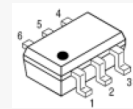


Features

- 17 dB Gain at 2000 MHz
- 14.5 dBm P1dB at 2000 MHz
- 29 dBm OIP3 at 2000 MHz
- 3.3 dB NF at 2000 MHz
- MTTF > 100 Years
- Single Supply

Description

The ASW114, 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 8 GHz. The amplifier is available in an SOT-363 package and passes through the stringent DC, RF, and reliability tests.



Package Style: SOT-363

Typical Performance

Parameters	Units	Typical						
		900	2000	3500	5800	900	2000	3500
Frequency	MHz	900	2000	3500	5800	900	2000	3500
Gain	dB	20	17	13.5	10.5	20.5	17	14
S11	dB	-18	-14	-18	-14	-20	-14	-16
S22	dB	-15	-15	-15	-18	-16	-16	-18
Output IP3 ¹⁾	dBm	24.5	26	26.5	23	29.5	29	--
Noise Figure	dB	3.2	3.3	4.2	3.9	3.1	3.3	4.3
Output P1dB	dBm	12.5	13	14	12	14.5	14.5	14.5
Current	mA	37			53			
Device Voltage	V	3.2			3.3			

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		2000	
Gain	dB	16.5	17	
S11	dB		-14	
S22	dB		-15	
Output IP3	dBm	24	26	
Noise Figure	dB		3.3	3.5
Output P1dB	dBm	12	13	
Current	mA	32	37	42
Device Voltage	V		3.2	

Absolute Maximum Ratings

Parameters	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-40 to +150°C
Device Voltage	+3.5 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

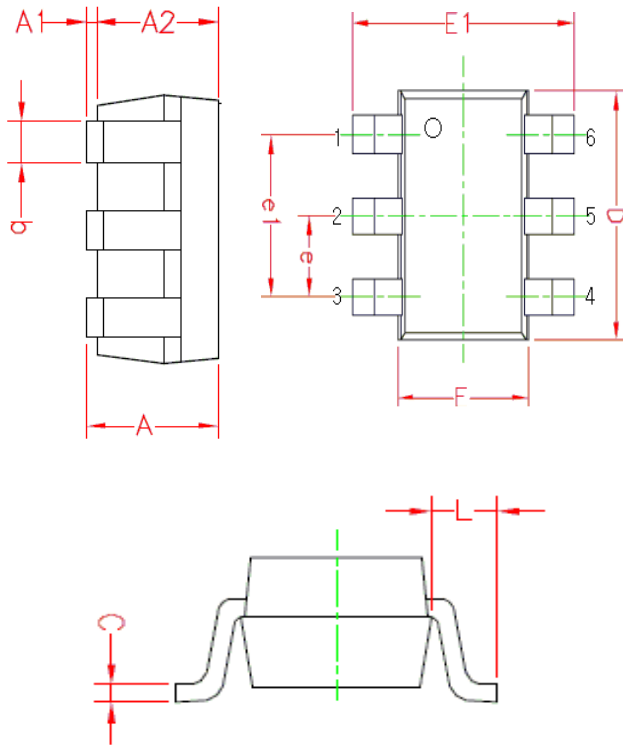
Application Circuit

- 5 ~ 140 MHz
- IF
- 500 ~ 3500 MHz
- 300 ~ 2170 MHz
- 4000 ~ 6000 MHz
- 6500 ~ 7800 MHz
- ATSC (57 ~ 213 MHz)
- DVB-T (V/U band)
- 950 ~ 2150 MHz (SMATV)
- 50 ~ 1000MHz (CATV / 75ohms)
- 50 ~ 2150MHz (SMATV / 75ohms)

Pin Configuration

Pin No.	Function
3	RF IN
6	RF OUT / Bias
1,2,4,5	GND

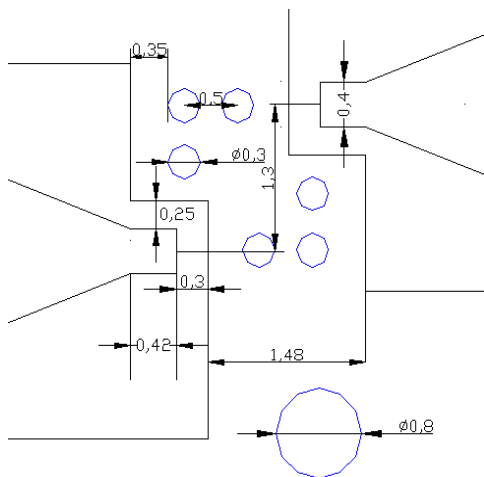
Outline Drawing



Symbols	Dimensions (In mm)		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.025	0.062	0.10
A2	0.875	0.937	1.00
b	0.20	0.30	0.40
C	0.10	0.125	0.15
D	1.90	2.00	2.10
F	1.15	1.25	1.35
E1	2.00	2.10	2.20
e	--	0.65BSC	--
e1	--	1.30BSC	--
L	--	0.425REF	--

Pin NO.	Function	Pin NO.	Function.
1	GND	4	GND
2	GND	5	GND
3	RF IN	6	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 lead pin 2 for better RF and thermal performance, as shown in the drawing at the left side.

Ordering Information

Part Number	Description
-------------	-------------

APPLICATION CIRCUIT

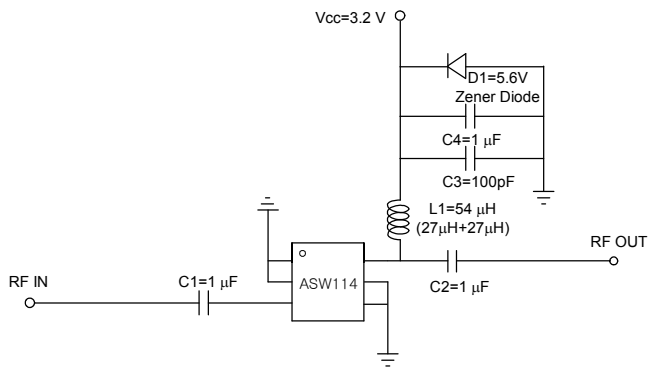
5 ~ 140 MHz

+3.2 V

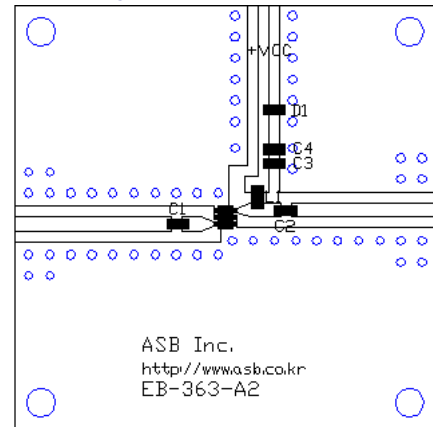
Frequency (MHz)	5	140
Magnitude S21 (dB)	20.5	20.5
Magnitude S11 (dB)	-18	-18
Magnitude S22 (dB)	-14	-14
Output P1dB (dBm)	10	9.5
Output IP3 ¹⁾ (dBm)	19	18.5
Noise Figure (dB)	3.0	2.9
Device Voltage (V)	3.2	3.2
Current (mA)	37	37

