

Features

- 31.5 dB Gain at 900 MHz
- 29.5 dBm P1dB at 900 MHz
- 47 dBm Output IP3 at 900 MHz
- 6.8 dB NF at 900 MHz
- MTTF > 100 Years
- Two Power Supplies

Description

The ASX420, 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 3.5 GHz. The amplifier is available in a SOIC8 package and passes through the stringent DC, RF, and reliability tests.



Package Style: SOIC8

Typical Performance

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

Parameters	Units	Typical		
Frequency	MHz	900	2000	2600
Gain	dB	31.5	21.5	16.5
S11	dB	-15	-15	-18
S22	dB	-7	-15	-15
Output IP3	dBm	47 ¹⁾	46 ²⁾	46 ²⁾
Noise Figure	dB	6.8	7.0	7.1
Output P1dB	dBm	29.5	29.5	30.0
Current	mA	370	370	370
Device Voltage	V	+5	+5	+5

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

2) OIP3 measured with two tones at an output power of +15 dBm/tone separated by 1 MHz.

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		900	
Gain	dB	30.5	31.5	
S11	dB		-15	
S22	dB		-7	
Output IP3	dBm	44	47	
Noise Figure	dB		6.8	7.0
Output P1dB	dBm	28.5	29.5	
Current	mA	340	370	400
Device Voltage	V		+5	

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, 50 Ω matched) ¹⁾	+25 dBm
Thermal Resistance	27 $^{\circ}\text{C/W}$

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

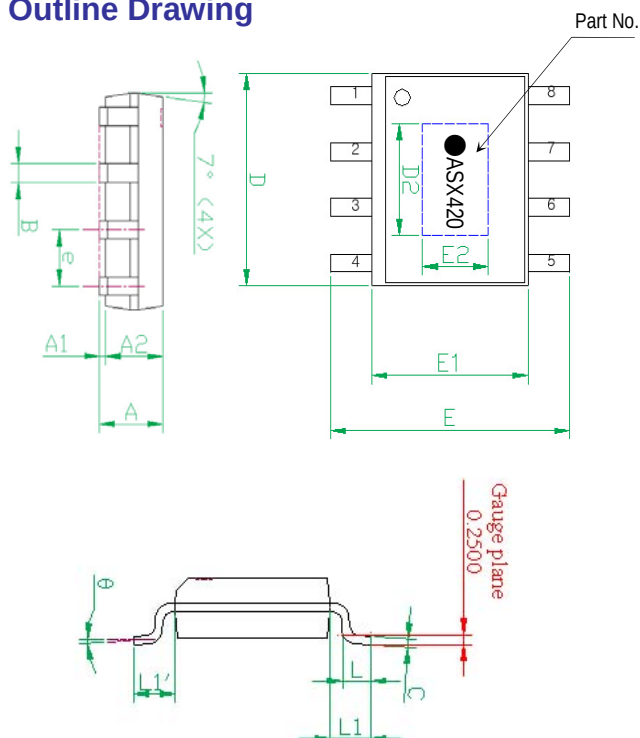
Application Circuit

- LTE
- CDMA
- GSM
- RFID (USA)
- PCS
- WCDMA
- WiBro
- WLAN
- WiMAX
- WiMAX (3100 ~ 3500 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

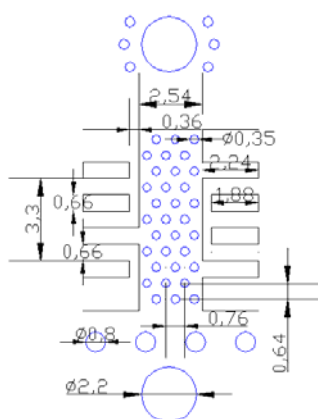


Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	1.40	1.50	1.60
A1	0.00	---	0.10
A2	---	1.45	---
B	0.33	---	0.51
C	0.19	---	0.25
D	4.80	---	5.00
D2	3.20	3.30	3.40
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
E2	2.30	2.40	2.50
e	---	1.27	---
L	0.40	---	1.27
y	---	---	0.10
θ	0°	---	8°
L1-L1'	---	---	0.12
L1	1.04REF		

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 sink. Ensure that the ground / thermal via region contacts the heat sink.
 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

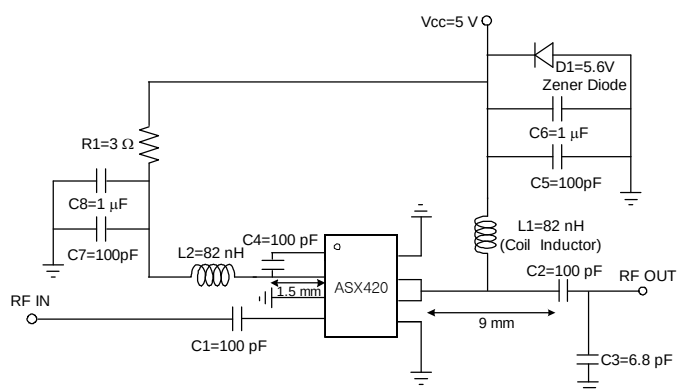
APPLICATION CIRCUIT

LTE
698 ~ 787 MHz
+5 V

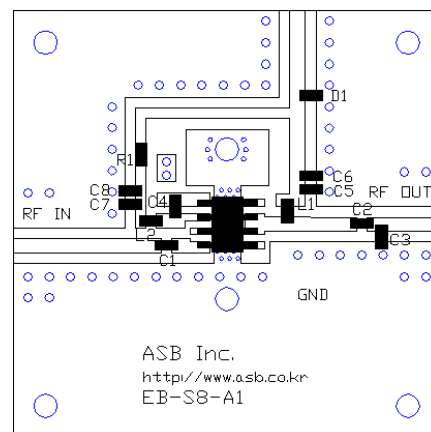
Frequency (MHz)	698 ~ 787
Magnitude S21 (dB)	34.0
Magnitude S11 (dB)	-14
Magnitude S22 (dB)	-7
Output P1dB (dBm)	30
Output IP3 ¹⁾ (dBm)	47
Noise Figure (dB)	6.5
Device Voltage (V)	+5
Current (mA)	370

