

### Features

- 16 dB Gain at 900 MHz
- 32.7 dBm P1dB at 900 MHz
- 49 dBm Output IP3 at 900 MHz
- MTTF > 100 Years
- Single Supply

### Description

The ASX601, 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 2.5 GHz. The amplifier is available in an SOT-89 package and passes through the stringent DC, RF, and reliability tests.



Package Style: SOT-89

### Typical Performance\*

Parameters	Units	Typical		Typical	
Frequency	MHz	900	2000	900	2000
Gain	dB	16	9.5	16	9.5
S11	dB	-18	-14	-18	-14
S22	dB	-14	-12	-14	-12
Output IP3 <sup>1)</sup>	dBm	49	47	44	43
Noise Figure	dB	5.6	5.8	5.6	5.8
Output P1dB	dBm	32.7	31	32	31
Current	mA	850	850	710	710
Device Voltage	V	5	5	4.7	4.7

\* Performance tested at 50 Ω system and a room temperature.

1) 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	15	16	
S11	dB		-18	
S22	dB		-14	
Output IP3	dBm	47	49	
Noise Figure	dB		5.6	5.9
Output P1dB	dBm	32	32.7	
Current	mA	820	850	900
Device Voltage	V		5	

\* 100% in-house DC & RF testing is done on packaged products before taping.

### Absolute Maximum Ratings

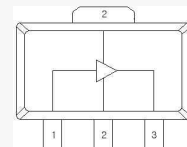
Parameters	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-40 to +150°C
Device Voltage	+6 V
Operating Junction Temperature	+150°C
Input RF Power (CW, 50ohm matched)*	25 dBm

\* Please find the max. input power data from [http://www.asb.co.kr/pdf/Maximum\\_Input\\_Power\\_Analysis.pdf](http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf)

### Application Circuit

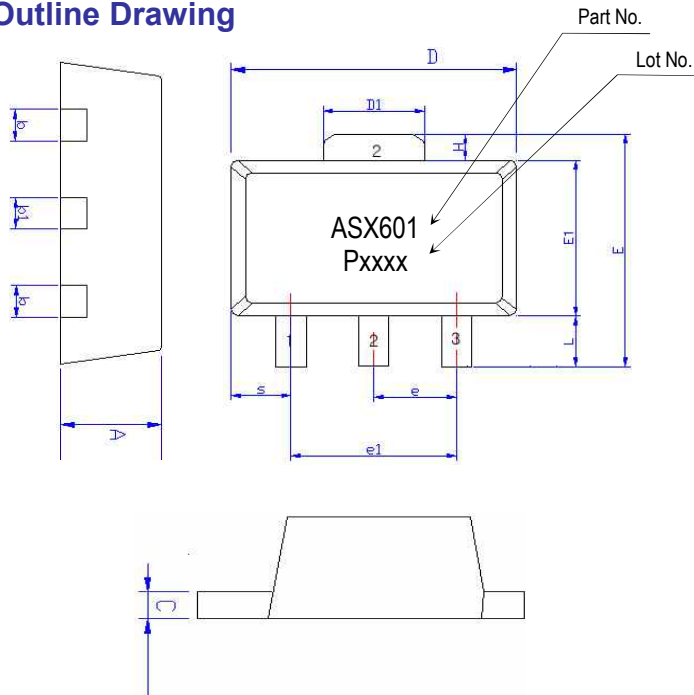
- 440 ~ 460 MHz
- 715 ~ 725 MHz
- CDMA
- RFID (USA)
- GSM
- 1400 ~ 1500 MHz
- PCS

### Pin Configuration



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

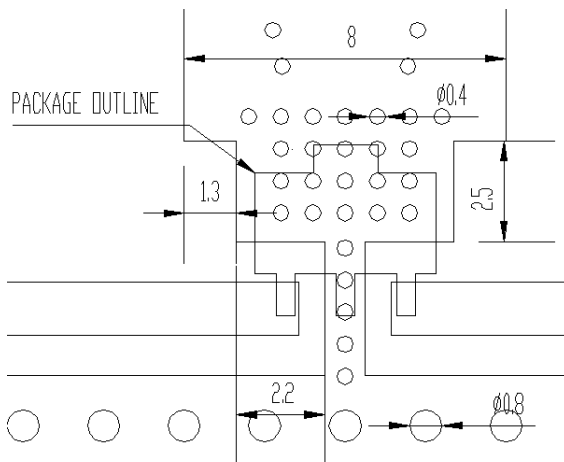
### Outline Drawing



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	RF IN
2	GND
3	RF OUT / Bias

### 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: 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**

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**440 ~ 460 MHz**

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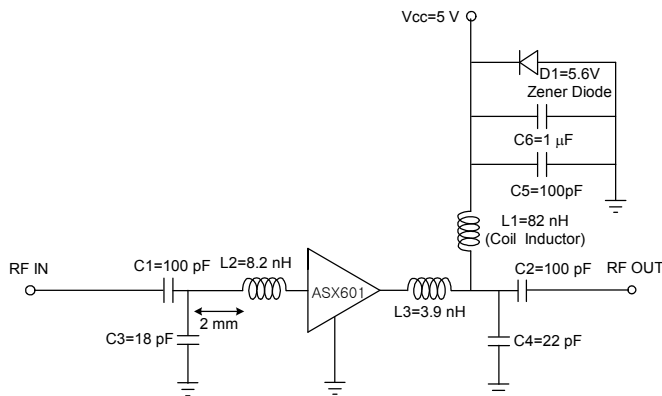
**+5 V**

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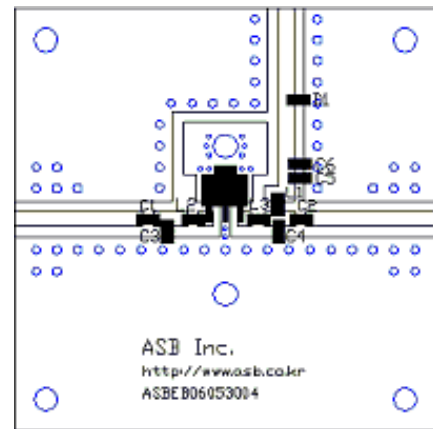
Frequency (MHz)	440~460
Magnitude S21 (dB)	19.5
Magnitude S11 (dB)	-13
Magnitude S22 (dB)	-18
Output P1dB (dBm)	34
Output IP3 <sup>1)</sup> (dBm)	47
Noise Figure (dB)	6.8
Device Voltage (V)	5
Current (mA)	850

