

Product Features

Frequency: 30MHz ~ 2GHz

Noise Figure: 0.6dB@500MHz

Gain: 18.7dB@500MHz

Output Third-Order Interception:

18.3dBm@500MHz

Output Power for 1dB Compression:

19.3dBm@500MHz

+3V/+5V Single Power Supply

Supply Current:

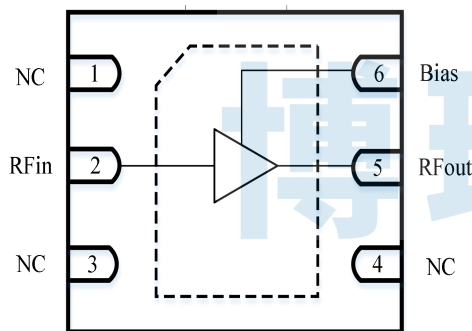
14mA@+5V, 12mA@+3V

Package: DFN6

General Description

The BR9533DC is a high performance MMIC low noise amplifier. Covering a frequency range of 30MHz ~ 2GHz, the amplifier has been internally matched to 50 ohms, and only requires an external RF choke and blocking/bypass capacitors. The amplifier contains on-chip active bias network to ensure that the quiescent current is not affected by temperature. The amplifier is powered by a single-supply operation of +5V or +3V with the characteristics of high stability, low dynamic power consumption, and low noise, which can be widely applied in the transceiver system with strict power consumption requirements.

Functional Block Diagram



Ordering Information

Part Number	Package	Description
BR9533DC	DFN6	30MHz~2GHz Low Noise Amplifier

Electrical Specifications

Parameter	Min.	Typ.	Max.	Units	Test Condition
Gain	-	14.66	-	dB	1GHz
Output Power for 1dB Compression	-	19.54	-	dBm	1GHz
Output Third-Order Interception	-	20.60	-	dBm	1GHz
Noise Figure	-	0.69	-	dB	1GHz
Input Return Loss	-	-9.22	-	dB	1GHz
Output Return Loss	-	-17.46	-	dB	1GHz
Reverse Isolation	-	-22.76	-	dB	1GHz
Operating Voltage	-	5	-	V	-
Static Supply Current	-	14	-	mA	-
Test Conditions: Vdd=+5V, I=14mA, R1=16kΩ, OIP3 spacing=1MHz, Pout=0dBm/tone, TA=+25°C					

Absolute Maximum Ratings

Maximum Operating Voltage (Vdd) : +7V;

Maximum Input Power: +30dBm

Recommended Operating Conditions

Supply Voltage: +3V/+5V

Supply Current: 14mA@+5V

12mA@+3V

Operating Temperature: -55°C ~ +125°C

Storage Temperature: -65°C ~ +150°C;

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



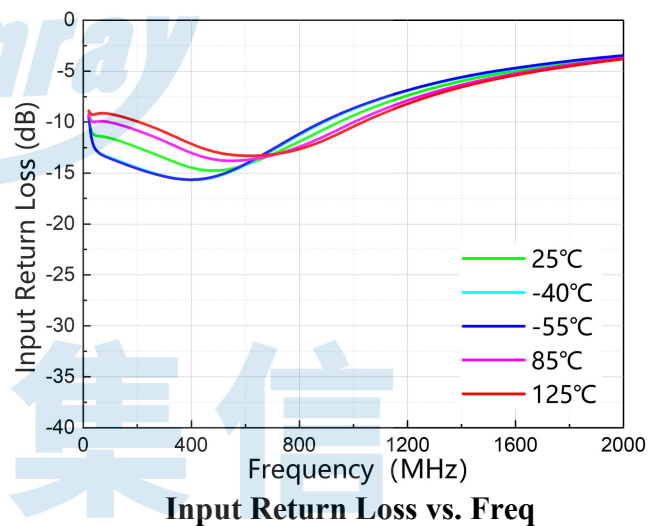
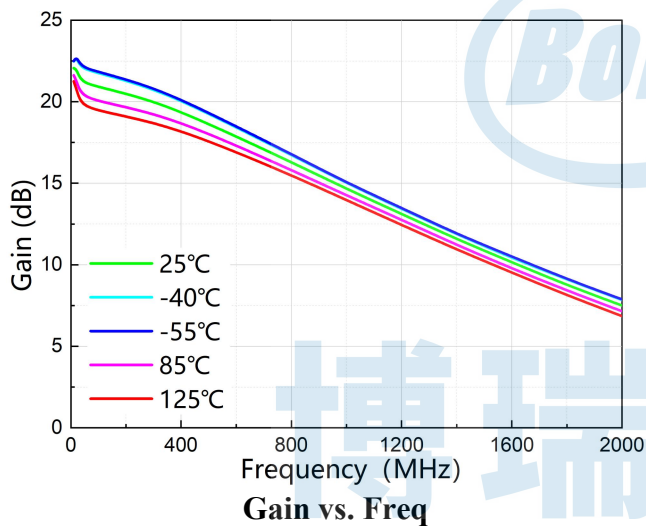
ELECTROSTATIC SENSITIVE DEVICE