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

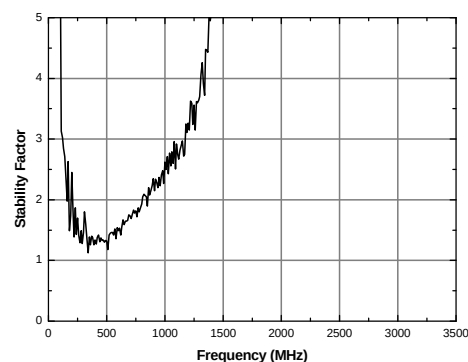
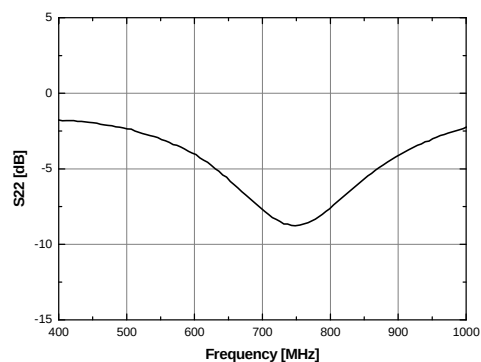
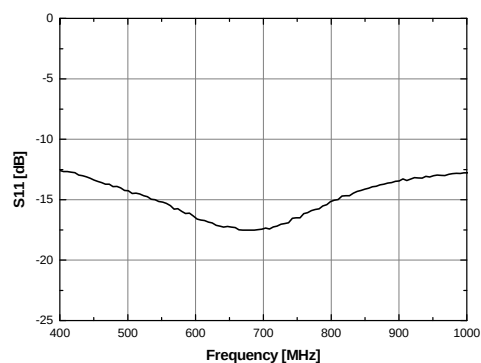
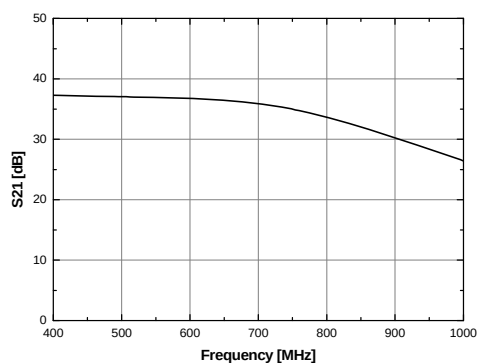
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

CDMA, GSM Rx

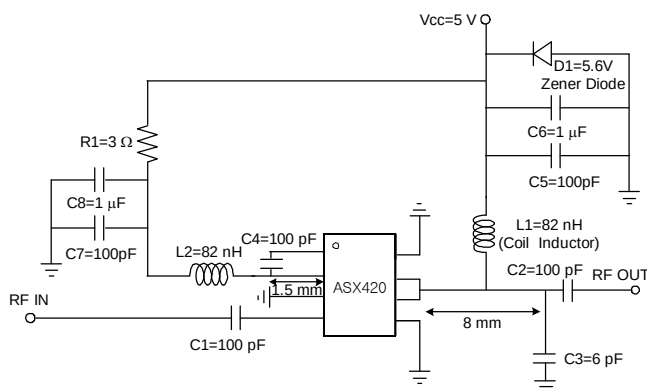
824 ~ 915 MHz

+5 V

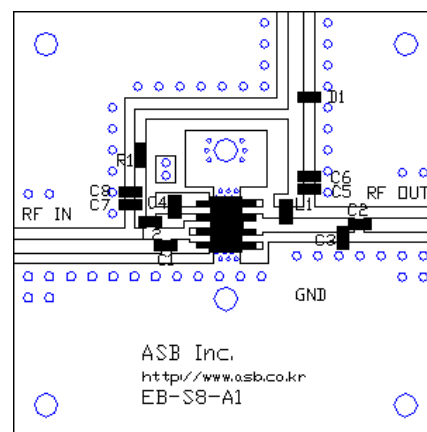
Frequency (MHz)	824 ~ 849	869 ~ 894	890 ~ 915
Magnitude S21 (dB)	33.0	32.0	31.5
Magnitude S11 (dB)	-15	-15	-15
Magnitude S22 (dB)	-9	-8	-7
Output P1dB (dBm)	29.5	29.5	29.5
Output IP3 ¹⁾ (dBm)	46.5	47.0	47.0
Noise Figure (dB)	7.0	7.5	6.8
Device Voltage (V)	+5	+5	+5
Current (mA)	370	370	370

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

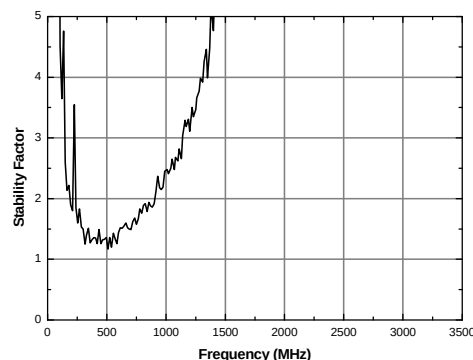
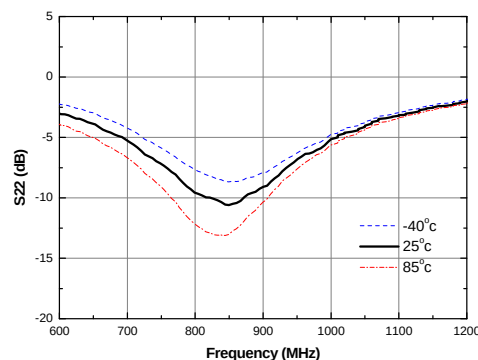
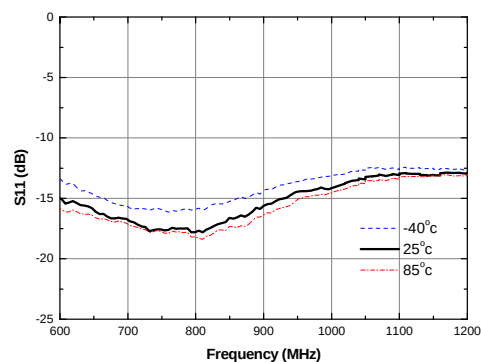
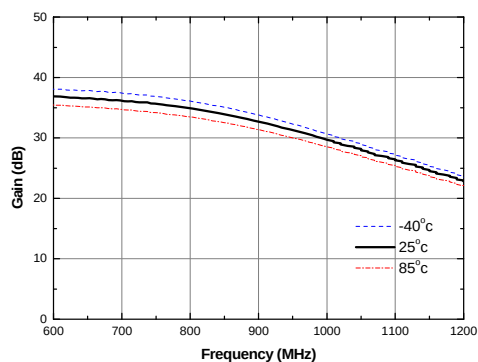
Schematic



