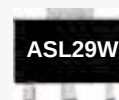


Features

- 12.5 dB Gain at 2 GHz
- 22 dBm P1dB at 2 GHz
- 39.5 dBm Output IP3 at 2 GHz
- 0.9 dB NF at 2 GHz
- MTTF > 100 Years
- Single Supply

Description

The ASL29W, a wideband linear low noise amplifier MMIC, has a low noise and high linearity at low bias current, being suitable for use in both receiver and transmitter of telecommunication systems up to 3 GHz. S11 down to -15 dB is easily achieved for low noise application to provide a good productivity. The amplifier is available in a SOT89 package and passes through the stringent DC, RF, and reliability tests.



Package Style: SOT89

Typical Performance

(Supply Voltage = 5V, $T_A = +25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$)

Parameters	Units	Typical		
Frequency	MHz	900	2000	2700
Gain	dB	19.0	12.5	10.2
S11	dB	-15	-14	-18
S22	dB	-18	-18	-12
Output IP3 ¹⁾	dBm	37.0	39.5	40.0
Noise Figure	dB	0.90	0.90	1.15
Output P1dB	dBm	22	22	23
Current	mA	75	75	75
Device Voltage	V	+4.3	+4.3	+4.3

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		900	
Gain	dB	18	19	
S11	dB		-15	
S22	dB		-18	
Output IP3	dBm	36	37	
Noise Figure	dB		0.9	1.1
Output P1dB	dBm	21	22	
Current	mA	60	75	90
Device Voltage	V		+4.3	

Absolute Maximum Ratings

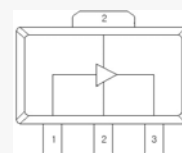
Parameters	Rating
Operating Case Temperature	-40 to +85 $^{\circ}\text{C}$
Storage Temperature	-40 to +150 $^{\circ}\text{C}$
Device Voltage	+6 V
Operating Junction Temperature	+150 $^{\circ}\text{C}$
Input RF Power (CW, 50ohm matched)*	23 dBm
Thermal Resistance	80 $^{\circ}\text{C/W}$

* Please find the max. input power data from http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf

Application Circuit

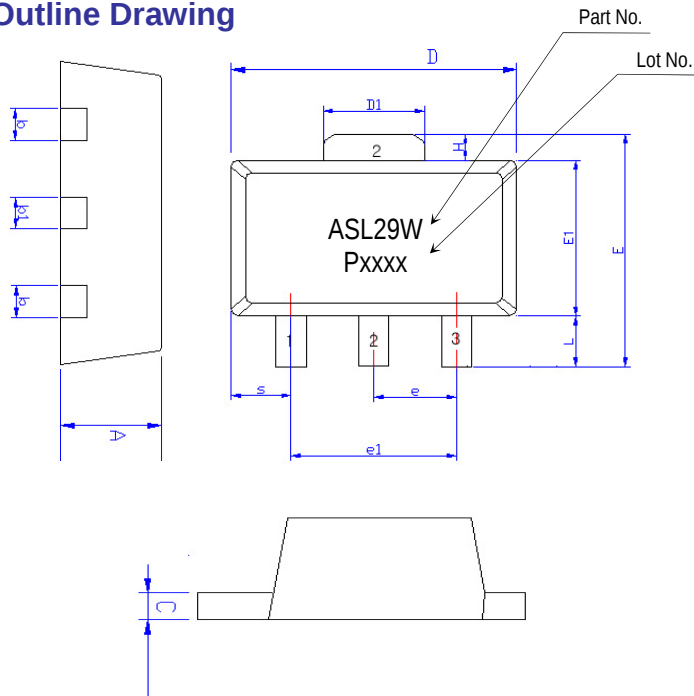
- IF
- LTE
- CDMA
- GSM
- PCS
- WCDMA
- 2300 ~ 2700 MHz

Pin Configuration



Pin No.	Function
1	RF IN
2	GND
3	RF OUT & Bias

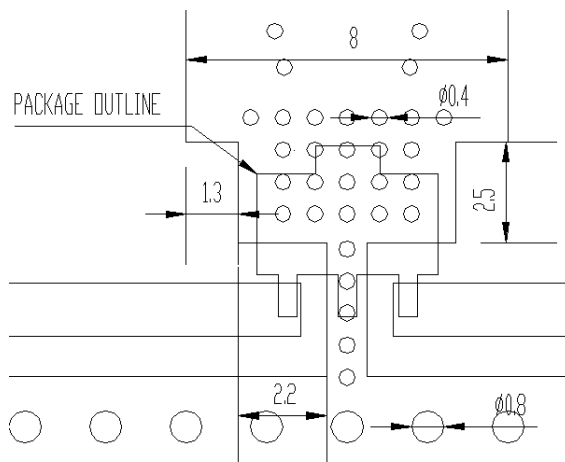
Outline Drawing



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
L	0.89	1.04	1.20
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
C	0.38	0.40	0.43
D	4.40	4.50	4.60
D1	1.40	1.60	1.75
E	3.64	---	4.25
E1	2.40	2.50	2.60
e1	2.90	3.00	3.10
H	0.35	0.40	0.45
S	0.65	0.75	0.85
e	1.40	1.50	1.60

Pin No.	Function
1	Input
2	GND
3	Output

Mounting Recommendation (In mm)



- Note:**
1. The number and size of ground via holes in a circuit board is critical for thermal and RF grounding considerations.
 2. We recommend that the ground via holes be placed on the bottom of the lead pin 2 and exposed pad of the device for better RF and thermal performance, as shown in the drawing at the left side.

