

Features

- 23.3 dB Gain at 500 MHz
- 22 dBm P1dB at 500 MHz
- 42 dBm Output IP3 at 500 MHz
- 75 Ohm Input / Output Match
- Bandwidth 5~1000 MHz
- Single Supply

Description

The ASL390, 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.



Package Style: SOT-89

Typical Performance

Parameters	Units	Typical			
		5	50	500	860
Frequency	MHz	5	50	500	860
Noise Figure	dB	3.1	2.3	2.3	2.5
Gain	dB	23.3	23.8	23.3	22.1
S11	dB	-15.0	-15.0	-20.0	-16.5
S22	dB	-16.0	-18.0	-18.0	-15.5
Output P1dB	dBm	18.5	22.0	22.0	19.5
Output IP3 ¹⁾	dBm	37.5 ¹⁾	39 ²⁾	42 ²⁾	41 ²⁾
Output IP2 ^{1),3)}	dBm	52 ^{1),3)}	49 ^{2),3)}	50 ^{2),3)}	50 ^{2),3)}
CSO ⁴⁾	dBc			66 / 60	
CTB ⁴⁾	dBc			75 / 69	
Supply Current	mA	120		120	
Supply Voltage	V	5		5	

1) OIP3 and OIP2 are measured with two tones at an output power of +7 dBm/tone separated by 1 MHz.

2) OIP3 and OIP2 are measured with two tones at an output power of +9 dBm/tone separated by 6 MHz.

3) OIP2 is measured at F1+F2 Frequency.

4) Pout=95 dBuV / 98 dBuV for 84 channels VHF signal..

Product Specifications

Parameters	Units	Min	Typ	Max
Testing Frequency	MHz		500	
Gain	dB		23.3	
S11	dB		-20	
S22	dB		-18	
Output IP3	dBm		42	
Noise Figure	dB		2.3	
Output P1dB	dBm		22	
Supply Current	mA		120	
Supply Voltage	V		5	

Absolute Maximum Ratings

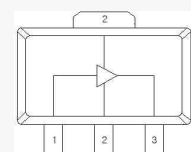
Parameters	Rating
Operating Case Temperature	-40 to +85°C
Storage Temperature	-40 to +150°C
Device Voltage	+7V
Operating Junction Temperature	+150°C
Input RF Power (CW, 75ohm matched)*	10 dBm

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

Applications

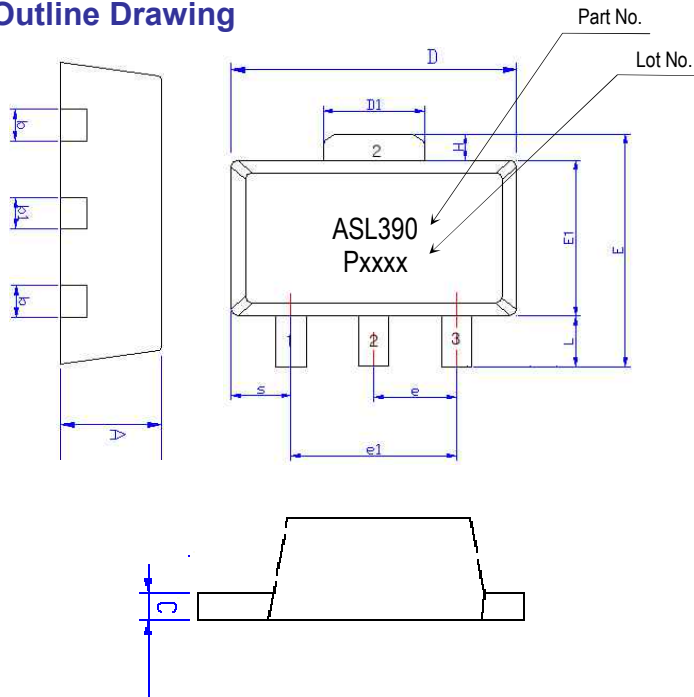
- 5 ~ 200 MHz (3.3 V)
- 5 ~ 200 MHz
- 50 ~ 1000 MHz
- 50 ~ 1000 MHz (Push-Pull / 1:1 transformer)

