Product Features

Operating Frequency: 30MHz ~ 4GHz

Gain: 16.6dB@900MHz@5V

Output Power for 1dB Compression:

22.3dBm@900MHz@5V

Noise Figure: 0.7dB@900MHz@5V

Output Third-Order Interception:

31.1dBm@900MHz@5V

Supply Current: 43mA @ Vdd=+5V

Supply Current: 25mA @ Vdd=+3V

Package: SOT343 (Plastic seal)

Application

Communication base stations

Test and measurement equipment

Point-to-point communication

Radio

Navigation equipment

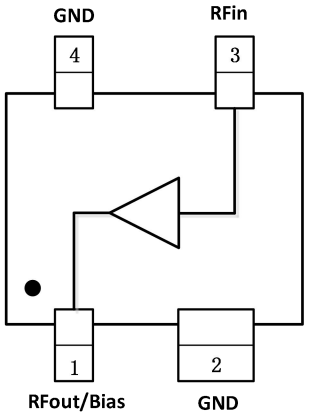
Ordering Information

Part Number	Package	Description
BR9123TC	SOT343	30MHz~4GHz Low Noise Amplifier

General Description

BR9123TC is a high performance MMIC low noise amplifier using GaAs process. The amplifier is internally matched to 50 ohms with frequency range of 30MHz ~ 4GHz, and only require an external RF choke and blocking/bypass capacitors. The product contains on-chip active bias network ensures that the quiescent current is not affected by the process and temperature. The product, from +3 to +5V single power supply, provides high stability, high linearity, low noise figure, high output power for 1dB compression and high output third-order Interception, which makes the product can be used in a high dynamic range of the system.

Functional Block Diagram



Electrical Specifications

Parameters	Min	Typ	Max	Units	Test conditions
Gain	-	22.7	-	dB	30MHz
	-	18.1	-	dB	750MHz
		11.7		dB	2000MHz
Output Power for 1dB	-	20.1	-	dBm	30MHz
Compression	-	22.3	-	dBm	750MHz
Output Third-Order	-	26.2	-	dBm	30MHz
Interception	-	30.8	-	dBm	750MHz
Noise Figure	-	1.49	-	dB	30MHz
		0.61		dB	750MHz
Input Echo	-	-16.0	-	dB	750MHz
Output Echo	-	-15.5	-	dB	750MHz
Reverse Isolation	-	-23.0	-	dB	750MHz
Supply Voltage	-	+5	-	V	750MHz
Static Supply Current	-	43	-	mA	-
Test conditions: Vdd=+5V, I=43mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25℃					

Absolute Maximum Ratings

Maximum Supply Voltage (Vdd) : +5.5V;

Maximum RF Input Power: +18dBm.

Recommended Operating Conditions

Supply Voltage:+3V ~ +5V

Storage Temperature: -65℃ ~ +150℃

Operating Temperature: -55℃ ~ +125℃

Note: Operation of the device outside the parameter ranges given absolute-maximum-ratings conditions may cause permanent damage, and. exposure to absolute-maximum-ratings conditions for extended periods will affect the reliability.

ESD WARNING

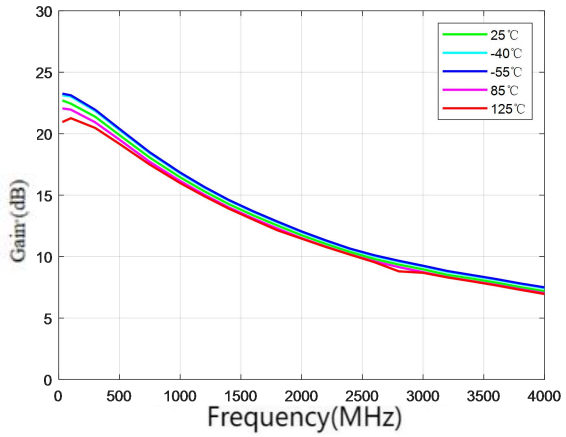
ELECTROSTATIC SENSITIVE DEVICE

OBSERVE HANDLING PRECAUTIONS

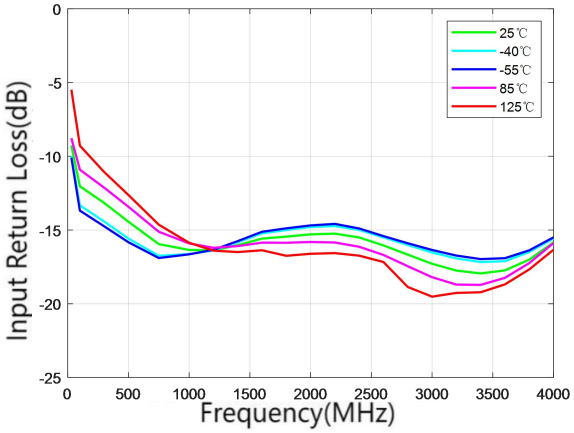
Typical Performance (EVB test results)