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

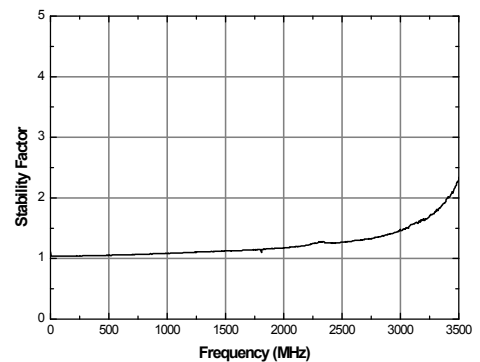
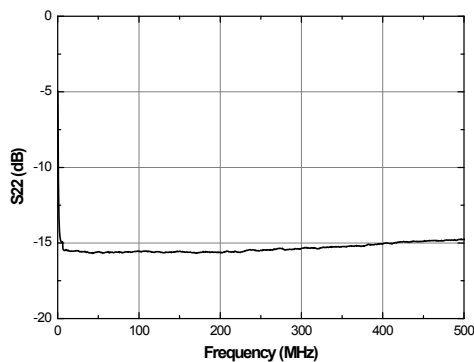
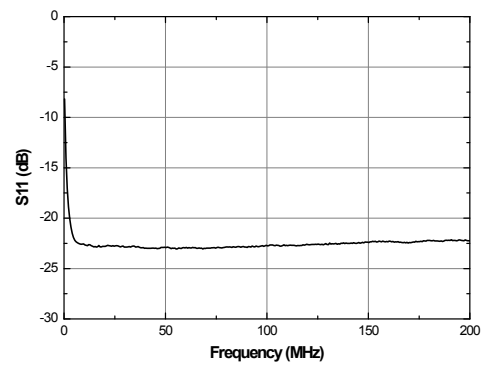
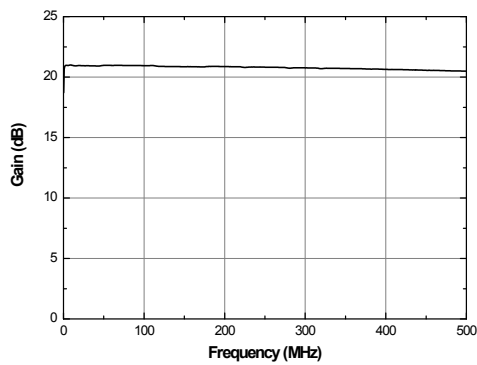
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



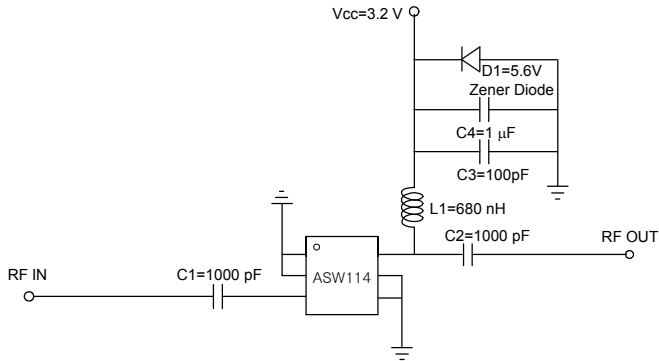
APPLICATION CIRCUIT

IF
 70 ~ 450 MHz
 +3.2 V

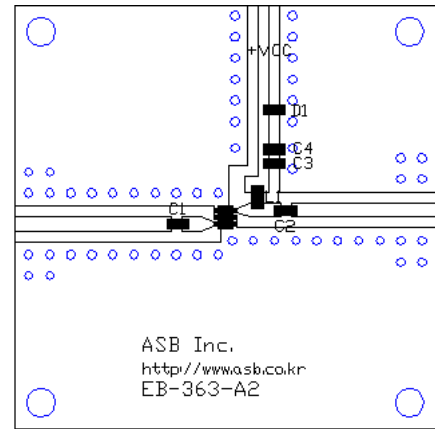
Frequency (MHz)	70	150	300	450
Magnitude S21 (dB)	21	21	21	20.5
Magnitude S11 (dB)	-15	-18	-18	-18
Magnitude S22 (dB)	-18	-16	-16	-16
Output P1dB (dBm)	12	12	12	12
Output IP3 ¹⁾ (dBm)	22.5	22.5	23	23.5
Noise Figure (dB)	--	--	--	--
Device Voltage (V)	3.2	3.2	3.2	3.2
Current (mA)	37	37	37	37

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

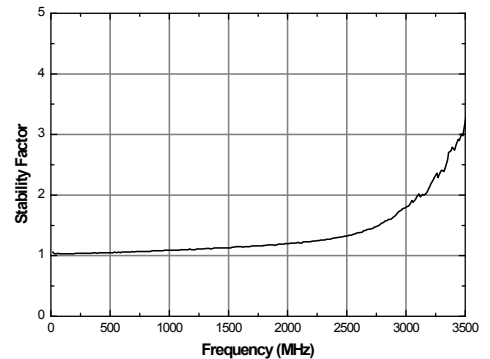
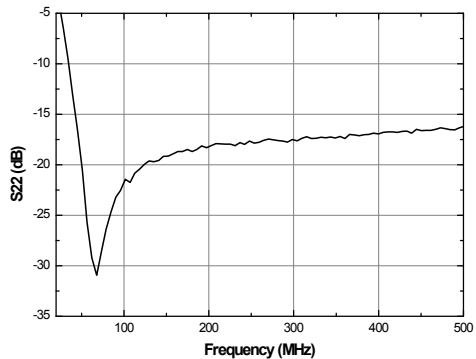
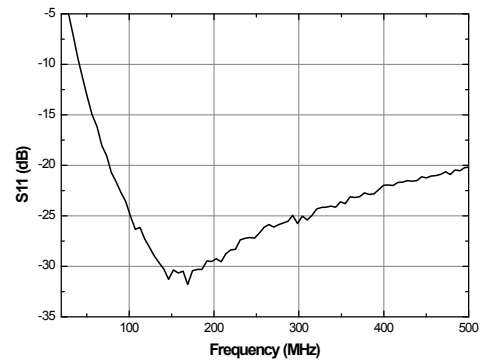
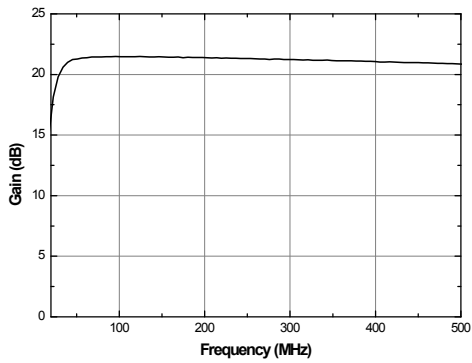
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

