ASX423

100 ~ 4500 MHz MMIC Amplifier

Features

- 32.5 dB Gain at 900 MHz
- 30 dBm P1dB at 900 MHz
- 45 dBm Output IP3 at 900 MHz
- MTTF > 100 Years
- Two Power Supplies

Description

The ASX423, a power amplifier MMIC, has a high linearity, high gain, and high efficiency over a wide range of frequency, being suitable for use in both receiver and transmitter of telecommunication systems up to 4.5 GHz. The amplifier is available in a SOIC8 package and passes through the stringent DC, RF, and reliability tests.

RoHS-compliant

Package Style: SOIC8

Typical Performance

(Supply Voltage = Device Voltage, T_A = +25 °C, Z_0 = 50 Ω)

Parameters	Units	Typical			
Frequency	MHz	900	2000	2300	2700
Gain	dB	32.5	22.5	20.5	17.0
S11	dB	-13	-11	-13	-14
S22	dB	-15	-18	-14	-13
Output IP3	dBm	45[1)]	47[2)]	45[3)]	45[3)]
Noise Figure	dB	2.4	2.6	2.9	3.2
Output P1dB	dBm	30.0	29.5	30.0	29.5
Current	mA	400	400	400	400
Device Voltage	V	+5	+5	+5	+5

1) OIP3 measured with two tones at an output power of +11 dBm/tone separated by 1 MHz.
2) OIP3 measured with two tones at an output power of +13 dBm/tone separated by 1 MHz.
3) OIP3 measured with two tones at an output power of +12 dBm/tone separated by 1 MHz.

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		900	
Gain	dB	32.0	32.5	
S11	dB		-13	
S22	dB		-15	
Output IP3	dBm	42	45	
Noise Figure	dB		2.4	2.6
Output P1dB	dBm	29	30	
Current	mA	360	400	460
Device Voltage	V		+5	

Absolute Maximum Ratings

Parameters	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-40 to +150 °C
Device Voltage	+6 V
Operating Junction Temperature	+150 °C
Input RF Power (CW, 50 Ω matched)[1)]	+23 dBm
Thermal Resistance	27 °C/W

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

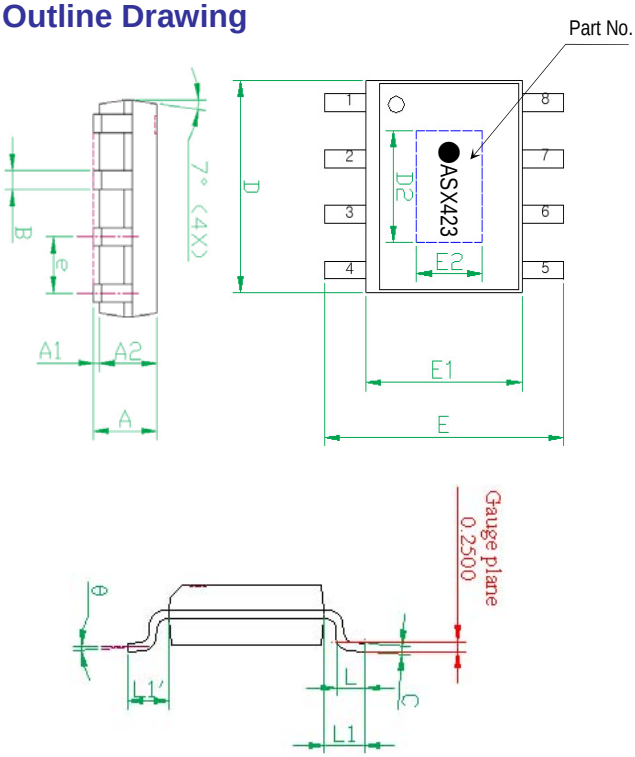
Application Circuit

- IF (150 MHz)
- IF (340 MHz)
- TETRA
- CDMA
- RFID (USA)
- PCS
- WCDMA
- WLAN & WiMAX (2300 ~ 2700 MHz)
- C-Band (4300 ~ 4500 MHz)

Pin Configuration

Pin No.	Function
1	2nd stage RF IN
2	1st stage RF OUT
3,5,8	GND
4	1st stage RF IN
6,7	2nd stage RF OUT

Outline Drawing

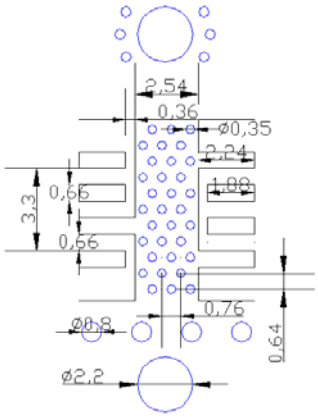


Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
A1	0.00	---	0.10
A2	---	1.45	---
B	0.33	---	0.51
C	0.19	---	0.25
D	4.80	---	5.00
D2	3.20	3.30	3.40
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
E2	2.30	2.40	2.50
e	---	1.27	---
L	0.40	---	1.27
y	---	---	0.10
θ	0°	---	8°
|L1-L1'|	---	---	0.12
L1	1.04REF		

Pin No.	Function	Pin No.	Function.
1	2nd stage RF IN	5	GND
2	1st stage RF OUT	6	2nd stage RF OUT
3	GND	7	2nd stage RF OUT
4	1st stage RF IN	8	GND

Note: 1. Backside metal paddle is RF and DC ground.

Mounting Recommendation (In mm)



Note: 1. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
2. To ensure reliable operation, device ground paddle-to-ground pad soldering is critical.
3. Add mounting screws near the part to fasten the board to a heat sinker. Ensure that the ground / thermal via region contacts the heat sinker.
4. A proper heat dissipation path underneath the area of the PCB for the mounted device is strictly required for proper thermal operation. Damage to the device can result from inappropriate heat dissipation.

ESD Classification

HBM	Class 1B
	Voltage Level: 500 V ~ 1000 V
MM	Class A
	Voltage Level: < 200 V

CAUTION: ESD-sensitive device!

