Advanced Semiconductor Business Inc.

ASL580

Wideband Linear Amplifier MMIC

Features

- 19.4 dB Gain at 500 MHz
- 24.5 dBm P1dB at 500 MHz
- 41 dBm Output IP3 at 500 MHz
- 1.6 dB NF at 500 MHz
- 75 Ohm Input / Output Match
- Bandwidth 5 ~ 1000 MHz
- Single Supply 8 V

Description

The ASL580, a wideband linear amplifier MMIC, has a high linearity and low noise over a wide range of frequency 5 MHz to 1 GHz, being suitable for use in the fiber receiver, distribution amplifiers and drop amplifiers of CATV systems, and in the mobile wireless repeaters and BTS. The amplifier is available in an SOT-89 package and passes through the stringent DC, RF, and reliability tests.

RoHS-compliant GREEN Package



Package Style: SOT-89

Typical Performance

Parameters	Units	Typical			
Frequency	MHz	5	50	500	860
Noise Figure	dB	2.0	1.4	1.6	1.7
Gain	dB	21.3	20.3	19.4	18.5
S11	dB	-18	-18	-15	-10
S22	dB	-18	-20	-14	-11
Output P1dB	dBm	25.5	24.5	24.5	23.5
Output IP3[1)]	dBm	37.5	39	41	39.5
Output IP2[1),2)]	dBm	43	52	52	45
CSO[3)]	dBc	60			
CTB[3)]	dBc	> 70			
Current	mA	120			
Device Voltage	V	8			

1) OIP3 and OIP2 are measured with two tones at an output power of +10 dBm/tone separated by 1 MHz(up-link) or 6 MHz(down-link).
2) OIP2 is measured at F1+F2 Frequency.
3) Pout = 95 dBuV for 84 channels VHF signal.

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		500	
Gain	dB		19.4	
S11	dB		-15	
S22	dB		-14	
Output IP3	dBm		41	
Noise Figure	dB		1.6	
Output P1dB	dBm		24.5	
Current	mA		120	
Device Voltage	V		8	

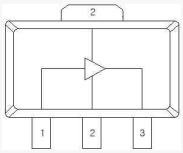
Absolute Maximum Ratings

Parameters	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-40 to +150°C
Device Voltage	+9 V
Operating Junction Temperature	+160°C
Input RF Power (CW, 75ohm matched)	6 dBm
Maximum Current	220 mA
Thermal Resistance	43 °C/W

Application Circuit

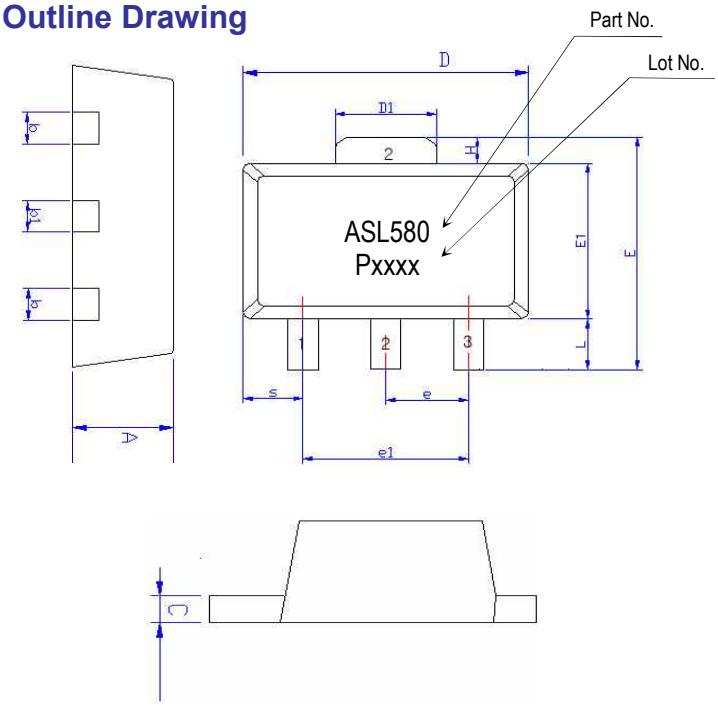
- CATV / 50 ~ 1000 MHz
- CATV / 50 ~ 1000 MHz / High Gain (S21 > 20 dB)
- CATV / 5 ~ 200 MHz
- 50 ~ 1000 MHz (Push-Pull / 1:1 transformer)
- RFID / 13.5 MHz (50 Ohm)
- DVB/CMMB / 450 ~ 950 MHz (50 Ohm)