ESD Classification & Moisture Sensitivity Level

ESD Classification

HBM	Class 1B
	Voltage Level: 550 V
MM	Class A
	Voltage Level: 50 V

CAUTION: ESD-sensitive device!

Moisture Sensitivity Level (MSL)

Level 3 at 260 °C reflow

OIP3 & Noise Figure Vs. Bias Resistor

R3 (ohm)	R2 (ohm)	Vd (V)	Ic (mA)	CDMA		WCDMA		R3 (ohm)	R2 (ohm)	Vd (V)	Ic (mA)	CDMA		WCDMA	
				NF (dB)	OIP3 (dBm)	NF (dB)	OIP3 (dBm)					NF (dB)	OIP3 (dBm)	NF (dB)	OIP3 (dBm)
9.1	5.1k	4.32	72	0.99	37.2	0.94	40.1	20	6.2k	3.67	66	0.90	36.3	0.93	39.3
	4.7k	4.41	60	0.91	36.8	1.01	38.4		5.6k	3.81	58	0.91	35.6	0.92	37.9
	4.3k	4.49	50	0.93	36.1	0.95	36.0		5.1k	3.93	50	0.89	34.6	0.95	35.9
	3.9k	4.61	42	0.94	32.8	0.98	31.7		4.7k	4.11	43	0.94	32.7	0.97	33.9
	3.6k	4.7	28	1.01	29.1	1.02	29.9		4.3k	4.22	35	0.95	30.8	0.94	31.6
11	5.1k	4.22	70	0.91	37.1	0.92	39.5		3.9k	4.4	27	0.97	27.4	1.01	29.2
	4.7k	4.34	56	0.92	36.5	0.99	37.3		3.6k	4.49	22	1.01	25.4	1.07	28.5
	4.3k	4.46	45	0.91	34.5	1.01	34.9								
	3.9k	4.58	34	0.94	31.1	0.99	31.2								
	3.6k	4.65	27	0.96	28.1	1.03	29.4								
15	5.6k	3.92	69	0.91	36.9	0.93	39.5								
	5.1k	4.1	58	0.91	36.1	0.95	38.0								
	4.7k	4.22	50	0.93	34.8	0.95	35.9								
	4.3k	4.32	41	0.94	33.2	0.97	33.5								
	3.9k	4.48	31	1.01	29.2	0.99	30.2								
	3.6k	4.57	25	1.02	26.7	1.07	28.9								

* Test Application Circuit : ASL29W CDMA / WCDMA application circuit

* OIP3 Test Condition : Freq. – 894 MHz / – 2140 MHz, +10 dBm output power per tone

V_D : Applied voltage to the device

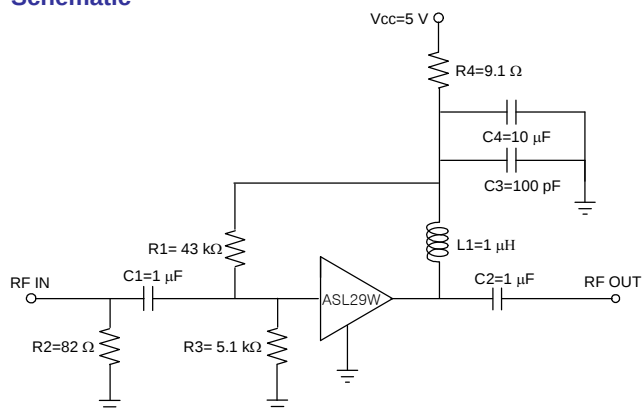
APPLICATION CIRCUIT

IF
30 ~ 400 MHz
+5 V

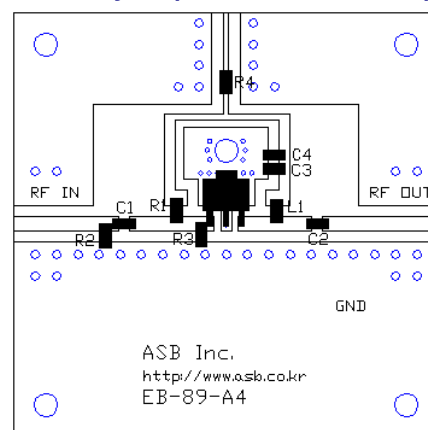
Frequency (MHz)	70	150	300
Magnitude S21 (dB)	25.0	24.0	22.5
Magnitude S11 (dB)	-13	-11	-8
Magnitude S22 (dB)	-18	-18	-18
Output P1dB (dBm)	21.5	21.5	21.5
Output IP3 ¹⁾ (dBm)	31	32	33
Noise Figure (dB)	3.0	3.0	2.9
Device Voltage (V)	+4.3	+4.3	+4.3
Current (mA)	75	75	75

