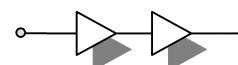


Features

- $S_{21} = 35.5 \text{ dB @ } 824 \text{ MHz}$
 $= 34.5 \text{ dB @ } 894 \text{ MHz}$
- $S_{21} = 35 \text{ dB @ } 890 \text{ MHz}$
 $= 34 \text{ dB @ } 960 \text{ MHz}$
- NF of 0.7~0.72 dB over Frequency
- Unconditionally Stable
- Single 5V Supply
- High OIP3 @ Low Current

Description

The plerow™ ALN-series is the compactly designed surface-mount module for the use of the LNA with or without the following gain blocks in the infrastructure equipment of the mobile wireless (CDMA, GSM, PCS, PHS, WCDMA, DMB, WLAN, WiBro, WiMAX), GPS, satellite communication terminals, CATV and so on. It has an exceptional performance of low noise figure, high gain, high OIP3, and low bias current. The stability factor is always kept more than unity over the application band in order to ensure its unconditionally stable implementation to the application system environment. The surface-mount module package including the completed matching circuit and other components necessary just in case allows very simple and convenient implementation onto the system board in mass production level.



2-stage Single Type

Specifications (in Production)

Typ. @ $T = 25^{\circ}\text{C}$, $V_s = 5 \text{ V}$, Freq. = 859.925 MHz, $Z_{0,\text{sys}} = 50 \text{ ohm}$

Parameter	Unit	Specifications					
		CDMA			GSM		
		Min	Typ	Max	Min	Typ	Max
Frequency Range	MHz	824		894	890		960
Gain	dB	34	35		33.5	34.5	
Gain Flatness	dB		± 0.5	± 0.6		± 0.5	± 0.6
Noise Figure	dB		0.7	0.75		0.72	0.77
Output IP3 ⁽¹⁾	dBm	34	36		34	36	
S11 / S22 ⁽²⁾	dB			-18 / -15			-18 / -15
Output P1dB	dBm	20	21		20	21	
Switching Time ⁽³⁾	sec		-			-	
Supply Current	mA		110	130		110	130
Supply Voltage	V	5					
Impedance	Ω	50					
Max. RF Input Power	dBm	C.W 23 ~ 25 (before fail)					
Package Type & Size	mm	Surface Mount Type, 10Wx10Lx3.8H					

Operating temperature is -40°C to $+85^{\circ}\text{C}$.

1) OIP3 is measured with two tones at an output power of 5 dBm / tone separated by 1 MHz.

2) S11/S22 (max) is the worst value within the frequency band.

3) Switching time means the time that takes for output power to get stabilized to its final level after switching DC voltage from 0 V to V_s .

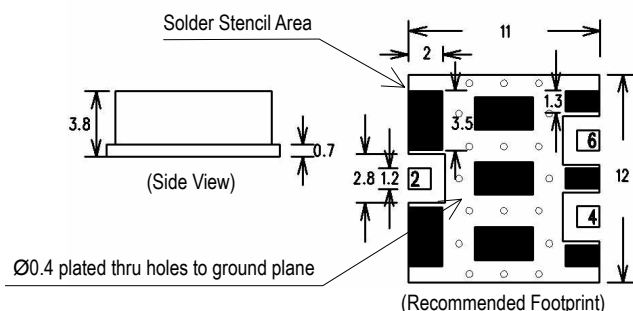
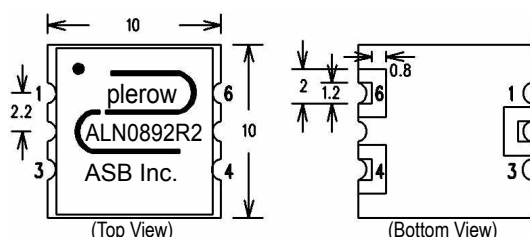
More Information

Website: www.asb.co.kr
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Tel: (82) 42-528-7223
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ASB Inc., 4th Fl. Venture Town
Bldg., 367-17 Goijeong-Dong,
Seo-Gu, Daejeon 302-716, Korea

