

Features

- 17.5 dB Gain at 900 MHz
- 26 dBm P1dB at 900 MHz
- 44 dBm Output IP3 at 900 MHz
- 2.0 dB NF at 900 MHz
- MTTF > 100 Years
- Single Supply

Description

The ASW338, 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 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	
Frequency	MHz	900	1950
Gain	dB	17.5	16.5
S11	dB	-14	-14
S22	dB	-18	-14
Output IP3	dBm	44 ¹⁾	43 ²⁾
Noise Figure	dB	2.0	2.2
Output P1dB	dBm	26	25
Current	mA	120	120
Device Voltage	V	8	8

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

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

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		900	
Gain	dB	17	17.5	18
S11	dB		-14	
S22	dB		-18	
Output IP3	dBm		44	
Noise Figure	dB		2.0	2.2
Output P1dB	dBm	25	26	
Current	mA	110	120	130
Device Voltage	V		8	

Absolute Maximum Ratings

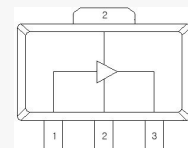
Parameters	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-40 to +150°C
Device Voltage	+9 V
Operating Junction Temperature	+150°C
Input RF Power (CW, 50ohm matched)*	26 dBm

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

Application Circuit

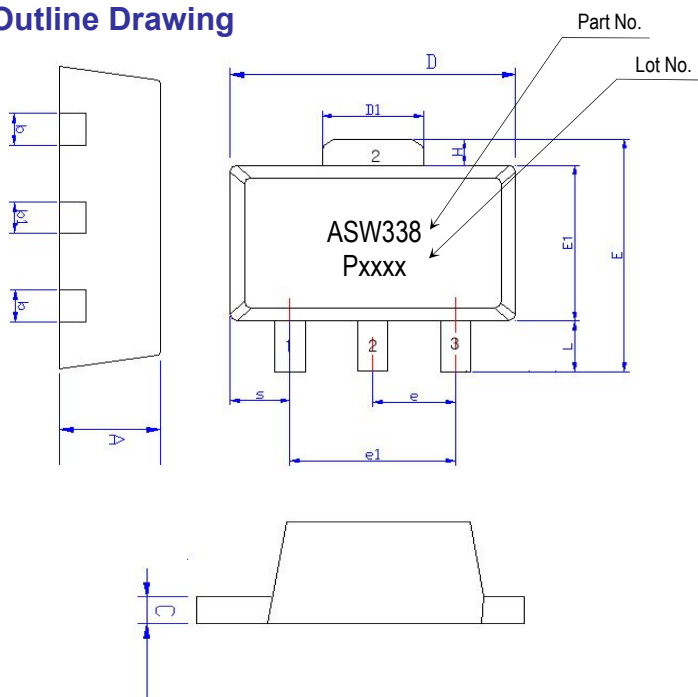
- IF (100 ~ 240 MHz)
- RFID (13.5 MHz)
- 30 ~ 520 MHz
- LTE
- CMMB
- 900 MHz
- 1700 ~ 2700 MHz
- 50 ~ 1000 MHz (75 ohm)

Pin Configuration



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

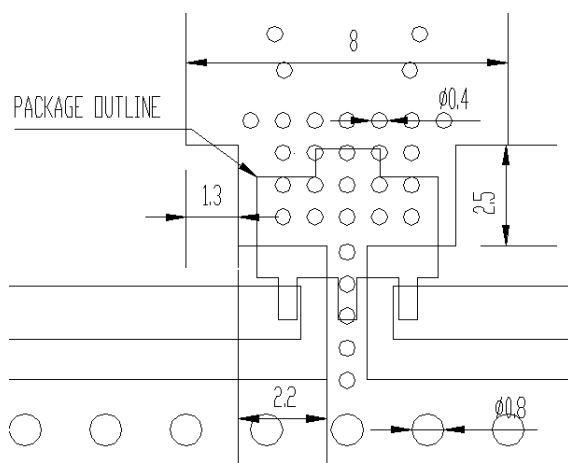
Outline Drawing



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: 550 V
MM	Class A
	Voltage Level: 50 V

CAUTION: ESD-sensitive device!