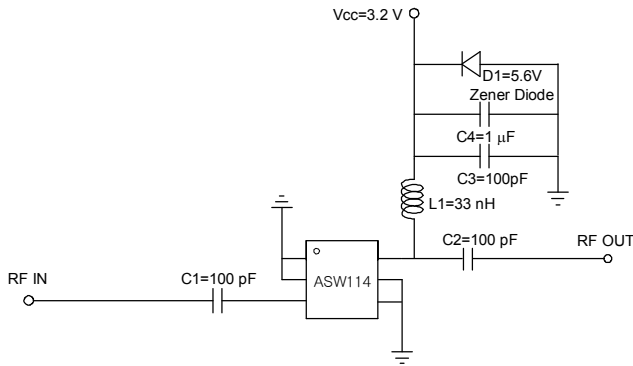
500 ~ 3500 MHz

+3.2 V

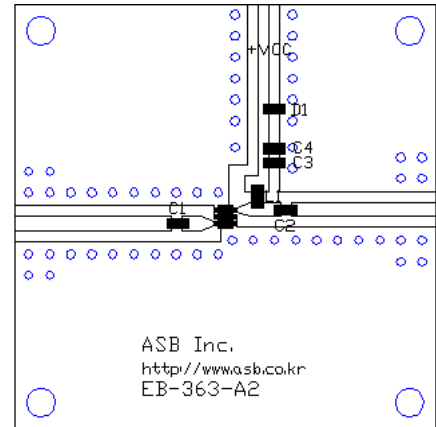
Frequency (MHz)	500	900	1750	2000	2400	2700	3500
Magnitude S21 (dB)	20.5	20	17.5	17	16	15.3	13.5
Magnitude S11 (dB)	-15	-18	-14	-14	-15	-15	-18
Magnitude S22 (dB)	-13	-15	-15	-15	-18	-18	-15
Output P1dB (dBm)	12.5	12.5	13	13	13.5	13.5	14
Output IP3 ¹⁾ (dBm)	25	24.5	25	26	26.5	25.5	26.5
Noise Figure (dB)	3.2	3.2	3.2	3.3	3.3	3.4	4.2
Device Voltage (V)	3.2						
Current (mA)	37						

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

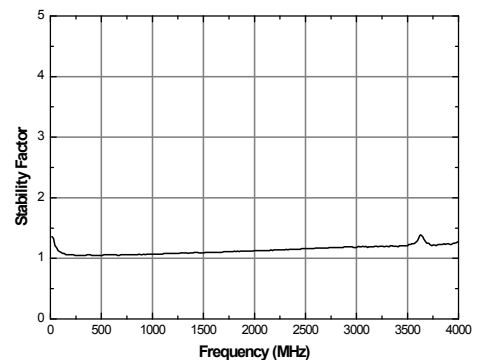
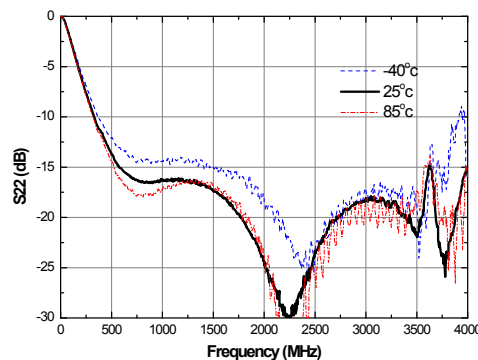
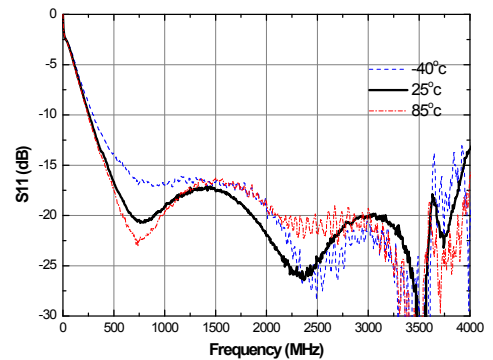
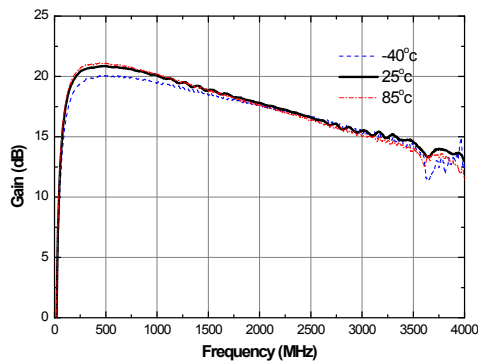
Schematic



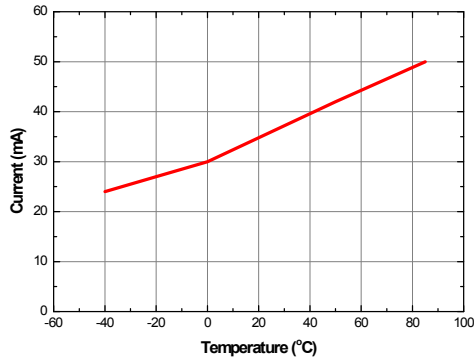
Board Layout (FR4, 40x40 mm², 0.8T)



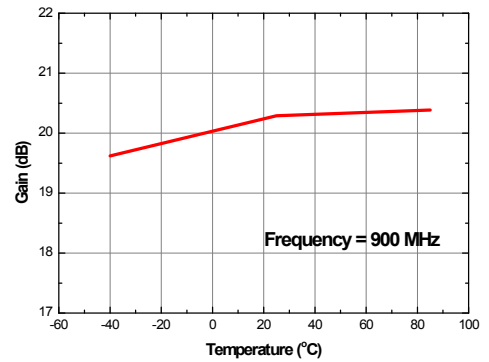
S-parameters & K-factor



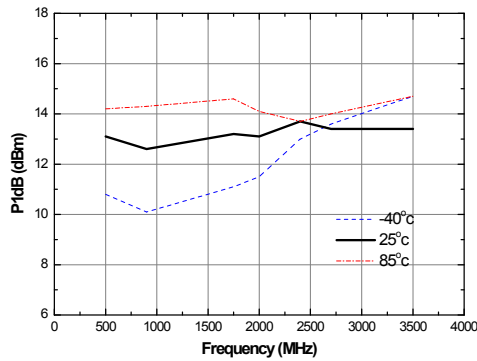
Current vs. Temperature



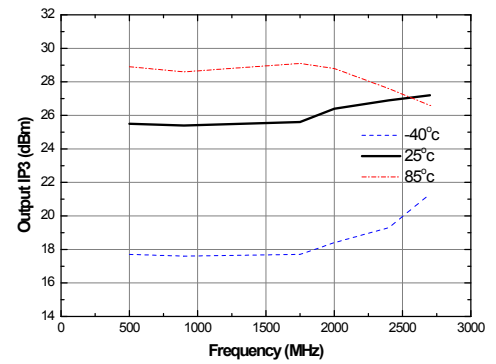
Gain vs. Temperature



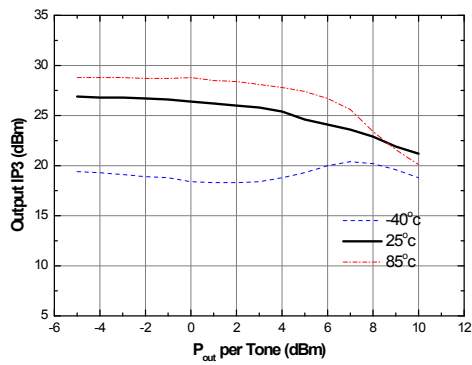
P1dB vs. Frequency



Output IP3 vs. Frequency



Output IP3 vs. Tone Power (Frequency = 2000MHz)