Moisture Sensitivity Level (MSL)

Level 3 at 260 °C reflow

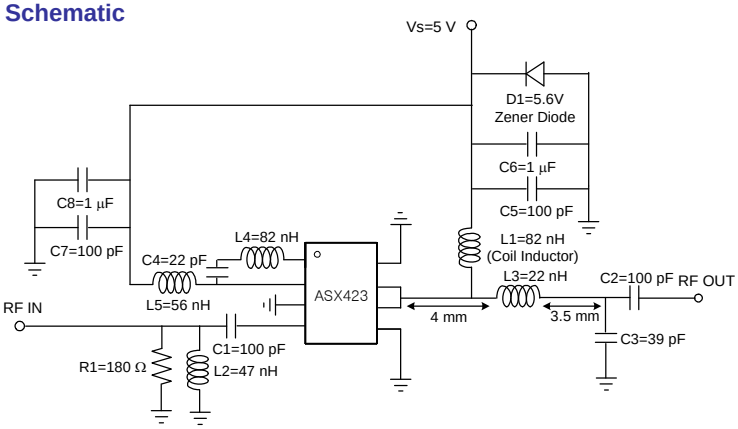
APPLICATION CIRCUIT

IF
150 MHz
+5 V

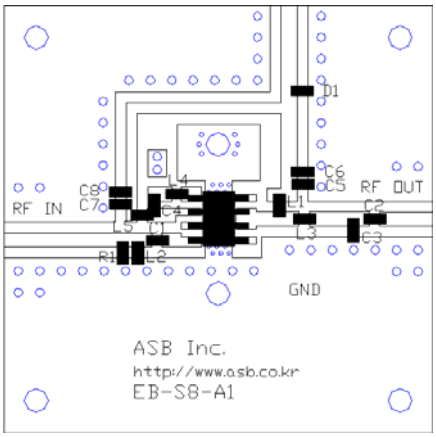
Frequency (MHz)	150
Magnitude S21 (dB)	33.5
Magnitude S11 (dB)	-17
Magnitude S22 (dB)	-13
Output P1dB (dBm)	29.5
Output IP3[1)] (dBm)	44.5
Noise Figure (dB)	4.5
Device Voltage (V)	+5
Current (mA)	400

1) OIP3 is measured with two tones at an output power of +9 dBm/tone separated by 1 MHz.

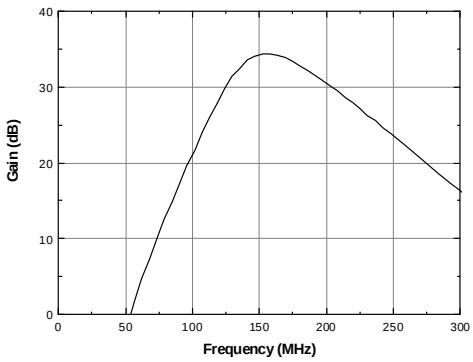
Schematic

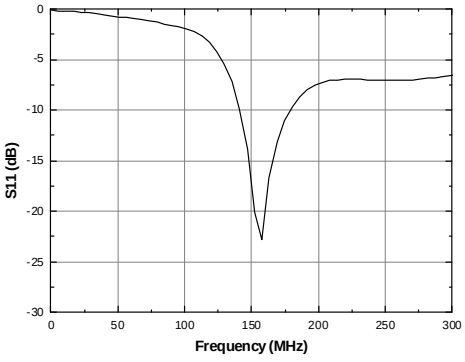


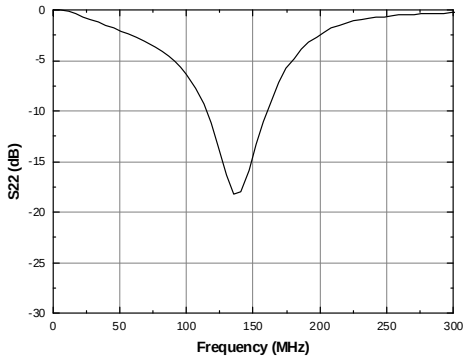
Board Layout (FR4, 40x40 mm², 0.8T)

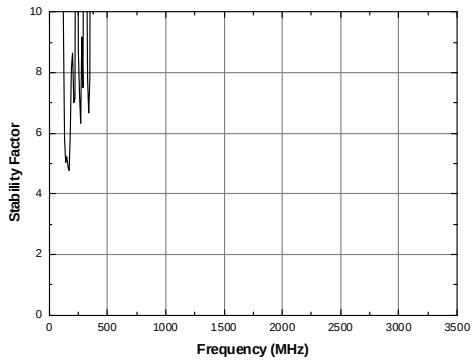


S-parameters & K-factor









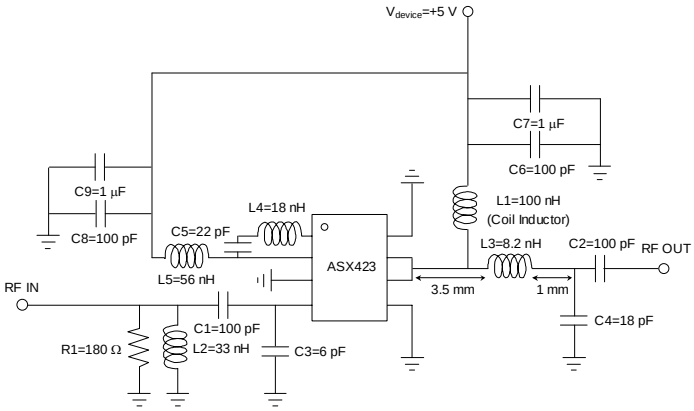
APPLICATION CIRCUIT

IF
340 MHz
+5 V

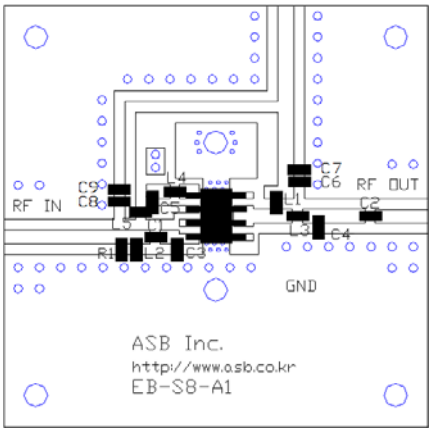
Frequency (MHz)	340
Magnitude S21 (dB)	35
Magnitude S11 (dB)	-9
Magnitude S22 (dB)	-8
Output P1dB (dBm)	30
Output IP3[1)] (dBm)	42
Noise Figure (dB)	2.9
Device Voltage (V)	+5
Current (mA)	400

1) OIP3 is measured with two tones at an output power of +8 dBm/tone separated by 1 MHz.