Moisture Sensitivity Level (MSL)

Level 3 at 260°C reflow

APPLICATION CIRCUIT

IF

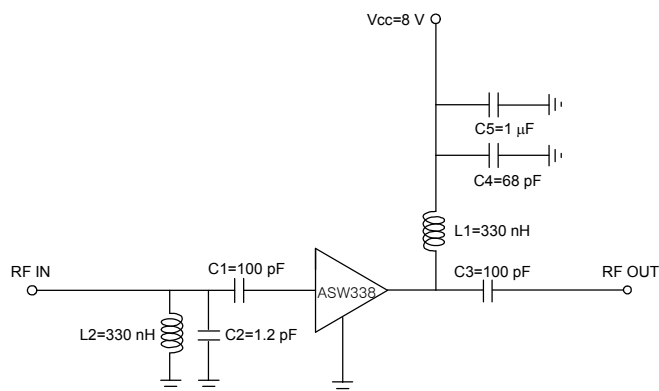
100 ~ 240 MHz

+8 V

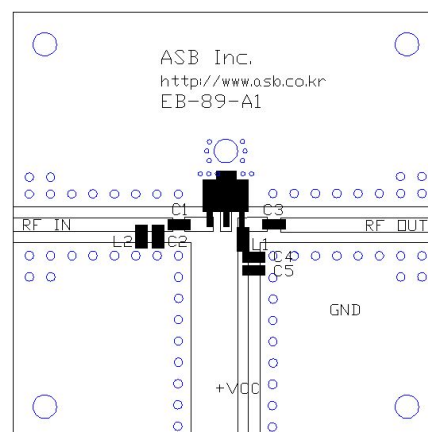
Frequency (MHz)	100	240
Magnitude S21 (dB)	19	18.5
Magnitude S11 (dB)	-14	-13
Magnitude S22 (dB)	-15	-14
Output P1dB (dBm)	26	26
Output IP3 ¹⁾ (dBm)	46	47
Noise Figure (dB)	1.7	1.9
Device Voltage (V)	8	8
Current (mA)	120	120

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

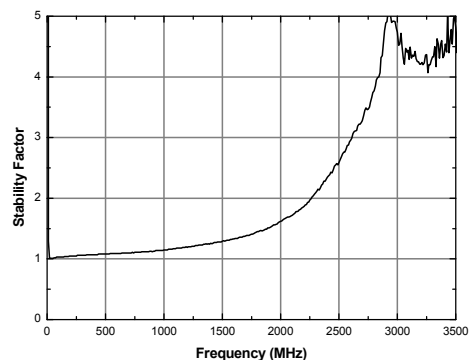
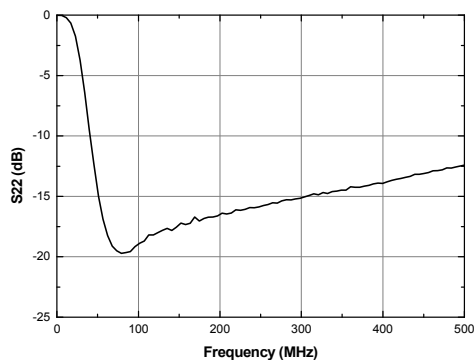
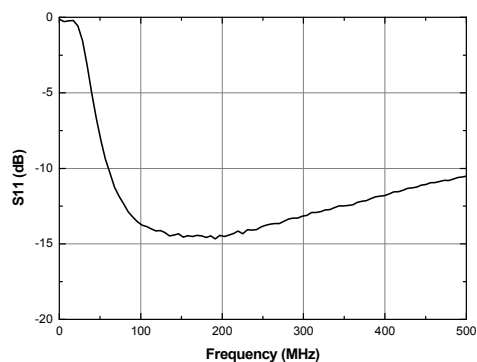
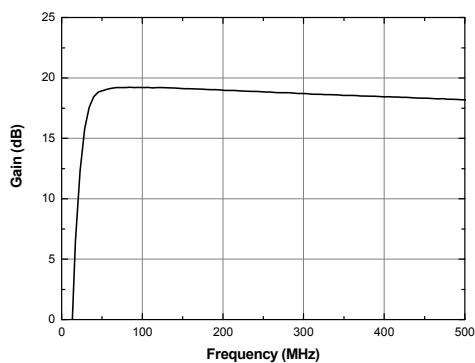
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

