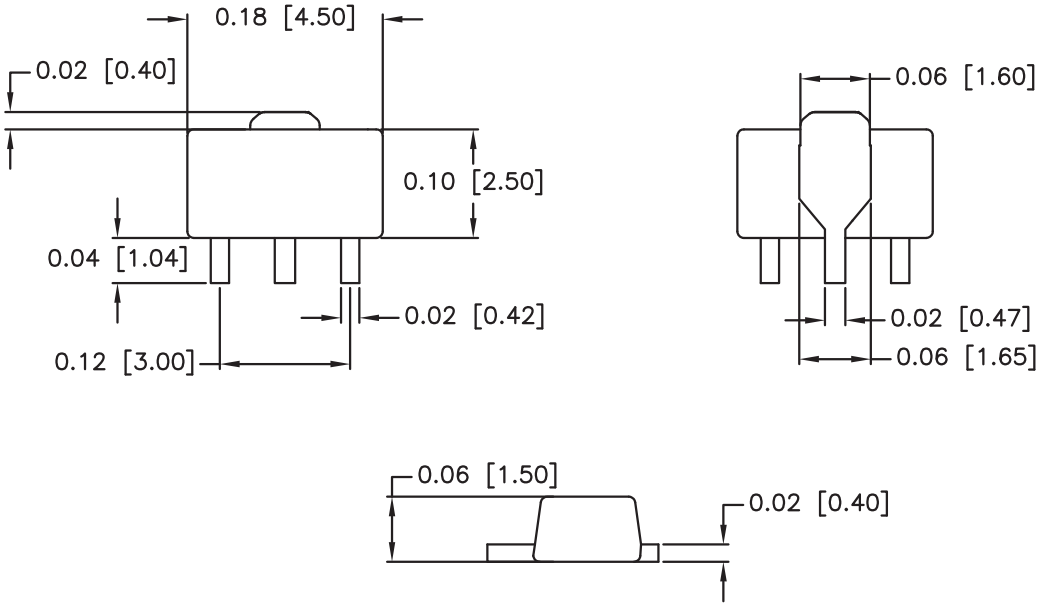
Pin	Function	Description
1	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
2, 4	GND	Connection to ground. Use via holes for best perfromance to reduce lead inductance as close to ground leads as possible.
3	RF OUT/Bias	RF output and bias pin. DC voltage is present on this pin, therefore a DC blocking capacitor is necessary for proper operation.

Suggested Pad Layout



Package Drawing

Dimensions in inches (millimeters)
Refer to drawing posted at www.rfmd.com for tolerances.



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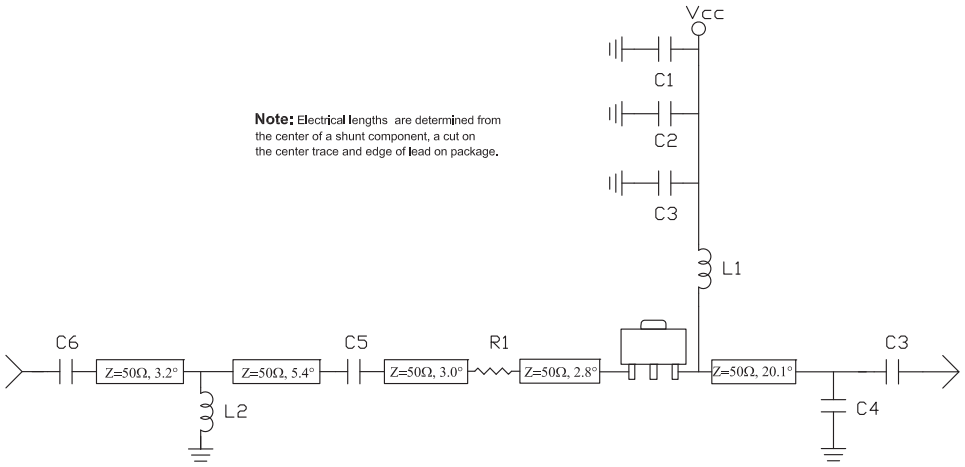
880 MHz Application Schematic