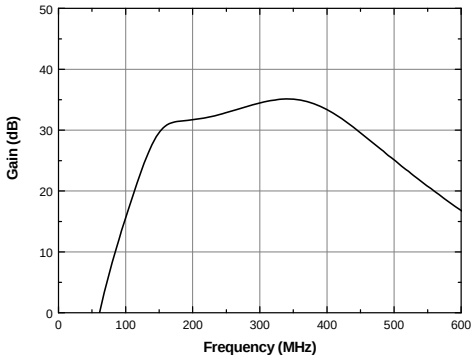
Schematic

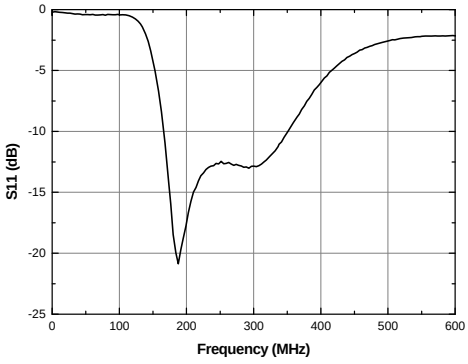


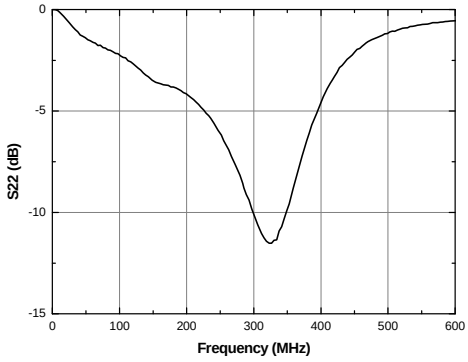
Board Layout (FR4, 40x40 mm², 0.8T)

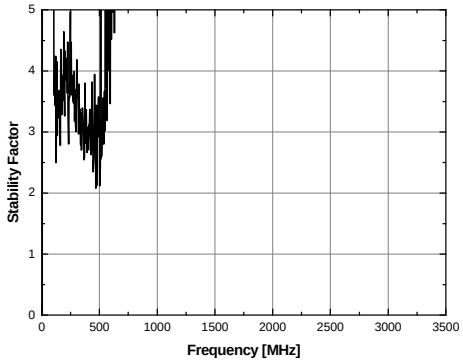


S-parameters & K-factor









APPLICATION CIRCUIT

TETRA

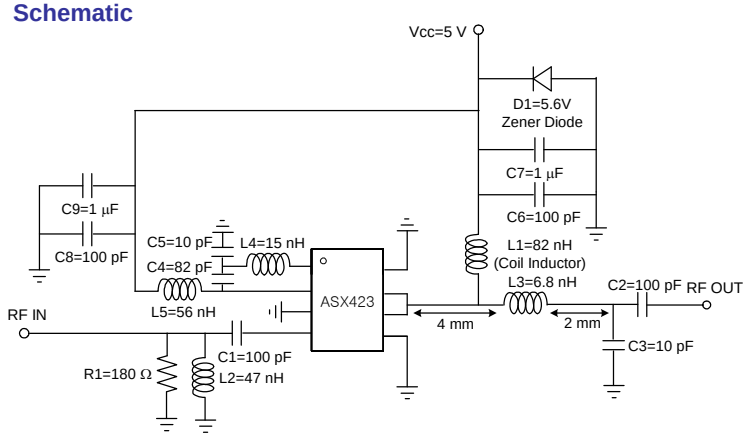
380 ~ 500 MHz

+5 V

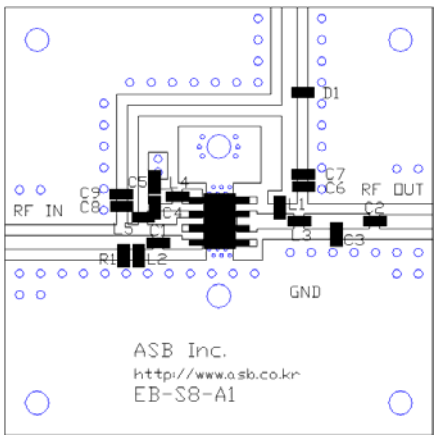
Frequency (MHz)	380	440	500
Magnitude S21 (dB)	34.0	36.5	34.0
Magnitude S11 (dB)	-10	-11	-11
Magnitude S22 (dB)	-5	-6	-6
Output P1dB (dBm)	29.0	29.5	29.0
Output IP3[1)] (dBm)	38.0	40.0	41.0
Noise Figure (dB)	3.7	3.4	3.4
Device Voltage (V)	+5	+5	+5
Current (mA)	400	400	400

1) OIP3 is measured with two tones at an output power of +7 dBm/tone separated by 1 MHz.

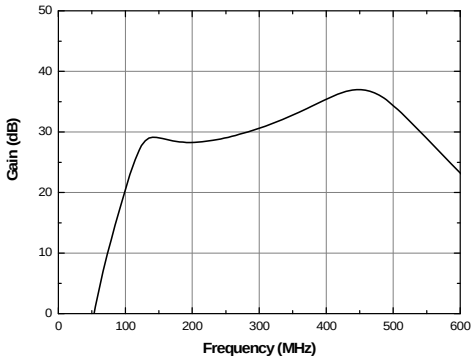
Schematic

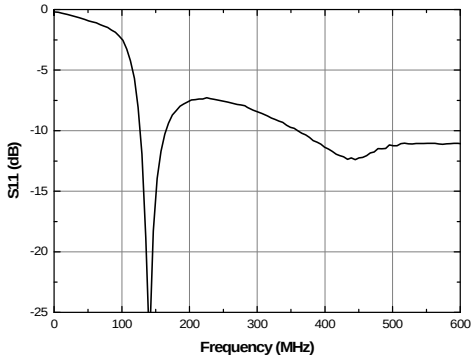


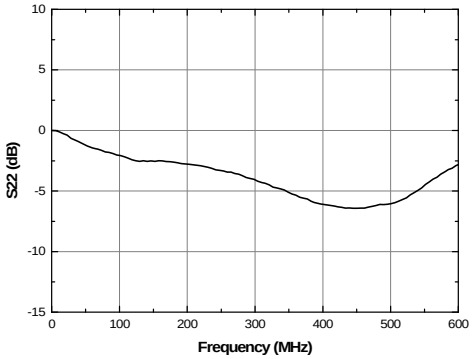
Board Layout (FR4, 40x40 mm², 0.8T)