Outline Drawing (Unit: mm)



Pin Number	Function
2	RF In
4	+Vcc
6	RF Out
Others	Ground

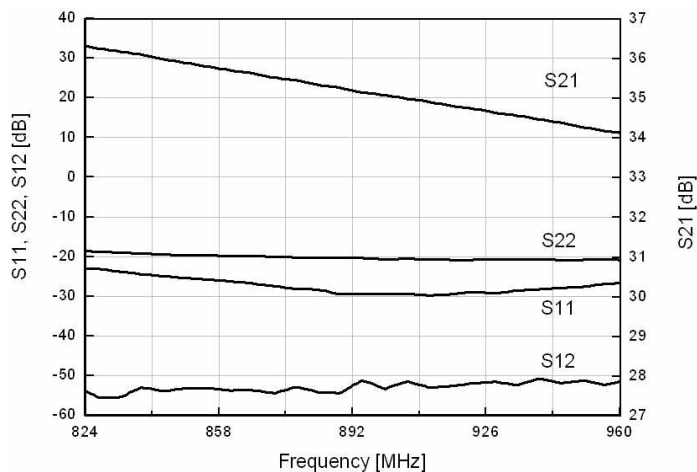
Note: 1. The number and size of ground via holes in a circuit board is critical for thermal RF grounding considerations.

2. We recommend that the ground via holes be placed on the bottom of all ground pins for better RF and thermal performance, as shown in the drawing at the left side.

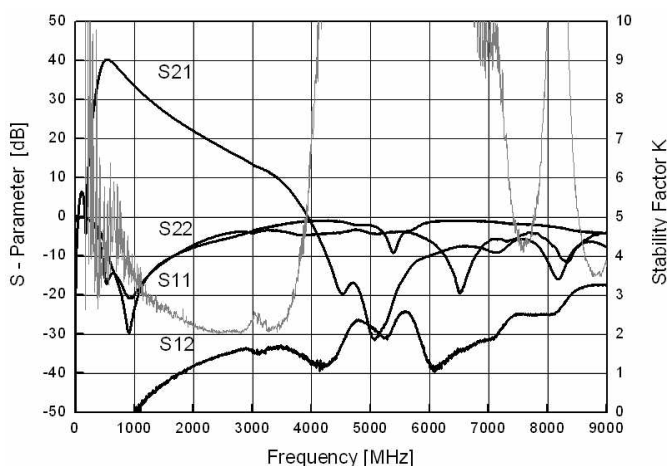
Typical Performance (Measured)

824~960
+5 V

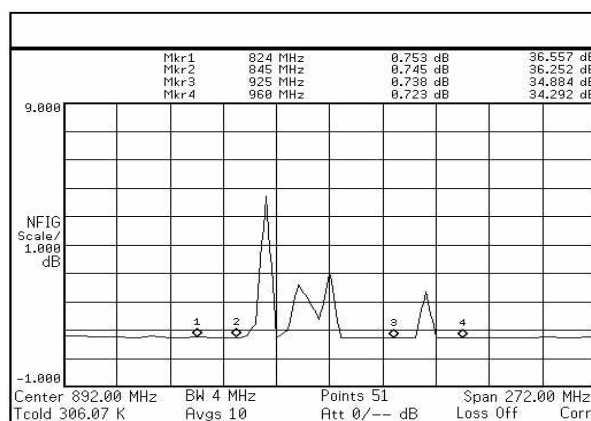
S-parameters



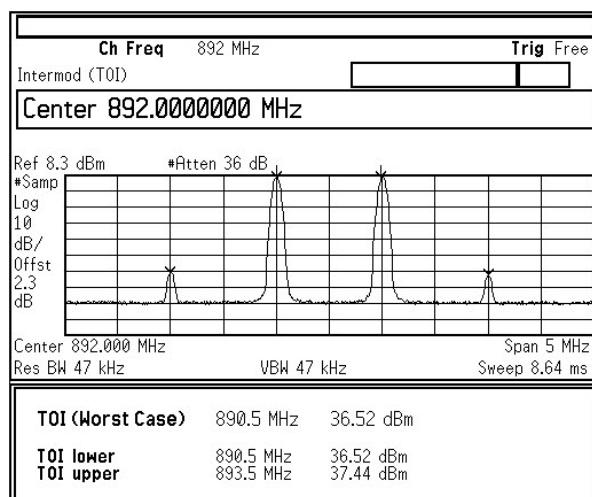
Stability Factor (K)