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

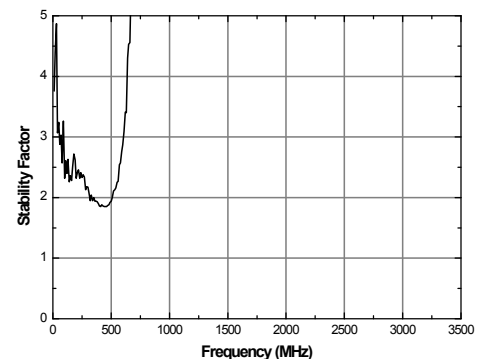
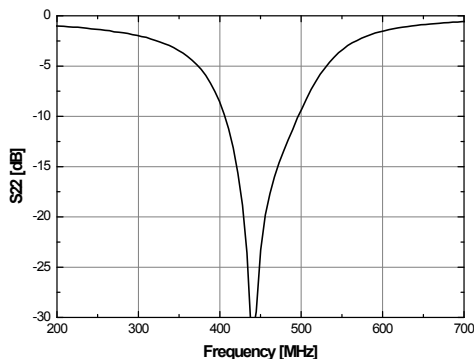
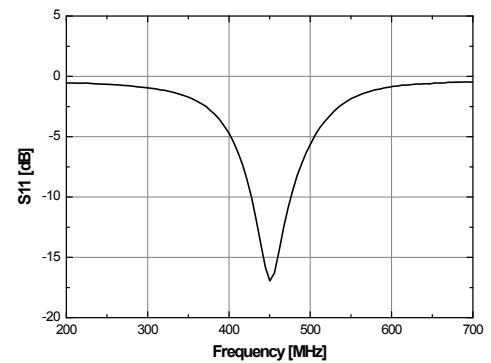
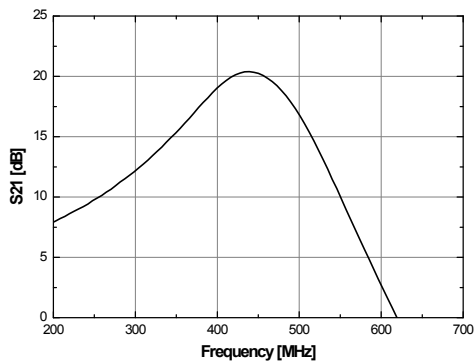
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



**APPLICATION CIRCUIT**

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**715 ~ 725 MHz**

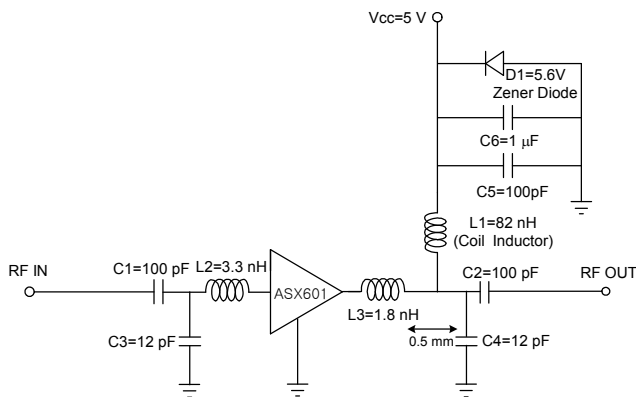
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**+5 V**

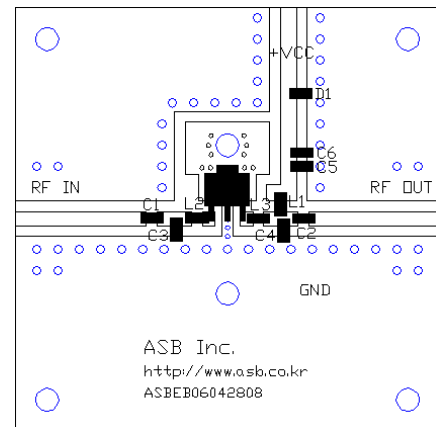
Frequency (MHz)	715~725
Magnitude S21 (dB)	18
Magnitude S11 (dB)	-18
Magnitude S22 (dB)	-15
Output P1dB (dBm)	34
Output IP3 <sup>1)</sup> (dBm)	46
Noise Figure (dB)	5.8
Device Voltage (V)	5
Current (mA)	850

1) OIP3 is measured with two tones at an output power of +18 dBm/tone separated by 1 MHz.

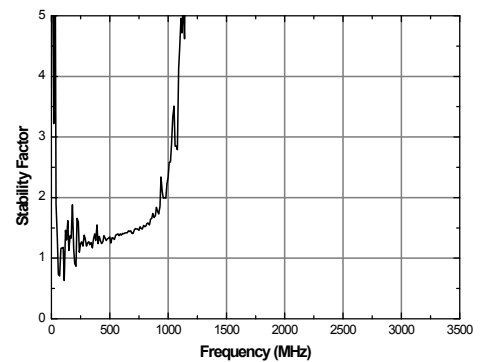
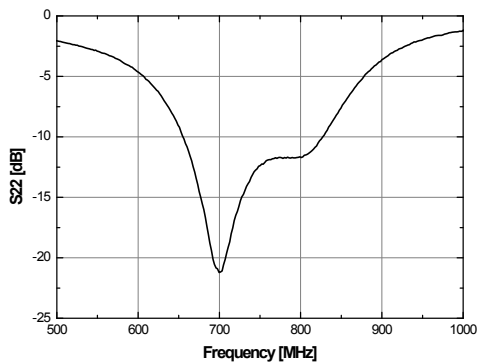
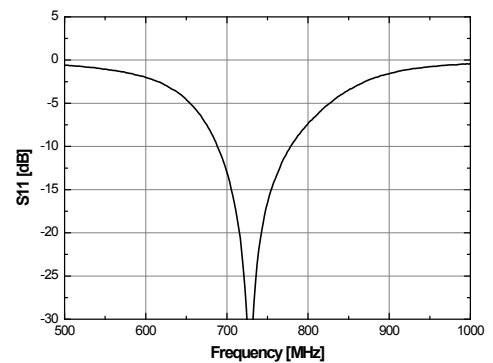
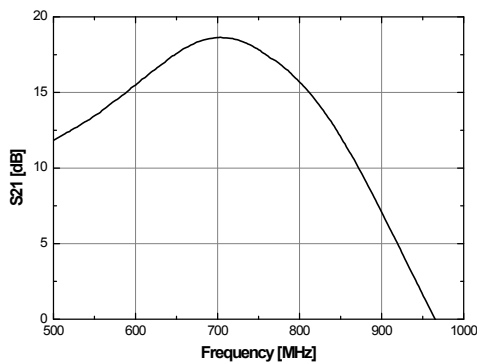
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