Parameters	Typ.							Units
Frequency	30	50	100	300	500	750	1000	MHz
Gain	22.7	22.2	22.4	21.4	19.9	18.1	16.4	dB
Input Return Loss	-9.3	-11.2	-12.0	-13.2	-14.4	-16.0	-16.4	dB
Output Return Loss	-17.6	-19.0	-18.4	-17.6	-16.7	-15.5	-14.5	dB
Output Power for 1dB Compression	20.1	22.3	22.7	22.3	22.4	22.3	22.3	dBm
Output Third-Order Interception	26.2	35.7	28.6	29.6	30.6	30.8	31.2	dBm
Noise Figure	1.49	1.32	0.89	0.65	0.60	0.62	0.72	dB
Test conditions: Vdd=+5V, I=43mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25℃								

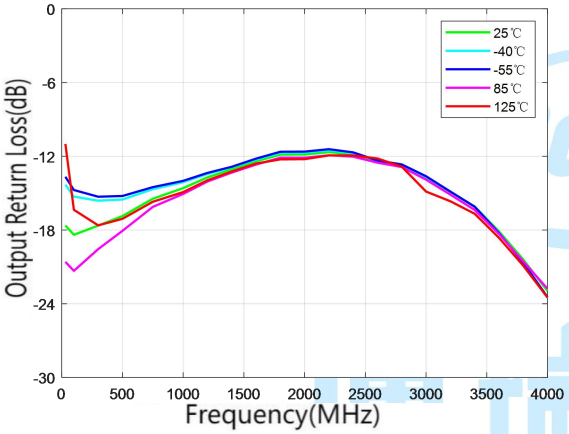
Parameters	Typ							Units
Frequency	1200	1600	2000	2600	3000	3600	4000	MHz
Gain	15.3	13.4	11.7	9.6	9.0	7.9	7.2	dB
Input Return Loss	-16.4	-15.6	-15.3	-16.7	-17.3	-17.7	-15.8	dB
Output Return Loss	-13.7	-12.4	-11.9	-12.5	-13.7	-18.1	-23.0	dB
Output Power for 1dB Compression	22.4	22.5	22.6	22.7	22.7	22.6	22.4	dBm
Output Third-Order Interception	31.9	33.1	33.4	35.7	35.9	36.0	25.2	dBm
Noise Figure	0.76	0.80	1.04	1.22	1.18	1.30	1.59	dB
Test conditions: Vdd=+5V, I=43mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25℃								