Pin Configuration



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

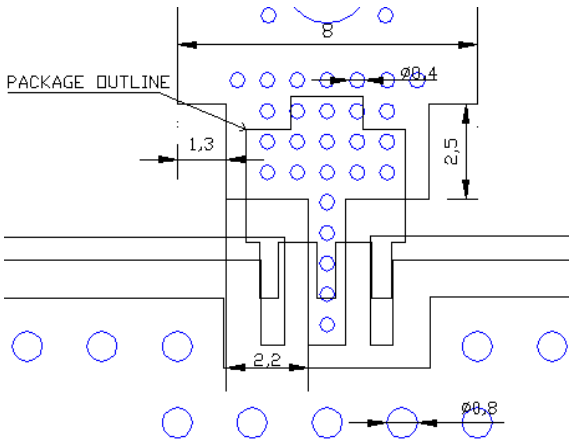
Outline Drawing



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: 500 V
MM	Class A
	Voltage Level: 125 V

CAUTION: ESD-sensitive device!

Moisture Sensitivity Level (MSL)	
	Level 3 at 260°C reflow

APPLICATION CIRCUIT

CATV

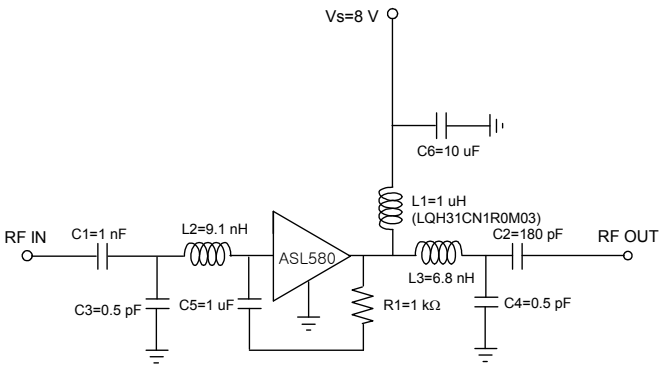
50 ~ 1000 MHz

+8 V

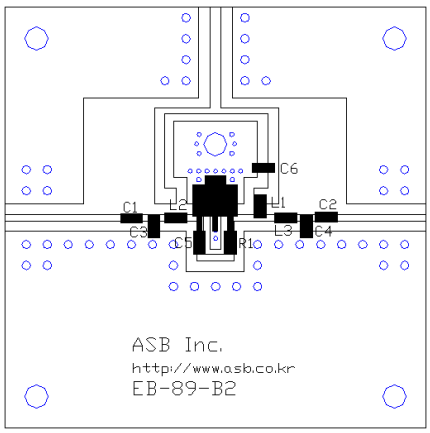
Frequency (MHz)	50	500	860
Noise Figure (dB)	1.4	1.6	1.7
Magnitude S21 (dB)	20.3	19.4	18.5
Magnitude S11 (dB)	-18	-15	-10
Magnitude S22 (dB)	-20	-14	-11
Output P1dB (dBm)	24.5	24.5	23.5
Output IP3[1] (dBm)	39	41	39.5
Output IP2[1),2)] (dBm)	52	52	45
CSO (dBc)[3]	60		
CTB (dBc)[3]	> 70		
Device Voltage (V)	8		
Current (mA)	120		

1) OIP3 and OIP2 are measured with two tones at an output power of +10 dBm/tone separated by 6 MHz.
2) OIP2 is measured at F1+F2 Frequency.
3) Pout = 95 dBuV for 84 channels VHF signal.