RFID

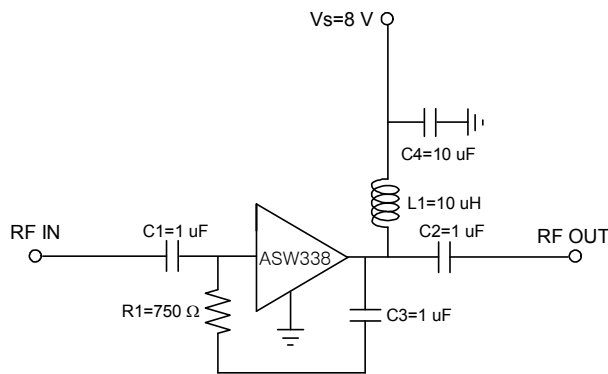
13.5 MHz

+8 V

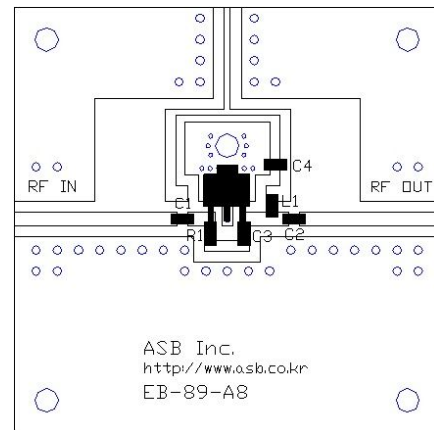
Frequency (MHz)	13.5
Magnitude S21 (dB)	17.5
Magnitude S11 (dB)	-10
Magnitude S22 (dB)	-20
Output P1dB (dBm)	25
Output IP3 ¹⁾ (dBm)	41
Noise Figure (dB)	2.2
Device Voltage (V)	8
Current (mA)	120

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

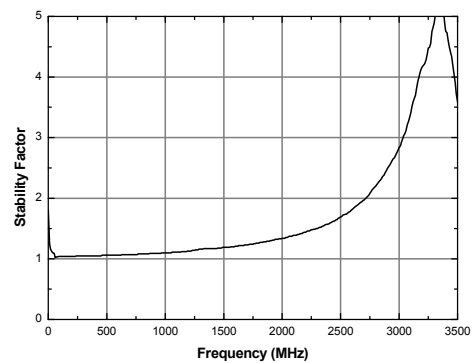
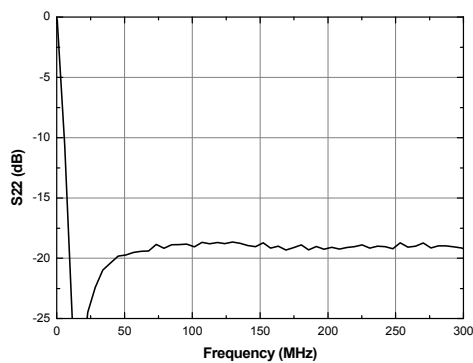
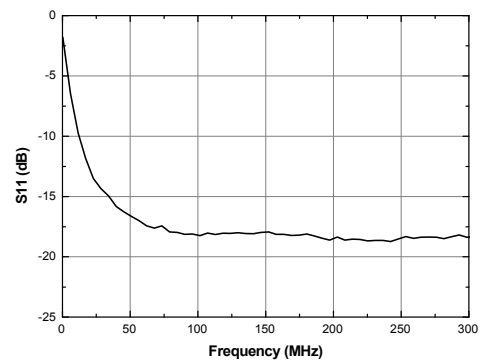
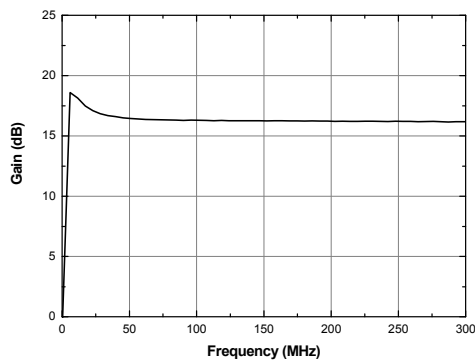
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

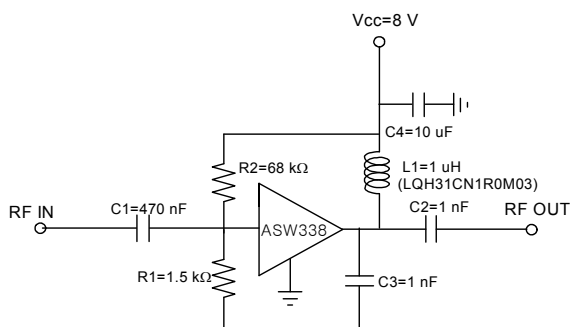
30 ~ 520 MHz

+8 V

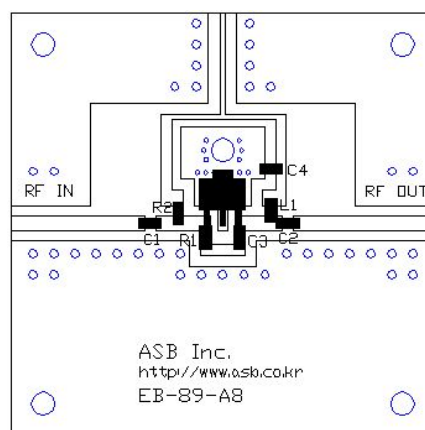
Frequency (MHz)	30	250	520
Magnitude S21 (dB)	17	17	16.5
Magnitude S11 (dB)	-8	-18	-18
Magnitude S22 (dB)	-18	-18	-18
Output P1dB (dBm)	26	26	26
Output IP3 ¹⁾ (dBm)	39.5	41	36.5
Noise Figure (dB)	1.8	1.7	1.8
Device Voltage (V)	8	8	8
Current (mA)	120	120	120

1) OIP3 is measured with two tones at an output power of +17 dBm/tone separated by 1 MHz.