Pin Configuration



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

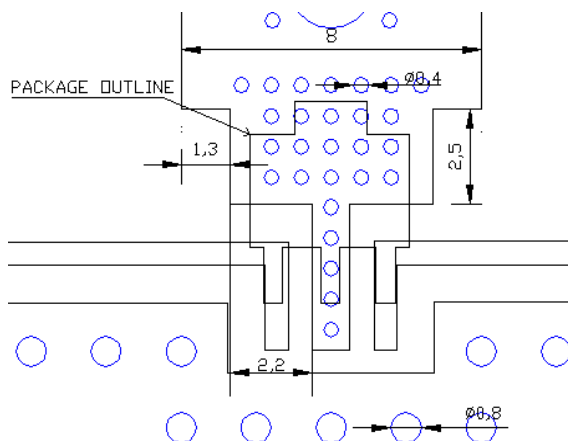
Outline Drawing



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: 750 V
MM	Class A
	Voltage Level: 175 V

CAUTION: ESD-sensitive device!

Moisture Sensitivity Level (MSL)

Level 3 at 260°C reflow

APPLICATION CIRCUIT

CATV

5 ~ 200 MHz

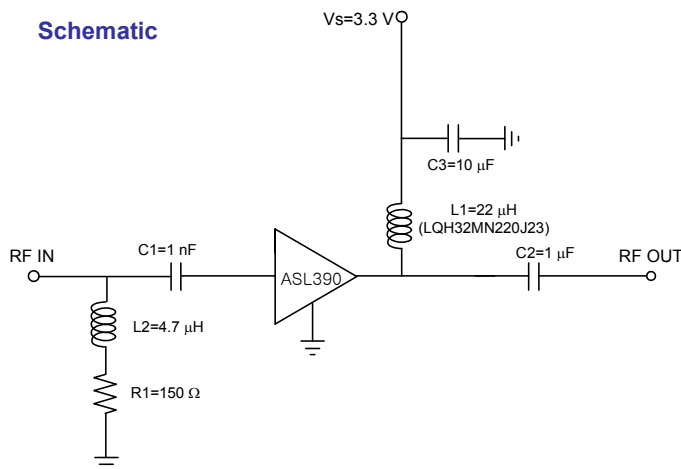
+3.3 V

Frequency (MHz)	5	50	200
Noise Figure (dB)	2.4	2.4	2.0
Magnitude S21 (dB)	23.3	23.4	23.0
Magnitude S11 (dB)	-12	-16	-17
Magnitude S22 (dB)	-16	-20	-20
Output P1dB (dBm)	14	18	18
Output IP3 ¹⁾ (dBm)	30	34	35
Output IP2 ^{1),2)} (dBm)	48	43	43
Supply Voltage (V)	3.3		
Current (mA)	68		

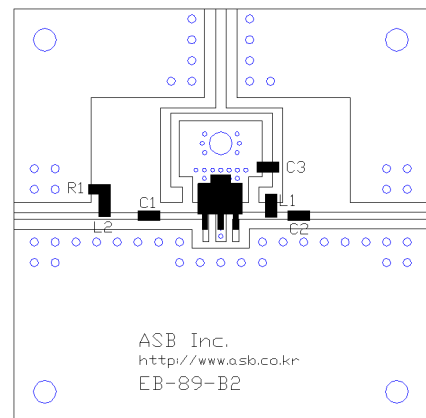
1) OIP3 and OIP2 are measured with two tones at an output power of +3 dBm/tone separated by 1 MHz.

2) OIP2 is measured at F1+F2 Frequency.

