ZK10D

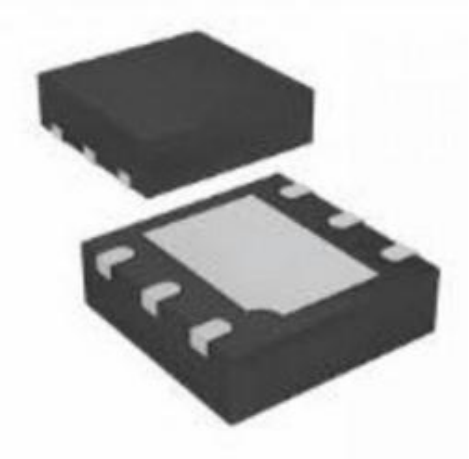
LF-10.0GHz Broadband Low-Noise Amplifier

ZeeTK

Zhejiang Zhike Technology Co., LTD

Features

- Frequency Range: LF~10GHz
- P-1: 17.4dBm@1.0GHz
- OIP3: 27.6dBm@1.0GHz
- Power Gain: 23.2dB @1.0GHz
- Noise Figure: 2.3dB@1.0GHz



Applications

- LTE / WCDMA / CDMA / GSM / Massive MIMO
- Repeaters / DAS
- CATV / FTTX
- W-LAN / ISM
- General Purpose Wireless
- Radio Frequency Instruments

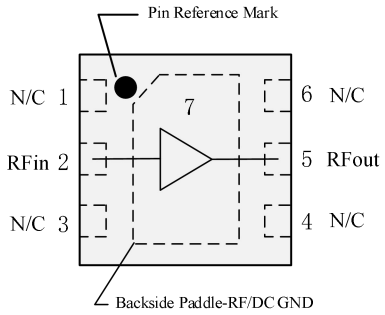
Description

The ZK10D is a low noise amplifier (LNA) that operates in the LF to 10GHz frequency range. The device incorporates on-chip input/output matching circuits and is fabricated with GaAs pHEMT process. The device is provided in a 2x2 mm, 6 pin DFN package. This device provides 23.2dB power gain at 1.0GHz, 27.6dBm OIP3, and 17.4dBm OP1dB with single +5V supply. Can be used as a gain amplifier. The device's minimum operating voltage can be as low as +3V, making it ideal for use as a first-stage LNA in low-power handheld devices.

Electrical Specifications （T_A=+25℃，VCC=+5V）

Parameter	Conditions	Min	Typ	Max	Units
Gain	0.01GHz~1GHz	21	23.2	25	dB
	1GHz~4GHz	21	23	25	
	4GHz~10GHz	24	21.5	12	
Input Return Loss	0.01GHz~1GHz	--	-11	-10	dB
	1GHz~4GHz	--	-10	-9	
	4GHz~10GHz	--	-12	-6	
Output Return Loss	0.01GHz~1GHz	--	-11	-4	dB
	1GHz~4GHz	--	-14	-10	
	4GHz~10GHz	--	-9	-6	
Reverse ISO	0.01GHz~1GHz	--	-32	-30	dB
	1GHz~4GHz	--	-32	-30	
	4GHz~10GHz	--	-34	-30	
Noise Figure	0.01GHz~1GHz	--	2.3	7	dB
	1GHz~4GHz	--	2.4	3	
	4GHz~10GHz	--	2.6	5	
OP1dB	0.01GHz~1GHz	14	17.4	--	dBm
	1GHz~4GHz	16	17.4	--	
	4GHz~10GHz	12	17	--	
OIP3	0.01GHz~1GHz	25	27.6	--	dBm
	1GHz~5GHz	25	28	--	
Operating Current		70	80	90	mA

Pin Assignments and Description



Pin	Name	Description
1,3,4,6	N/C	No electrical connection. Provide grounded land pads for PCB mounting integrity.
2	RFin	RF Input pin, DC Block is required.
5	RFout	RF output pin.