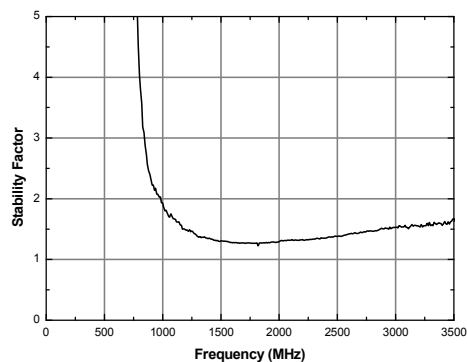
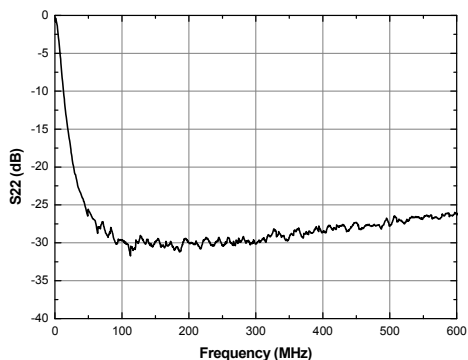
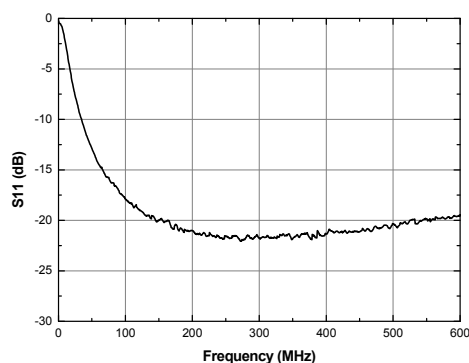
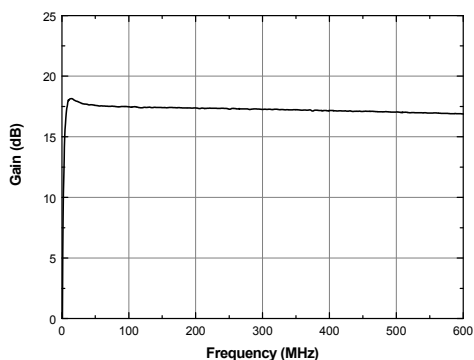
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

LTE

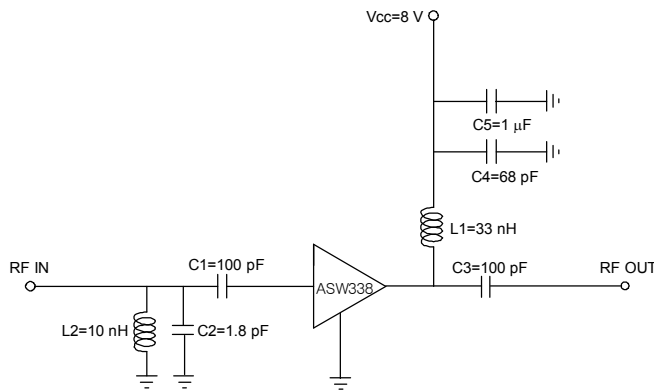
698 ~ 787 MHz

+8 V

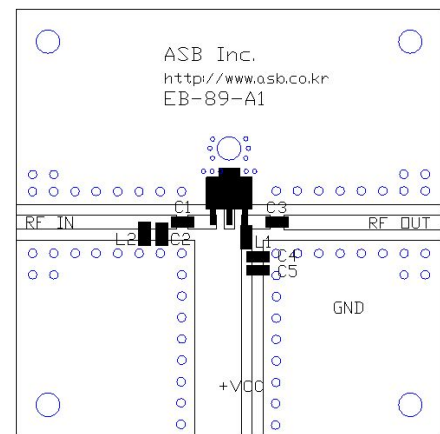
Frequency (MHz)	698~787
Magnitude S21 (dB)	17.5
Magnitude S11 (dB)	-17
Magnitude S22 (dB)	-18
Output P1dB (dBm)	26
Output IP3 ¹⁾ (dBm)	44
Noise Figure (dB)	1.7
Device Voltage (V)	8
Current (mA)	120