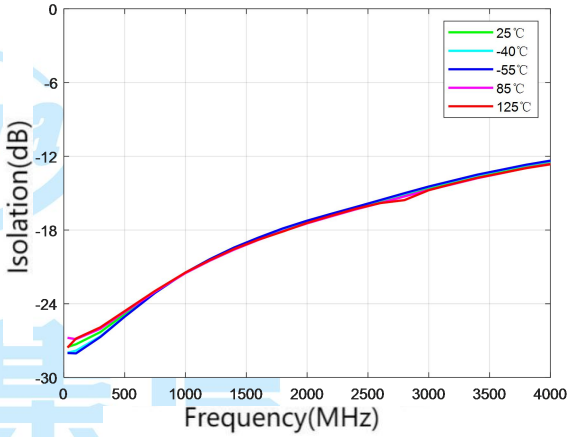
Gain



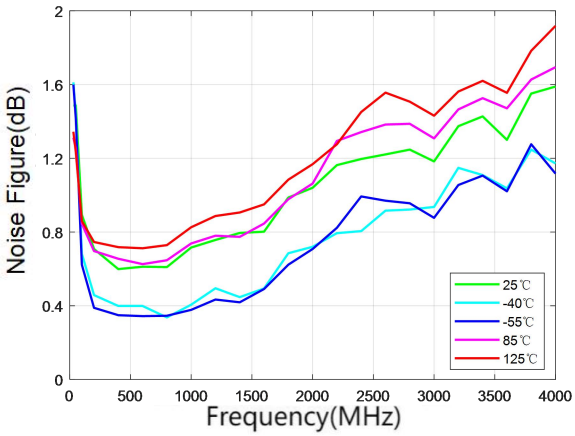
Input Return Loss



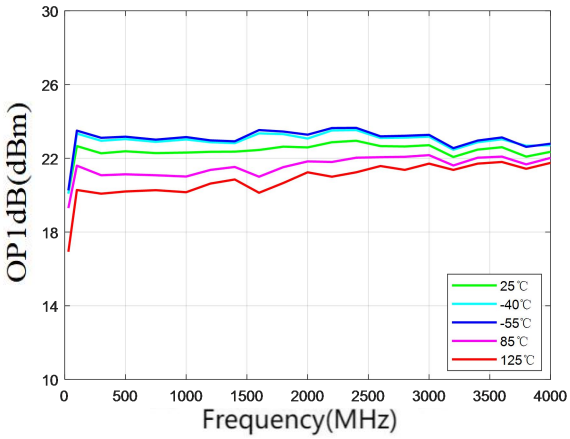
Output Return Loss



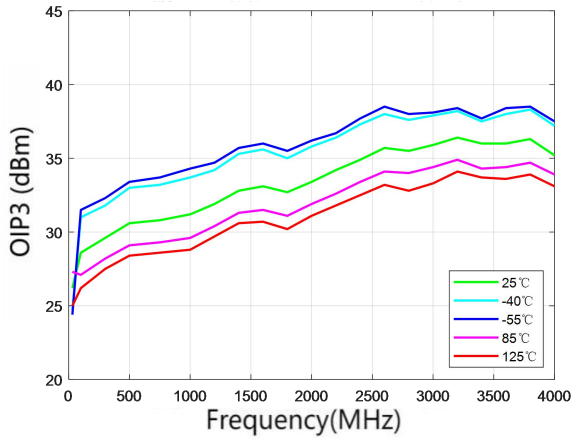
Reverse Isolation



Noise Figure



Output Power for 1dB compression

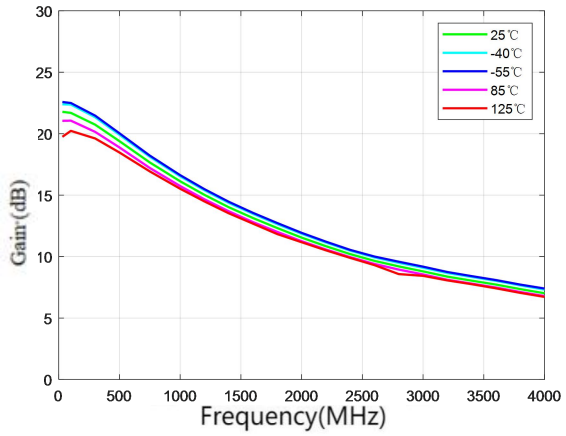


Output Third-Order Interception

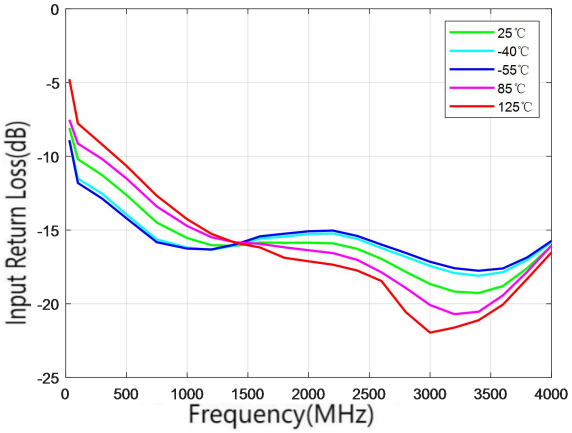
Test results of +3V power supply Demo board

Parameters	Typ							Units
Frequency	30	50	100	300	500	750	1000	MHz
Gain	21.8	21.5	21.7	20.7	19.4	17.7	16.1	dB
Input Return Loss	-8.0	-9.6	-10.2	-11.3	-12.6	-14.5	-15.5	dB
Output Return Loss	-21.5	-24.9	-21.9	-20.4	-18.9	-16.9	-15.8	dB
Output Power for 1dB Compression	3.8	18.8	19.3	19.0	19.1	19.1	19.3	dBm
Output Third-Order Interception	25.5	25.9	24.5	25.0	25.6	26.1	26.0	dBm
Noise Figure	1.48	1.37	0.79	0.52	0.48	0.49	0.56	dB
Test Condition: Vdd=+3V, I=25mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25℃								