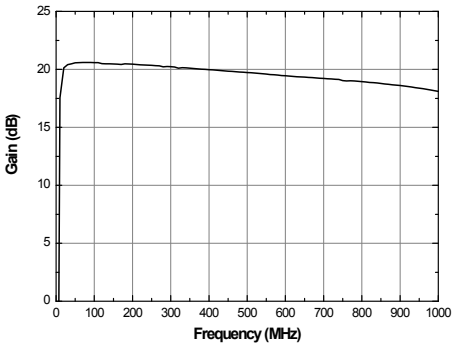
Schematic

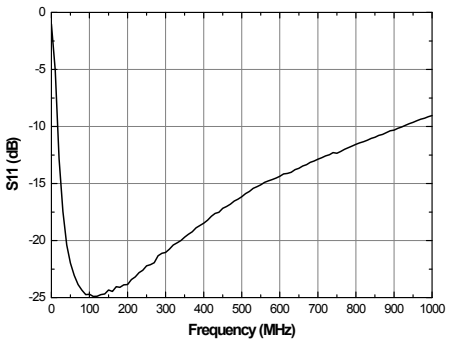


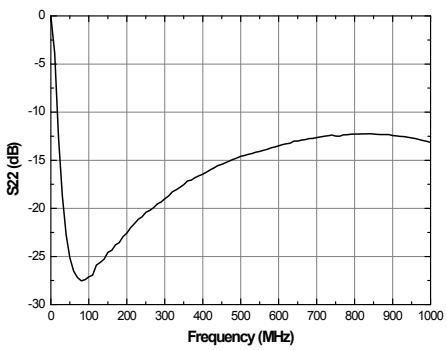
Board Layout (FR4, 40x40 mm^2, 0.8T)



S-parameters







APPLICATION CIRCUIT

CATV

High Gain

(S21 > 20 dB)

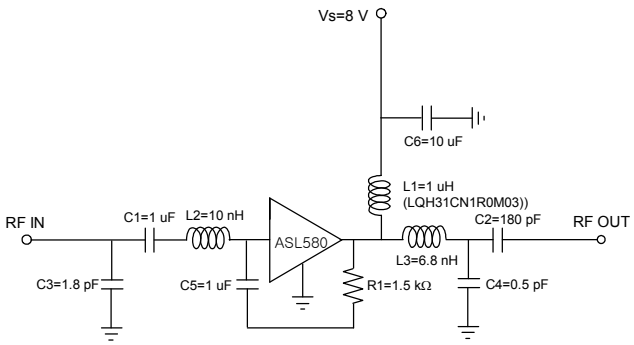
50 ~ 1000 MHz

+8 V

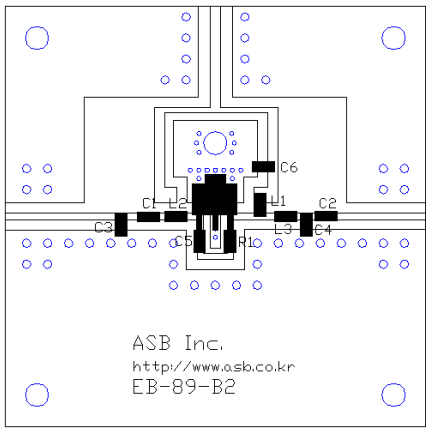
Frequency (MHz)	50	500	860
Noise Figure (dB)	1.4	1.3	1.4
Magnitude S21 (dB)	22.4	20.5	20.1
Magnitude S11 (dB)	-18	-8	-12
Magnitude S22 (dB)	-18	-9	-9
Output P1dB (dBm)	20.5	19.5	20
Output IP3[1] (dBm)	39	43	45
Output IP2[1),2)] (dBm)	53	57	51
CSO (dBc)[3]	60		
CTB (dBc)[3]	> 70		
Device Voltage (V)	8		
Current (mA)	120		

1) OIP3 and OIP2 are measured with two tones at an output power of +10 dBm/tone separated by 6 MHz.
2) OIP2 is measured at F1+F2 Frequency.
3) Pout = 95 dBuV for 84 channels VHF signal.