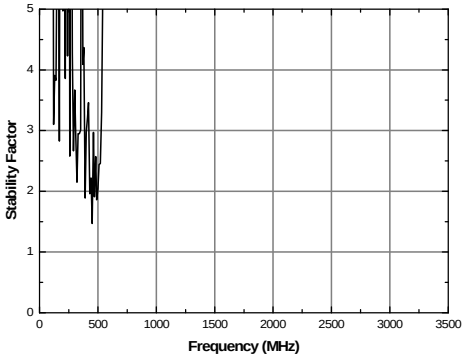


S-parameters & K-factor









APPLICATION CIRCUIT

CDMA

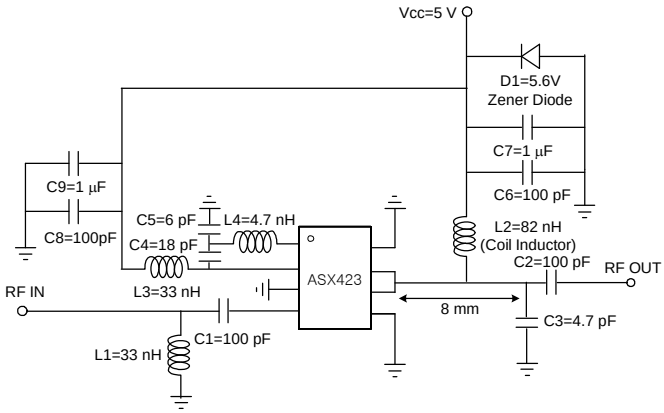
824 ~ 894 MHz

+5 V

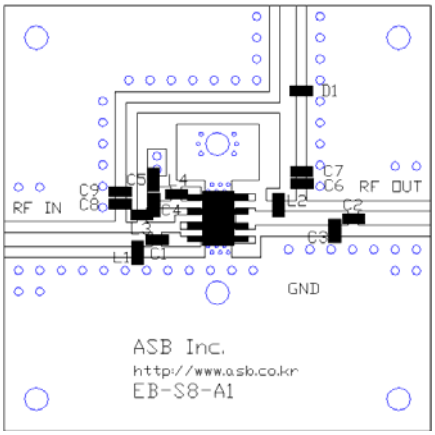
Frequency (MHz)	824 ~ 849	869 ~ 894
Magnitude S21 (dB)	34.0	32.5
Magnitude S11 (dB)	-14	-13
Magnitude S22 (dB)	-14	-15
Output P1dB (dBm)	30	30
Output IP3[1)] (dBm)	45	45
Noise Figure (dB)	2.4	2.4
Device Voltage (V)	+5	
Current (mA)	400	

1) OIP3 is measured with two tones at an output power of +11 dBm/tone separated by 1 MHz.

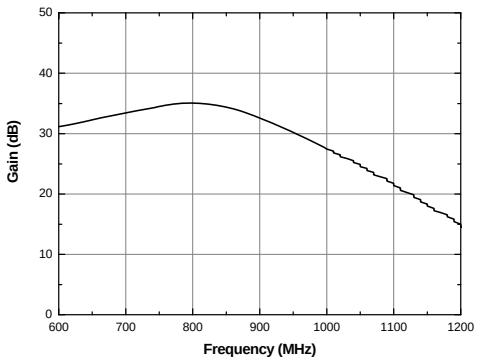
Schematic

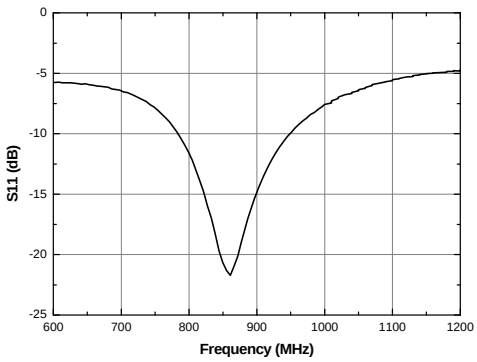


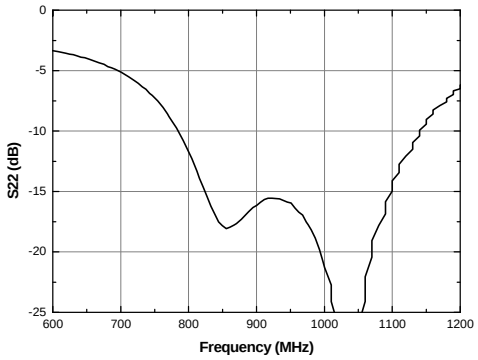
Board Layout (FR4, 40x40 mm², 0.8T)

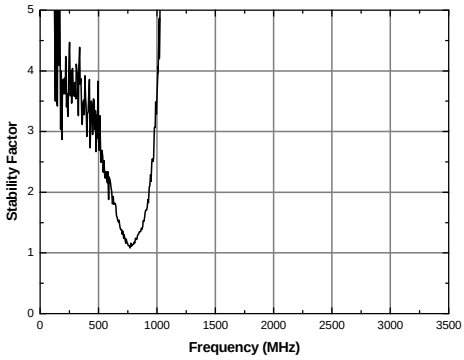


S-parameters & K-factor









APPLICATION CIRCUIT

RFID (USA)

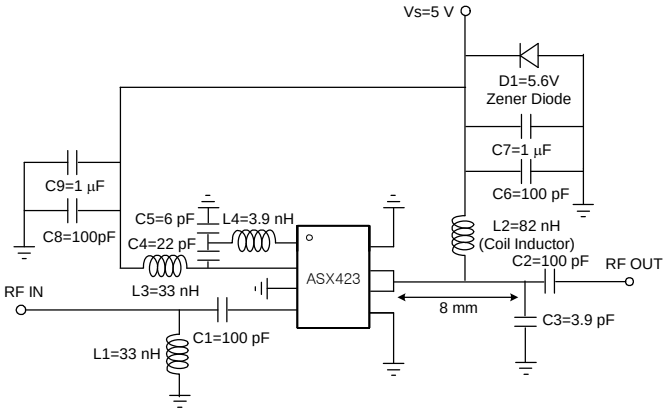
902 ~ 928 MHz

+5 V

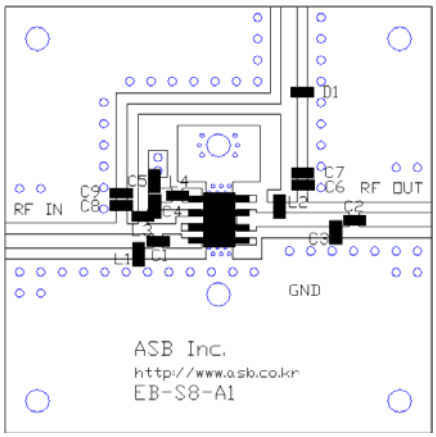
Frequency (MHz)	902 ~ 928
Magnitude S21 (dB)	32.0
Magnitude S11 (dB)	-16
Magnitude S22 (dB)	-20
Output P1dB (dBm)	29.5
Output IP3[1)] (dBm)	45
Noise Figure (dB)	2.3
Device Voltage (V)	+5
Current (mA)	400

1) OIP3 is measured with two tones at an output power of +11 dBm/tone separated by 1 MHz.