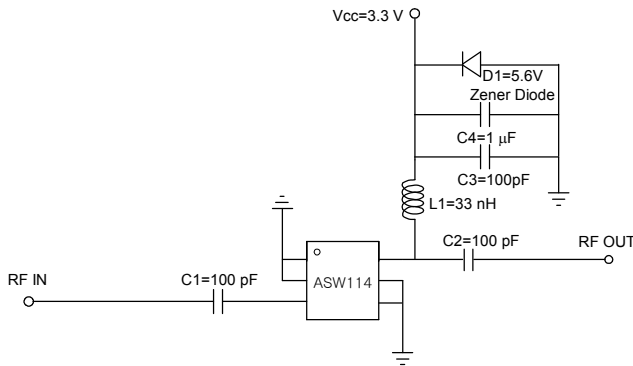
APPLICATION CIRCUIT

500 ~ 3500 MHz
+3.3 V

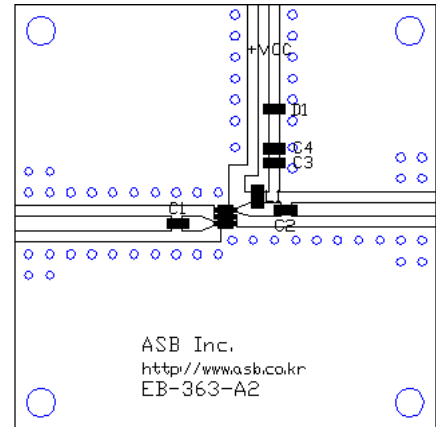
Frequency (MHz)	500	900	1750	2000	2400	2700	3500
Magnitude S21 (dB)	21	20.5	18	17	16	15.5	14
Magnitude S11 (dB)	-18	-20	-14	-14	-14	-13	-16
Magnitude S22 (dB)	-13	-16	-14	-16	-18	-18	-18
Output P1dB (dBm)	14.5	14.5	14.5	14.5	14.5	14	14.5
Output IP3 ¹⁾ (dBm)	30	29.5	29	29	29	27	--
Noise Figure (dB)	3.4	3.1	3.2	3.3	3.4	3.5	4.3
Device Voltage (V)	3.3						
Current (mA)	53						

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

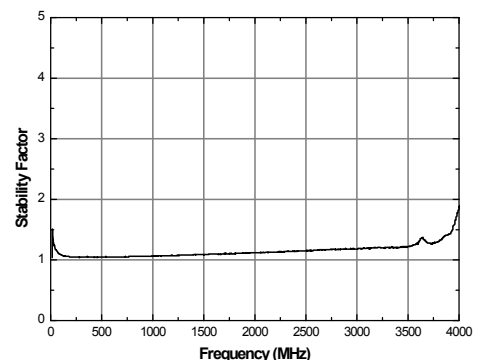
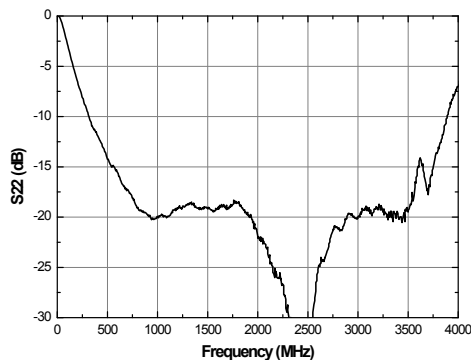
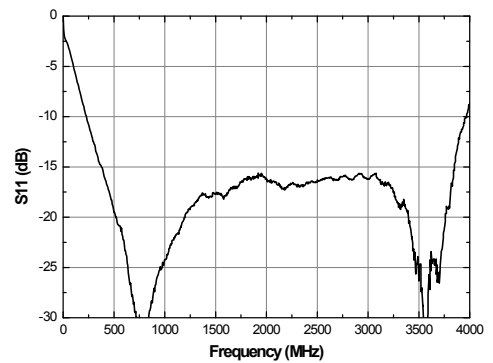
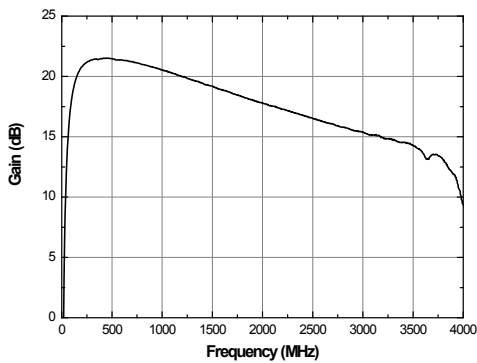
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

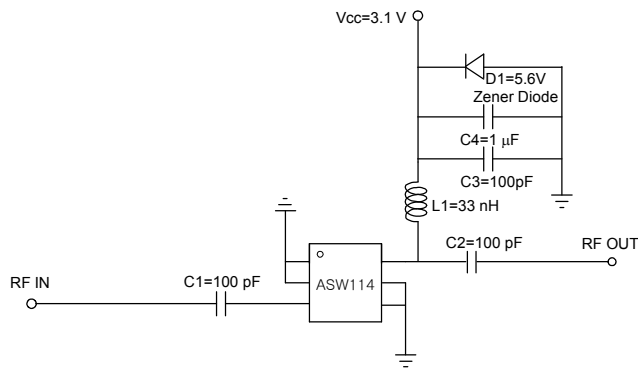
300 ~ 2700 MHz

+3.1 V

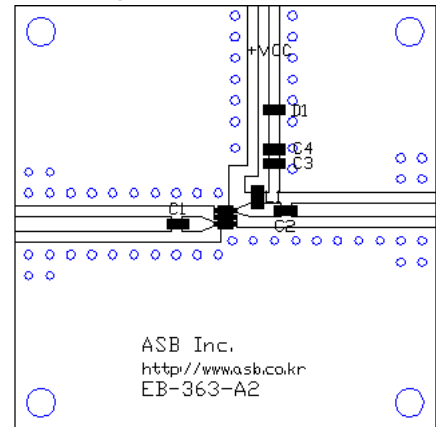
Frequency (MHz)	300	900	2000	2700
Magnitude S21 (dB)	19.3	19	16.4	15
Magnitude S11 (dB)	-10	-15	-15	-18
Magnitude S22 (dB)	-8	-13	-14	-16
Output P1dB (dBm)	11	11	11.5	12
Output IP3 ¹⁾ (dBm)	17.0	17.5	18.5	22
Noise Figure (dB)	3.2	3	3	3.3
Device Voltage (V)	3.1	3.1	3.1	3.1
Current (mA)	25	25	25	25

1) OIP3 is measured with two tones at an output power of -5 dBm/ tone separated by 1 MHz.