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

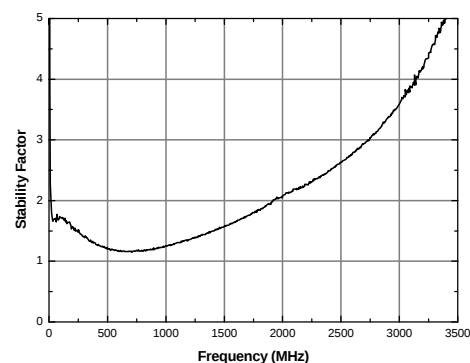
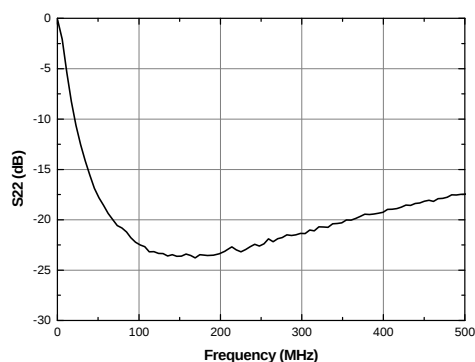
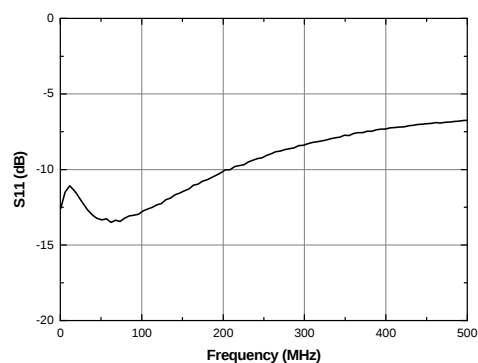
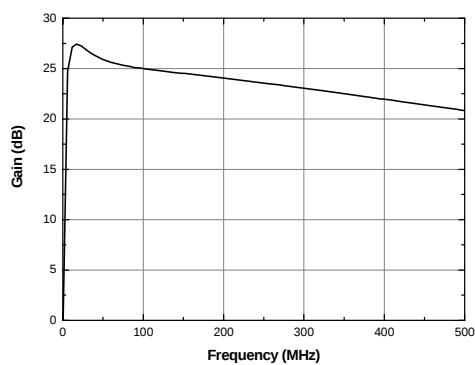
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

LTE

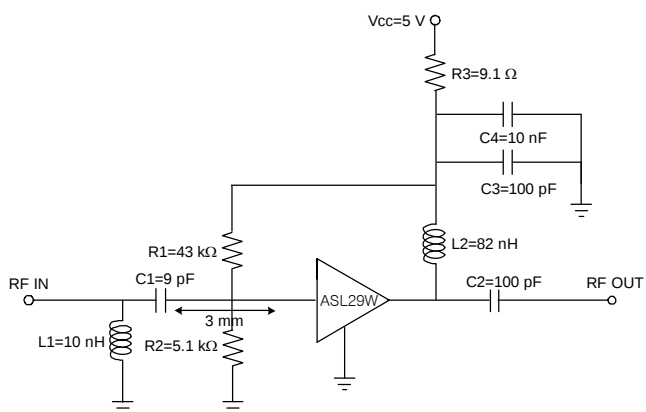
698 ~ 787 MHz

+5 V

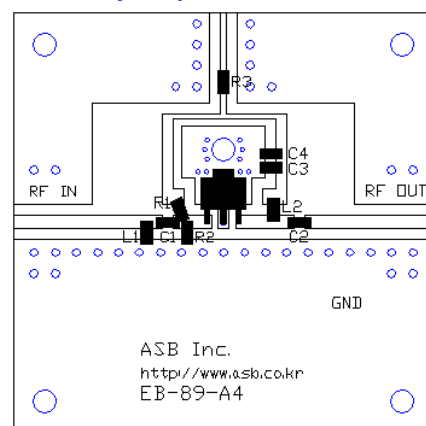
Frequency (MHz)	698 ~ 787
Magnitude S21 (dB)	20
Magnitude S11 (dB)	-18
Magnitude S22 (dB)	-13
Output P1dB (dBm)	22.5
Output IP3 ¹⁾ (dBm)	36.5
Noise Figure (dB)	0.75
Device Voltage (V)	+4.3
Current (mA)	75