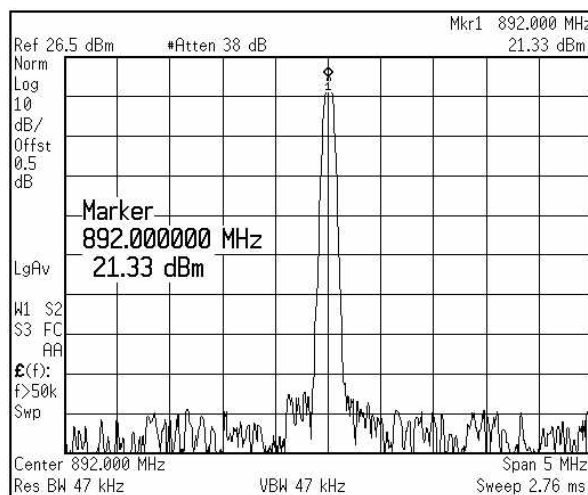
Noise Figure



OIP3



P1dB



RF Performance with Voltage Change

Item Voltage	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Current (mA)
4.5	-23.77	-22.20	34.18	2.13	0.662	20.44	34.92	80
4.6	-24.02	-21.95	34.28	2.12	0.665	20.69	35.94	86
4.7	-24.25	-21.58	34.37	2.11	0.674	20.94	35.91	91
4.8	-24.57	-21.26	34.46	2.12	0.684	21.19	36.42	97
4.9	-24.78	-21.19	34.53	2.12	0.699	21.40	36.61	102
5.0	-24.69	-21.14	34.59	2.11	0.699	21.59	36.41	108
5.1	-24.34	-21.07	34.65	2.11	0.699	21.80	36.23	113
5.2	-24.06	-21.22	34.69	2.11	0.711	21.98	35.89	118
5.3	-23.76	-21.22	34.73	2.11	0.710	22.14	35.59	123
5.4	-23.41	-21.45	34.75	2.12	0.713	22.31	35.32	127
5.5	-23.23	-21.68	34.77	2.12	0.733	22.47	35.17	132

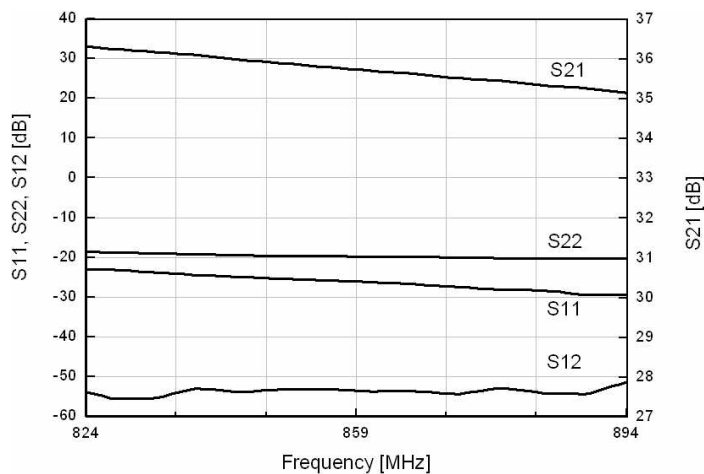
RF Performance with Operating Temperature

Item Temp.	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Current (mA)
- 40°C	-22.90	-17.25	35.42	2.15	0.514	22.03	36.79	100
- 20°C	-23.48	-17.90	35.31	2.08	0.586	21.92	36.67	101
0°C	-23.81	-18.60	35.21	2.09	0.648	21.79	36.53	102
25°C	-23.35	-19.36	35.06	2.10	0.744	21.57	36.68	105
40°C	-23.01	-19.92	34.96	2.10	0.787	21.50	36.58	106
60°C	-22.68	-20.67	34.77	2.11	0.876	21.28	36.90	106
80°C	-22.22	-21.31	34.56	2.13	0.957	21.00	35.60	107
100°C	-21.94	-21.93	34.31	2.13	1.052	20.44	34.45	105