Absolute Maximum Ratings

Parameter	Value	Units
Operating Current	120	mA
Maximum RF Input Power (CW，50Ω，T_A=25°C)	9	dBm
Storage Temperature	-60 ~ +150	°C

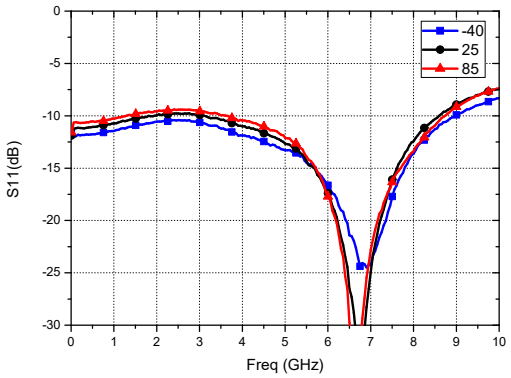
Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
DC Supply Voltage (VDD)	3.0	5	5.25	V
Operating Temperature	-40	25	85	°C

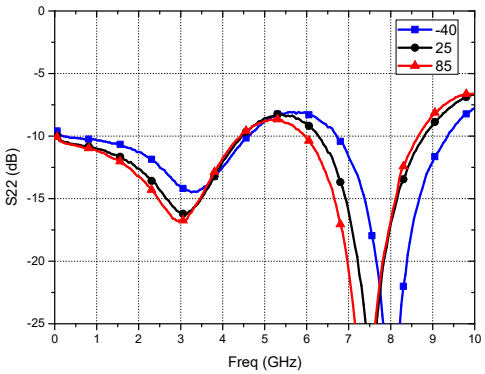
Performance Plots - VDD=5V

Test Conditions: VCC=+5V， RF In sweep Power=-20dBm.

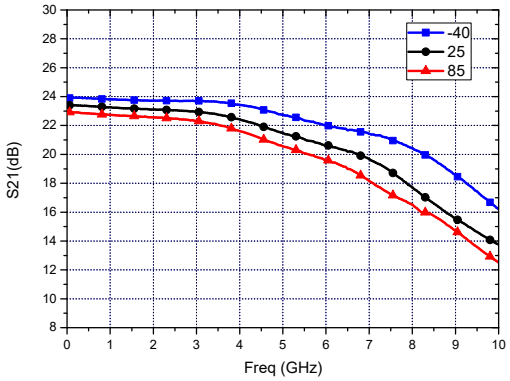
（T_A=25℃， I_Q=81mA； T_A=-40℃， I_Q=82mA； T_A=85℃， I_Q=81mA。）



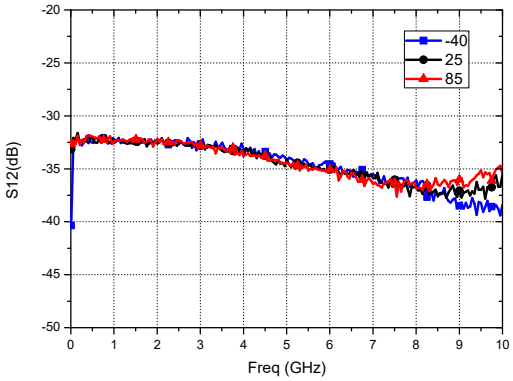
Input Return Loss vs. Frequency



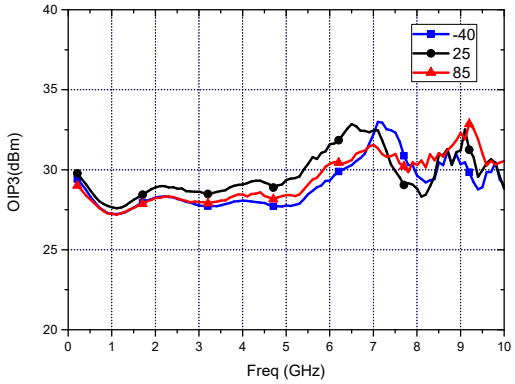
Output Return Loss vs. Frequency



Gain vs. Frequency



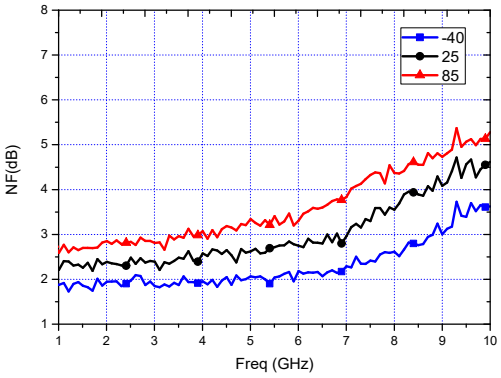
Reverse Isolation vs. Frequency



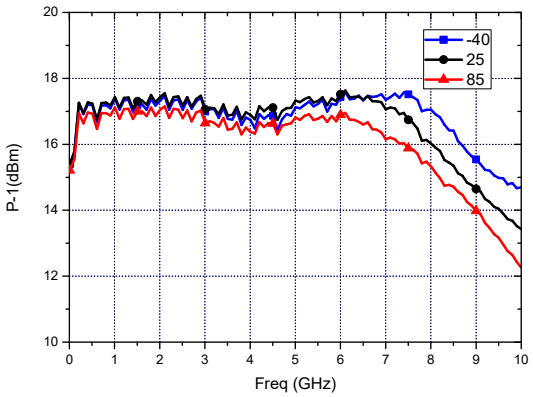
Output Third-Order Intercept Point vs. Frequency

a: Two-tone test, input power -20dBm/tone, △f=5MHz.

b: Input SMA connector loss not removed.