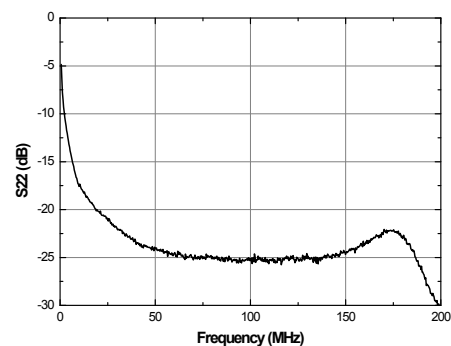
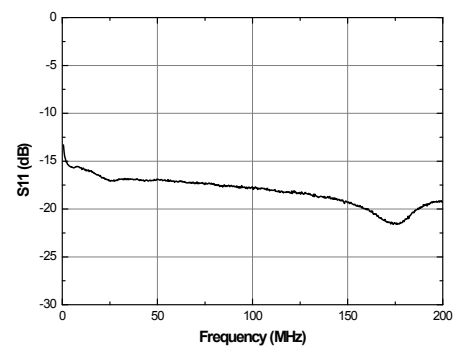
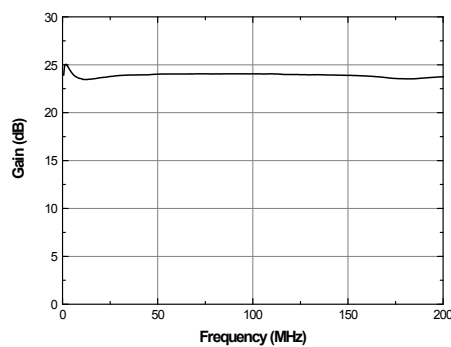
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters



APPLICATION CIRCUIT

CATV

5 ~ 200 MHz

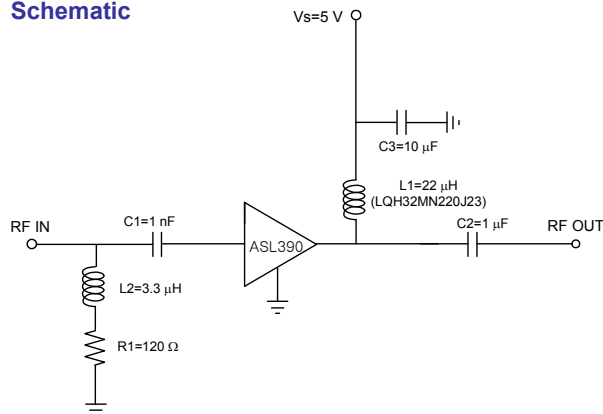
+5 V

Frequency (MHz)	5	50	200
Noise Figure (dB)	3.1	2.5	2.5
Magnitude S21 (dB)	23.3	23.8	23.3
Magnitude S11 (dB)	-15	-15	-18
Magnitude S22 (dB)	-16	-20	-20
Output P1dB (dBm)	18.5	21.5	21.5
Output IP3 ¹⁾ (dBm)	37.5	40.0	41.5
Output IP2 ^{1),2)} (dBm)	52	50	50
Supply Voltage (V)	5		
Current (mA)	120		

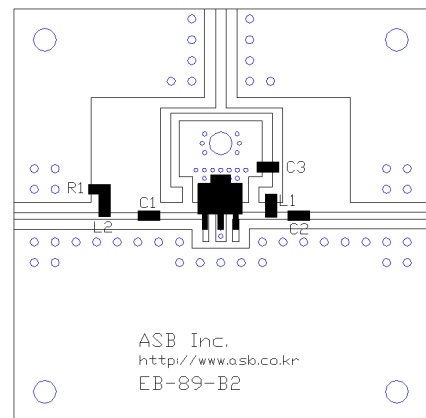
1) OIP3 and OIP2 are measured with two tones at an output power of +7 dBm/tone separated by 1 MHz.

2) OIP2 is measured at F1+F2 Frequency.

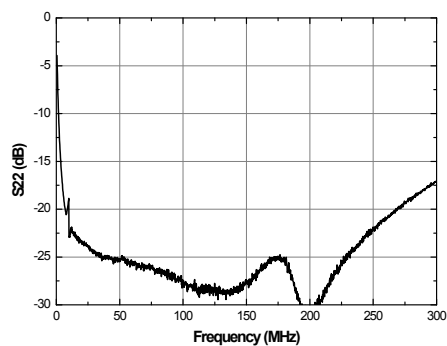
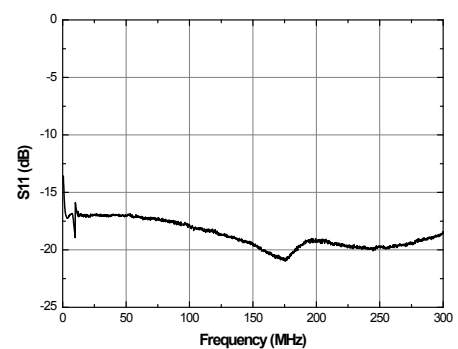
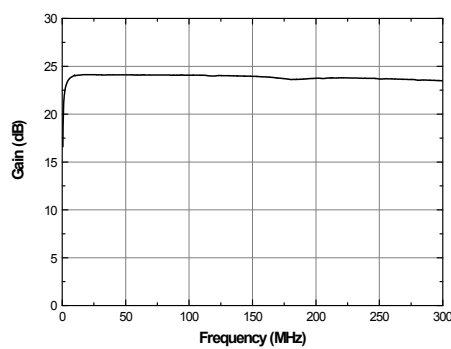
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters



APPLICATION CIRCUIT

CATV

50 ~ 1000 MHz

+5 V

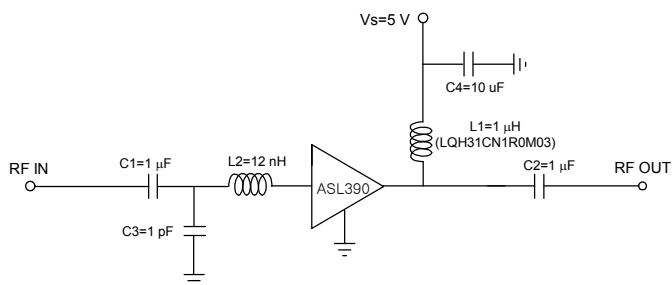
Frequency (MHz)	50	500	860
Noise Figure (dB)	2.3	2.3	2.5
Magnitude S21 (dB)	23.8	23.3	22.1
Magnitude S11 (dB)	-15.0	-20.0	-16.5
Magnitude S22 (dB)	-18.0	-18.0	-15.5
Output P1dB (dBm)	22.0	22.0	19.5
Output IP3 ¹⁾ (dBm)	39	42	41
Output IP2 ^{1),2)} (dBm)	49	50	50
CSO ³⁾ (dBc)	66 / 60		
CTB ³⁾ (dBc)	75 / 69		
Supply Voltage (V)	5		
Current (mA)	120		

1) OIP3 and OIP2 are measured with two tones at an output power of +9 dBm/tone separated by 6 MHz.

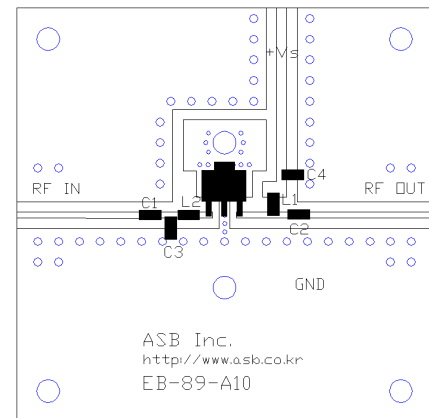
2) OIP2 is measured at F1+F2 Frequency.

3) Pout=95 dBuV / 98 dBuV for 84 channels VHF signal

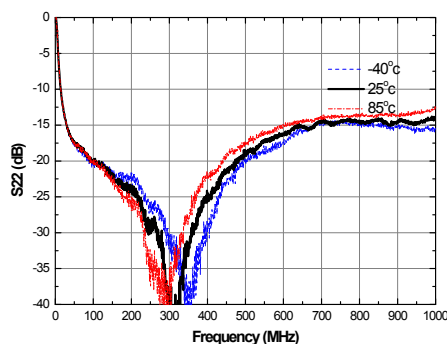
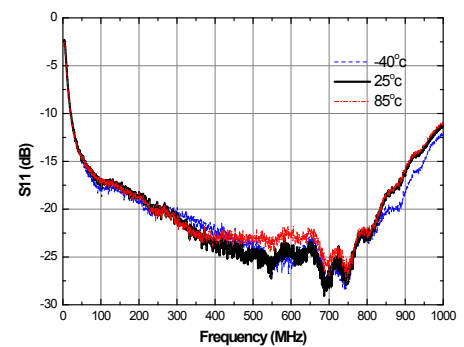
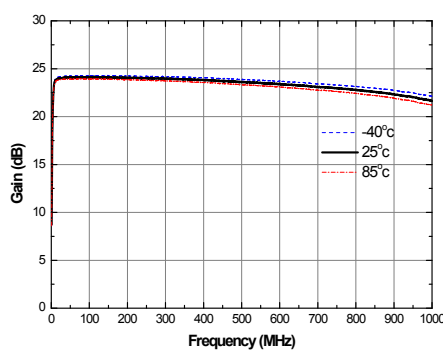
Schematic