**APPLICATION CIRCUIT**

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**CDMA Rx**

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**824 ~ 849 MHz**

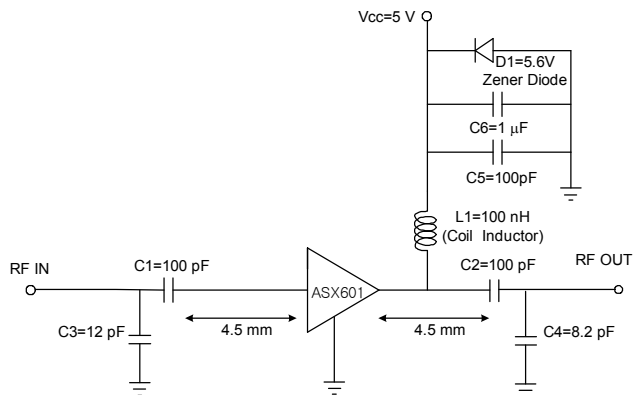
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**+5 V**

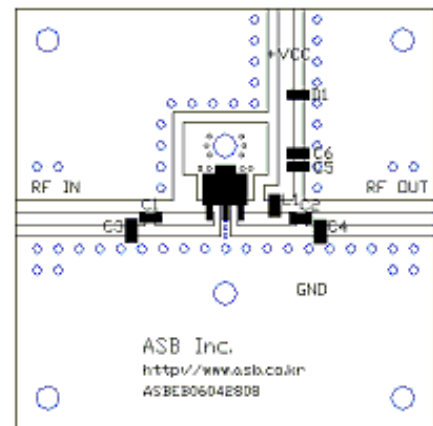
Frequency (MHz)	824~849
Magnitude S21 (dB)	17
Magnitude S11 (dB)	-14
Magnitude S22 (dB)	-18
Output P1dB (dBm)	33
Output IP3 <sup>1)</sup> (dBm)	48
Noise Figure (dB)	5.3
Device Voltage (V)	5
Current (mA)	850

1) OIP3 is measured with two tones at an output power of +14 dBm/tone separated by 1 MHz.

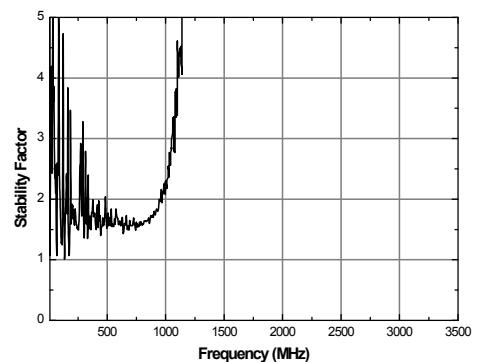
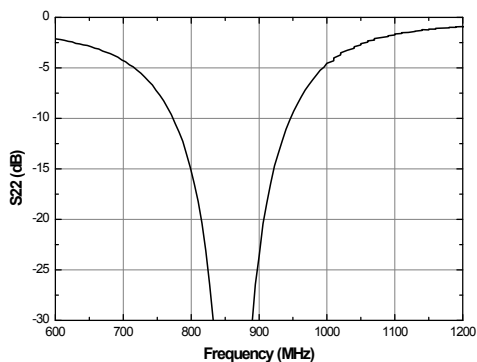
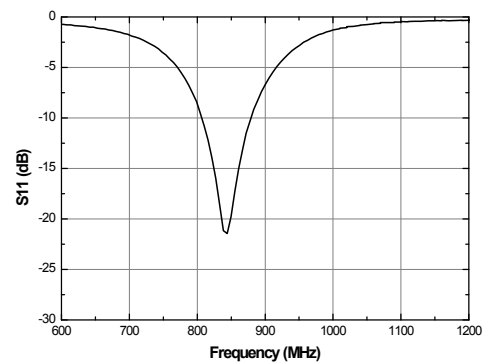
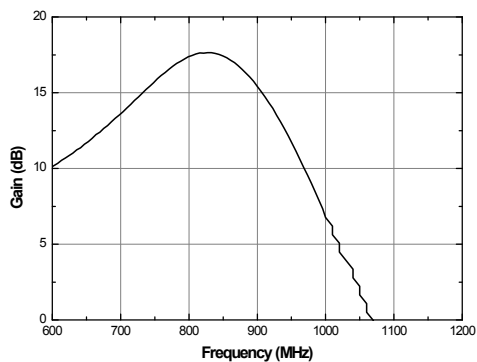
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