880 MHz Demo Board

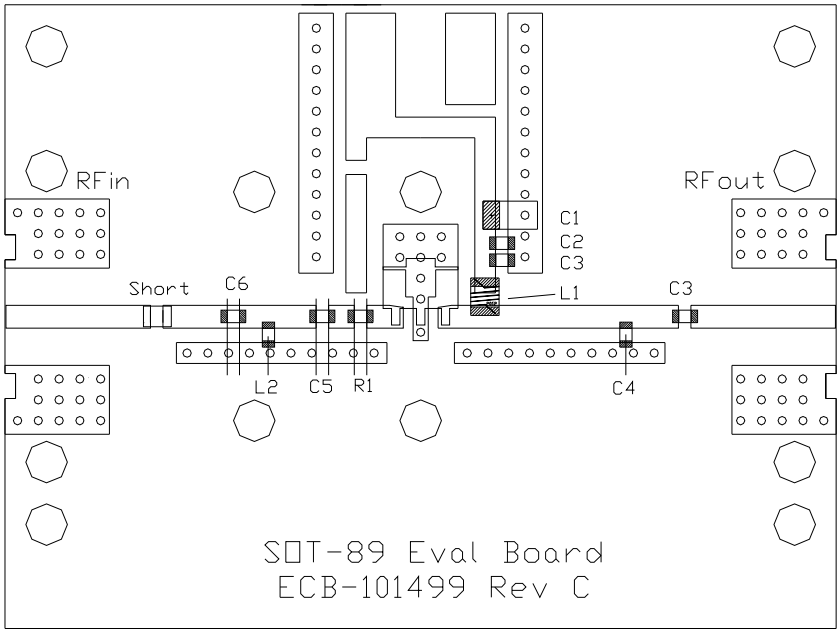


Note: Electrical lengths are determined from the center of a shunt component, a cut on the center trace and edge of lead on package.

Bill of Materials

C1 1x TAJB104KLRH Rohm 0.1uF
C2 1x MCH185C102KK Rohm 1000pF
C3 2x MCH185A680JK Rohm 68pF
C4 1x MCH185A3R9CK Rohm 3.9pF
C5 1x MCH185C4R7CK Rohm 4.7pF
C6 1x MCH185C120CK Rohm 12pF
L1 1x 0805HQ- Coilcraft 48nH
L2 1x LL1608-FS2N7J Toko 2.7nH
R1 1x 0603-Rohm 1ohm
RF1 2x 142-0701-846 Johnson Comp.
Heat sink EEF-101216
PCB ECB-101499 C

880 MHz Evaluation Board Layout



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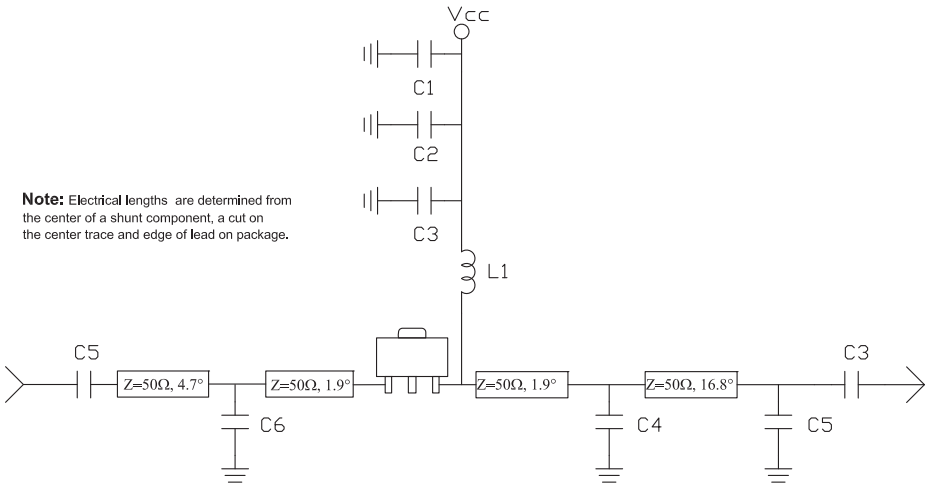
1960MHz Application Schematic