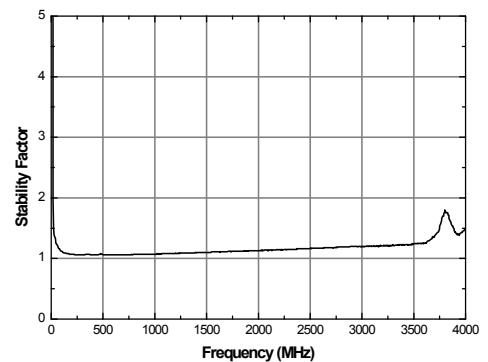
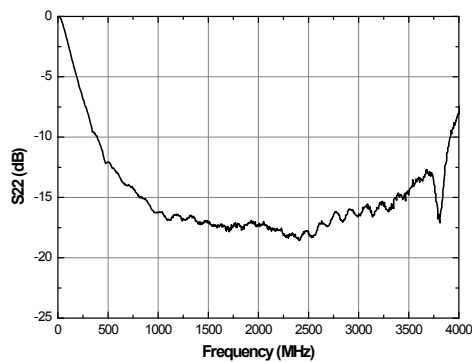
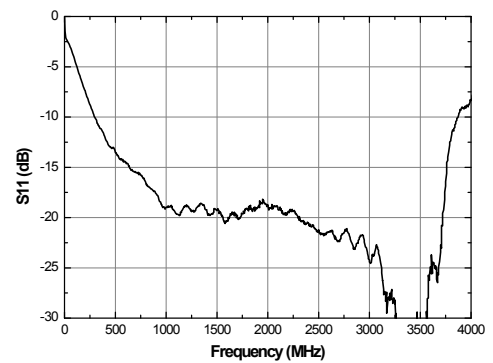
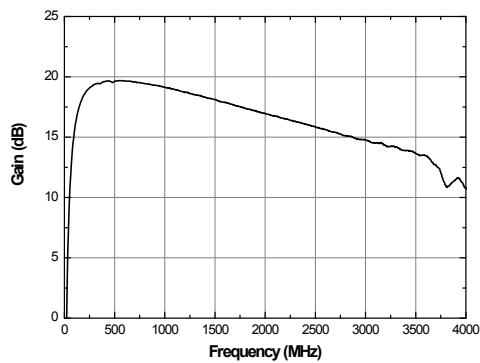
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

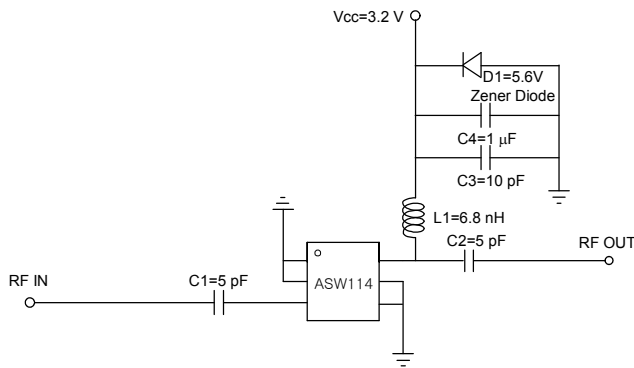
4000 ~ 6000 MHz

+3.2 V

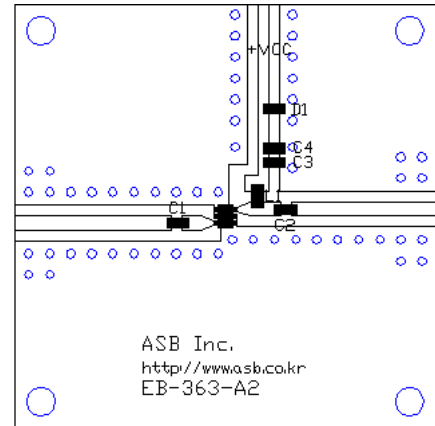
Frequency (MHz)	4000	5000	5800	6000
Magnitude S21 (dB)	13	11.5	10.5	10.5
Magnitude S11 (dB)	-18	-18	-14	-14
Magnitude S22 (dB)	-14	-16	-18	-16
Output P1dB (dBm)	13	12	12	11
Output IP3 ¹⁾ (dBm)	25	25	23	22.5
Noise Figure (dB)	3.4	3.8	3.9	3.9
Device Voltage (V)	3.2	3.2	3.2	3.2
Current (mA)	37	37	37	37

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

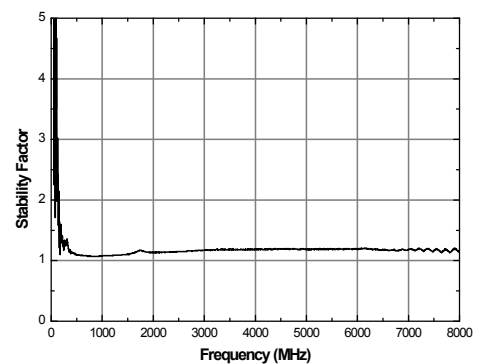
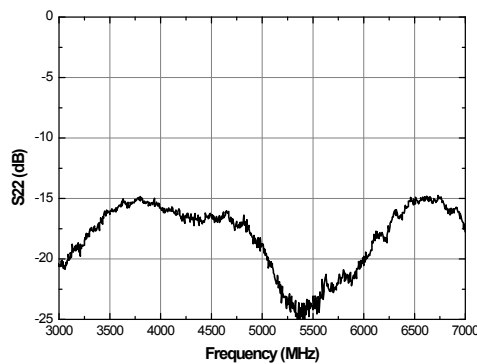
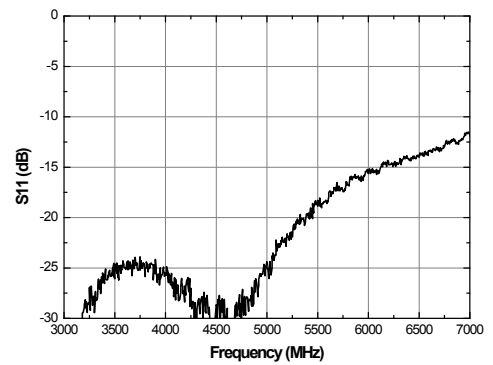
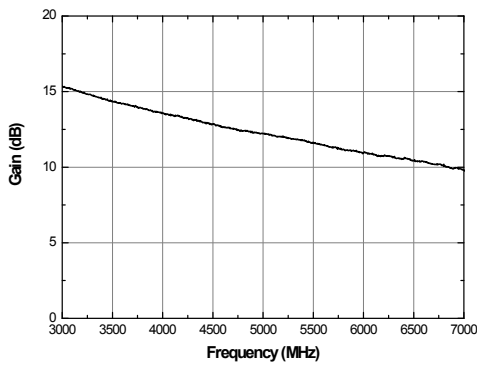
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

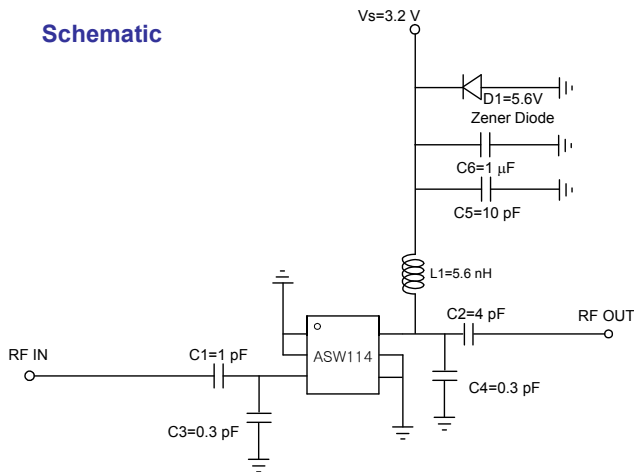
6500 ~ 7800 MHz

+3.2 V

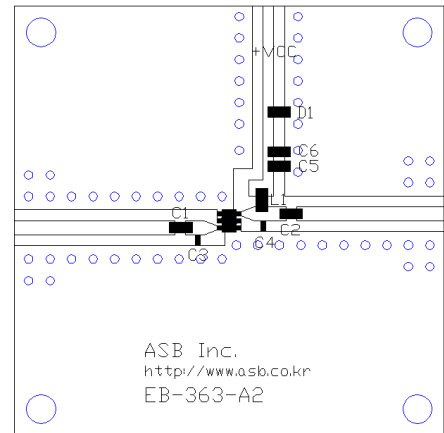
Frequency (MHz)	6500	7800
Magnitude S21 (dB)	9.8	9.1
Magnitude S11 (dB)	-11	-8
Magnitude S22 (dB)	-18	-18
Output P1dB (dBm)	6	3
Output IP3 ¹⁾ (dBm)	15.5	14.0
Noise Figure (dB)	5.6	5.5
Device Voltage (V)	3.2	3.2
Current (mA)	37	37