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

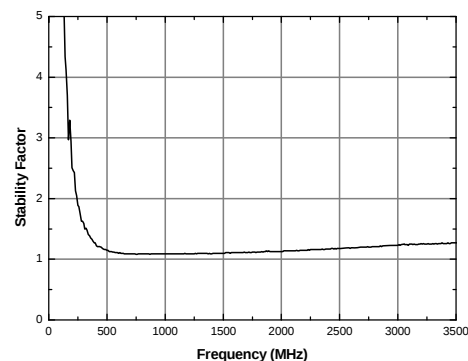
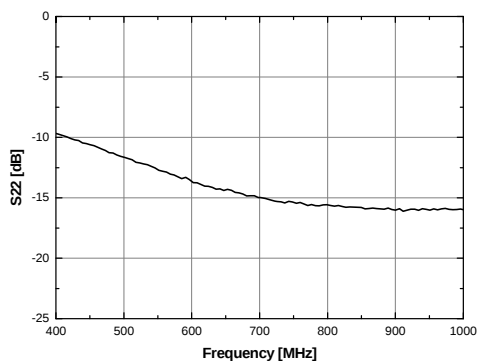
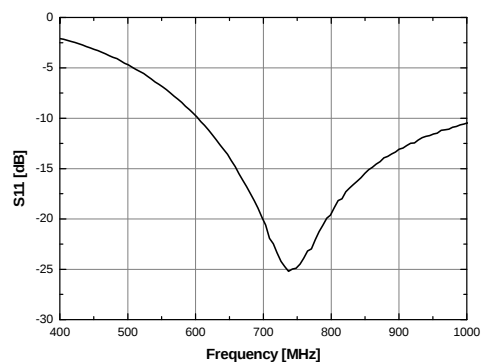
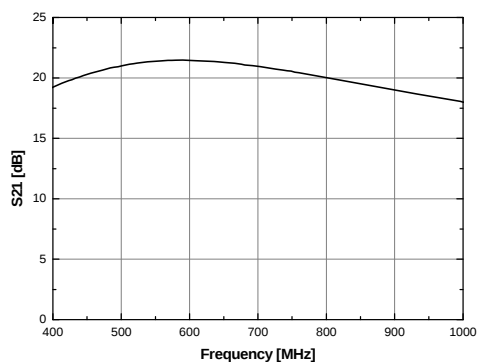
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

CDMA & GSM

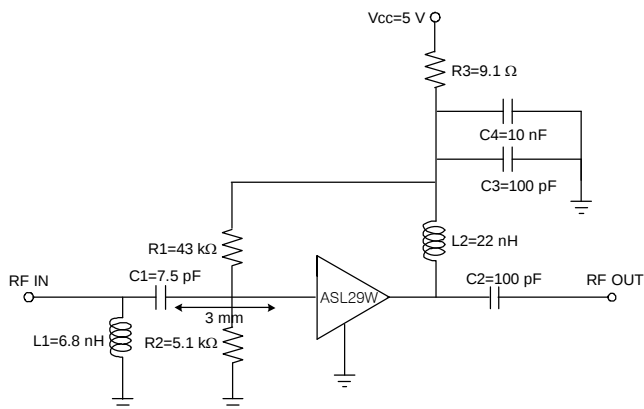
824 ~ 960 MHz

+5 V

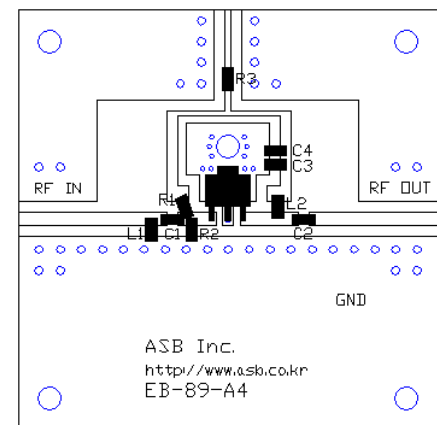
Frequency (MHz)	824 ~ 894	890 ~ 960
Magnitude S ₂₁ (dB)	19.5	19.0
Magnitude S ₁₁ (dB)	-15	-15
Magnitude S ₂₂ (dB)	-15	-18
Output P _{1dB} (dBm)	22	22
Output IP ₃ ¹⁾ (dBm)	37	37
Noise Figure (dB)	0.95	0.90
Device Voltage (V)	+4.3	+4.3
Current (mA)	75	75

1) OIP₃ is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

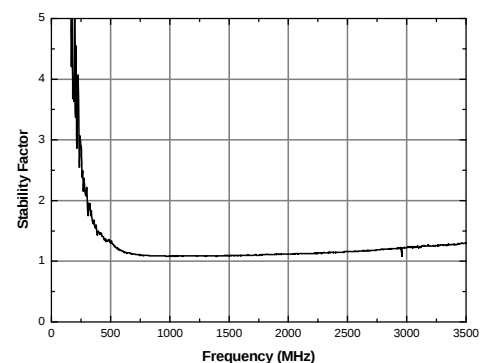
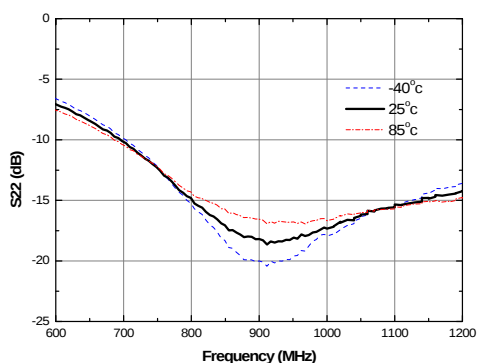
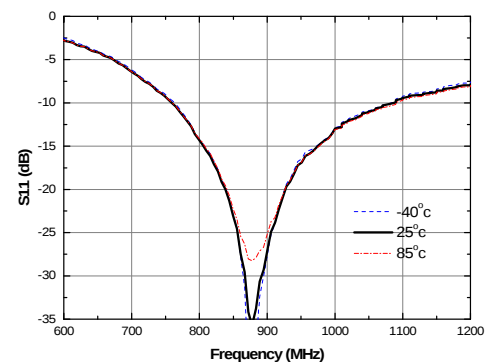
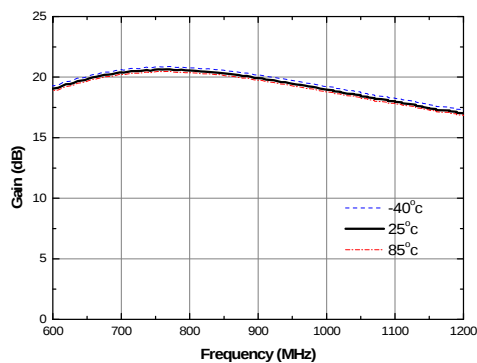
Schematic