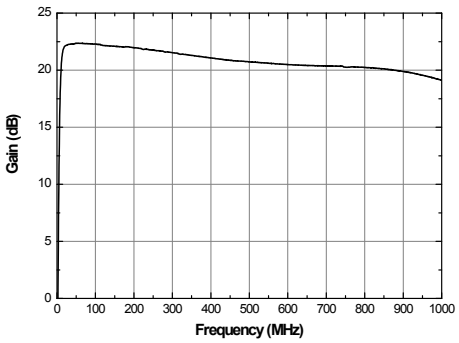
Schematic

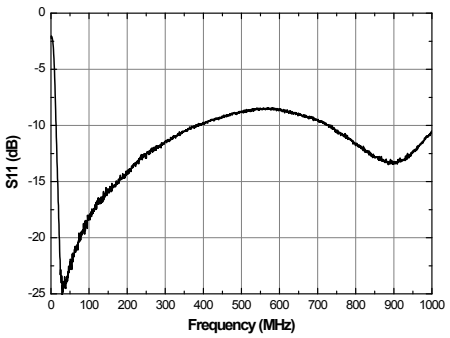


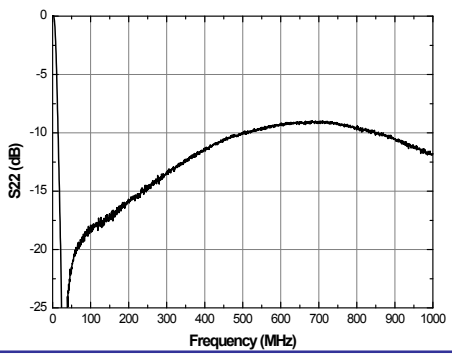
Board Layout (FR4, 40x40 mm^2, 0.8T)



S-parameters







APPLICATION CIRCUIT

CATV

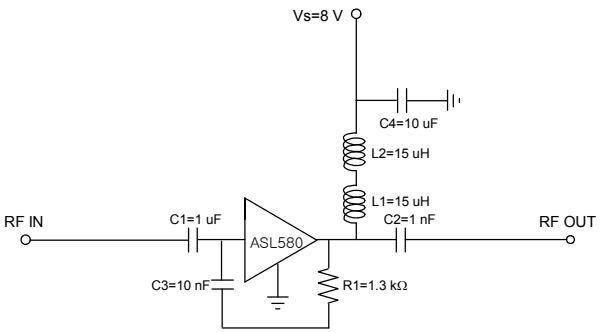
5 ~ 200 MHz

+8 V

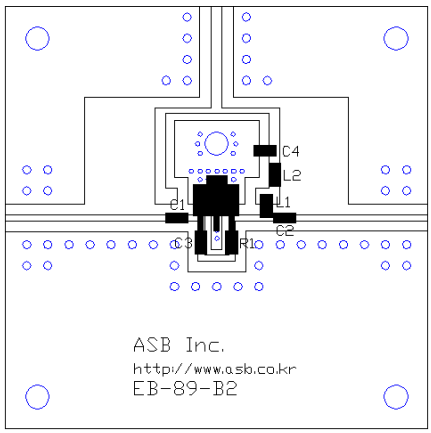
Frequency (MHz)	5	50	200
Noise Figure (dB)	2.0	1.2	1.3
Magnitude S21 (dB)	21.3	21.6	21.3
Magnitude S11 (dB)	-18	-20	-18
Magnitude S22 (dB)	-18	-20	-17
Output P1dB (dBm)	25.5	25	24.5
Output IP3[1] (dBm)	37.5	41	42.5
Output IP2[1),2)] (dBm)	43	52	52
Device Voltage (V)	8		
Current (mA)	120		

1) OIP3 and OIP2 are measured with two tones at an output power of +10 dBm/tone separated by 1 MHz.
2) OIP2 is measured at F1+F2 Frequency.