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

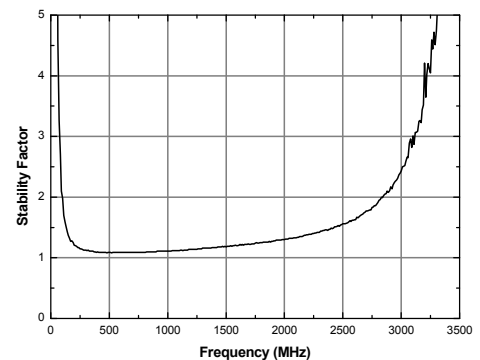
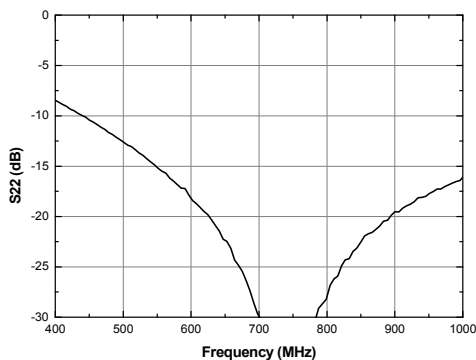
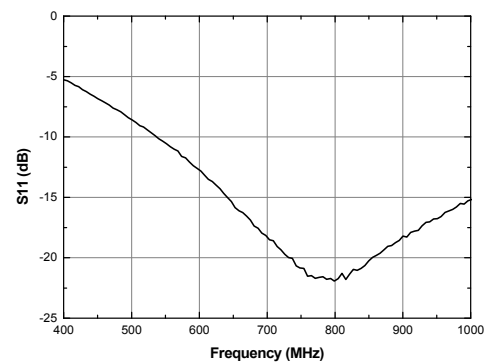
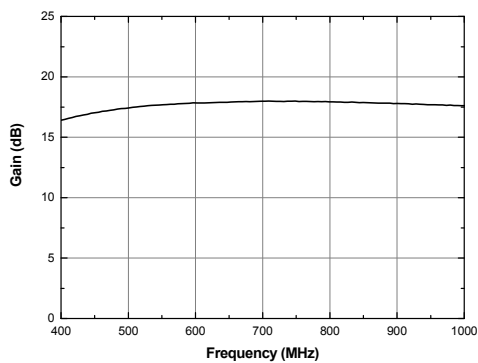
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

CMMB

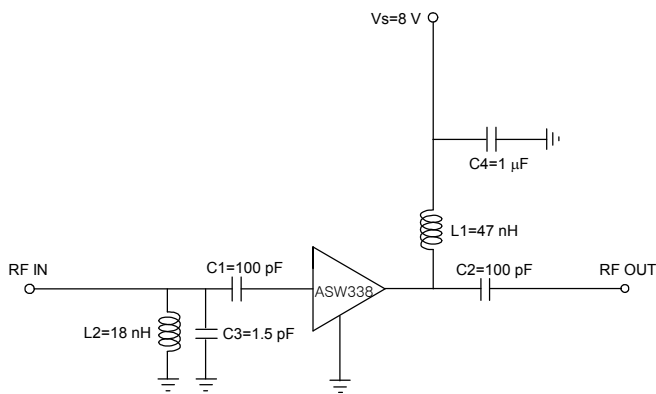
470 ~ 860 MHz

+8 V

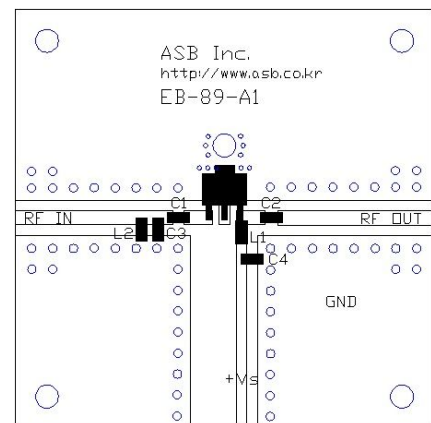
Frequency (MHz)	470	860
Magnitude S21 (dB)	17.5	17.5
Magnitude S11 (dB)	-15	-16
Magnitude S22 (dB)	-15	-16
Output P1dB (dBm)	26	26
Output IP3 ¹⁾ (dBm)	46	41.5
Noise Figure (dB)	2.0	1.7
Device Voltage (V)	8	8
Current (mA)	120	120