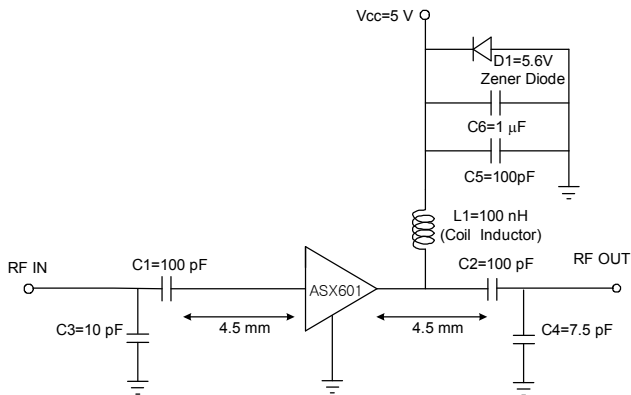
### APPLICATION CIRCUIT

**CDMA Tx**  
**869 ~ 894 MHz**  
**+5 V**

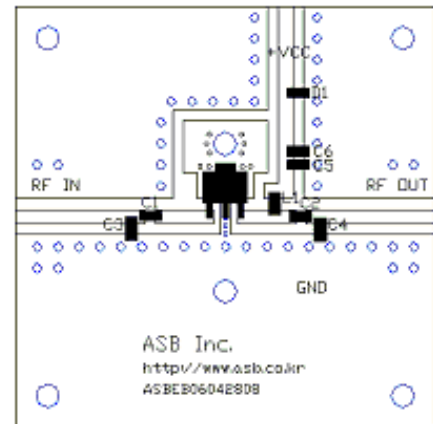
Frequency (MHz)	869~894
Magnitude S21 (dB)	16.5
Magnitude S11 (dB)	-17
Magnitude S22 (dB)	-18
Output P1dB (dBm)	33
Output IP3 <sup>1)</sup> (dBm)	48
Noise Figure (dB)	5.6
Device Voltage (V)	5
Current (mA)	850

1) OIP3 is measured with two tones at an output power of +14 dBm/tone separated by 1 MHz.

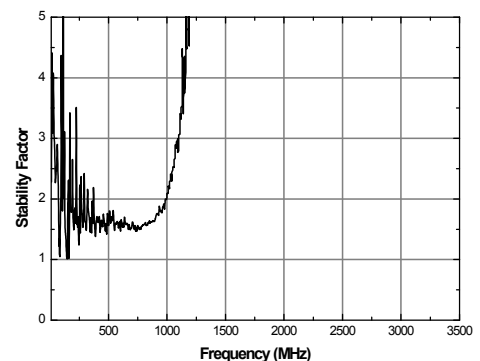
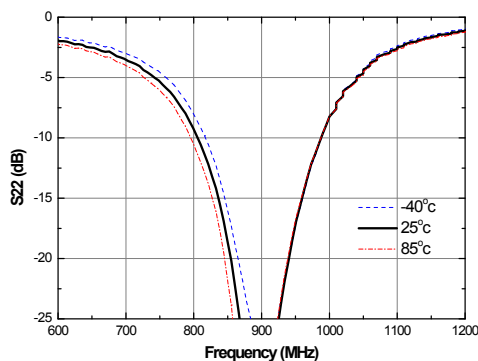
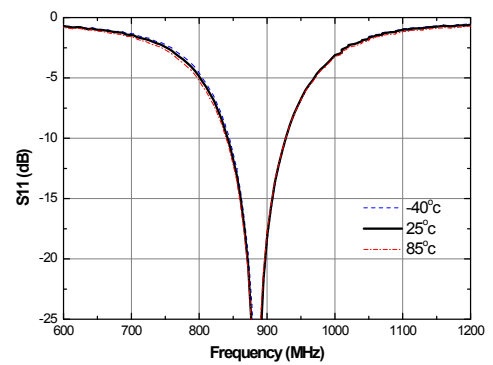
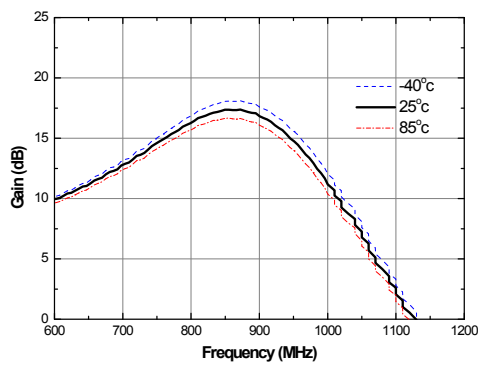
### Schematic



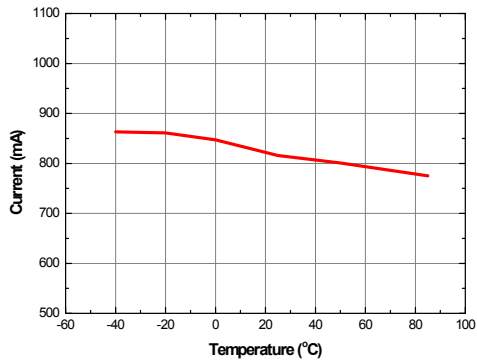
### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