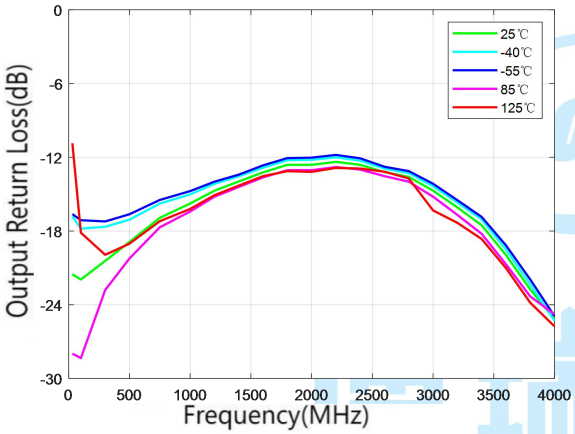
Parameters	Typ.							Units
Frequency	1200	1600	2000	2600	3000	3600	4000	MHz
Gain	15.0	13.1	11.5	9.7	8.8	7.7	7.0	dB
Input Return Loss	-16.0	-15.8	-15.9	-17.0	-18.7	-18.8	-16.1	dB
Output Return Loss	-14.7	-13.2	-12.6	-13.2	-14.7	-19.9	-25.2	dB
Output Power for 1dB Compression	19.1	20.0	19.5	19.6	19.6	19.6	19.3	dBm
Output Third-Order Interception	27.4	27.7	28.5	31.3	30.8	31.2	30.9	dBm
Noise Figure	0.66	0.70	0.90	1.26	1.04	1.25	1.42	dB
Test Condition: Vdd=+3V, I=25mA, OIP3 spacing=1MHz, Pout=+0dBm/tone, Temp=+25℃								