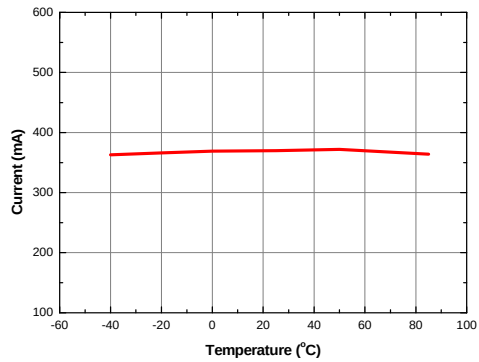
Board Layout (FR4, 40x40 mm², 0.8T)



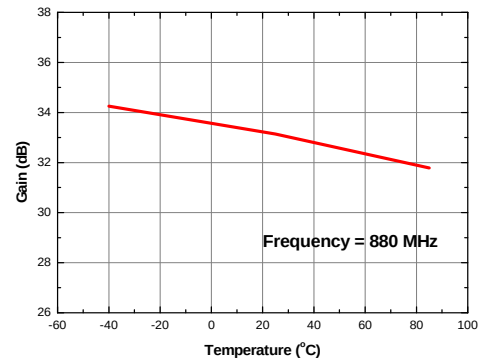
S-parameters & K-factor



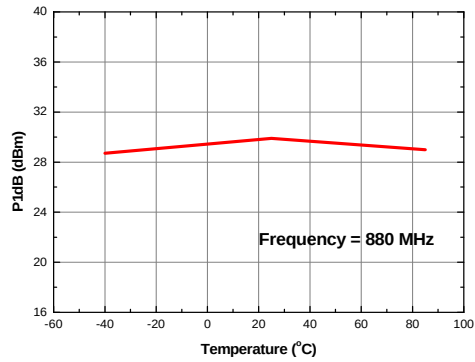
Current vs. Temperature



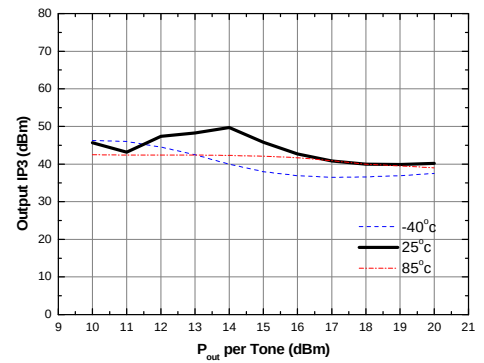
Gain vs. Temperature



P1dB vs. Temperature



Output IP3 vs. Tone Power (Frequency = 880 MHz)



APPLICATION CIRCUIT

GSM Tx

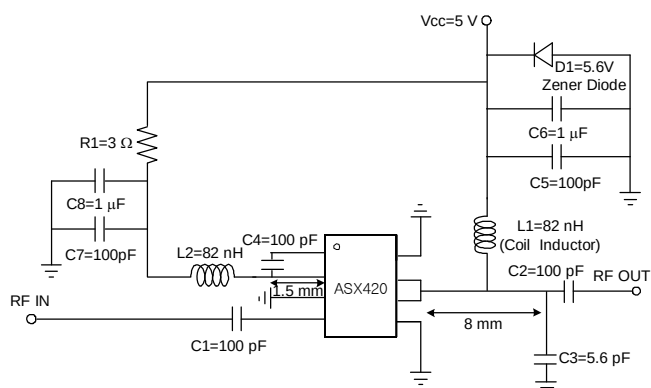
935 ~ 960 MHz

+5 V

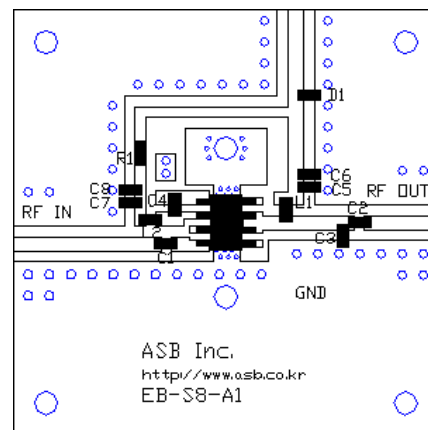
Frequency (MHz)	935 ~ 960
Magnitude S21 (dB)	31.0
Magnitude S11 (dB)	-15
Magnitude S22 (dB)	-8
Output P1dB (dBm)	29.5
Output IP3 ¹⁾ (dBm)	47
Noise Figure (dB)	7.0
Device Voltage (V)	+5
Current (mA)	370