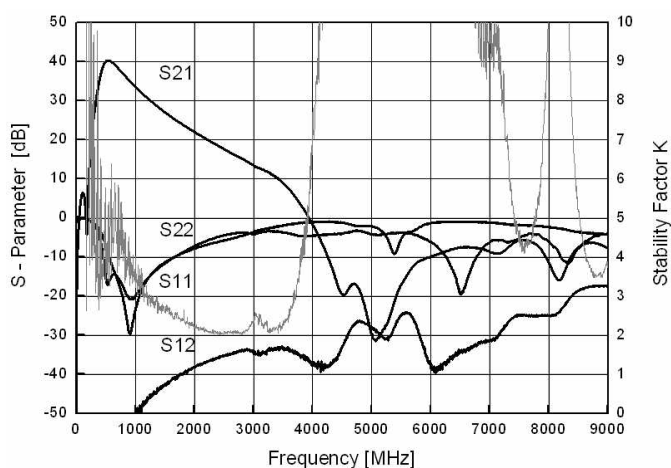
Typical Performance (Measured)

859 ± 35 MHz
+5 V

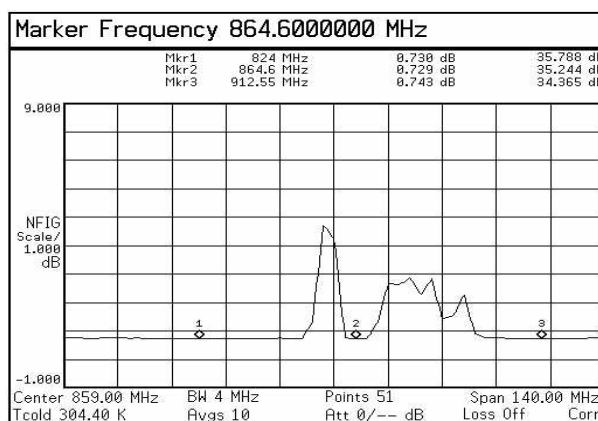
S-parameters



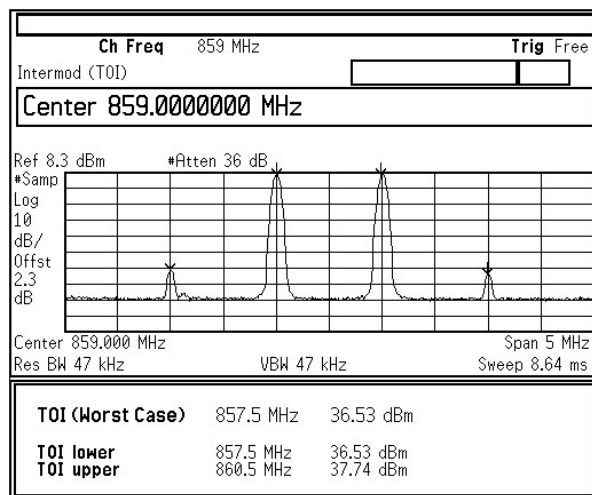
Stability Factor (K)