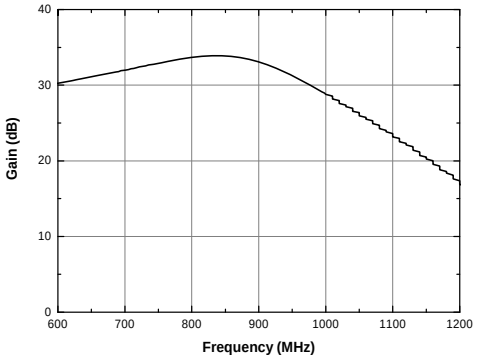
Schematic

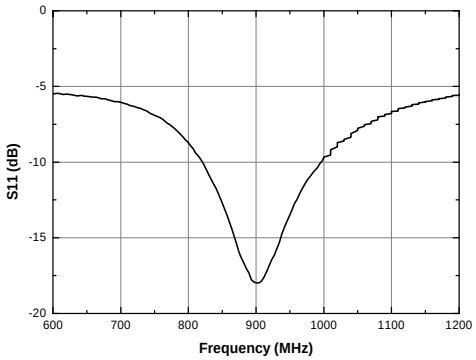


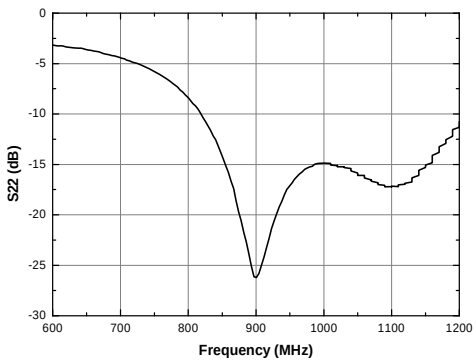
Board Layout (FR4, 40x40 mm², 0.8T)

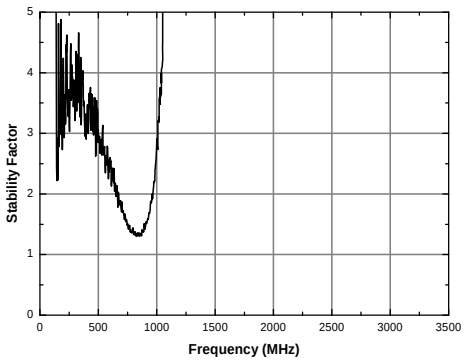


S-parameters & K-factor









APPLICATION CIRCUIT

PCS

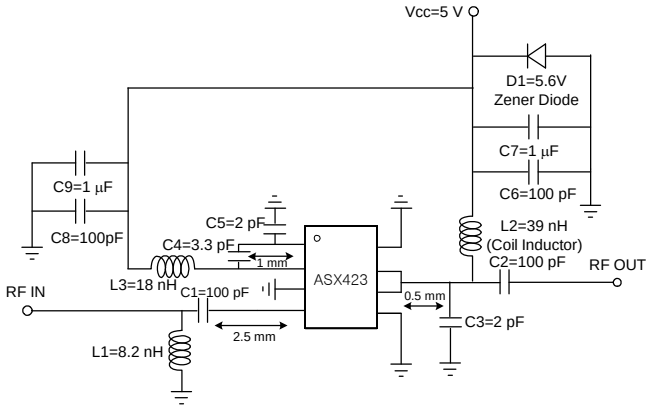
1710 ~ 1880 MHz

+5 V

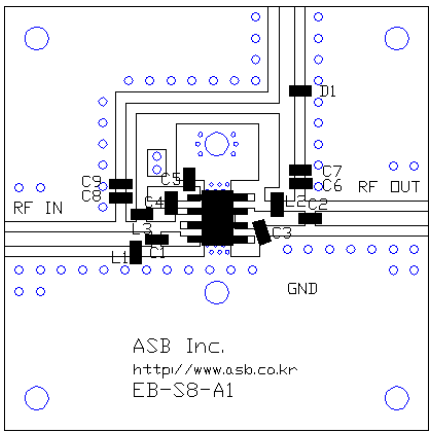
Frequency (MHz)	1710 ~ 1880
Magnitude S21 (dB)	23.5
Magnitude S11 (dB)	-15
Magnitude S22 (dB)	-15
Output P1dB (dBm)	29
Output IP3[1)] (dBm)	46
Noise Figure (dB)	2.9
Device Voltage (V)	+5
Current (mA)	400

1) OIP3 is measured with two tones at an output power of +11 dBm/tone separated by 1 MHz.

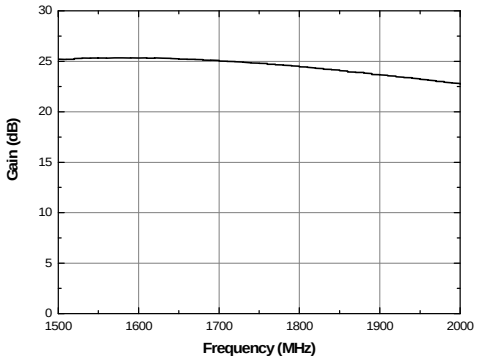
Schematic

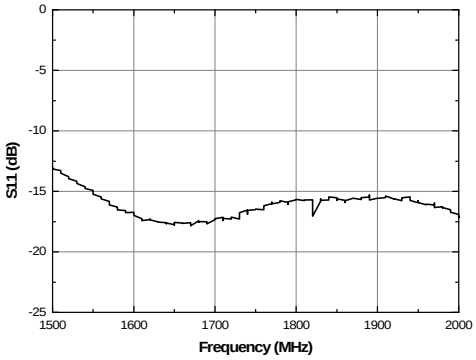


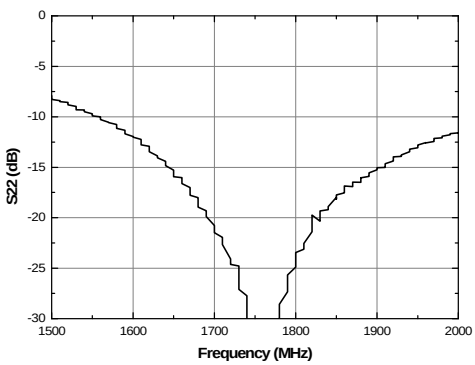
Board Layout (FR4, 40x40 mm², 0.8T)