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

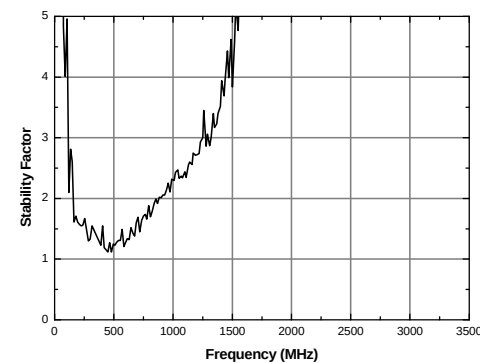
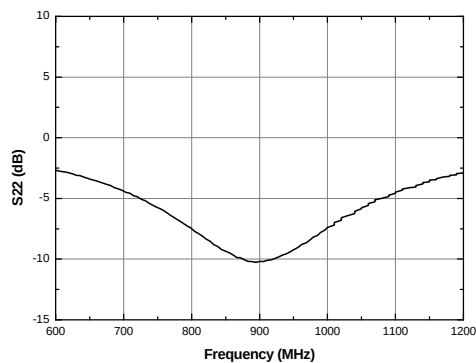
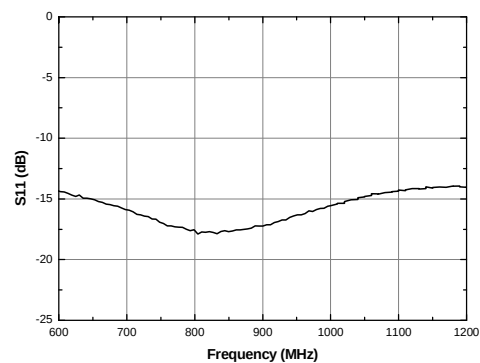
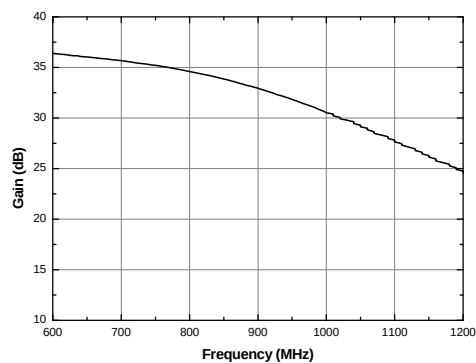
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

RFID (USA)

902 ~ 928 MHz

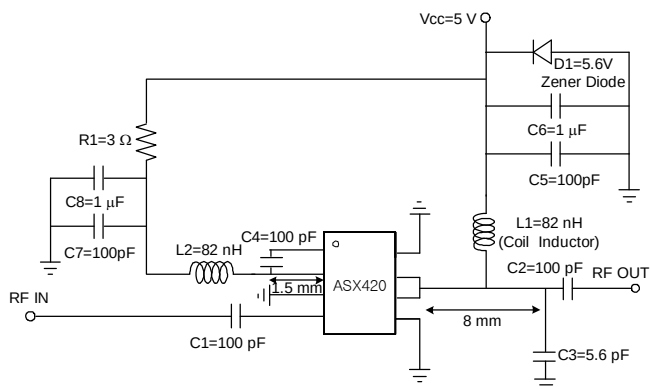
+5 V

Country	EU ²⁾	USA	Korea ²⁾	Japan ²⁾
Frequency (MHz)	865.6 ~ 867.6	902 ~ 928	910 ~ 914	950 ~ 956
Magnitude S21 (dB)	32.0	32.0	31.5	31.0
Magnitude S11 (dB)	-15	-15	-15	-15
Magnitude S22 (dB)	-8	-9	-7	-8
Output P1dB (dBm)	29.5	29.5	29.5	29.5
Output IP3 ¹⁾ (dBm)	47	47	47	47
Noise Figure (dB)	7.5	7.0	7.0	7.0
Device Voltage (V)	+5	+5	+5	+5
Current (mA)	370	370	370	370

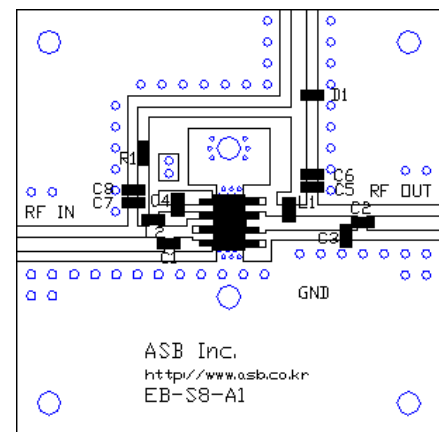
1) OIP3 is measured with two tones at an output power of +12 dBm/one separated by 1 MHz.

2) Test Results are measured by CDMA Tx (EU), GSM Rx (Korea), GSM Tx (Japan) Application circuits.

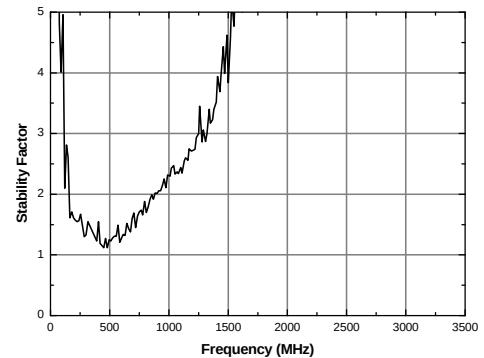
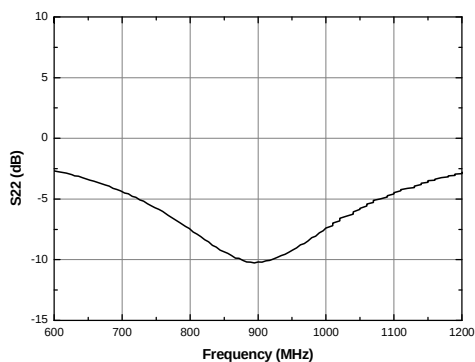
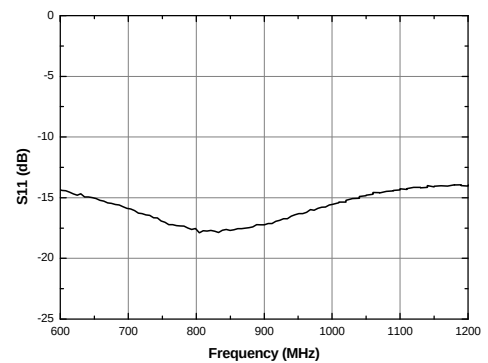
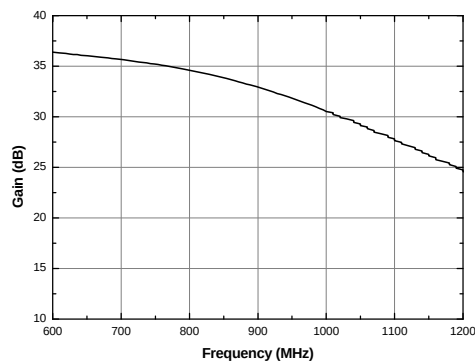
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