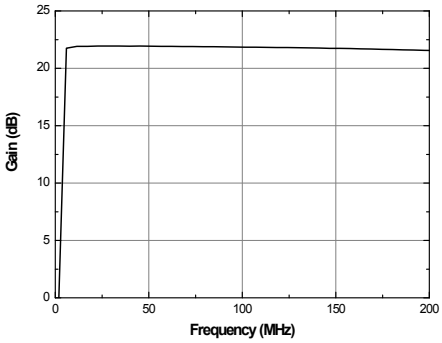
Schematic

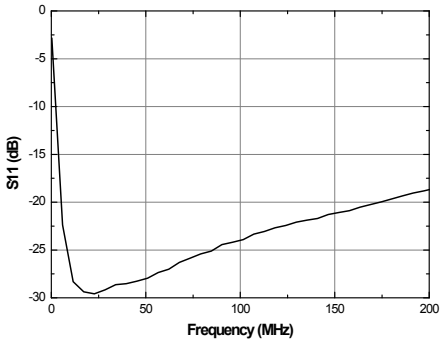


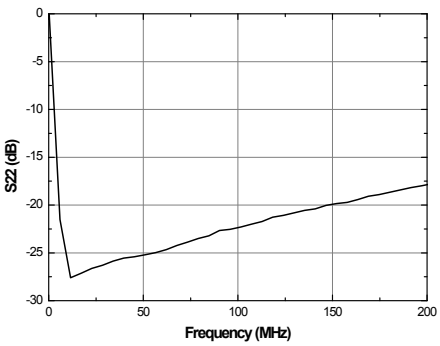
Board Layout (FR4, 40x40 mm^2, 0.8T)



S-parameters







APPLICATION CIRCUIT

CATV Push-Pull

1 : 1 transformer

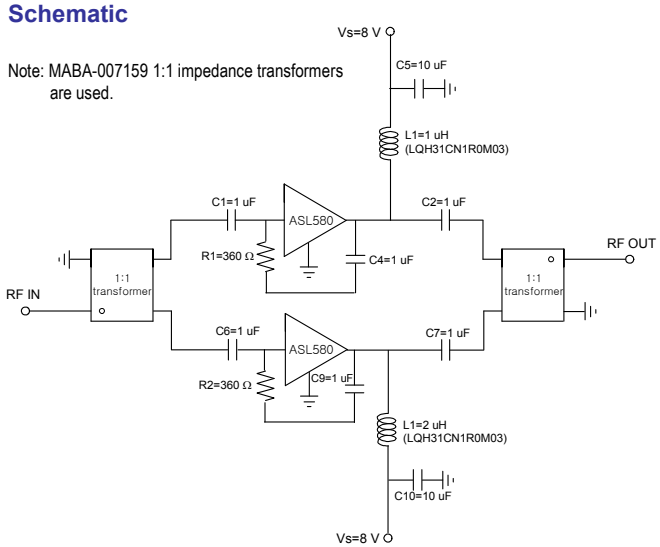
50 ~ 1000 MHz

+8 V

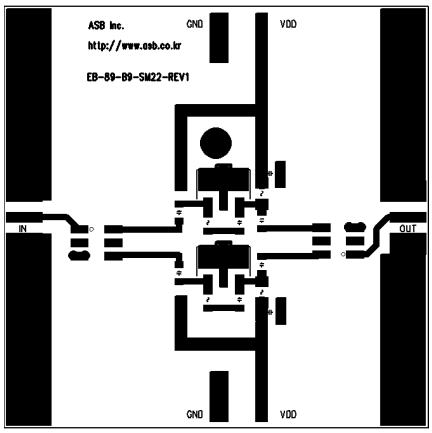
Frequency (MHz)	50	500	860
Magnitude S21 (dB)	15.7	15.4	15.4
Magnitude S11 (dB)	-16	-12	-18
Magnitude S22 (dB)	-16	-12	-16
Output P1dB (dBm)	25.5	27	27
Output IP3[1] (dBm)	40	44	42.5
Output IP2[1),2)] (dBm)	67	47	65
Noise Figure (dB)	2.3	2.2	2.1
Device Voltage (V)	8		
Current (mA)	240		

1) OIP3 and OIP2 are measured with two tones at an output power of +10 dBm/tone separated by 6 MHz.
2) OIP2 is measured at F1+F2 Frequency.