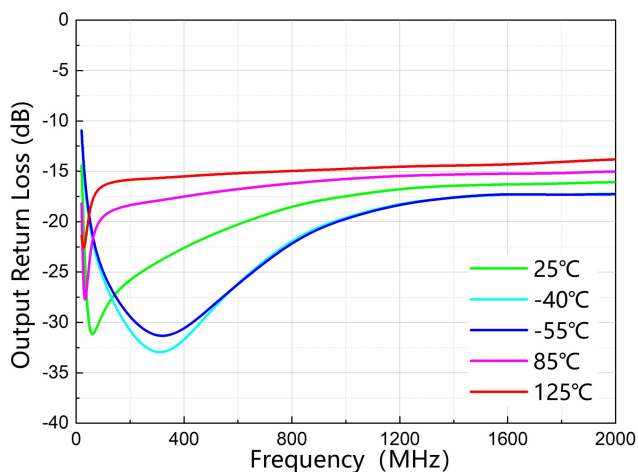
OBSERVE HANDLING PRECAUTIONS

ESD Rating: Class 2

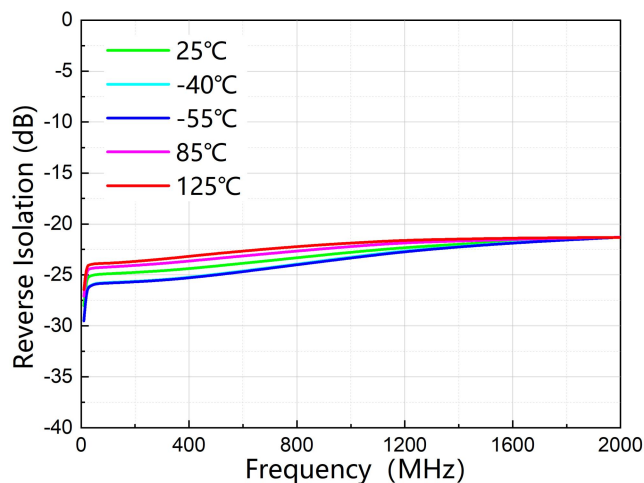
Typical Performance (EVB test results at +5V Supply Voltage)

Parameter	Typ.									Units
Frequency	30	50	100	300	500	1000	1400	1800	2000	MHz
Gain	21.53	21.14	20.91	20.07	18.66	14.66	11.58	8.75	7.49	dB
Output Power for 1dB Compression	9.47	10.81	14.27	19.03	19.29	19.54	19.64	19.38	19.41	dBm
Output-Third-Order Interception	27.70	26.90	20.30	18.30	18.30	20.60	20.70	19.80	19.70	dBm
Noise Figure	0.82	0.72	0.73	0.55	0.55	0.69	0.87	1.32	1.75	dB
Input Return Loss	-11.18	-11.40	-11.44	-13.51	-15.71	-9.22	-5.91	-4.17	-3.60	dB
Output Return Loss	-22.92	-33.95	-27.37	-23.94	-21.19	-17.46	-16.40	-16.23	-16.02	dB
Reverse Isolation	-25.14	-24.96	-24.88	-24.63	-24.13	-22.76	-21.99	-21.49	-21.32	dB
Test Conditions: Vdd=+5V, Idd=14mA, R1=16kΩ, OIP3 spacing=1MHz/Tone, Pout=0dBm/tone, TA=+25°C										