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

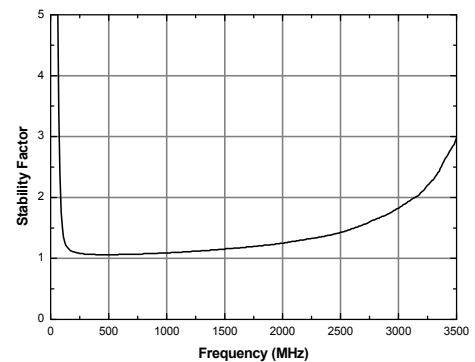
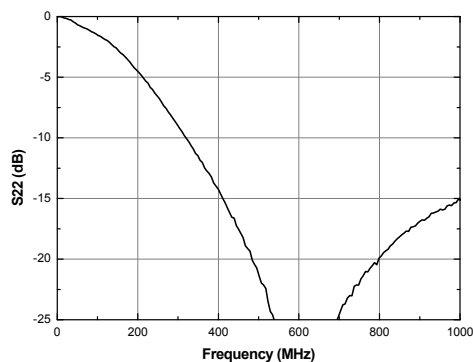
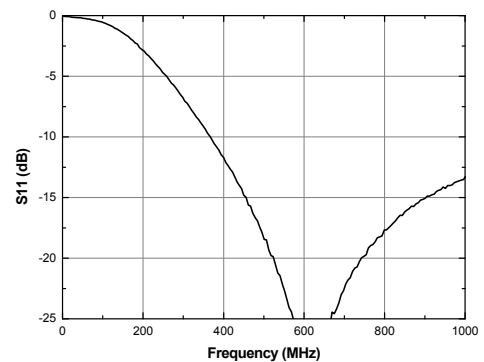
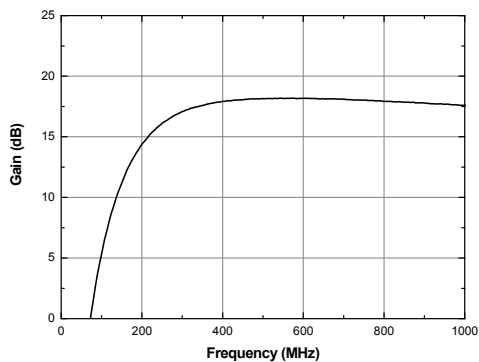
Schematic

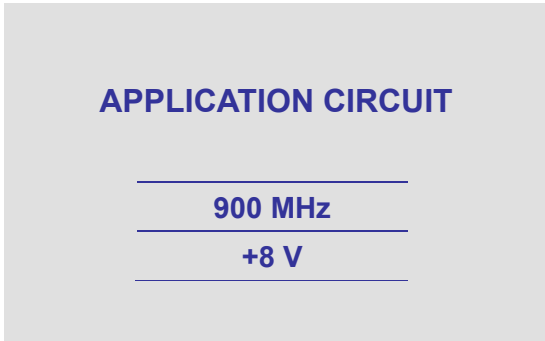


Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor

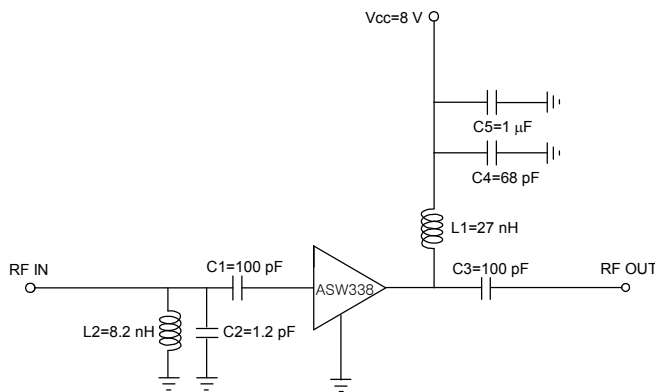




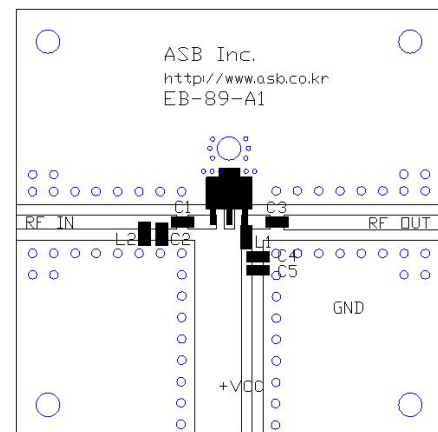
Frequency (MHz)	900
Magnitude S21 (dB)	17.5
Magnitude S11 (dB)	-14
Magnitude S22 (dB)	-18
Output P1dB (dBm)	26
Output IP3 ¹⁾ (dBm)	44
Noise Figure (dB)	2.0
Device Voltage (V)	8
Current (mA)	120