PCS

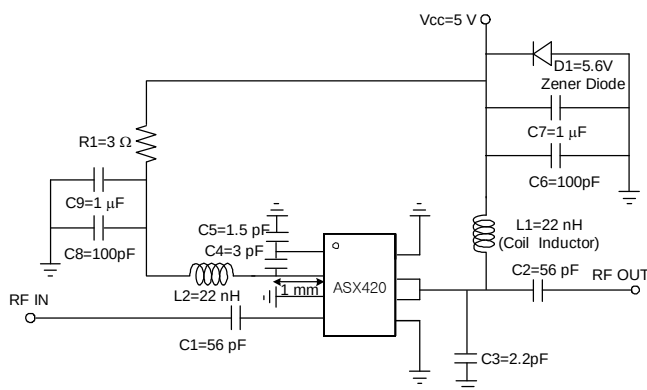
1750 ~ 1870 MHz

+5 V

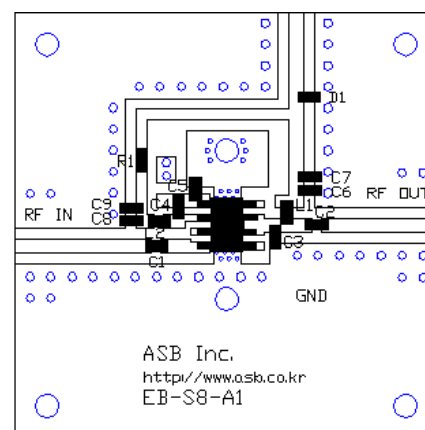
Frequency (MHz)	1750 ~ 1780	1840 ~ 1870
Magnitude S21 (dB)	22.5	22.0
Magnitude S11 (dB)	-15	-15
Magnitude S22 (dB)	-15	-18
Output P1dB (dBm)	29	29
Output IP3 (dBm) ¹⁾	46	46
Noise Figure (dB)	7.1	7.2
Device Voltage (V)	+5	+5
Current (mA)	370	370

1) OIP3 is measured with two tones at an output power of +12 dBm/tone (1750 ~ 1780) and +15dBm/tone (1840 ~ 1870) separated by 1 MHz.

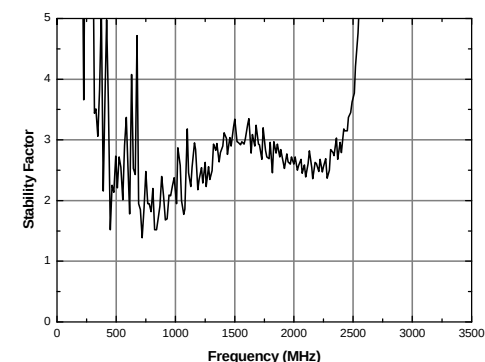
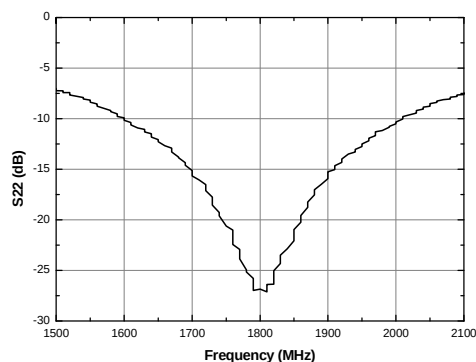
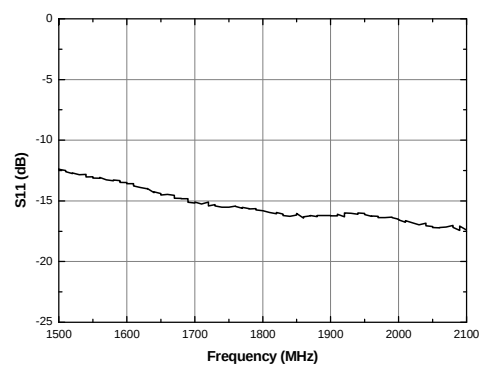
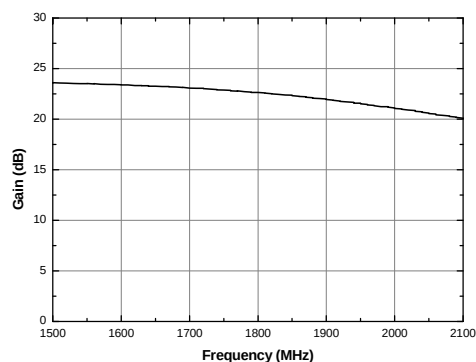
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

WCDMA

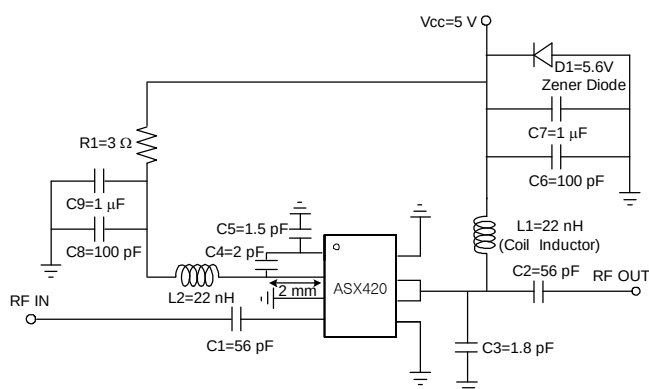
1920 ~ 2170 MHz

+5 V

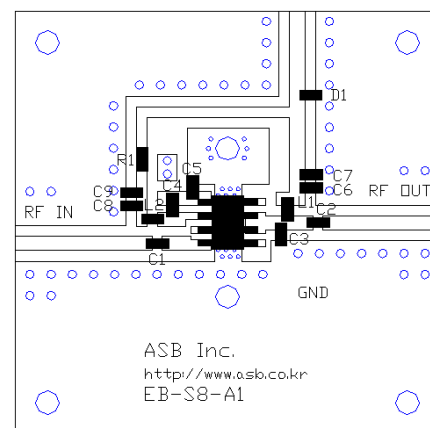
Frequency (MHz)	1920 ~ 1980	2110 ~ 2170
Magnitude S21 (dB)	21.5	20.5
Magnitude S11 (dB)	-15	-14
Magnitude S22 (dB)	-15	-14
Output P1dB (dBm)	29.5	30.0
Output IP3 (dBm) ¹⁾	46	46
Noise Figure (dB)	7.0	7.0
Device Voltage (V)	+5	+5
Current (mA)	370	370

1) OIP3 is measured with two tones at an output power of +15 dBm/tone separated by 1 MHz.

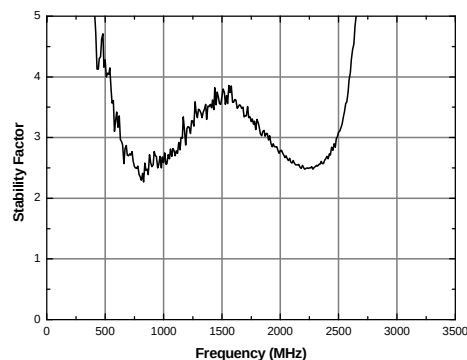
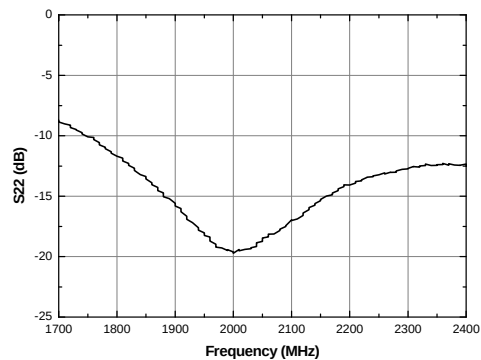
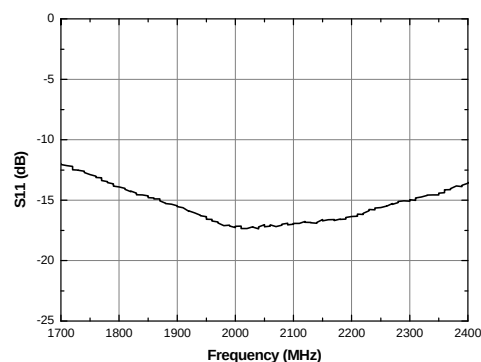
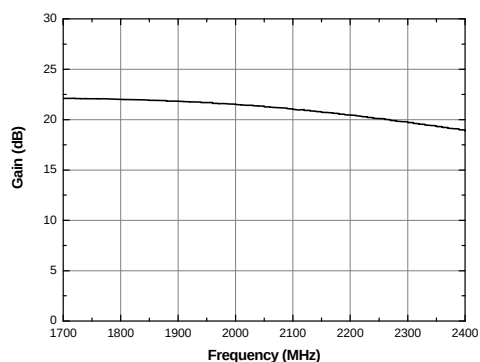
Schematic



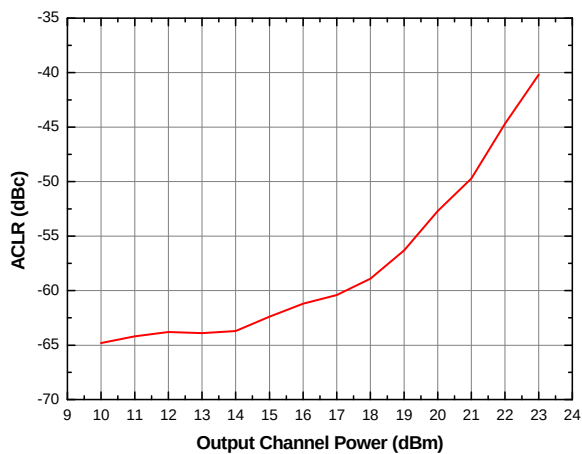
Board Layout (FR4, 40x40 mm², 0.8T)



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

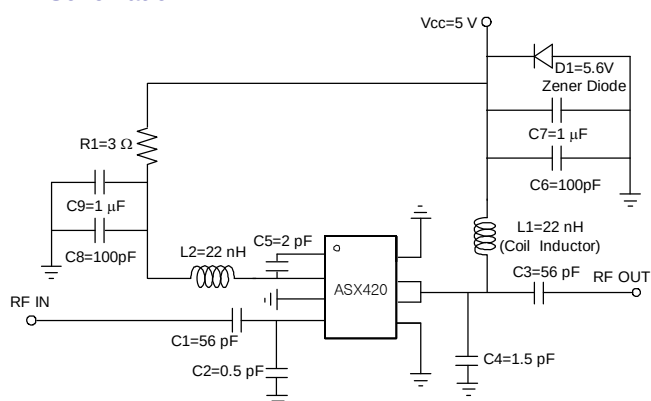
APPLICATION CIRCUIT

WiBro, WLAN
2300 ~ 2500 MHz
+5 V

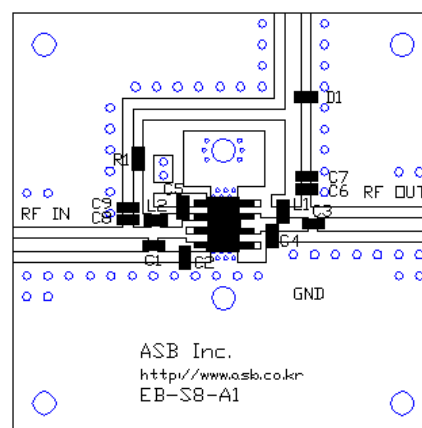
Frequency (MHz)	2300	2400	2500
Magnitude S21 (dB)	18.0	17.5	17.0
Magnitude S11 (dB)	-18	-18	-18
Magnitude S22 (dB)	-15	-15	-15
Output P1dB (dBm)	28.5	29.0	29.0
Output IP3 ¹⁾ (dBm)	45	46	47
Noise Figure (dB)	7.3	7.3	7.3
Device Voltage (V)	+5	+5	+5
Current (mA)	370	370	370

1) OIP3 is measured with two tones at an output power of +15 dBm/tone separated by 1 MHz.