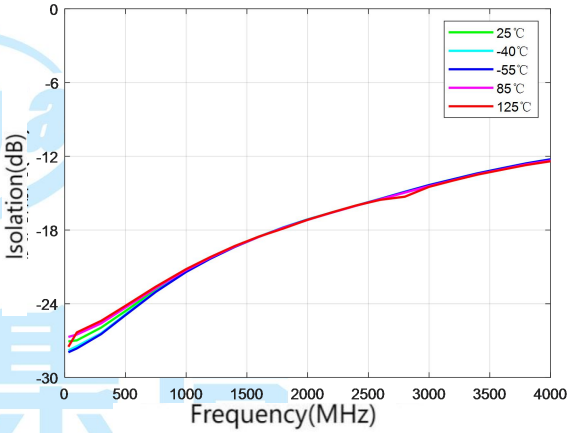
Gain



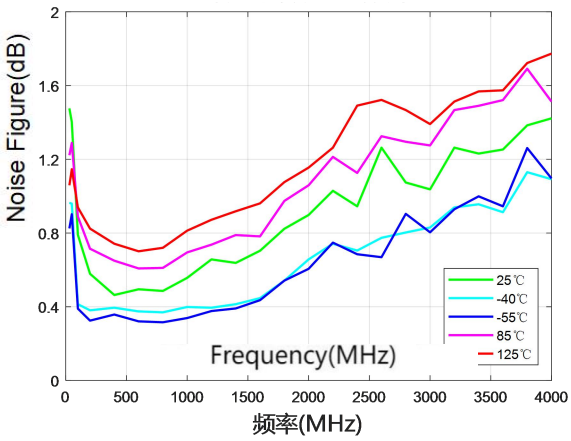
Input Return Loss



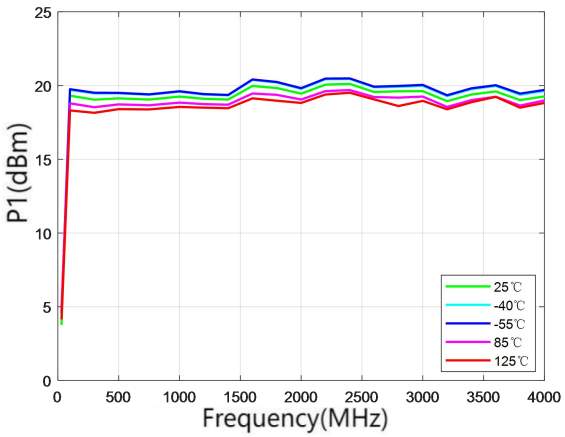
Output Return Loss



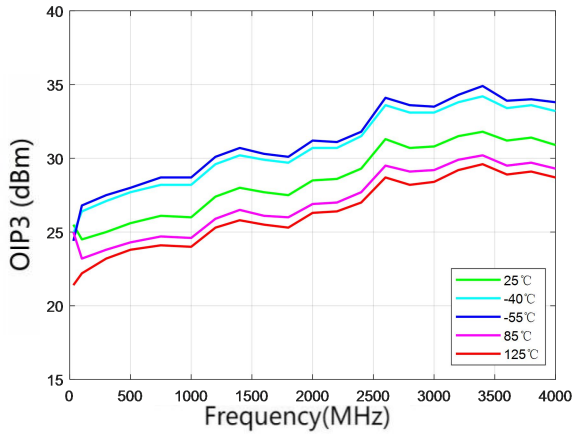
Reverse Isolation



Noise

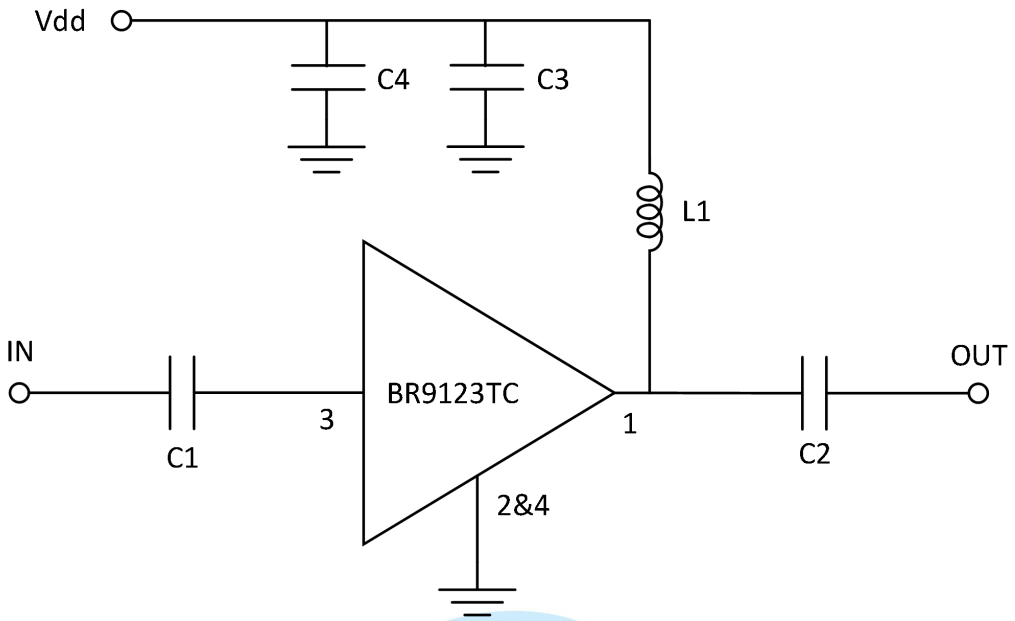


Output 1dB compression point



outputs the third order crossover point

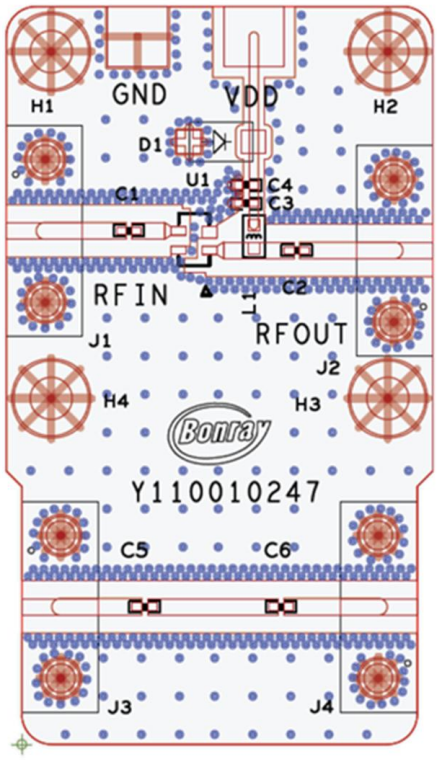
Typical Application Schematic

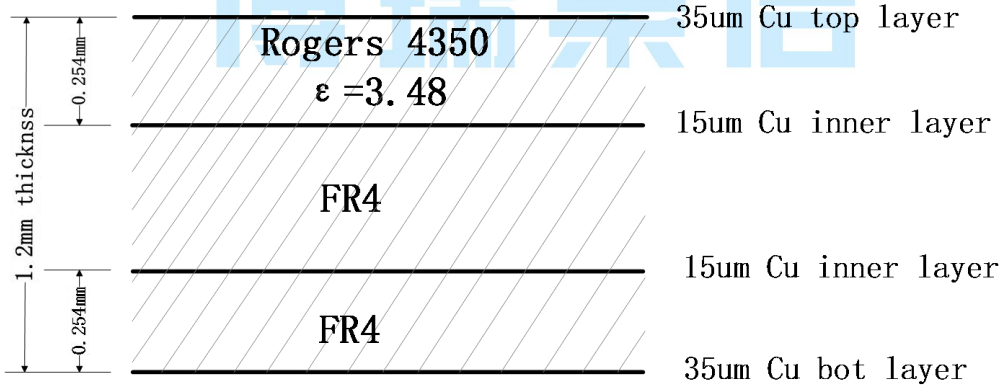


Bill of Material

Devices	Package size	Value	Model number
C1, C2	0402	1000pF	GRM1555C1H102JA01D
C3	0402	100pF	GRM1555C1H101JA01D
C4	0402	10nF	GRM155R71E103KA01D
L1	0603	1uH	0603LS-102XJLC

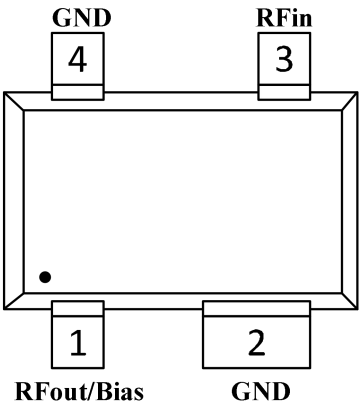
PCB Evaluation Board





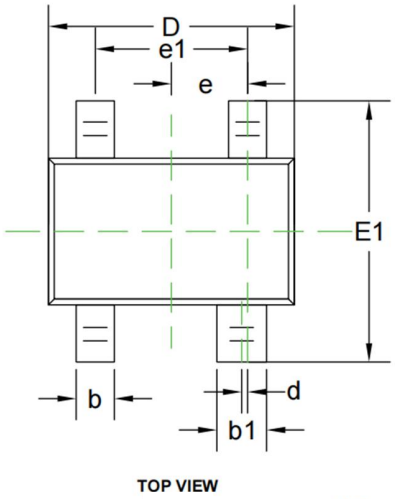
50 ohms Impedance Signal Lines: width=0.53mm, spacing=0.53mm

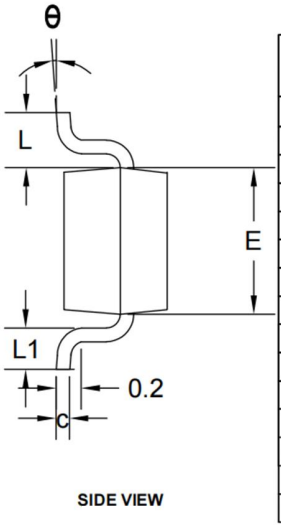
Pin Configuration and Description



Pin Number	Pin Name	Description
1	RFout/Bias	RF Output pin. DC bias will also need to be injected through a RF bias choke/inductor for operation.
2,4	GND	RF/DC Ground pin. Use recommended via pattern to minimize inductance and thermal resistance; See PCB Mounting Pattern for suggested footprint.
3	RFin	RF input pin. A DC Block is required.

Package Dimensions (unit: mm)





No.	Size (mm)		
	Min	TYP	Max
A	0.850	0.950	1.050
A1	0.000	0.050	0.100
A2	0.850	0.900	0.950
b	0.250	0.325	0.400
b1	0.350	0.425	0.500
c	0.080	0.115	0.150
d	0.05TYP		
D	2.000	2.100	2.200
E	1.150	1.250	1.350
E1	2.000	2.250	2.450
e	0.650TYP		
e1	1.200	1.300	1.400
L	0.525TYP		
L1	0.260	0.360	0.460
θ	0°	4°	8°