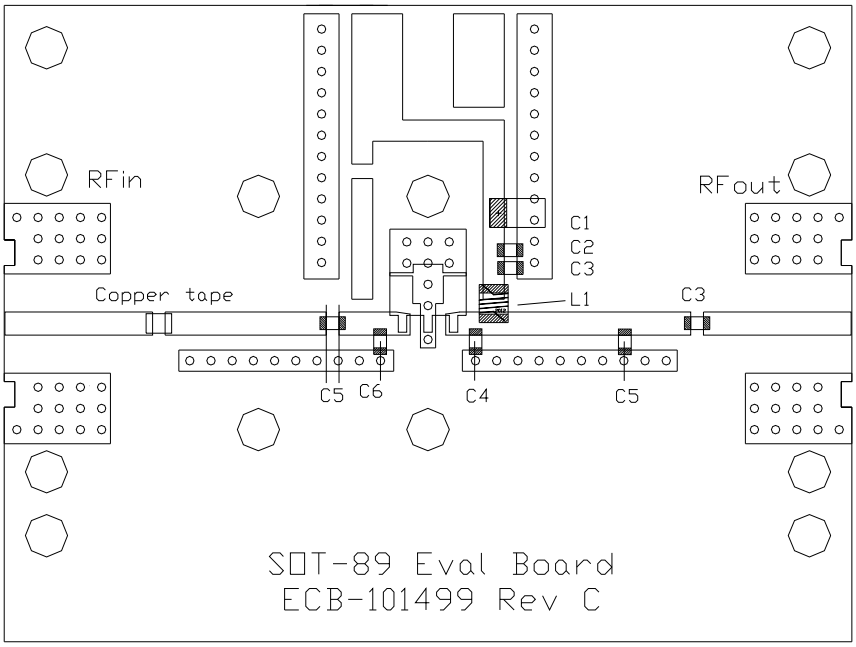
1960 MHz Demo Board



Bill of Materials

C1 1x TAJB104KLRH Rohm 0.1uF
C2 1x MCH185C102KK Rohm 1000pF
C3 2x MCH185A220JK Rohm 22pF
C4 1x MCH185A1R5CK Rohm 1.5pF
C5 2x MCH185A1R2CK Rohm 1.2pF
C6 1x MCH185A1R8CK Rohm 1.8pF
L1 1x 0805HQ- Coilcraft 20nH
RF1 2x 142-0701-846 Johnson Comp.
Heat sink EEF-101216
PCB ECB-101499 C

1960MHz Evaluation Board Layout



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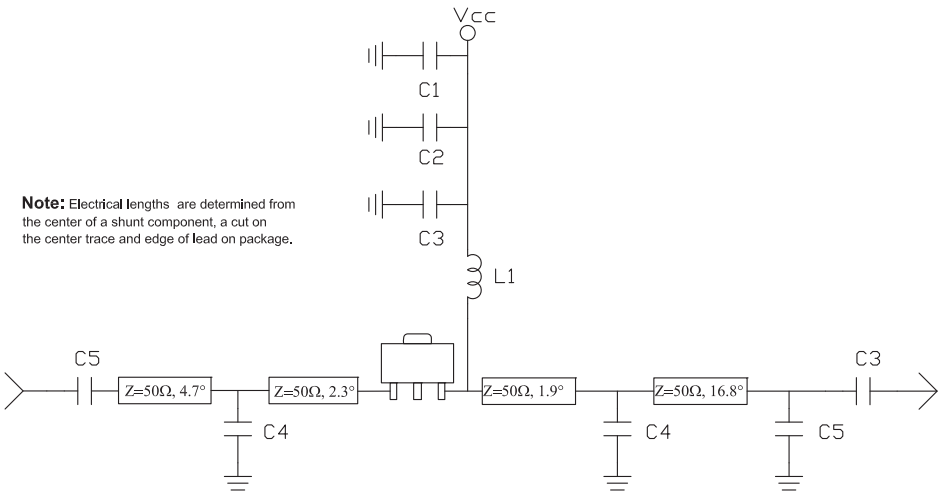
2140MHz Application Schematic