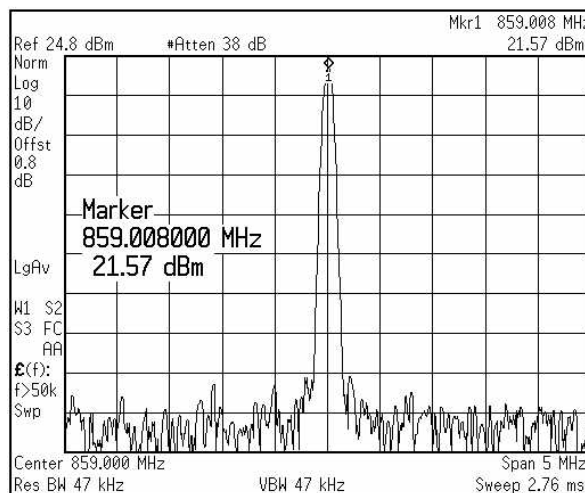
Noise Figure



OIP3



P1dB



RF Performance with Voltage Change

Item Voltage	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Current (mA)
4.5	-26.79	-22.20	34.70	1.11	0.666	20.47	33.52	80
4.6	26.31	-21.95	34.80	1.11	0.692	20.73	34.60	86
4.7	-25.83	-21.58	34.90	1.10	0.696	20.98	35.51	91
4.8	-25.41	-21.26	34.98	1.10	0.983	21.21	36.22	97
4.9	-25.03	-21.19	35.05	1.10	0.711	21.42	36.59	102
5.0	-24.69	-21.14	35.11	1.10	0.703	21.61	36.62	108
5.1	-24.34	-21.07	35.17	1.09	0.708	21.81	36.41	113
5.2	-24.06	-21.22	35.21	1.09	0.727	21.99	36.21	118
5.3	-23.76	-21.22	35.25	1.09	0.718	22.15	36.03	123
5.4	-23.41	-21.45	35.27	1.10	0.741	22.31	35.88	127
5.5	-23.23	-21.68	35.29	1.10	0.741	22.49	35.54	132

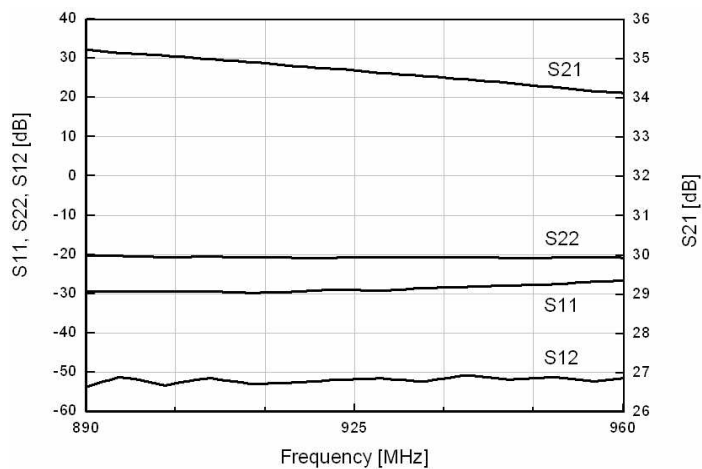
RF Performance with Operating Temperature

Item Temp.	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Current (mA)
- 40°C	-28.12	-17.11	35.95	1.10	0.517	22.05	36.42	100
- 20°C	-27.75	-17.92	35.84	1.10	0.588	21.98	36.77	101
0°C	-27.61	-18.64	35.74	1.10	0.654	21.77	36.47	102
25°C	-26.89	-19.31	35.58	1.12	0.746	21.66	36.72	105
40°C	-26.82	-19.92	35.49	1.12	0.792	21.55	36.57	106
60°C	-27.00	-20.58	35.31	1.12	0.881	21.31	35.87	106
80°C	-27.80	-21.23	35.00	1.13	0.965	20.98	34.36	107
100°C	-27.69	-22.02	34.85	1.13	1.054	20.43	33.88	105

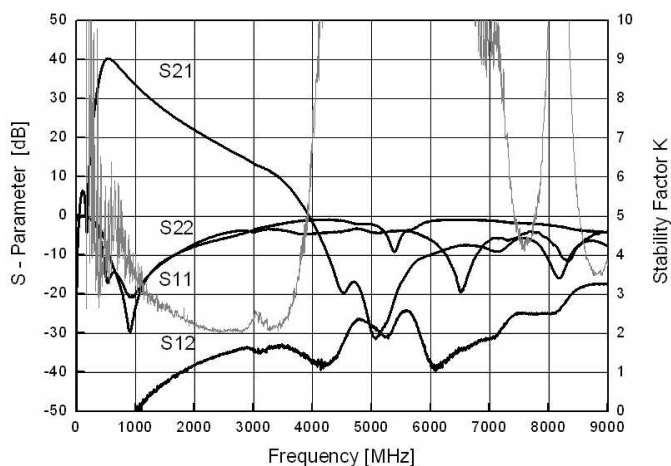
Typical Performance (Measured)