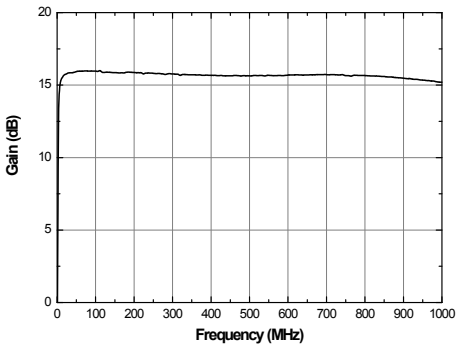
Schematic

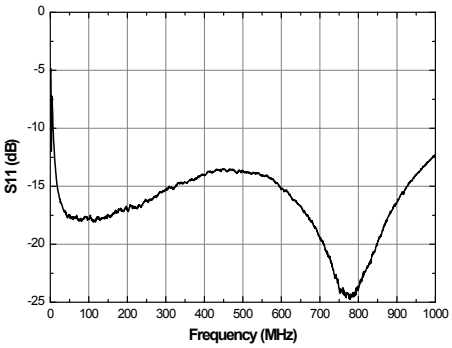


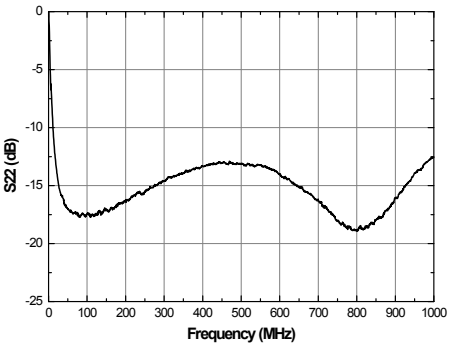
Board Layout (FR4, 40x40 mm^2, 0.8T)



S-parameters







APPLICATION CIRCUIT

RFID (50 Ohm)

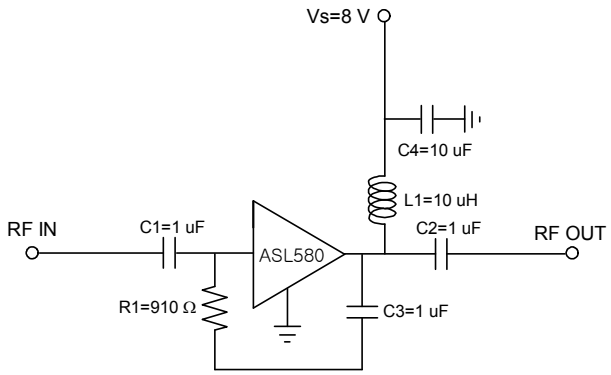
13.5 MHz

+8 V

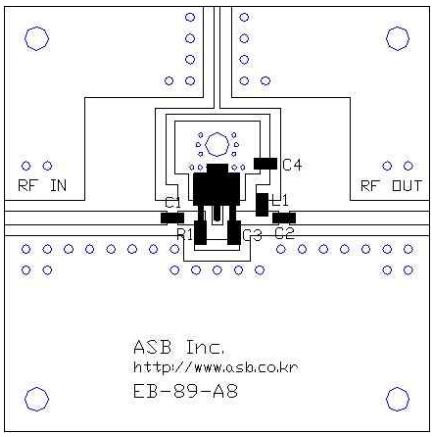
Frequency (MHz)	13.5
Magnitude S21 (dB)	19.5
Magnitude S11 (dB)	-10
Magnitude S22 (dB)	-9
Output P1dB (dBm)	25
Output IP3[1] (dBm)	39.5
Noise Figure (dB)	1.9
Device Voltage (V)	8
Current (mA)	120