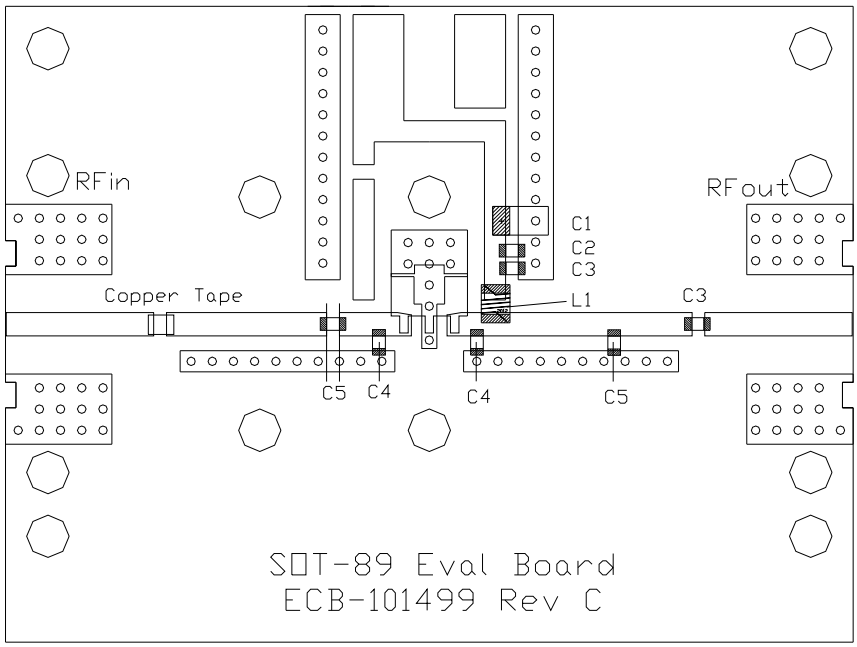
1240 MHz Demo Board



Bill of Materials

C1 1x TAJB104KLRH Rohm 0.1uF
C2 1x MCH185C102KK Rohm 1000pF
C3 2x MCH185A220JK Rohm 22pF
C4 2x MCH185A1R5CK Rohm 1.5pF
C5 2x MCH185A1R0CK Rohm 1.0pF
L1 1x 0805HQ- Coilcraft 20nH
RF1 2x 142-0701-846 Johnson Comp.
Heat sink EEF-101216
PCB ECB-101499 C

2140MHz Evaluation Board Layout



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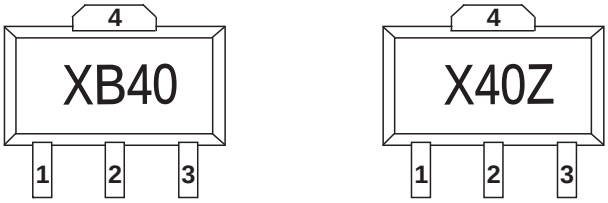
Part Identification



Tin-Lead Lead Free

Alternate marking is SXB4089 or SXB4089Z on line 1 with Trace Code on line 2.

Ordering Information

Part Number	Reel Size	Devices/Reel
SXB-4089	7"	1000
SXB-4089Z	7"	1000

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