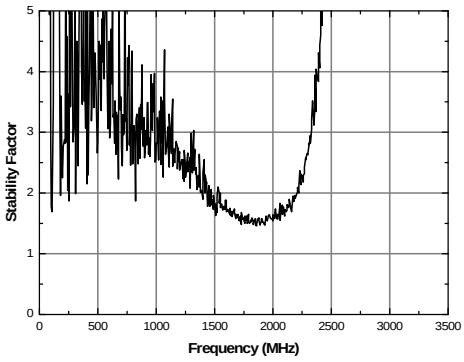


S-parameters & K-factor









APPLICATION CIRCUIT

WCDMA Rx

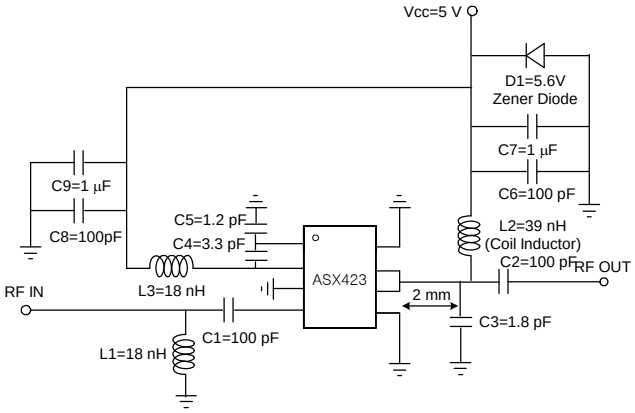
1920 ~ 1980 MHz

+5 V

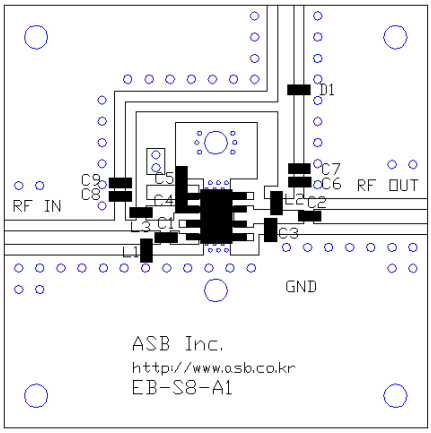
Frequency (MHz)	1920 ~ 1980
Magnitude S21 (dB)	22.5
Magnitude S11 (dB)	-11
Magnitude S22 (dB)	-18
Output P1dB (dBm)	29.5
Output IP3[1)] (dBm)	47
Noise Figure (dB)	2.6
Device Voltage (V)	+5
Current (mA)	400

1) OIP3 is measured with two tones at an output power of +13 dBm/tone separated by 1 MHz.

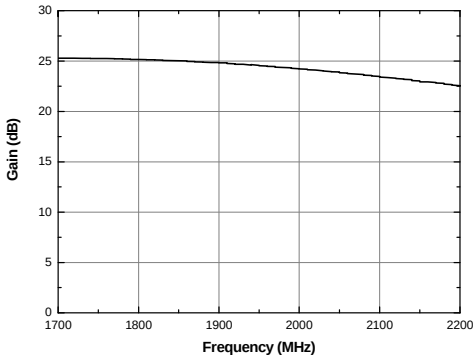
Schematic

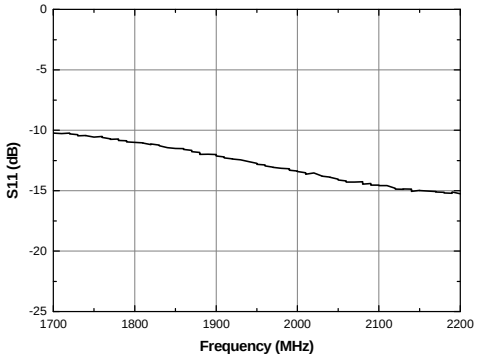


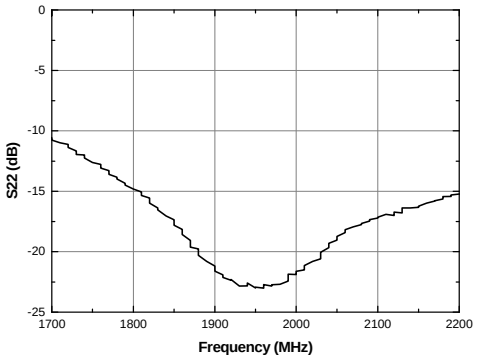
Board Layout (FR4, 40x40 mm², 0.8T)

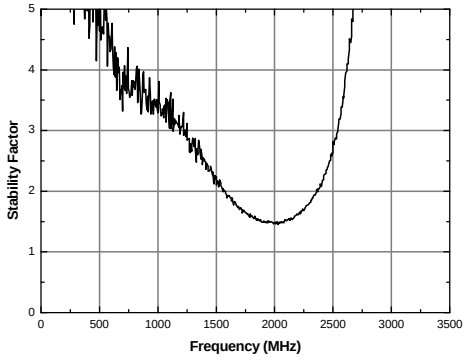


S-parameters & K-factor

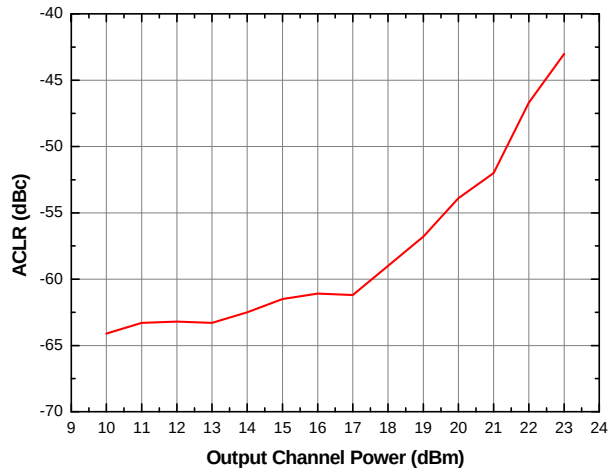








WCDMA ACLR – 1FA



* Test Source : WCDMA 1FA(3GPP 3.4 12-00), Test Model1 w/64 DPCH, PAR=13 dB @ 0.01% probability on CCDF / 1950 MHz / 5 MHz offset