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

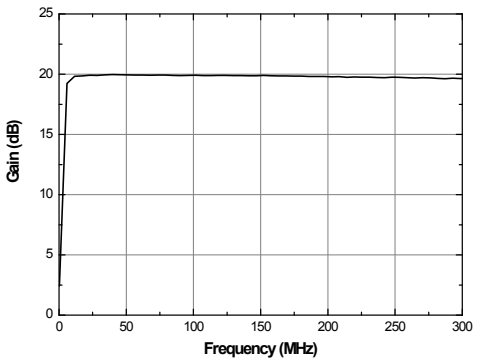
Schematic

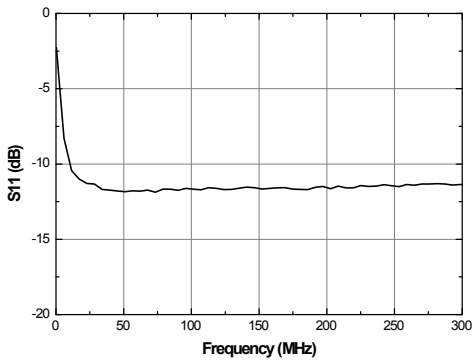


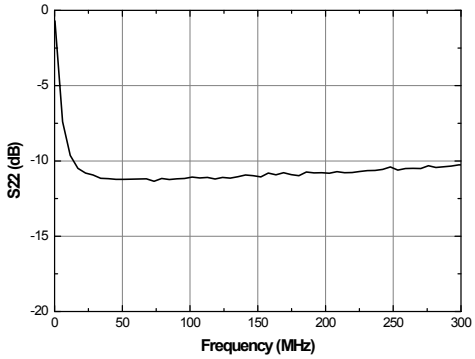
Board Layout (FR4, 40x40 mm^2, 0.8T)



S-parameters







APPLICATION CIRCUIT

DVB/CMMB

(50 Ohm)

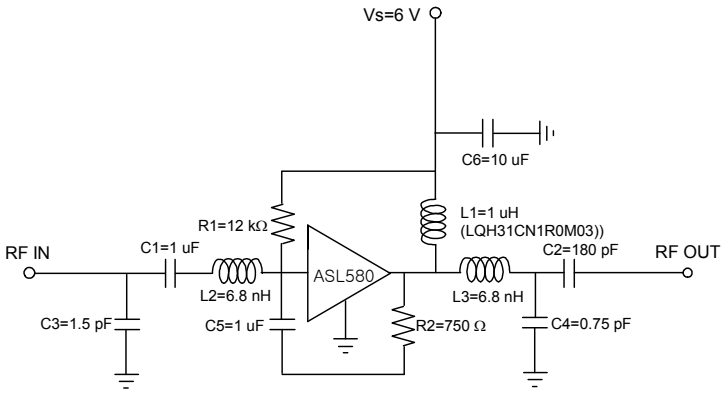
450 ~ 950 MHz

+6 V

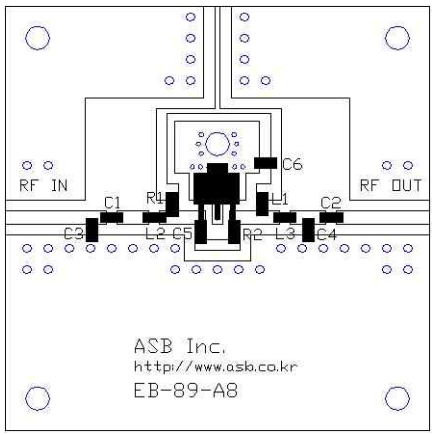
Frequency (MHz)	450	700	950
Magnitude S21 (dB)	19	19	18.5
Magnitude S11 (dB)	-12	-14	-10
Magnitude S22 (dB)	-13	-18	-16
Output P1dB (dBm)	24.5	24	23
Output IP3[1)] (dBm)	44	45	44.5
Noise Figure (dB)	1.6	1.6	1.7
Device Voltage (V)	6		
Current (mA)	150		

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

Schematic



Board Layout (FR4, 40x40 mm^2, 0.8T)



S-parameters