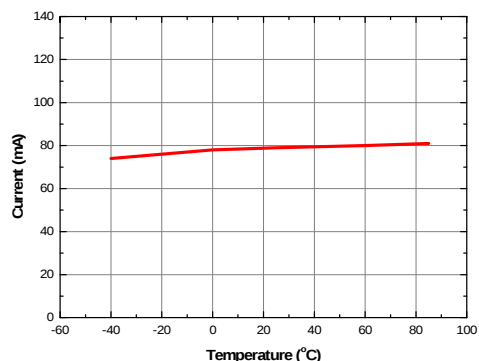
Board Layout (FR4, 40x40 mm², 0.8T)



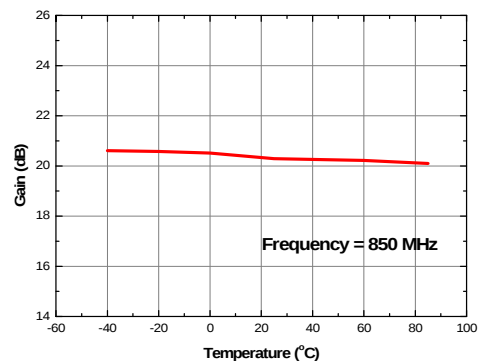
S-parameters & K-factor



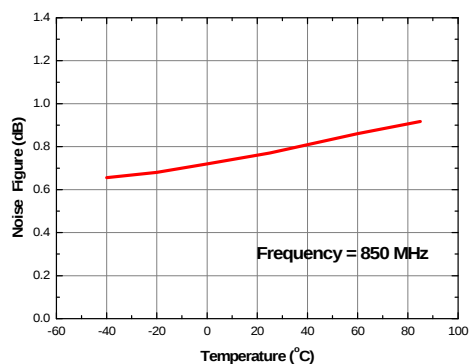
Current vs. Temperature



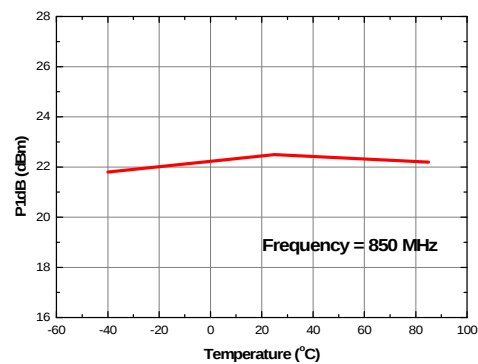
Gain vs. Temperature



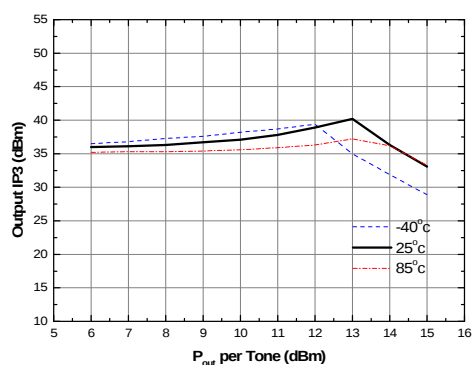
Noise Figure vs. Temperature



P1dB vs. Temperature



Output IP3 vs. Tone Power (Frequency = 850 MHz)