APPLICATION CIRCUIT

WCDMA Tx

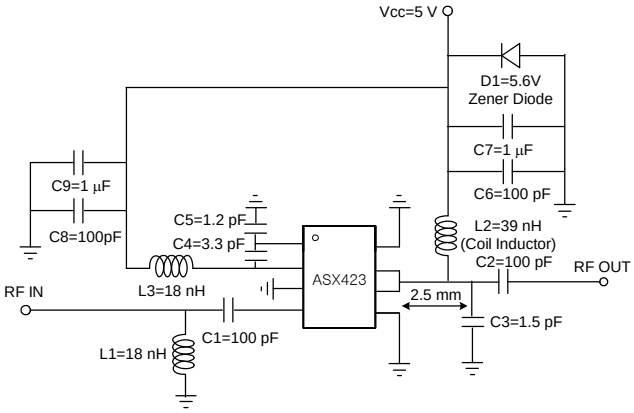
2110 ~ 2170 MHz

+5 V

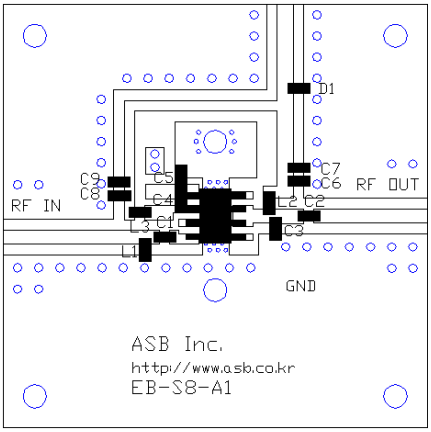
Frequency (MHz)	2110 ~ 2170
Magnitude S21 (dB)	23.0
Magnitude S11 (dB)	-10
Magnitude S22 (dB)	-15
Output P1dB (dBm)	29
Output IP3[1)] (dBm)	46
Noise Figure (dB)	2.7
Device Voltage (V)	+5
Current (mA)	400

1) OIP3 is measured with two tones at an output power of +12 dBm/tone separated by 1 MHz.

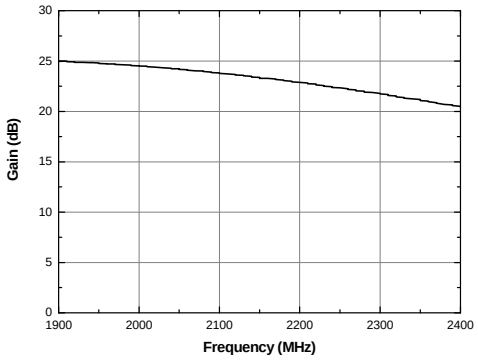
Schematic

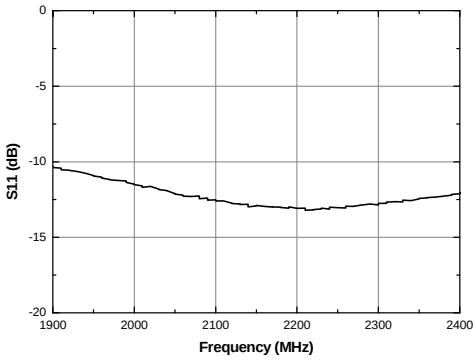


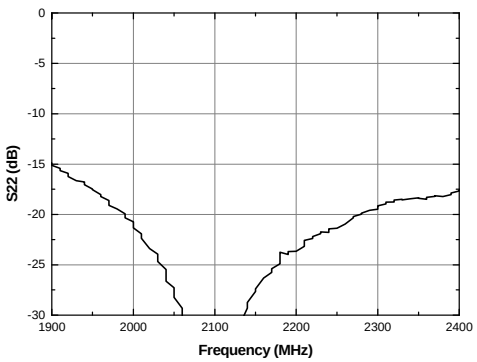
Board Layout (FR4, 40x40 mm², 0.8T)

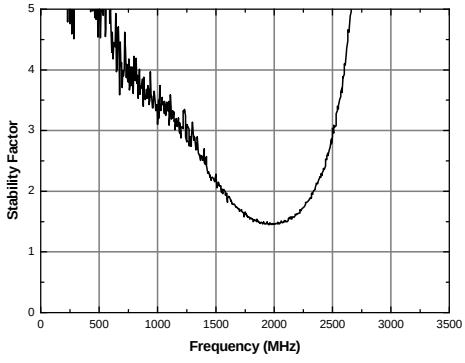


S-parameters & K-factor









APPLICATION CIRCUIT

WLAN & WiMAX

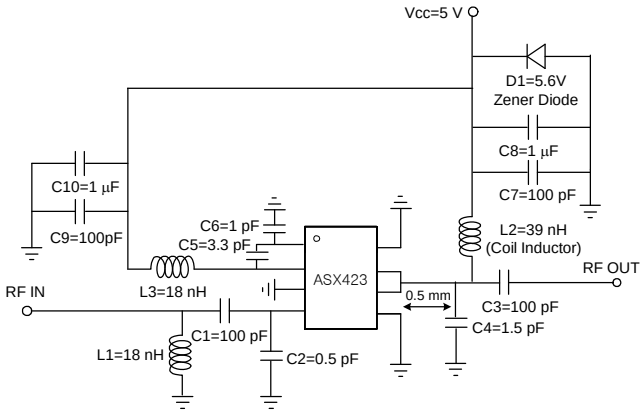
2300 ~ 2700 MHz

+5 V

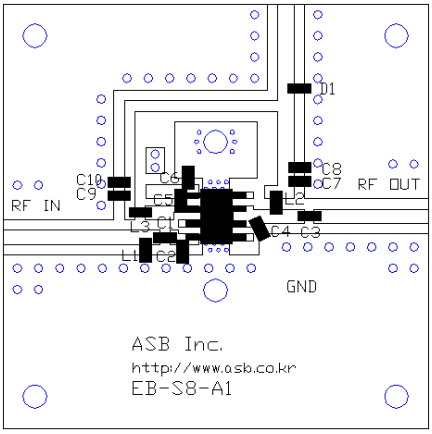
Frequency (MHz)	2300	2500	2700
Magnitude S21 (dB)	20.5	19.0	17.0
Magnitude S11 (dB)	-13	-20	-14
Magnitude S22 (dB)	-14	-11	-13
Output P1dB (dBm)	30.0	30.0	29.5
Output IP3[1)] (dBm)	45	45	45
Noise Figure (dB)	2.8	2.9	3.2
Device Voltage (V)	+5	+5	+5
Current (mA)	400	400	400

1) OIP3 is measured with two tones at an output power of +12 dBm/tone separated by 1 MHz.