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

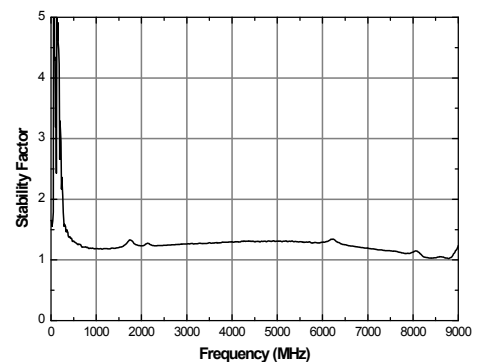
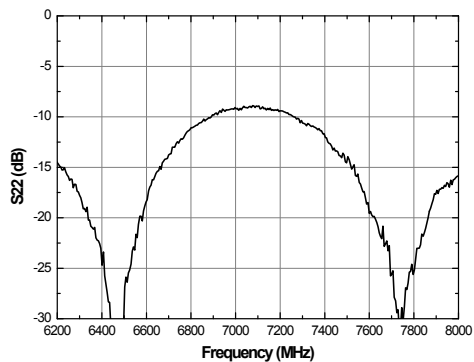
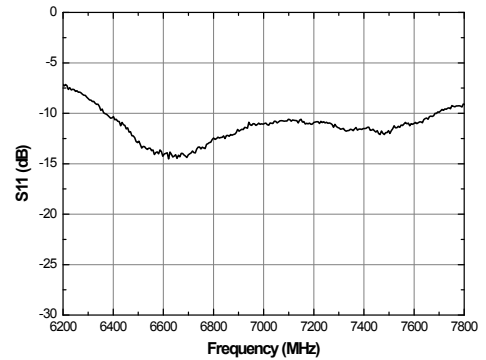
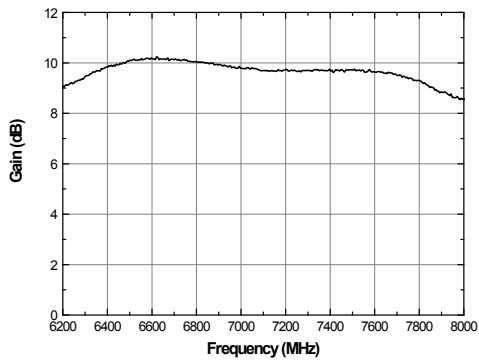
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

ATSC

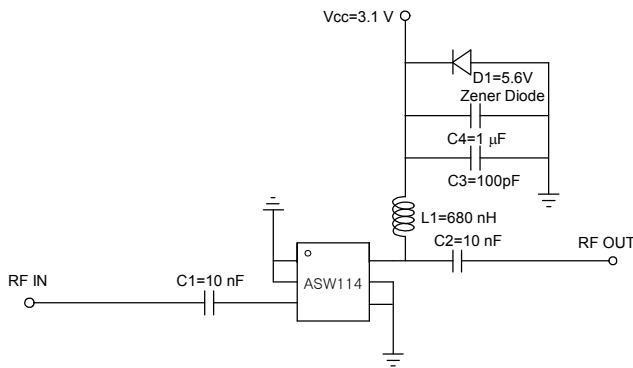
57 ~ 213 MHz

+3.1 V

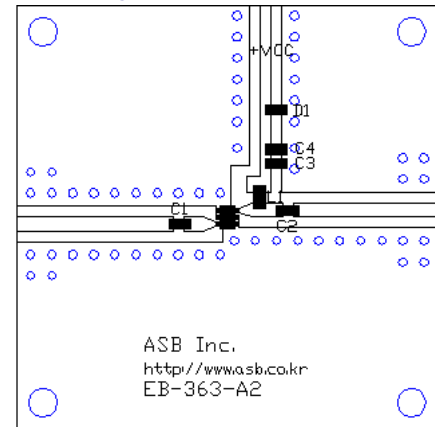
Frequency (MHz)	57	213
Magnitude S21 (dB)	20	20
Magnitude S11 (dB)	-15	-15
Magnitude S22 (dB)	-12	-13
Output P1dB (dBm)	10.5	10.5
Output IP3 ¹⁾ (dBm)	18.5	19
Noise Figure (dB)	2.7	2.8
Device Voltage (V)	3.1	3.1
Current (mA)	25	25

1) OIP3 is measured with two tones at an output power of -5 dBm/tone separated by 1 MHz.

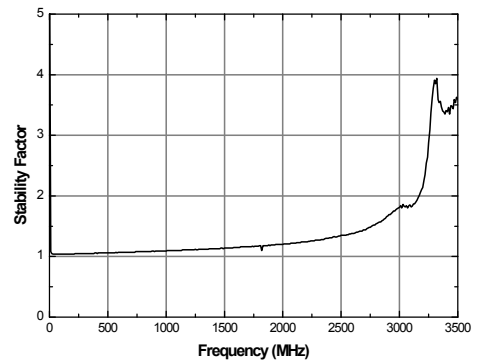
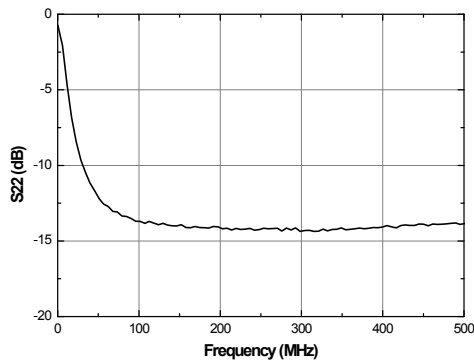
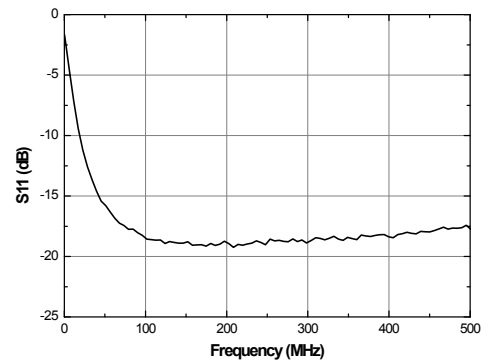
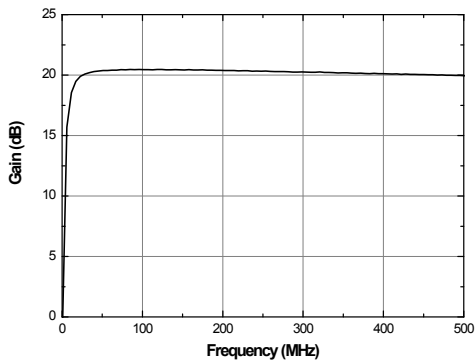
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