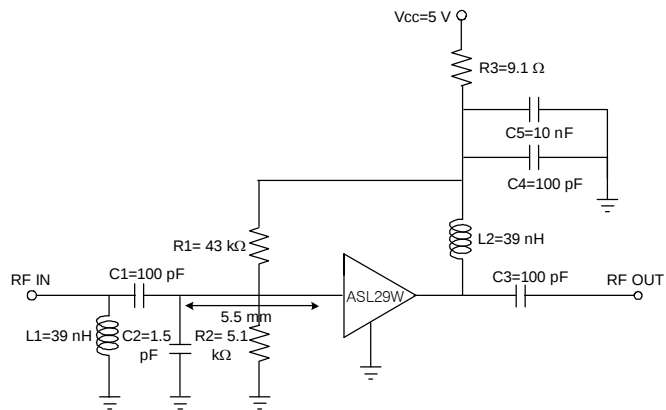
APPLICATION CIRCUIT

PCS
1710 ~ 1785 MHz
+5 V

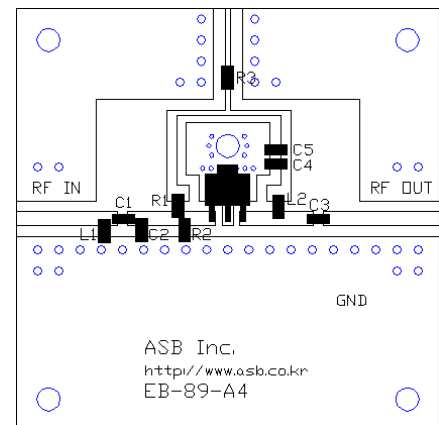
Frequency (MHz)	1710 ~ 1785
Magnitude S21 (dB)	14
Magnitude S11 (dB)	-18
Magnitude S22 (dB)	-15
Output P1dB (dBm)	22
Output IP3 ¹⁾ (dBm)	38
Noise Figure (dB)	0.85
Device Voltage (V)	+4.3
Current (mA)	75

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

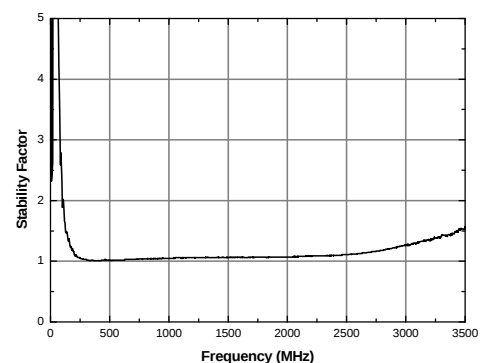
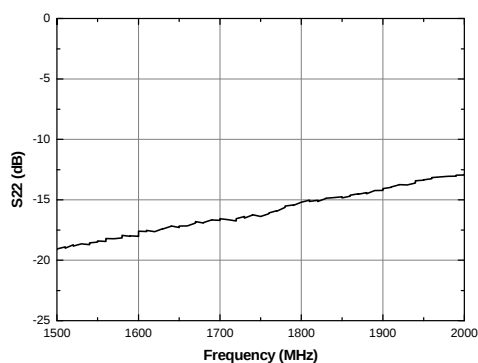
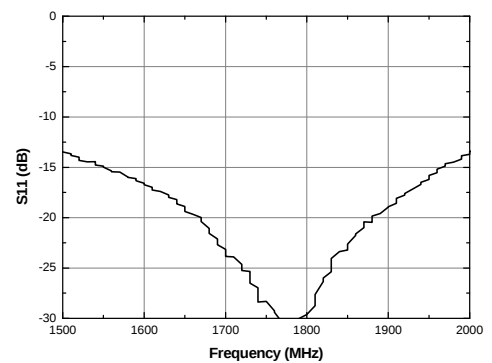
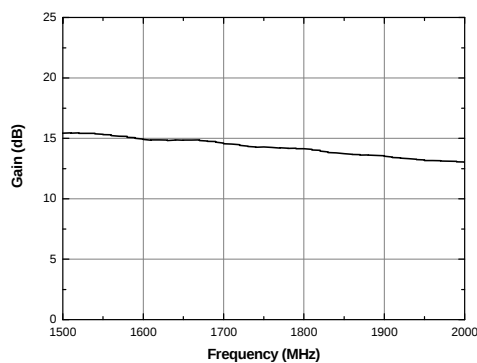
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

WCDMA

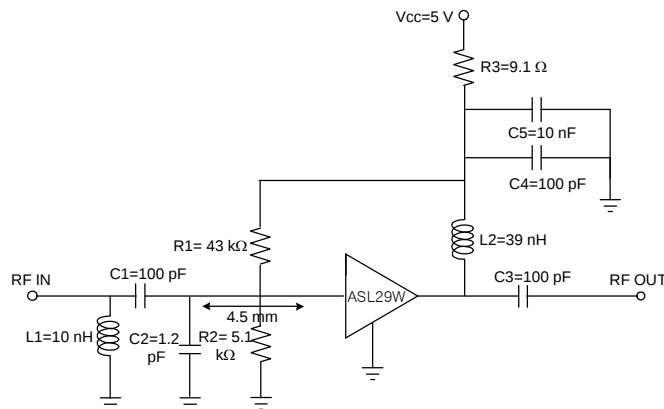
1920 ~ 2170 MHz

+5 V

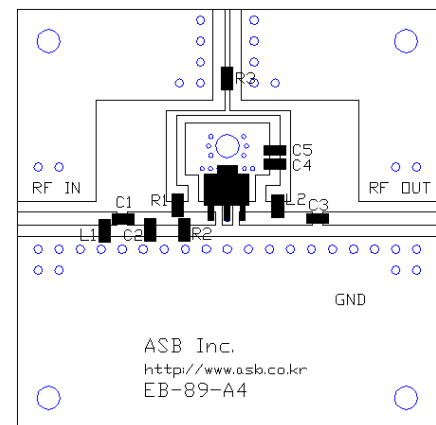
Frequency (MHz)	1920 ~ 1980	2110 ~ 2170
Magnitude S21 (dB)	12.5	12.0
Magnitude S11 (dB)	-14	-18
Magnitude S22 (dB)	-18	-15
Output P1dB (dBm)	22.0	22.5
Output IP3 ¹⁾ (dBm)	39.5	40.0
Noise Figure (dB)	0.90	0.95
Device Voltage (V)	+4.3	+4.3
Current (mA)	75	75