925 ± 35 MHz
+5 V

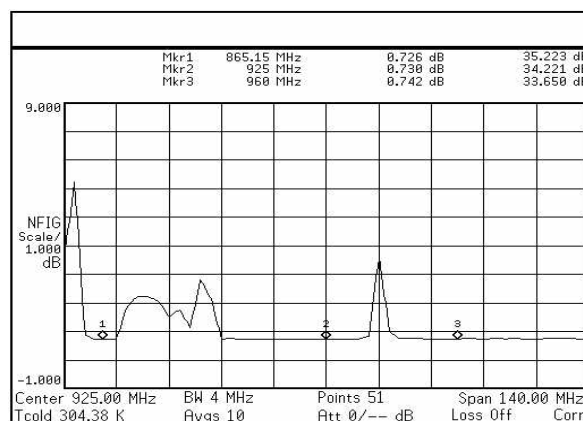
S-parameters



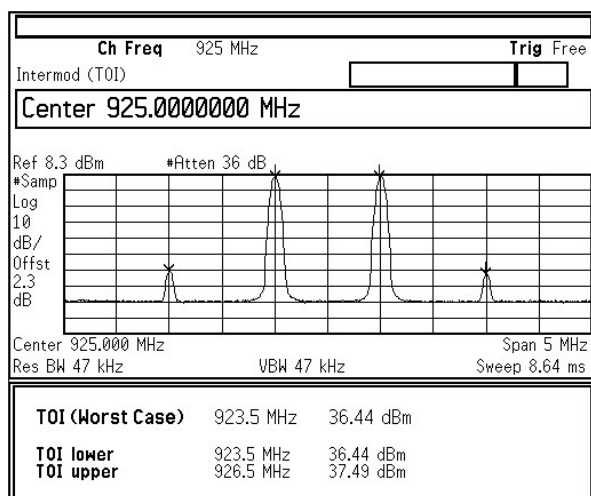
Stability Factor (K)