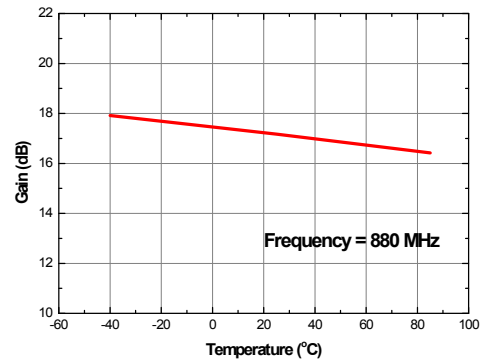
### S-parameters & K-factor



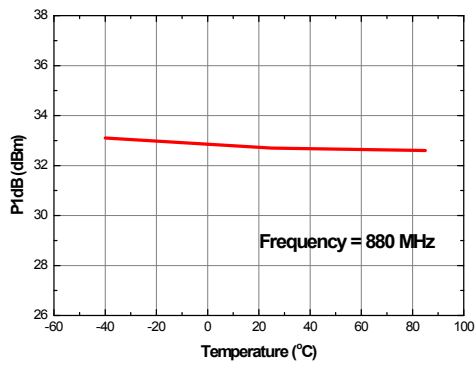
### Current vs. Temperature



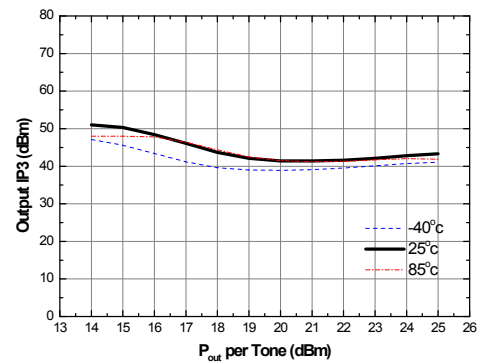
### Gain vs. Temperature



### P1dB vs. Temperature



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



**APPLICATION CIRCUIT**

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**RFID(USA)**

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**902 ~ 928 MHz**

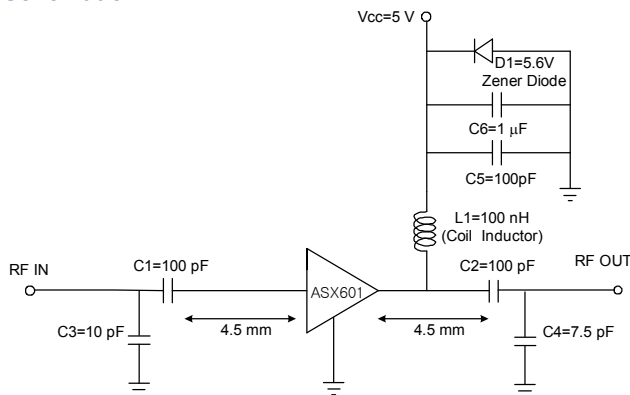
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**+5 V**

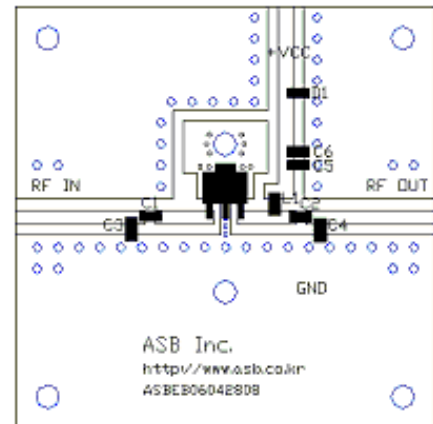
Frequency (MHz)	902~928
Magnitude S21 (dB)	16
Magnitude S11 (dB)	-18
Magnitude S22 (dB)	-15
Output P1dB (dBm)	32.7
Output IP3 <sup>1)</sup> (dBm)	48
Noise Figure (dB)	5.5
Device Voltage (V)	5
Current (mA)	850

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

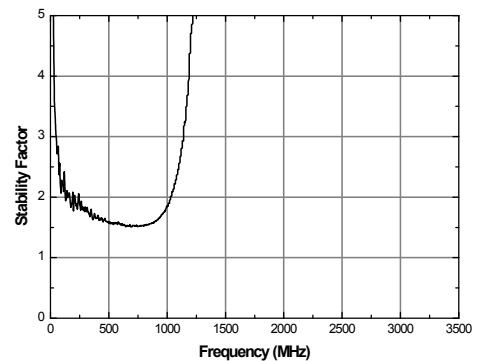
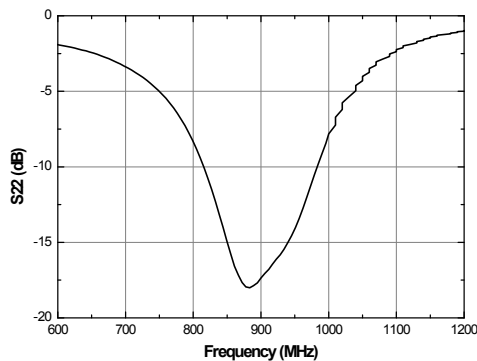
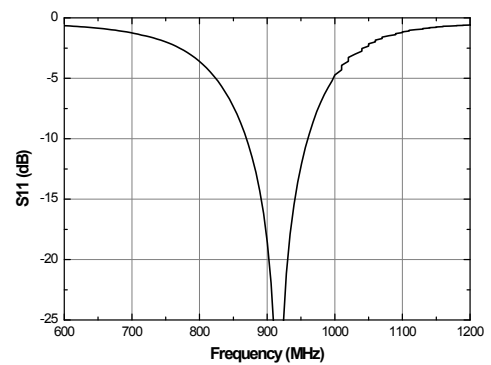
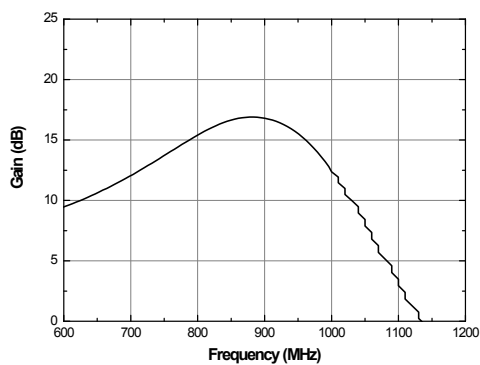
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor





**APPLICATION CIRCUIT**

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**GSM Rx**

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**890 ~ 915 MHz**

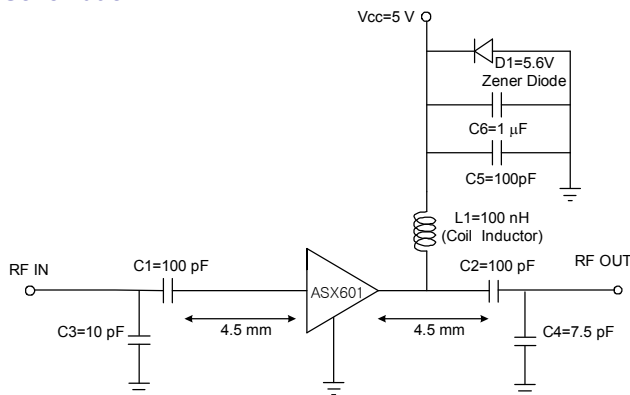
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**+5 V**