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

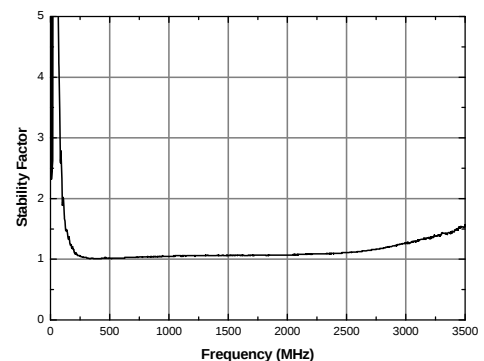
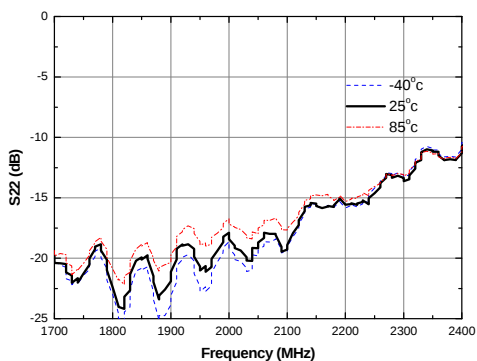
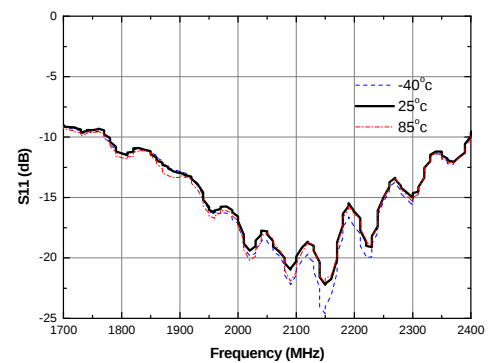
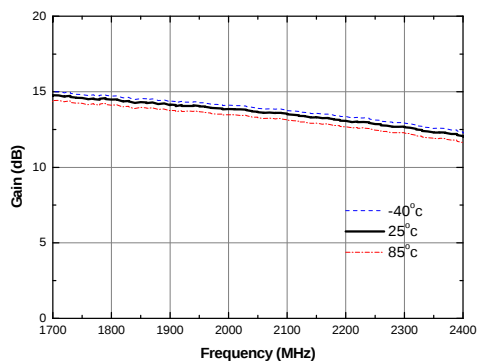
Schematic



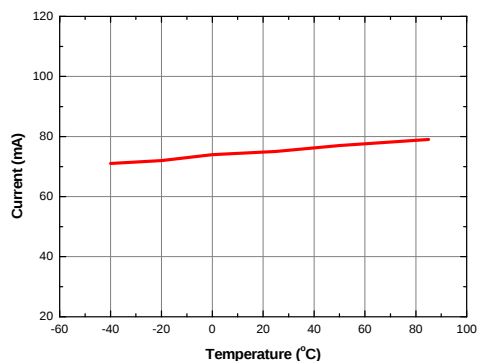
Board Layout (FR4, 40x40 mm², 0.8T)



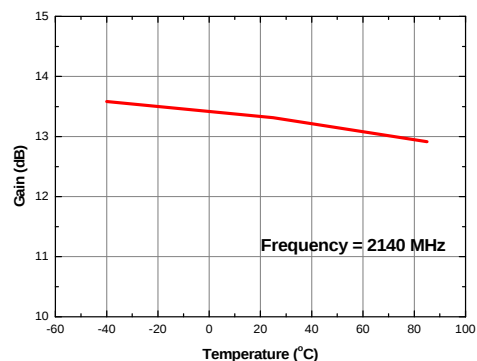
S-parameters & K-factor



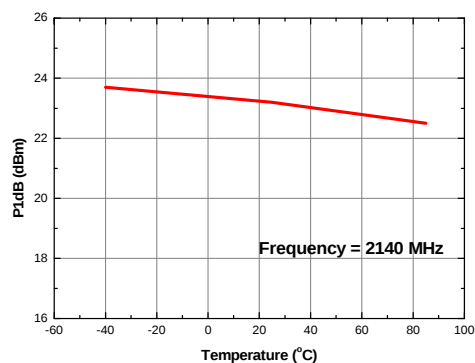
Current vs. Temperature



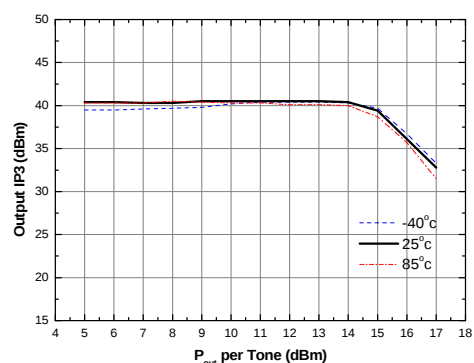
Gain vs. Temperature



P1dB vs. Temperature



Output IP3 vs. Tone Power (Frequency = 2140 MHz)