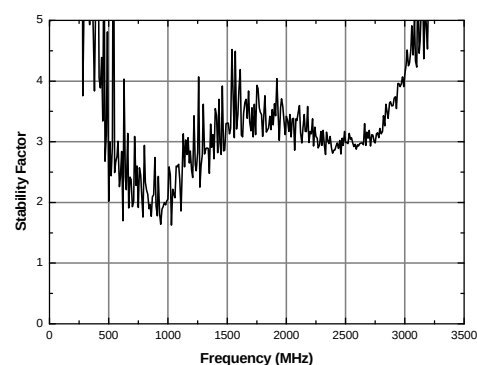
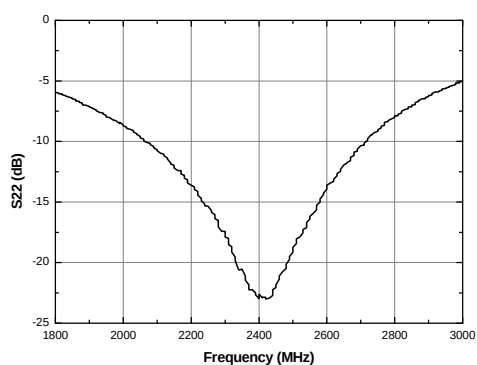
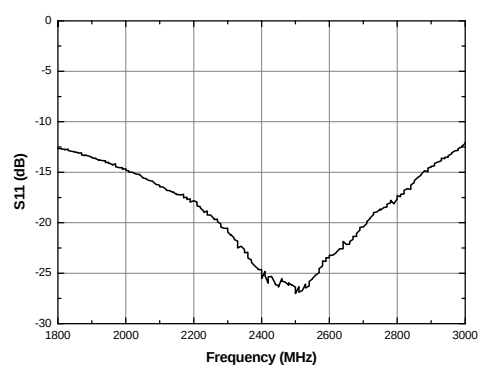
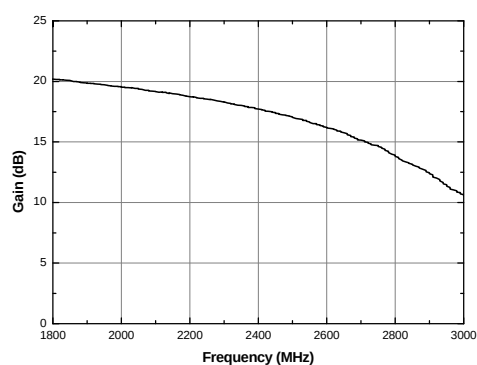
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

WiMAX

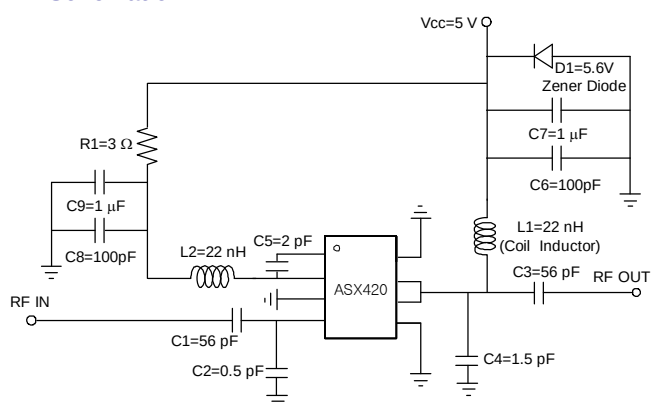
2500 ~ 2700 MHz

+5 V

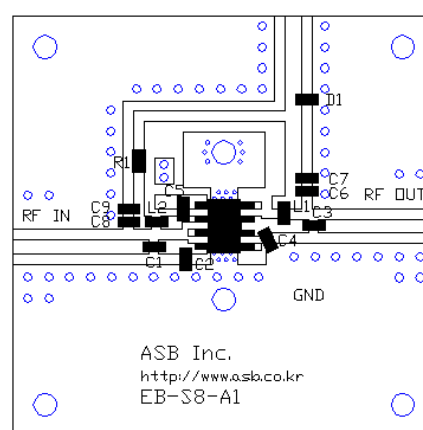
Frequency (MHz)	2500	2600	2700
Magnitude S21 (dB)	17.0	16.5	16.0
Magnitude S11 (dB)	-18	-18	-15
Magnitude S22 (dB)	-18	-15	-13
Output P1dB (dBm)	30		
Output IP3 ¹⁾ (dBm)	46		
Noise Figure (dB)	7.1		
Device Voltage (V)	+5		
Current (mA)	370		

1) OIP3 is measured with two tones at an output power of +15 dBm/tone separated by 1 MHz.