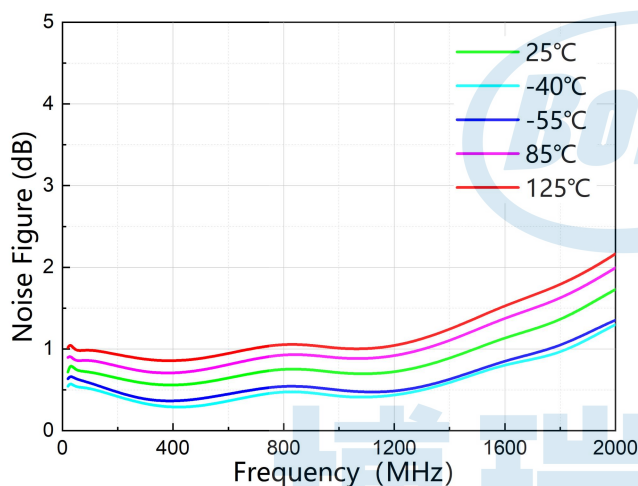




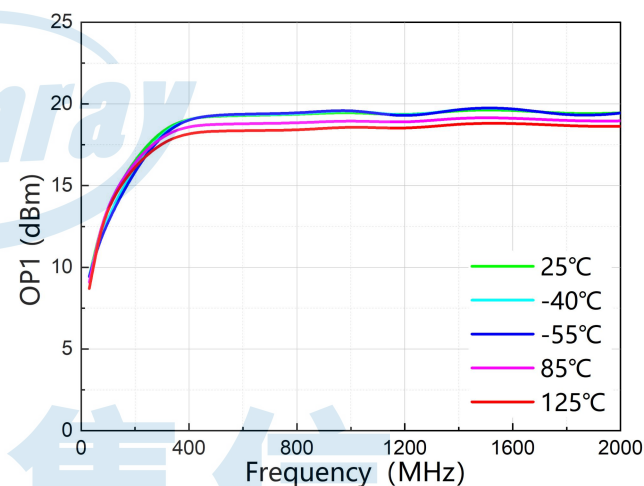
Output Return Loss vs. Freq



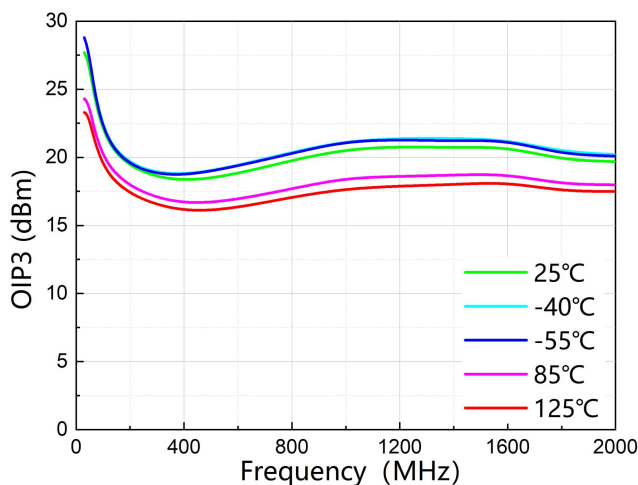
Reverse Isolation vs. Freq



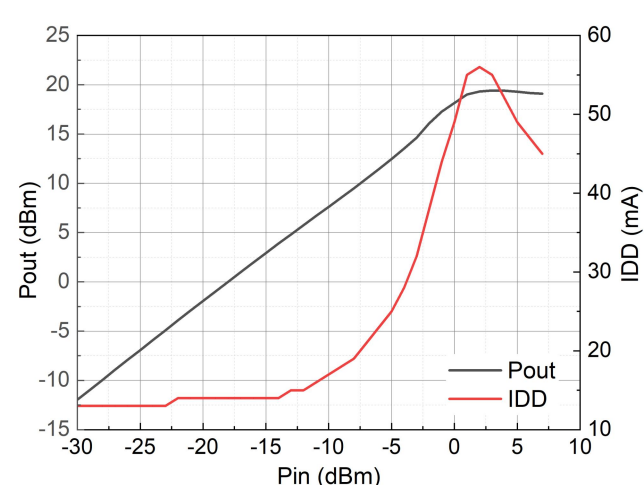
Noise Figure vs. Freq