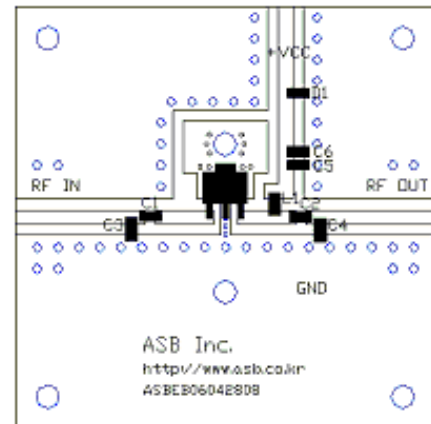
Frequency (MHz)	890~915
Magnitude S21 (dB)	16
Magnitude S11 (dB)	-18
Magnitude S22 (dB)	-14
Output P1dB (dBm)	32.7
Output IP3 <sup>1)</sup> (dBm)	49
Noise Figure (dB)	5.6
Device Voltage (V)	5
Current (mA)	850

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

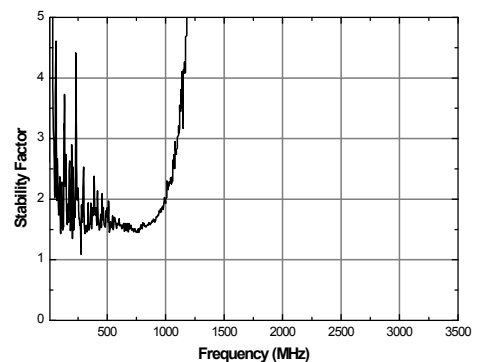
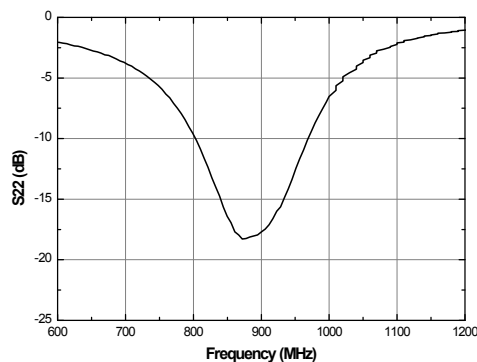
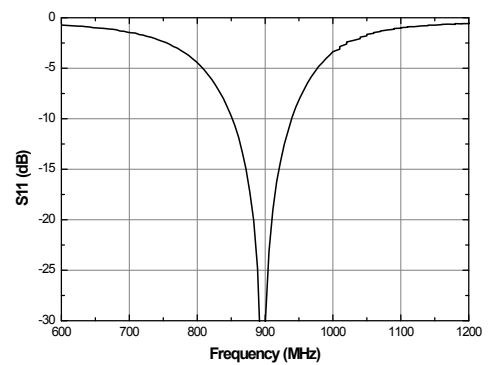
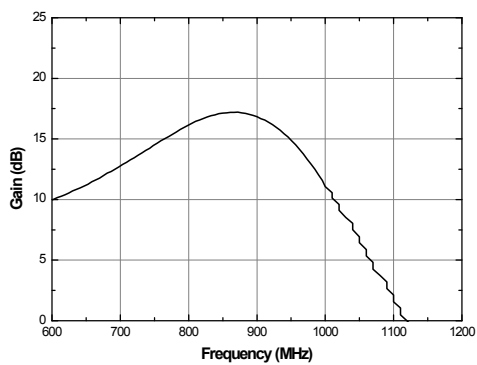
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



### APPLICATION CIRCUIT

GSM Tx

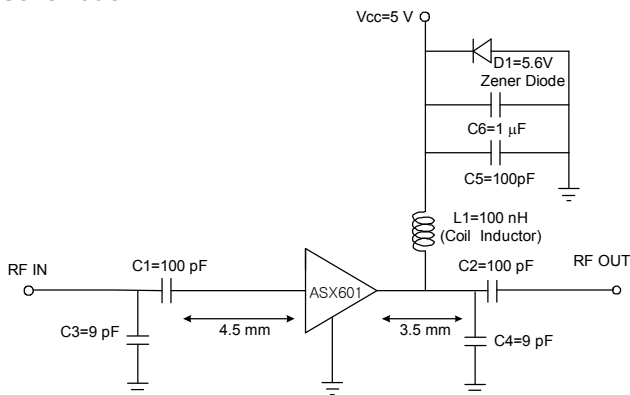
935 ~ 960 MHz

+5 V

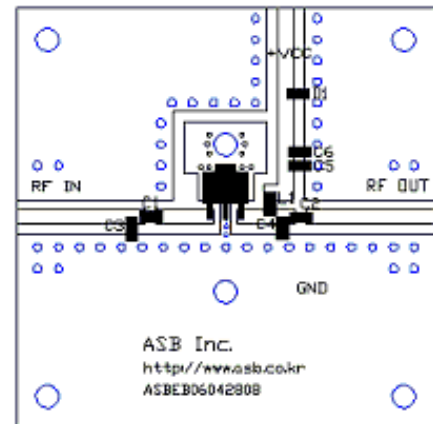
Frequency (MHz)	935~960
Magnitude S21 (dB)	16
Magnitude S11 (dB)	-15
Magnitude S22 (dB)	-12
Output P1dB (dBm)	34
Output IP3 <sup>1)</sup> (dBm)	49
Noise Figure (dB)	5.5
Device Voltage (V)	5
Current (mA)	850