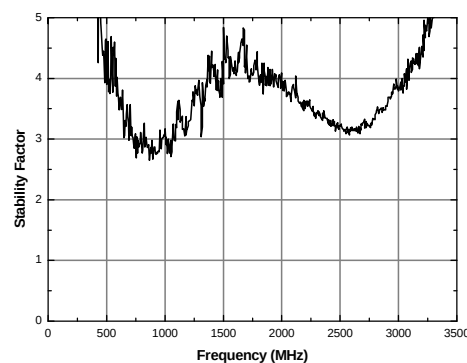
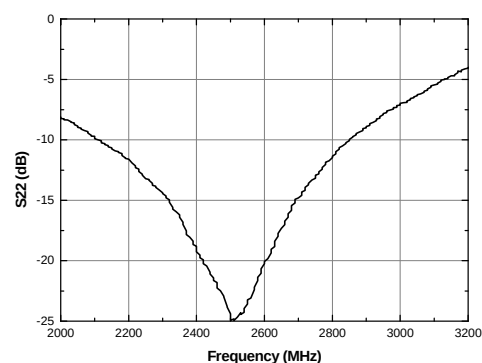
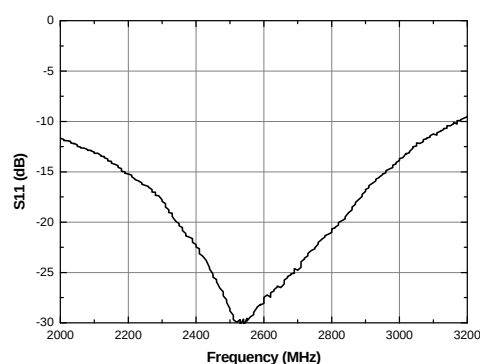
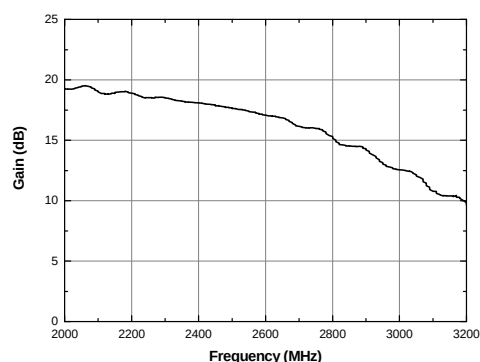
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

WiMAX

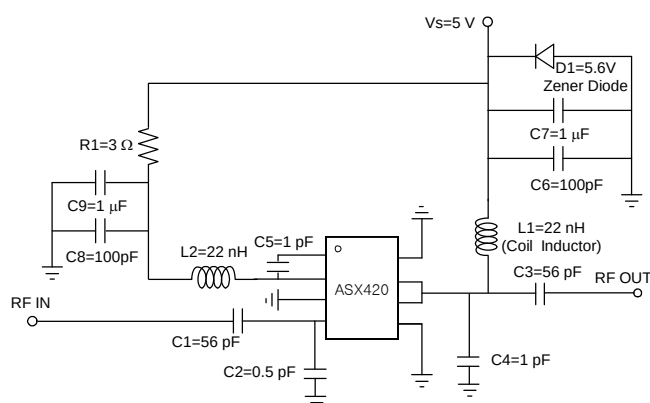
3100 ~ 3500 MHz

+5 V

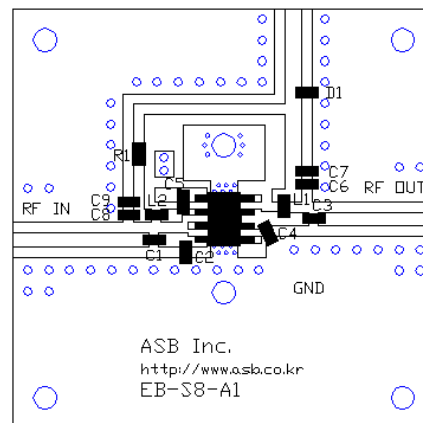
Frequency (MHz)	3100	3500
Magnitude S21 (dB)	13.5	13.0
Magnitude S11 (dB)	-18	-16
Magnitude S22 (dB)	-15	-18
Output P1dB (dBm)	27.5	28.5
Output IP3 (dBm) ¹⁾	42	47
Noise Figure (dB)	7.4	7.4
Device Voltage (V)	+5	+5
Current (mA)	370	370

1) OIP3 is measured with two tones at an output power of +15 dBm/tone separated by 1 MHz.

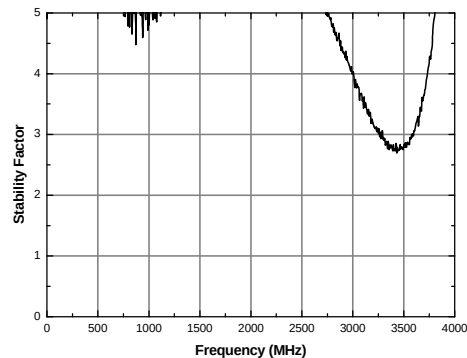
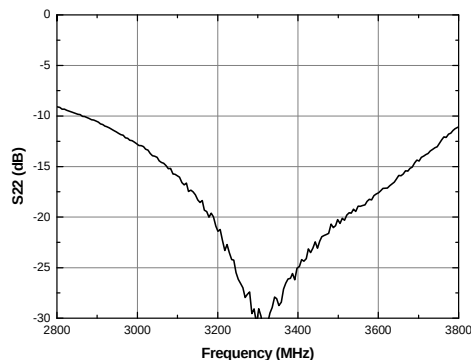
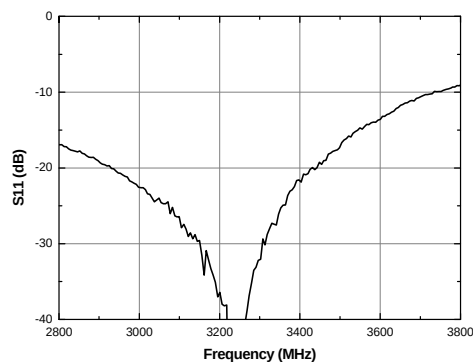
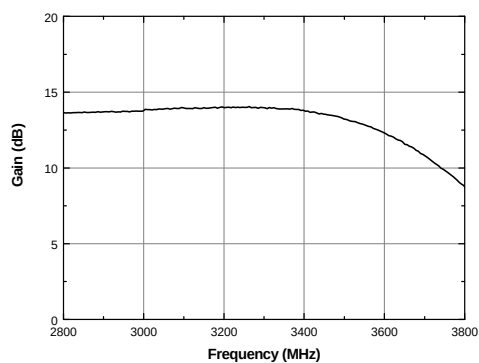
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



Recommended Soldering Reflow Profile