Output Power for 1dB Compression vs. Freq



Output Third-Order Interception vs. Freq

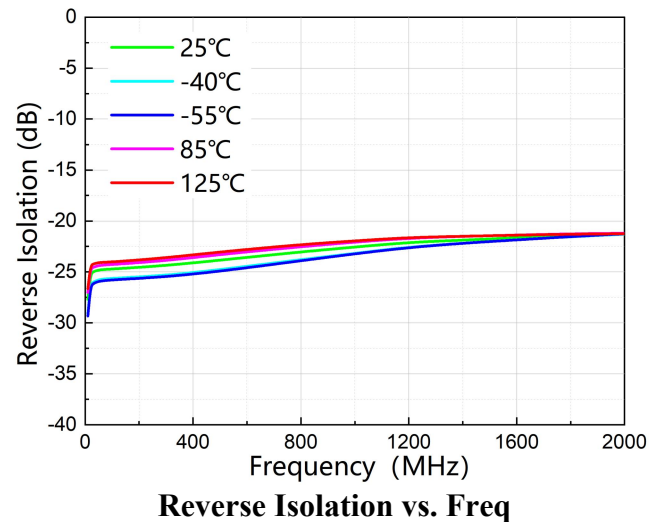
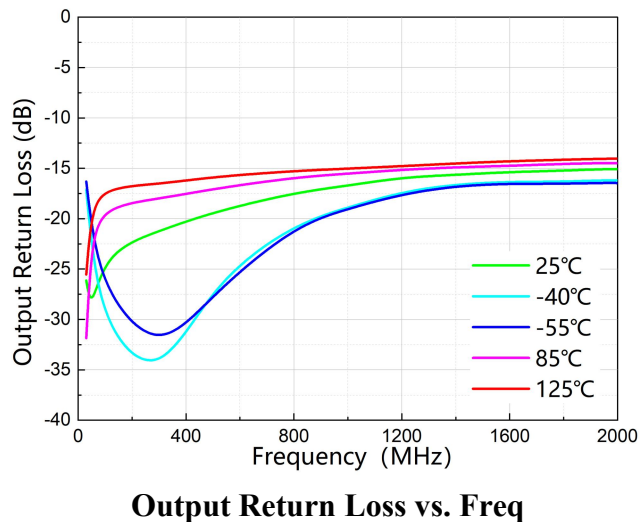
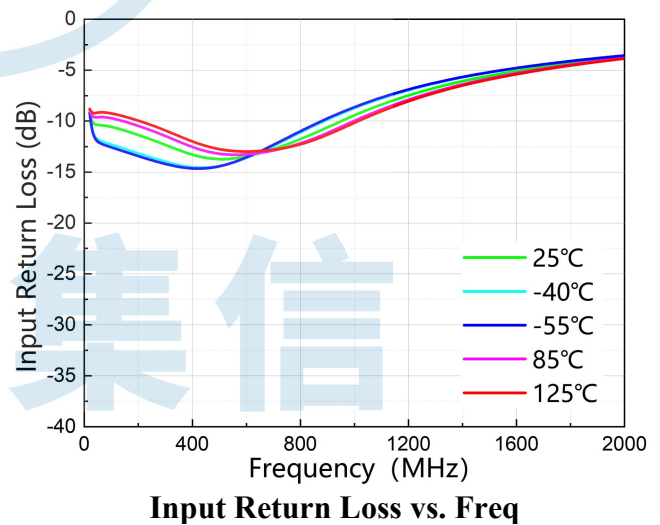
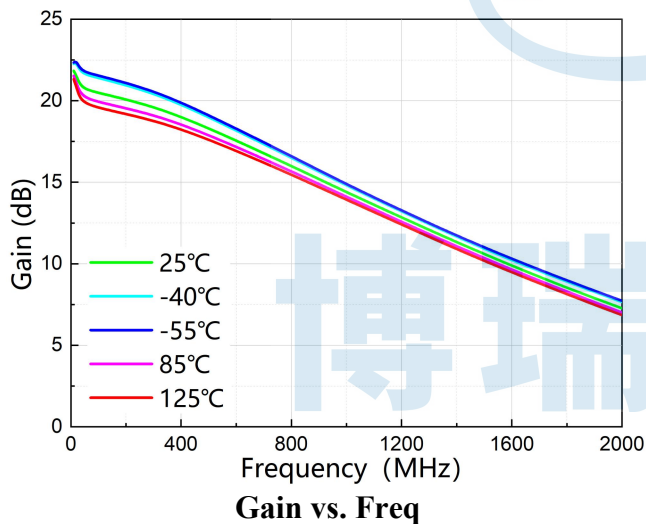