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

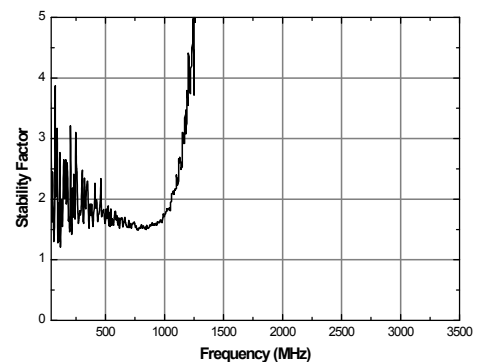
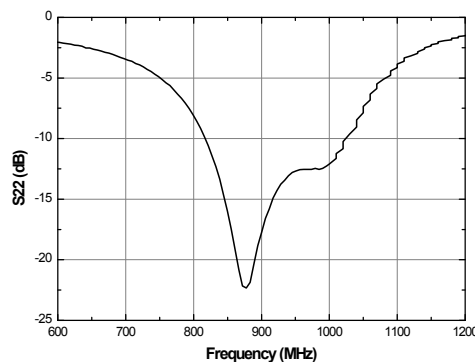
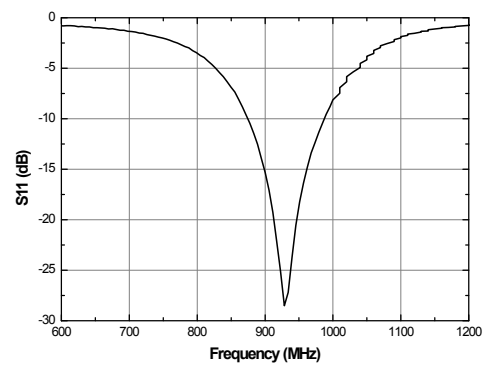
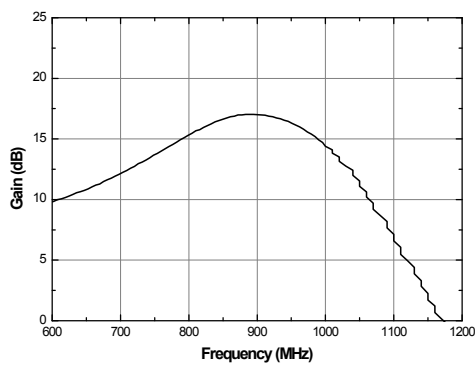
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



### APPLICATION CIRCUIT

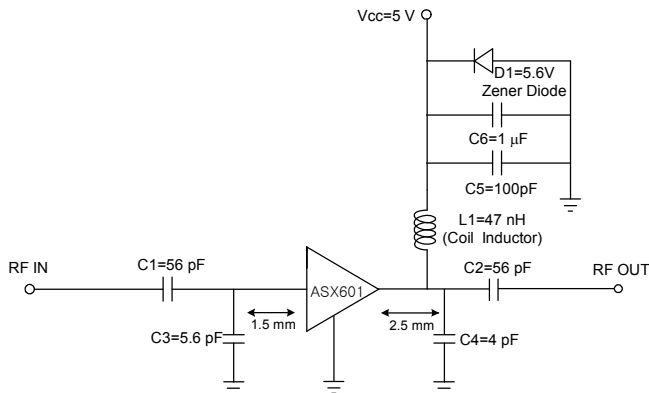
1400 ~ 1500 MHz

+5 V

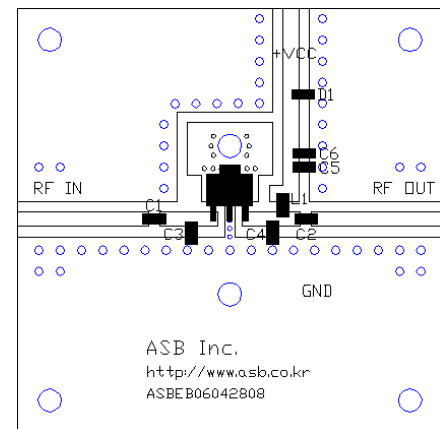
Frequency (MHz)	1400	1500
Magnitude S21 (dB)	13.5	12.5
Magnitude S11 (dB)	-13	-12
Magnitude S22 (dB)	-18	-18
Output P1dB (dBm)	32	32.5
Output IP3 <sup>1)</sup> (dBm)	48.5	48.5
Noise Figure (dB)	5.5	5.5
Device Voltage (V)	5	5
Current (mA)	850	850

1) OIP3 is measured with two tones at an output power of +14 dBm/tone separated by 1 MHz.

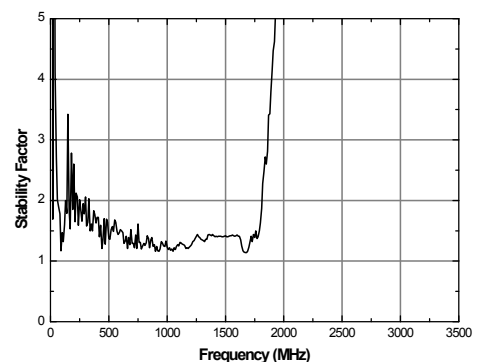
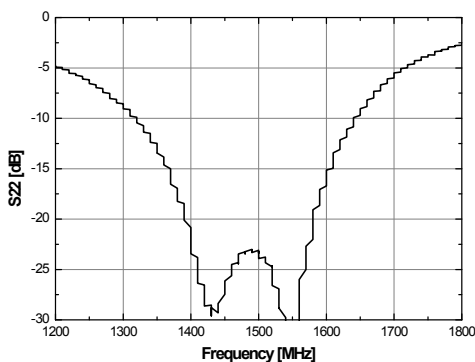
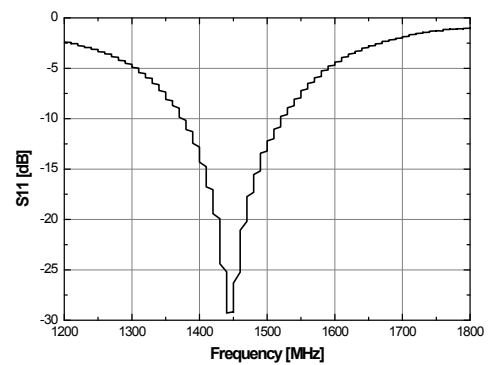
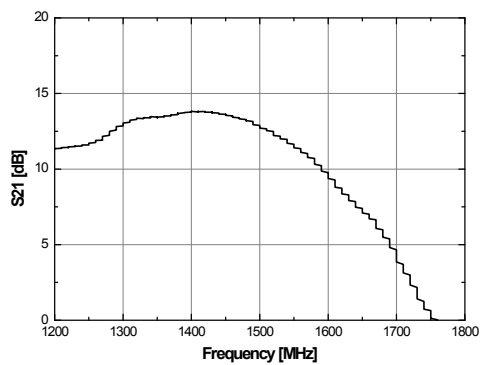
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