DVB-T (V / U band)

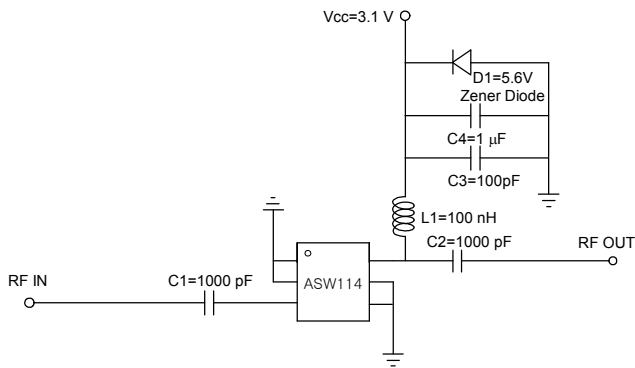
170 ~ 860 MHz

+3.1 V

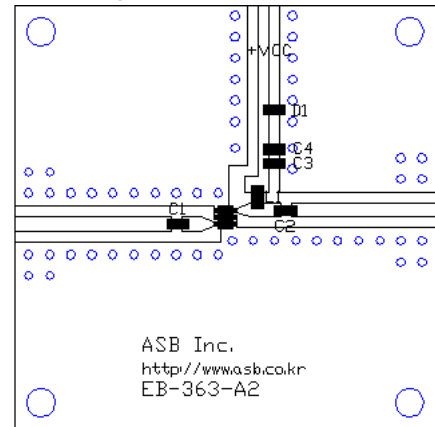
Frequency (MHz)	170	860
Magnitude S21 (dB)	20	18.5
Magnitude S11 (dB)	-15	-14
Magnitude S22 (dB)	-12	-15
Output P1dB (dBm)	11	10
Output IP3 ¹⁾ (dBm)	20	19
Noise Figure (dB)	2.7	2.8
Device Voltage (V)	3.1	3.1
Current (mA)	25	25

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

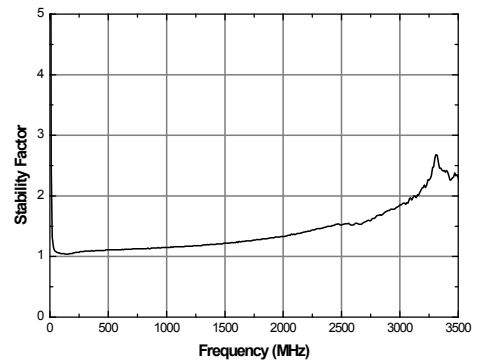
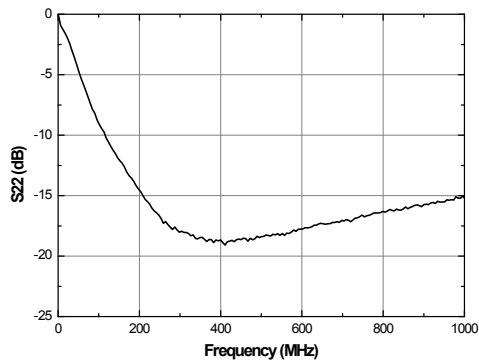
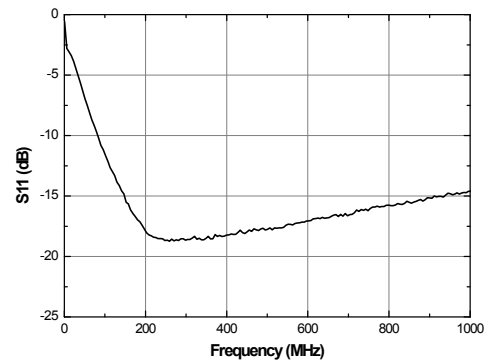
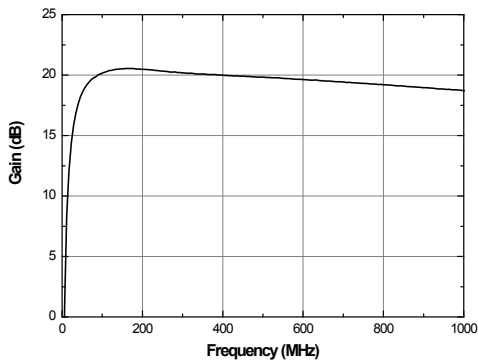
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



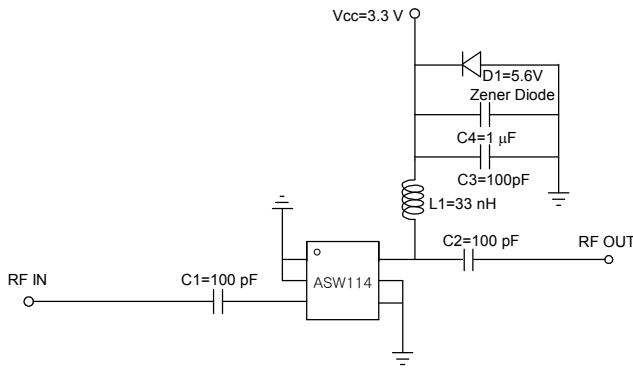
APPLICATION CIRCUIT

SMATV
950 ~ 2150 MHz
+3.3 V

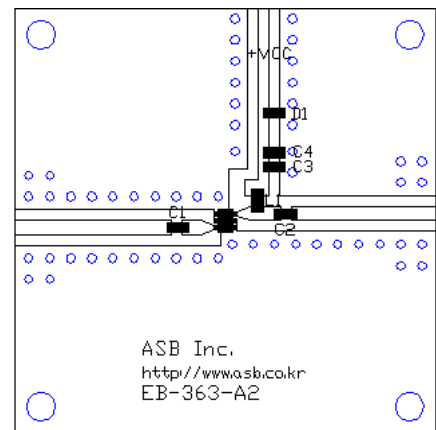
Frequency (MHz)	950	1500	2000
Magnitude S21 (dB)	20.5	18.5	17
Magnitude S11 (dB)	-20	-14	-14
Magnitude S22 (dB)	-16	-14	-16
Output P1dB (dBm)	14.5	14.5	14.5
Output IP3 ¹⁾ (dBm)	29.5	29	29
Noise Figure (dB)	3.1	3.2	3.3
Device Voltage (V)	3.3		
Current (mA)	53		

1) OIP3 is measured with two tones at an output power of +0 dBm/tone separated by 1 MHz.