APPLICATION CIRCUIT

LTE

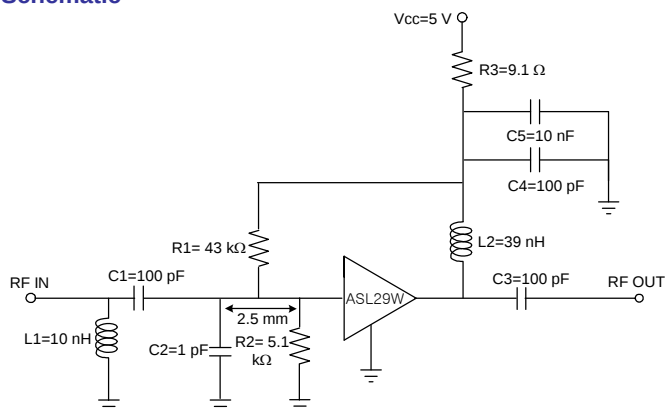
2300 ~ 2700 MHz

+5 V

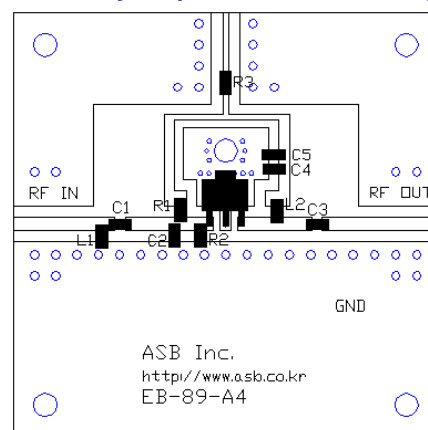
Frequency (MHz)	2300	2500	2700
Magnitude S21 (dB)	11.5	11.0	10.2
Magnitude S11 (dB)	-15	-18	-18
Magnitude S22 (dB)	-18	-14	-12
Output P1dB (dBm)	23	23	23
Output IP3 ¹⁾ (dBm)	40	40	40
Noise Figure (dB)	1.05	1.10	1.15
Device Voltage (V)	+4.3	+4.3	+4.3
Current (mA)	75	75	75

1) OIP3 is measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.

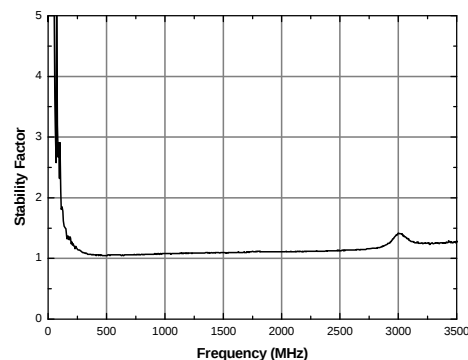
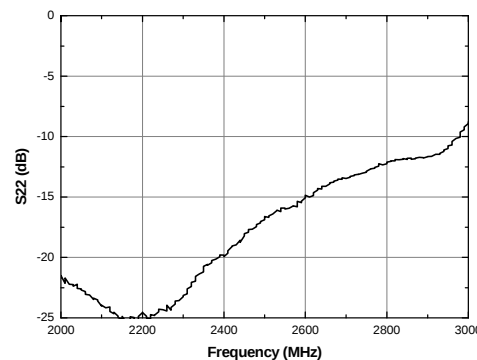
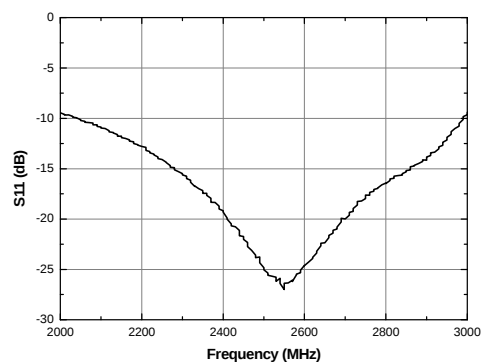
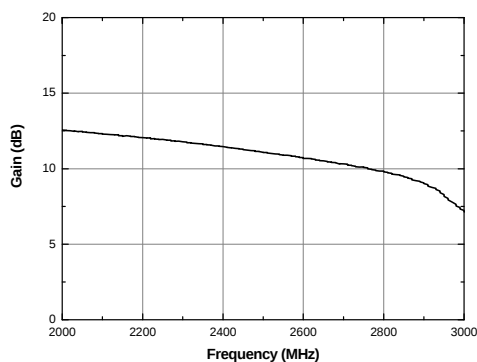
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



Recommended Soldering Reflow Profile