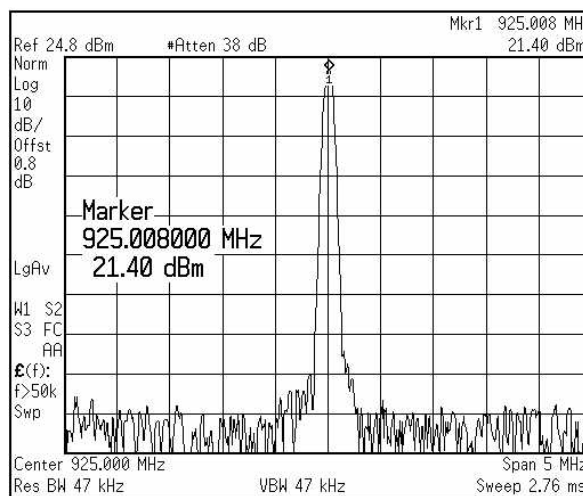
Noise Figure



OIP3



P1dB



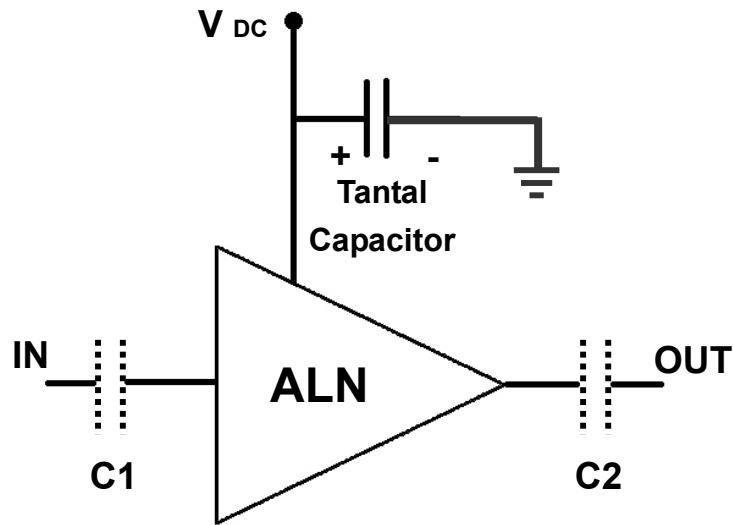
RF Performance with Voltage Change

Item Voltage	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Current (mA)
4.5	-23.76	-23.74	33.66	1.09	0.695	20.39	33.01	80
4.6	-24.01	-25.55	33.77	1.08	0.700	20.66	34.17	86
4.7	-24.24	-23.25	33.87	1.08	0.715	20.91	35.32	91
4.8	-24.56	-22.91	33.95	1.09	0.704	21.15	36.11	97
4.9	-24.77	-22.92	34.02	1.08	0.705	21.36	36.65	102
5.0	-25.04	-22.93	34.08	1.08	0.722	21.58	36.89	108
5.1	-25.21	-22.94	34.14	1.08	0.732	21.78	36.79	113
5.2	-25.37	-22.98	34.18	1.08	0.738	21.96	36.61	118
5.3	-25.63	-23.10	34.22	1.08	0.746	22.14	36.34	123
5.4	-25.85	-23.24	34.24	1.09	0.767	22.30	36.19	127
5.5	-26.01	-23.52	34.25	1.09	0.765	22.46	35.86	132

RF Performance with Operating Temperature

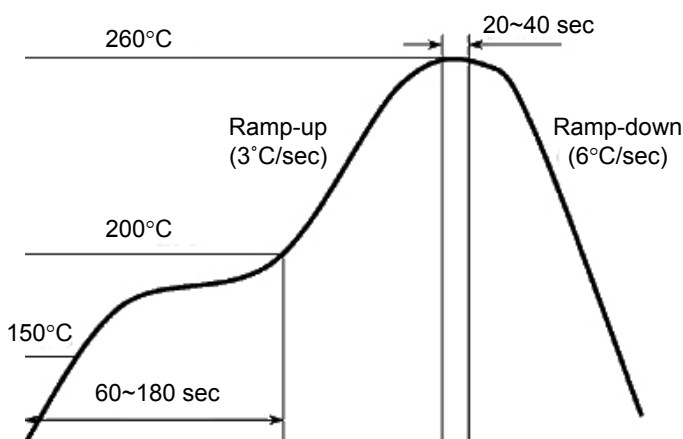
Item Temp.	S11 (dB)	S22 (dB)	S21 (dB)	G/F (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Current (mA)
- 40°C	-22.74	-18.26	34.96	1.07	0.515	22.00	36.23	100
- 20°C	-23.48	-19.35	34.85	1.08	0.586	21.93	36.59	101
0°C	-23.72	-20.54	34.75	1.08	0.647	21.85	36.45	102
25°C	-23.36	-22.07	34.59	1.08	0.745	21.62	36.48	105
40°C	-23.04	-23.25	34.49	1.08	0.788	21.51	36.43	106
60°C	-22.68	-24.82	34.30	1.09	0.881	21.27	35.52	106
80°C	-22.19	-26.63	34.07	1.10	0.957	20.94	34.02	107
100°C	-21.94	-28.37	33.84	1.09	1.057	20.36	33.53	105

Application Circuit



- 1) The tantal capacitor is optional and for bypassing the AC noise introduced from the DC supply. The capacitance value may be determined by customer's DC supply status.
- 2) So-called DC blocking capacitors are always necessarily placed at the input and output port for allowing only the RF signal to pass and blocking the DC component in the signal. The DC blocking capacitors are included inside the LNA module. Therefore, C1 & C2 capacitors may not be necessary, but can be added just in case that the customer wants. The value of C1 & C2 is determined by considering the application frequency.

Recommended Soldering Reflow Process



Evaluation Board Layout