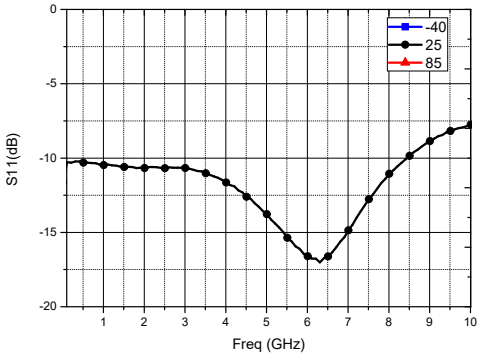
Noise Figure vs. Frequency



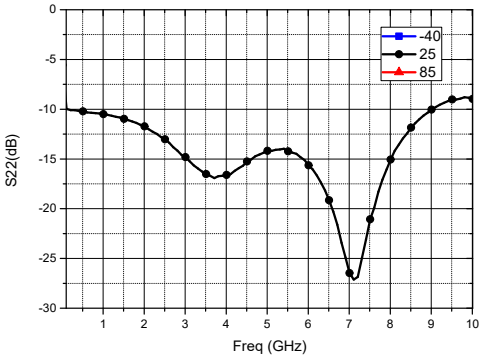
Output 1dB Compression Point P-1 vs. Frequency

Performance Plots - VDD=3.3V

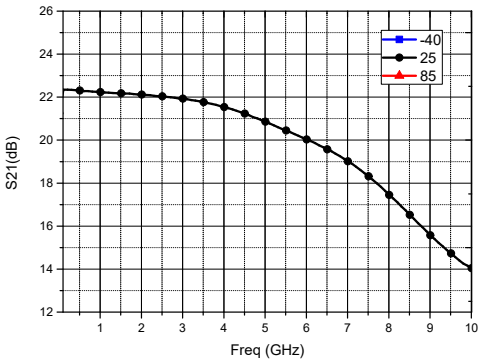
Test Conditions: VCC=+3.3V , RF In sweep Power=-20dBm. (TA=25 ℃ , IQ=57mA)