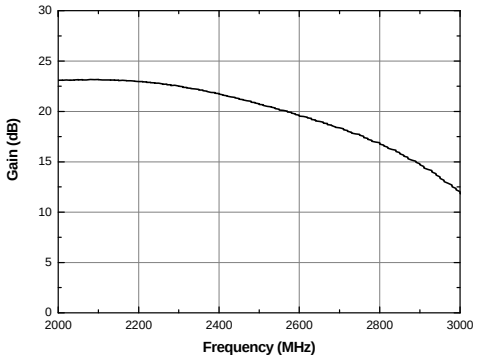
Schematic

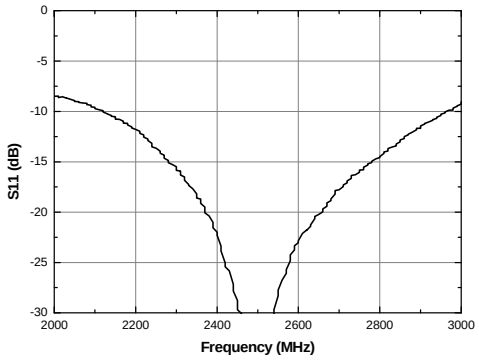


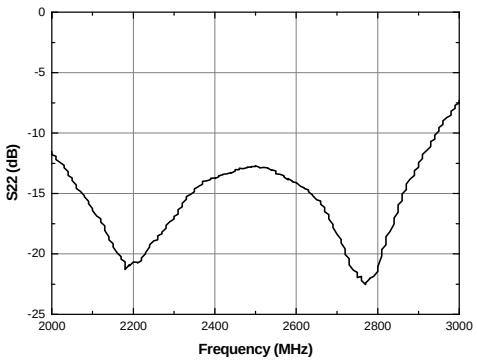
Board Layout (FR4, 40x40 mm², 0.8T)

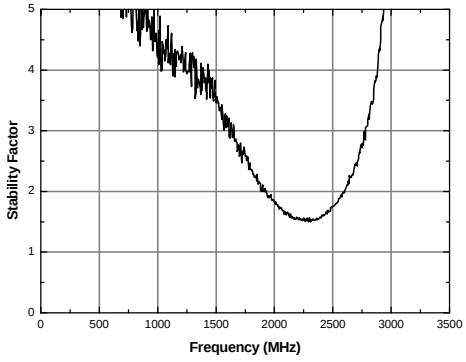


S-parameters & K-factor









APPLICATION CIRCUIT

C-Band

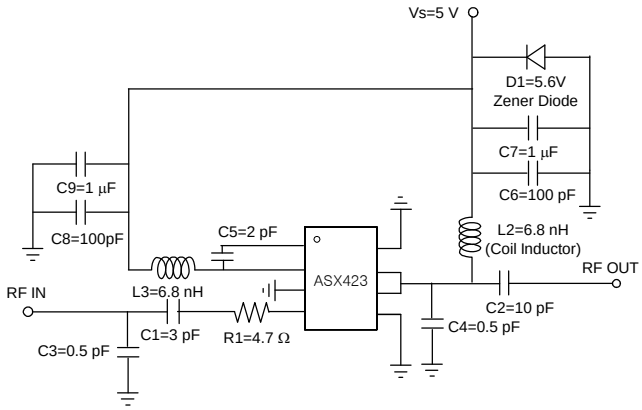
4300 ~ 4500 MHz

+5 V

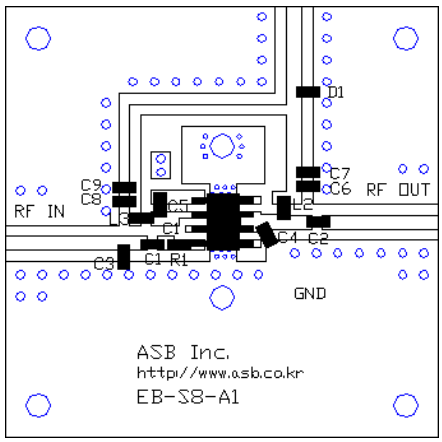
Frequency (MHz)	4300	4500
Magnitude S21 (dB)	10.0	10.5
Magnitude S11 (dB)	-9	-11
Magnitude S22 (dB)	-8	-7
Output P1dB (dBm)	27	23
Output IP3[1)] (dBm)	41	39
Noise Figure (dB)	6.2	6.2
Device Voltage (V)	+5	+5
Current (mA)	400	400

1) OIP3 is measured with two tones at an output power of +12 dBm/tone separated by 1 MHz.

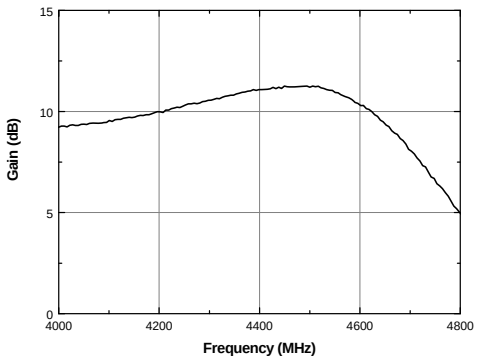
Schematic

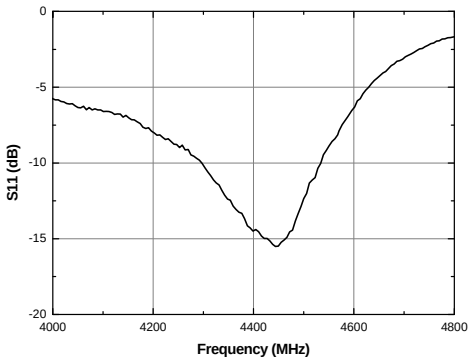


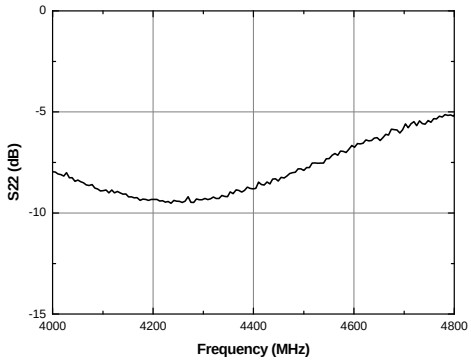
Board Layout (FR4, 40x40 mm², 0.8T)

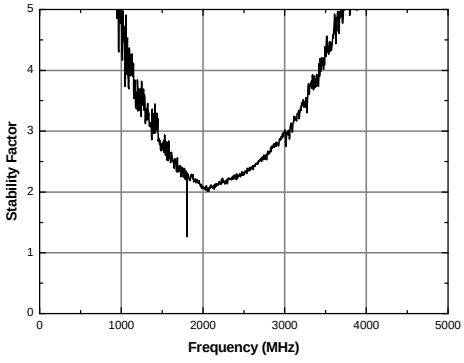


S-parameters & K-factor









Recommended Soldering Reflow Profile