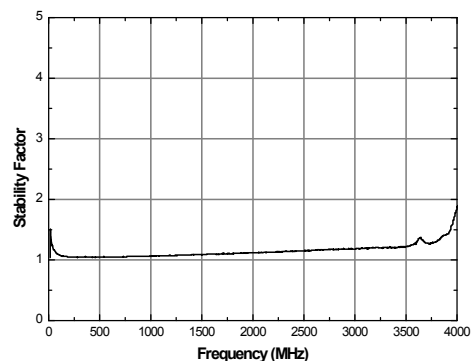
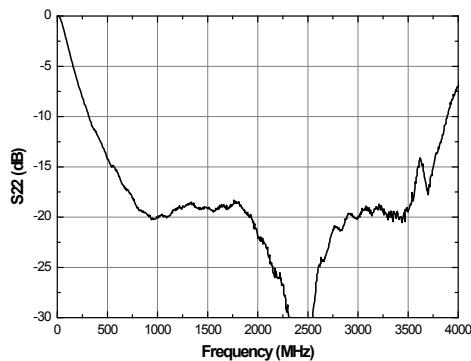
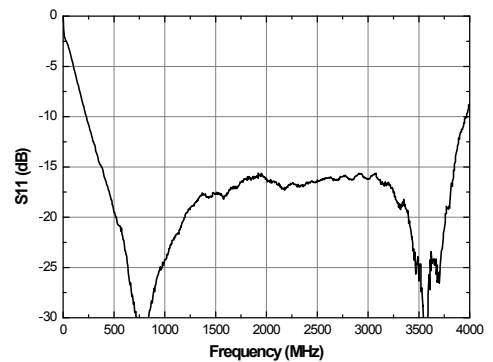
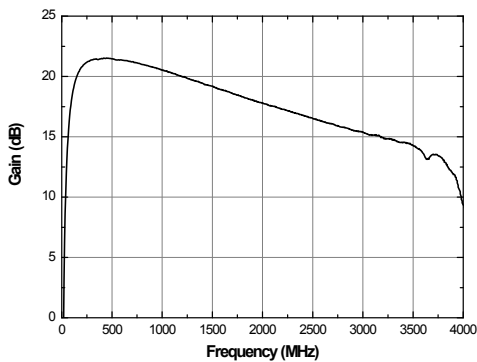
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

CATV (75 ohms)

50 ~ 1000 MHz

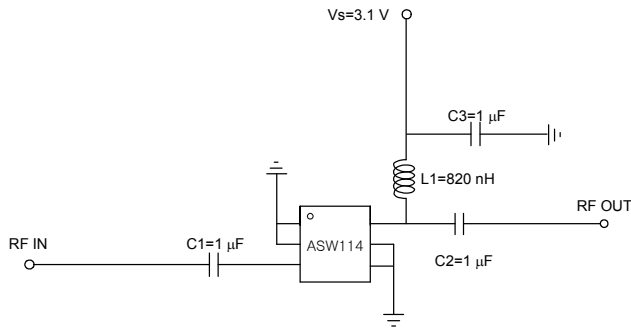
+3.1 V

Frequency (MHz)	50	500	860
Magnitude S21 (dB)	19.5	19	18.5
Magnitude S11 (dB)	-12.5	-17	-20
Magnitude S22 (dB)	-15	-20	-15
Output P1dB (dBm)	11	11	11
Output IP3 ¹⁾ (dBm)	17	19	20
Output IP2 ^{1),2)} (dBm)	16	24	26
Noise Figure (dB)	2.9	3.1	3.2
Device Voltage (V)	3.1	3.1	3.1
Current (mA)	25	25	25

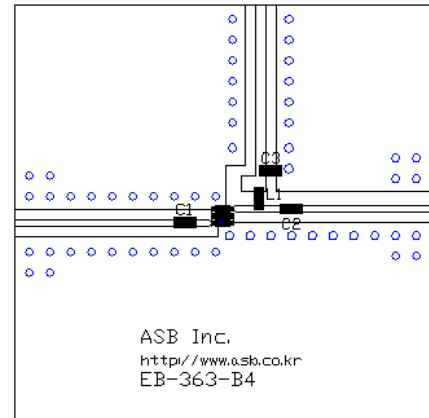
1) OIP3 and OIP2 are measured with two tones at an output power of +0 dBm/tone separated by 6 MHz.

2) OIP2 is measured at F1+F2 Frequency.

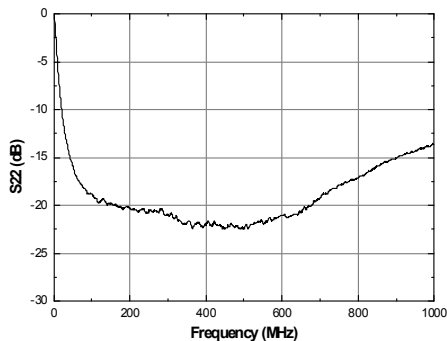
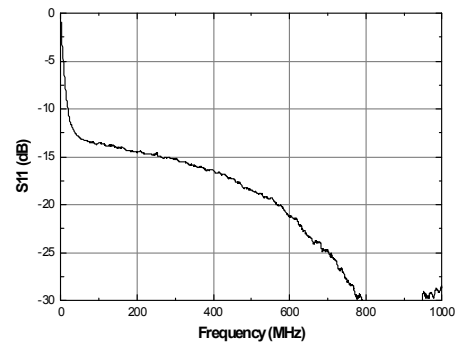
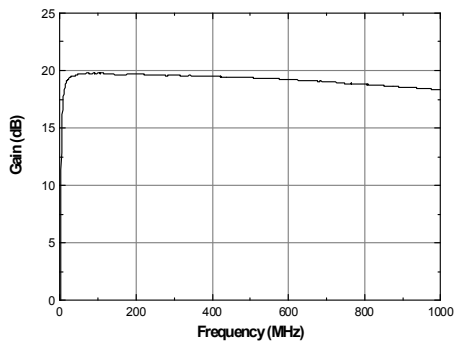
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor



APPLICATION CIRCUIT

SMATV (75 ohms)

50 ~ 2150 MHz

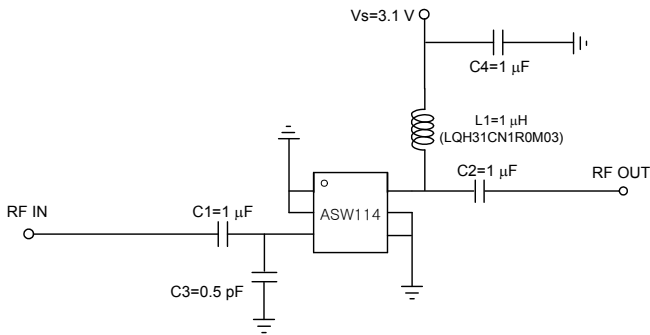
+3.1 V

Frequency (MHz)	50	1000	2150
Magnitude S21 (dB)	19.8	18.9	16.0
Magnitude S11 (dB)	-11	-16	-20
Magnitude S22 (dB)	-13	-16	-20
Output P1dB (dBm)	7	9	7
Output IP3 ¹⁾ (dBm)	17	20	17
Output IP2 ^{1),2)} (dBm)	18	29	25
Noise Figure (dB)	3.2	3.0	3.2
Device Voltage (V)	3.1	3.1	3.1
Current (mA)	25	25	25

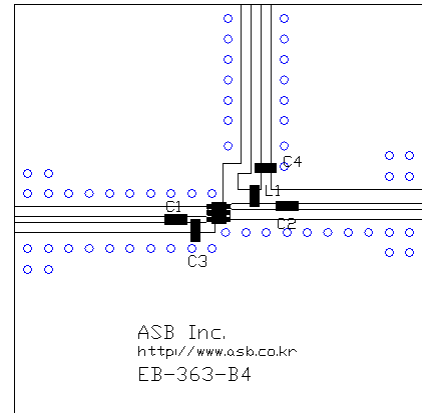
1) OIP3 and OIP2 are measured with two tones at an output power of +0 dBm/tone separated by 6 MHz.

2) OIP2 is measured at F1+F2 Frequency.

Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters & K-factor