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

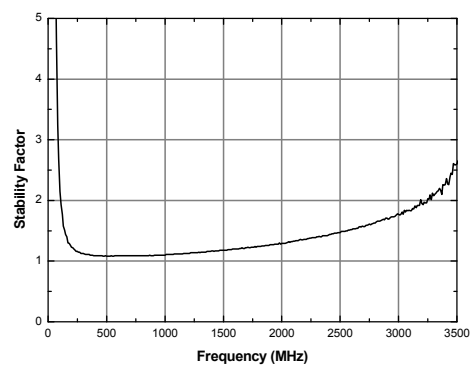
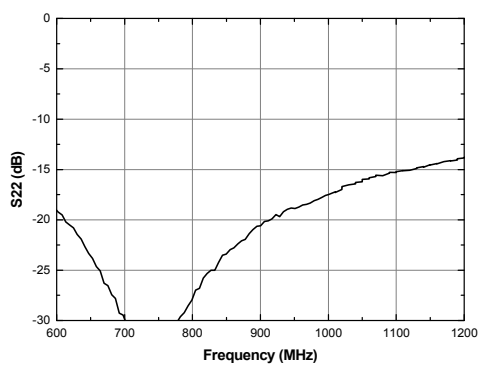
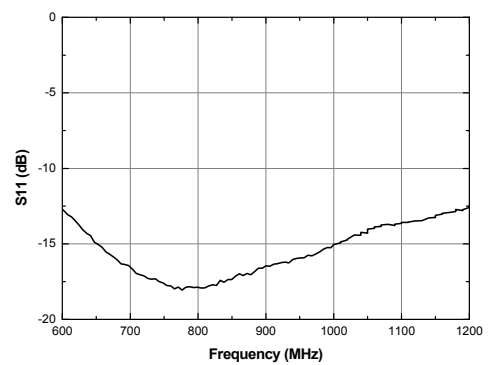
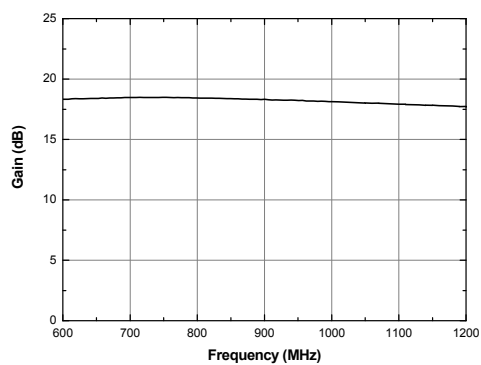
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

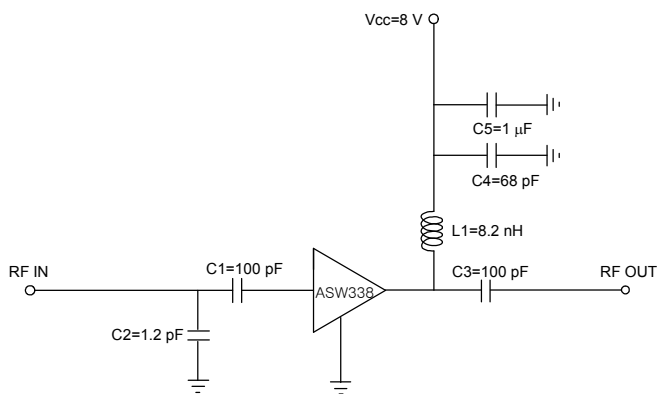
1700 ~ 2700 MHz

+8 V

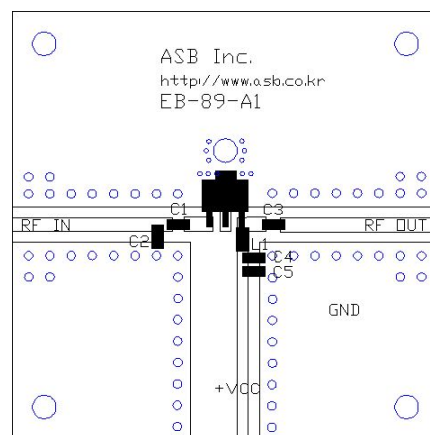
Frequency (MHz)	1950	2450
Magnitude S21 (dB)	16.5	16
Magnitude S11 (dB)	-14	-14
Magnitude S22 (dB)	-14	-14
Output P1dB (dBm)	25	22
Output IP3 ¹⁾ (dBm)	43	41.5
Noise Figure (dB)	2.2	2.8
Device Voltage (V)	8	8
Current (mA)	120	120