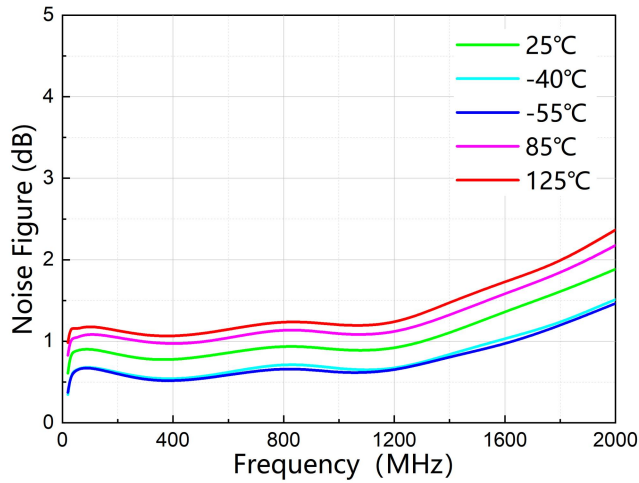
P_{out} and IDD vs. P_{in}(500MHz)

Typical Performance (EVB test results at +3V Supply Voltage)

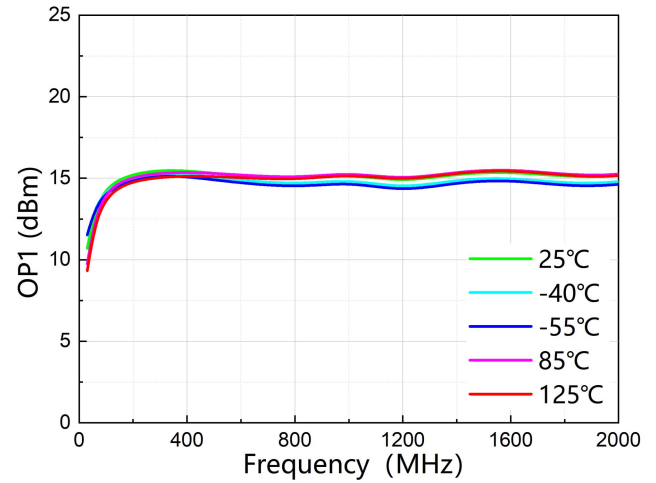
Parameter	Typ.									Units
Frequency	30	50	100	300	500	1000	1400	1800	2000	MHz
Gain	21.07	20.70	20.48	19.68	18.33	14.39	11.32	8.51	7.27	dB
Output 1dB compression point	10.70	12.39	14.93	15.61	15.30	15.29	15.29	15.09	15.06	dBm
Output-Third-Order Interception	26.60	26.60	21.10	17.50	16.90	18.80	18.90	18.10	18.00	dBm
Noise Figure	0.86	0.88	0.93	0.75	0.79	0.88	1.10	1.60	1.88	dB
Input Return Loss	-10.30	-10.40	-10.45	-12.25	-14.55	-9.32	-6.01	-4.30	-3.70	dB
Output Return Loss	-26.14	-29.19	-23.27	-21.20	-19.34	-16.72	-15.65	-15.24	-15.00	dB
Reverse Isolation	-24.98	-24.79	-24.71	-24.38	-23.84	-22.56	-21.89	-21.43	-21.30	dB

Test Conditions: Vdd=+3V, Idd=12mA, R1=4.3kΩ, OIP3 spacing=1MHz/Tone, Pout=0dBm/tone, TA=+25°C