**APPLICATION CIRCUIT**

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**PCS Rx**

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**1750 ~ 1780 MHz**

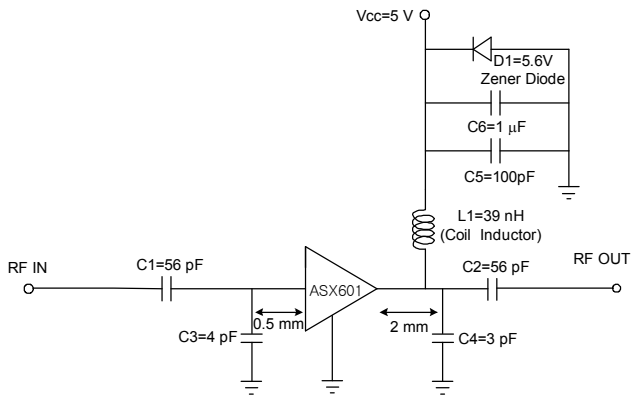
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**+5 V**

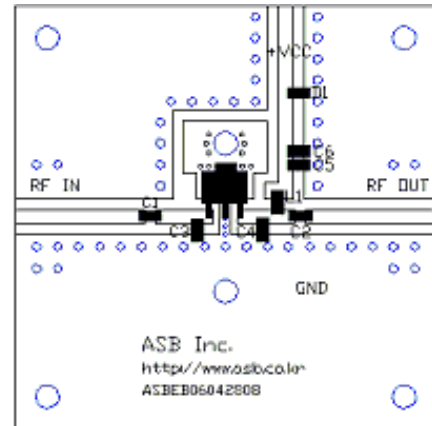
Frequency (MHz)	1750~1780
Magnitude S21 (dB)	11.2
Magnitude S11 (dB)	-14
Magnitude S22 (dB)	-15
Output P1dB (dBm)	30
Output IP3 <sup>1)</sup> (dBm)	47
Noise Figure (dB)	5.5
Device Voltage (V)	5
Current (mA)	850

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

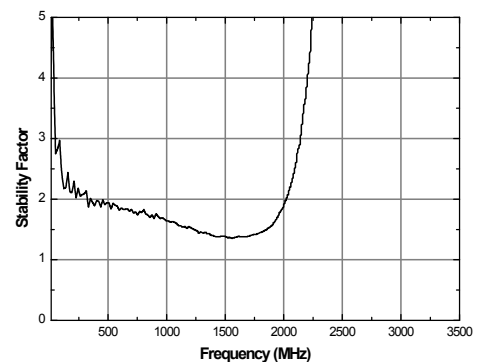
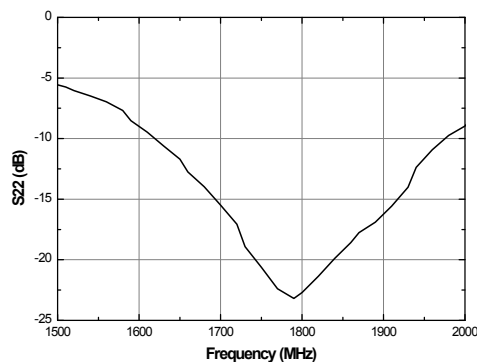
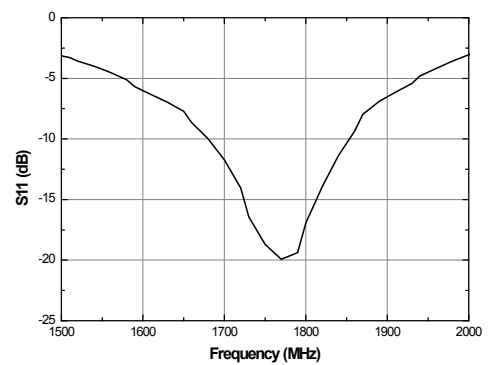
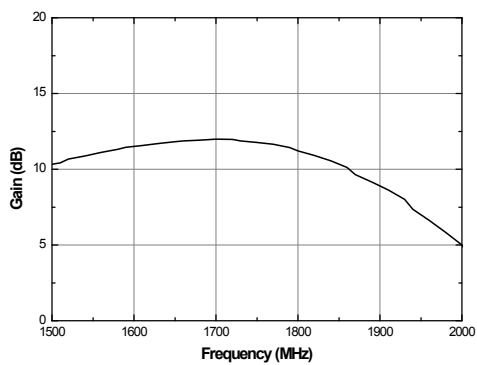
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



### APPLICATION CIRCUIT

PCS Tx

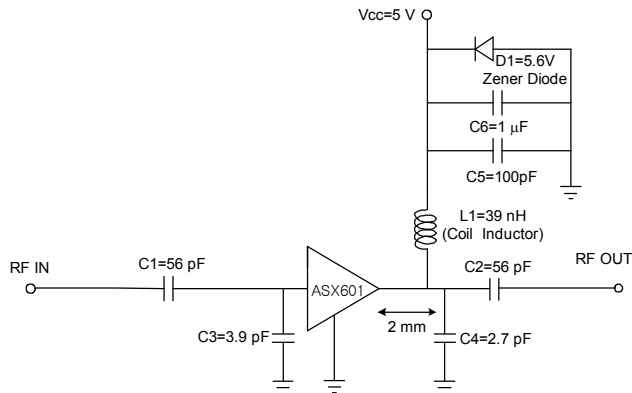
1840 ~ 1870 MHz

+5 V

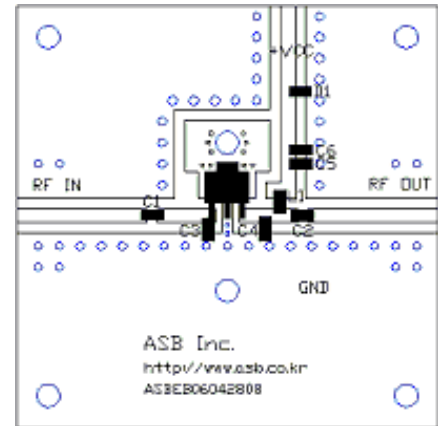
Frequency (MHz)	1840~1870
Magnitude S21 (dB)	10.3
Magnitude S11 (dB)	-16
Magnitude S22 (dB)	-17
Output P1dB (dBm)	29.5
Output IP3 <sup>1)</sup> (dBm)	47
Noise Figure (dB)	5.7
Device Voltage (V)	5
Current (mA)	850

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

### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor