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

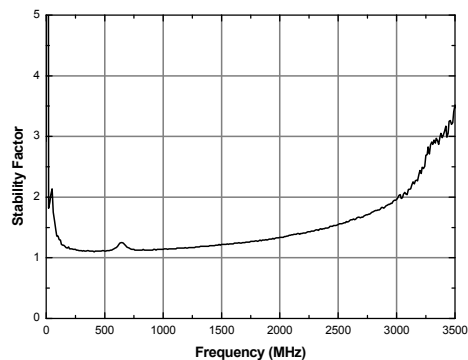
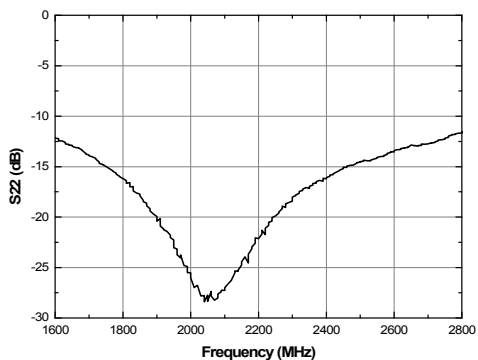
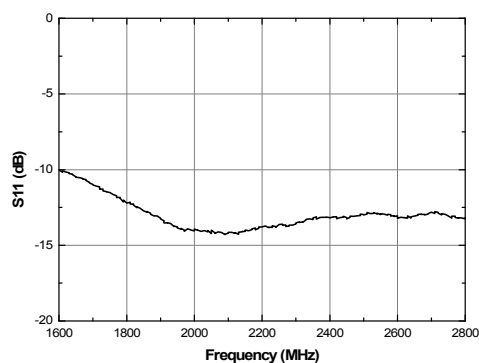
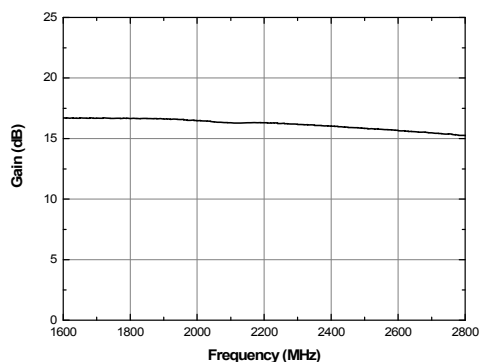
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

CATV Push-Pull (75 Ohm)

50 ~ 1000 MHz

+8 V

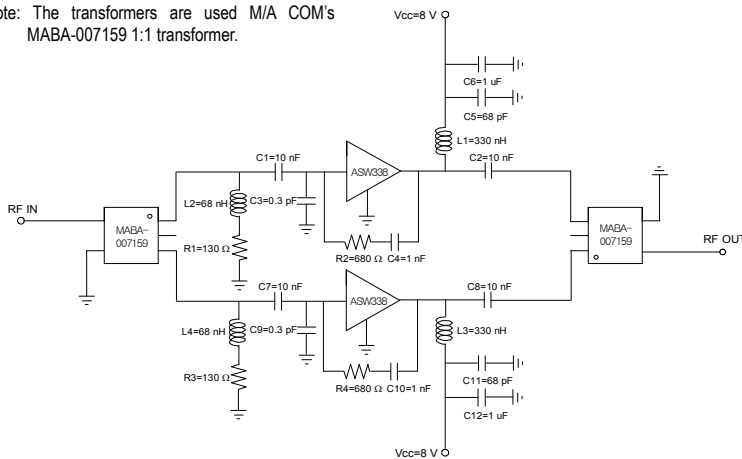
Frequency (MHz)	50	500	860
Magnitude S21 (dB)	14.1	14.3	14.2
Magnitude S11 (dB)	-15	-11	-14
Magnitude S22 (dB)	-11	-10	-12
Output P1dB (dBm)	26	28	28
Output IP3 ¹⁾ (dBm)	41	45	42.5
Output IP2 ^{1),2)} (dBm)	73	65	54
Noise Figure (dB)	3.5	2.8	3.2
Device Voltage (V)	8	8	8
Current (mA)	240	240	240

1) OIP3 and OIP2 are measured with two tones at an output power of +8 dBm/tone separated by 6 MHz.

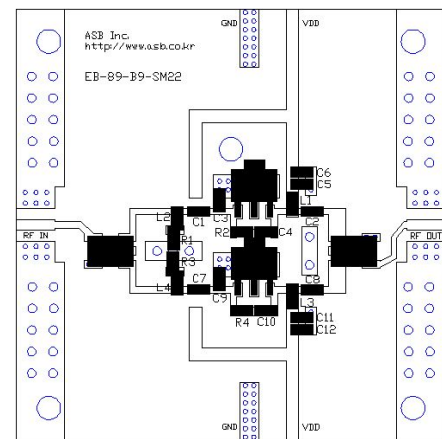
2) OIP2 is measured at F1+F2 Frequency.

Schematic

Note: The transformers are used M/A COM's MABA-007159 1:1 transformer.



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters