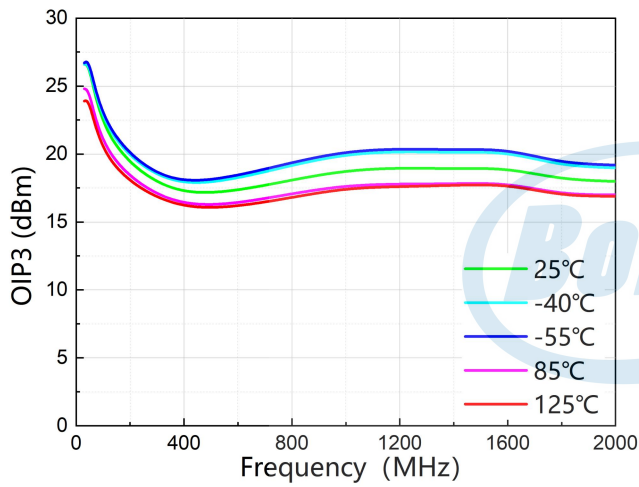




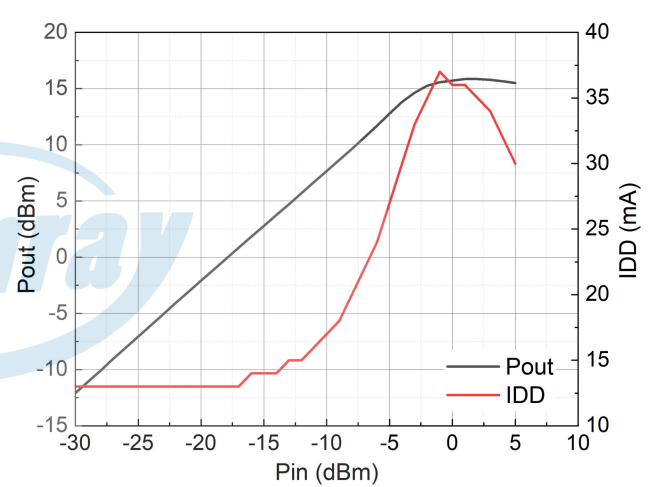
Noise Figure vs. Freq



Output Power for 1dB Compression vs. Freq



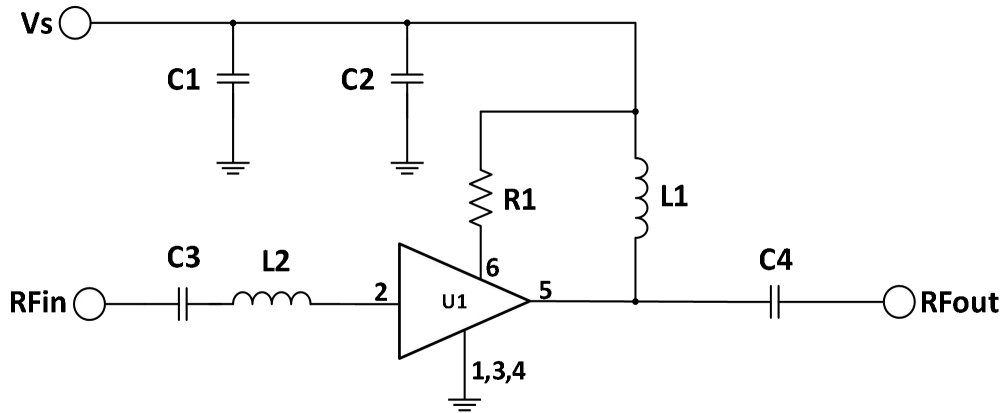
Output Third-Order Interception vs. Freq



P_{out}, IDD vs. P_{in} (500MHz)

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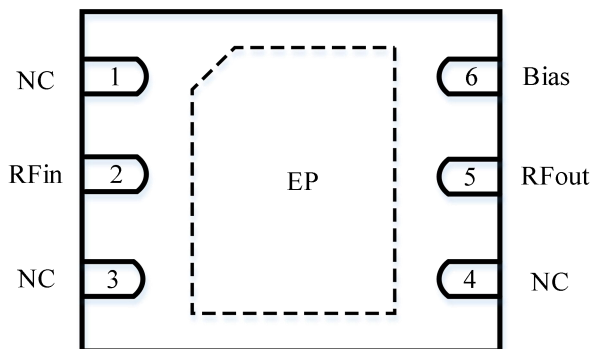
Typical Application Schematic



Bill of Material

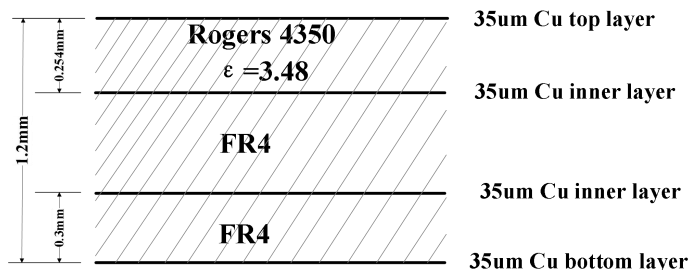
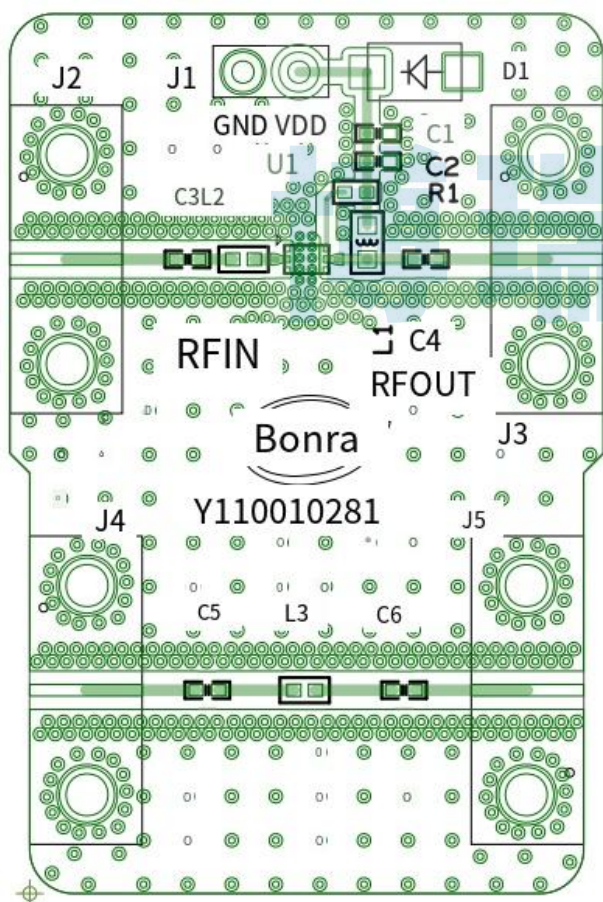
Reference Designator	Value (+5V Supply Voltage)	Value (+3V Supply Voltage)
L1	1.1uH, Coilcraft, 1008 Pkg	1.1uH, Coilcraft, 1008 Pkg
L2	4.7nH, 0402 Pkg	4.7nH, 0402 Pkg
R1	16kΩ, 0402 Pkg	4.3kΩ, 0402 Pkg
C1	10nF, 0402 Pkg	10nF, 0402 Pkg
C2	68pF, 0402 Pkg	68pF, 0402 Pkg
C3, C4	270pF, 0402 Pkg	270pF, 0402 Pkg

Pin Configuration and Description



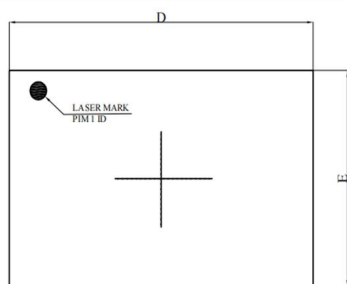
Pin Number	Pin Name	Description
2	RFin	RF input pin. A DC Block is required.
1,3,4	NC	No electrical connection. These pins should be connected to ground
5	RFout	RF output and power supply pin. DC bias will also need to be injected through a RF bias choke/inductor for operation.
6	Bias	Bias pin. This pin is used to set the Icq bias point for the device.
-	EP	Exposed pin. The exposed pins that must be connected to RF/DC ground.

PCB Evaluation Board

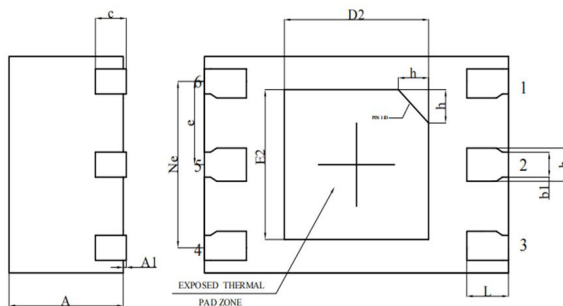


**50ohm Transmission Line:
width=0.53mm,spacing=0.35mm**

Package Dimensions (mm)



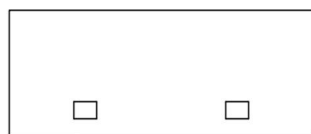
TOP VIEW



SIDE VIEW

BOTTOM VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	--	0.02	0.05
b	0.15	0.20	0.25
b1	0.150REF		
c	0.203REF		
D	1.90	2.00	2.10
D2	0.85	0.95	1.05
e	0.50BSC		
Ne	1.00BSC		
E	1.20	1.30	1.40
E2	0.80	0.90	1.00
L	0.225	0.275	0.325



SIDE VIEW



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