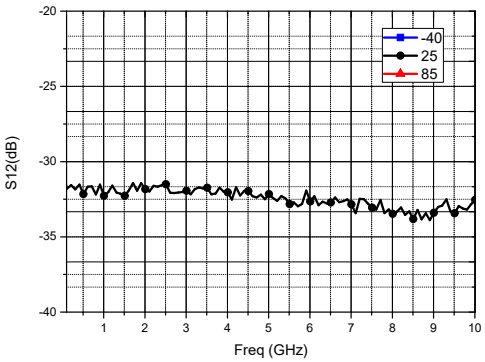
Input Return Loss vs. Frequency



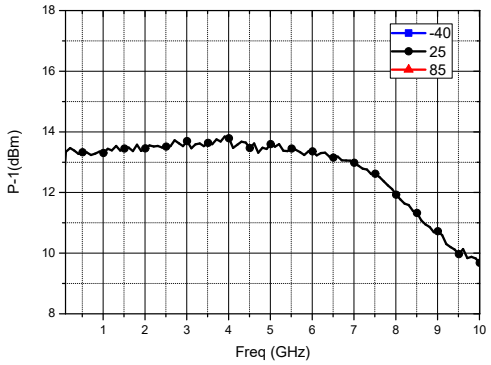
Output Return Loss vs. Frequency



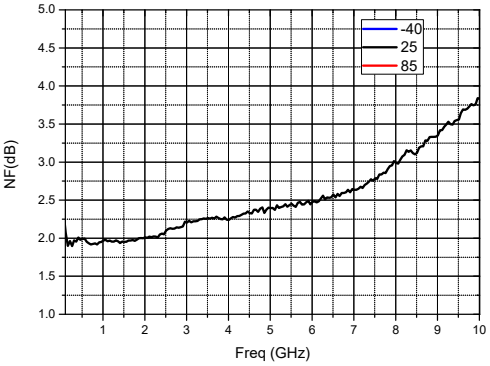
Gain vs. Frequency



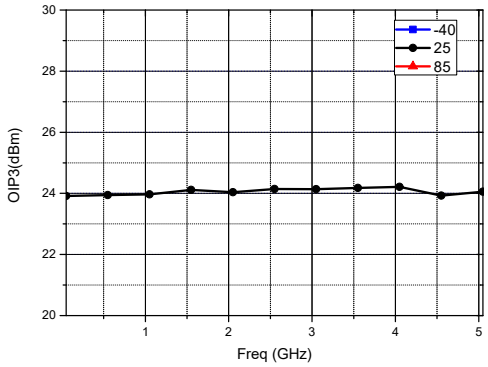
Reverse Isolation vs. Frequency



Output 1dB Compression Point P-1 vs. Frequency



Noise Figure vs. Frequency

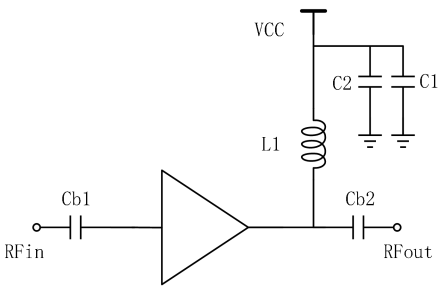


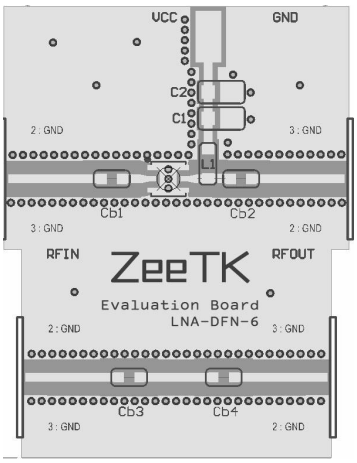
Output Third-Order Intercept Point vs. Frequency

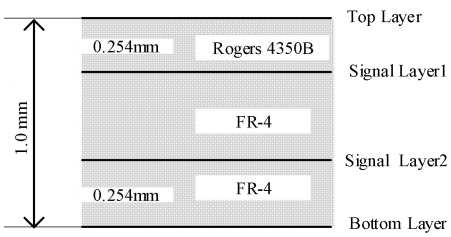
a: Two-tone test, output power 5dBm/tone, △f=5MHz.

b: Input SMA connector loss not removed.

PCB Evaluation Board

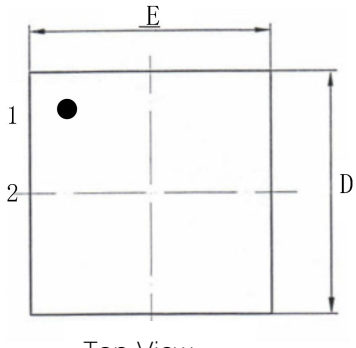




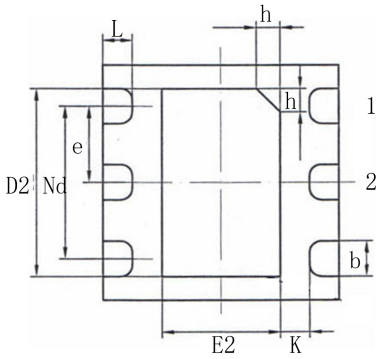


Reference Des.	Value	Description
Cb1、Cb2	2.2μF	CAP, SMD, 2.2uF, 0402
L1	560nH	Coli IND, SMD, 560nH, 0603
C2	4.7μF	CAP, SMD, 4.7uF, 0603
C1	100pF	CAP, SMD, 100p, 0603

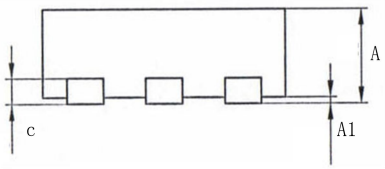
Package Diagram



Top View



Bottom View



Side View

Symbol	Value (mm)		
	Min	Typ	Max
A	0.70	0.75	0.80
A1	0	0.02	0.05
b	0.25	0.30	0.35
c	0.18	0.20	0.25
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	1.50	1.60	1.70
E2	0.90	1.00	1.10
e		0.65BSC	
Nd		1.30BSC	
L	0.20	0.25	0.30
h	0.15	0.20	0.25
K	0.20	-	-

Handling Precaution

ESD countermeasure methods should be developed and used to control potential ESD damage during handling in a factory environment at each manufacturing site.

Solderability

Compatible with lead-free (260 ℃ maximum reflow temperature) soldering processes.

RoHS Compliance

This product is compliant with the EU RoHs2.0, EU Directive 2015/863.