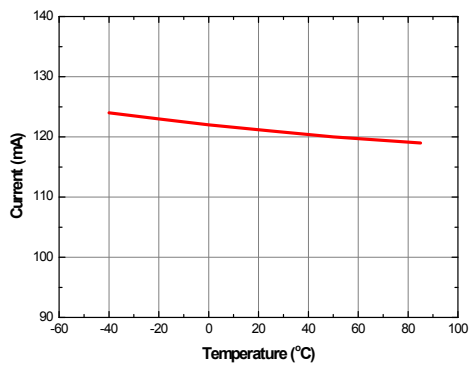
Board Layout (FR4, 40x40 mm², 0.8T)



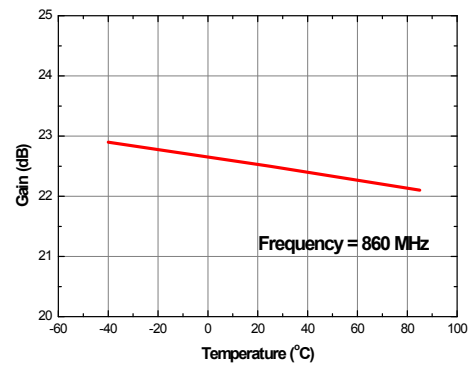
S-parameters



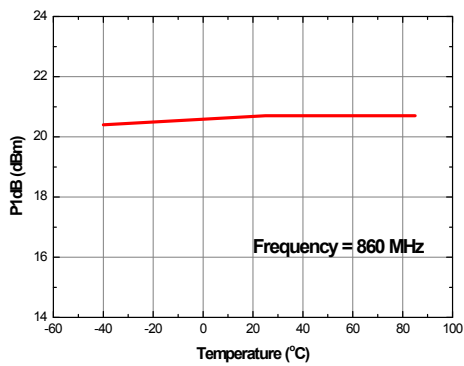
Current vs. Temperature



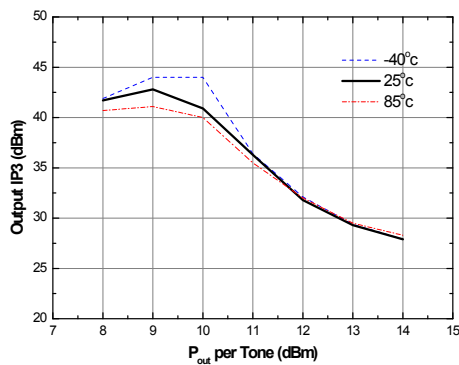
Gain vs. Temperature



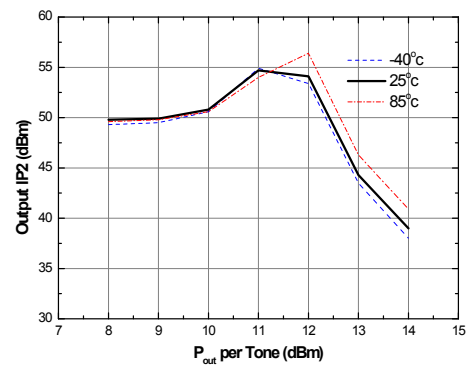
P1dB vs. Temperature



Output IP3 vs. Tone Power (Frequency = 860 MHz)



Output IP2 vs. Tone Power (Frequency = 860 MHz)



APPLICATION CIRCUIT

CATV Push-Pull

1 : 1 transformer

50 ~ 1000 MHz

+5 V

Frequency (MHz)	50	500	860
Noise Figure (dB)	3.2	2.6	2.5
Magnitude S21 (dB)	19.2	18.6	17.8
Magnitude S11 (dB)	-17	-13	-14
Magnitude S22 (dB)	-17	-11	-13
Output P1dB (dBm)	25	26	26
Output IP3 ¹⁾ (dBm)	39	43	42
Output IP2 ¹⁾ (dBm)	70	63	56
CSO (dBc) ²⁾	66		
CTB (dBc) ²⁾	63		
Device Voltage (V)	5		
Current (mA)	240		

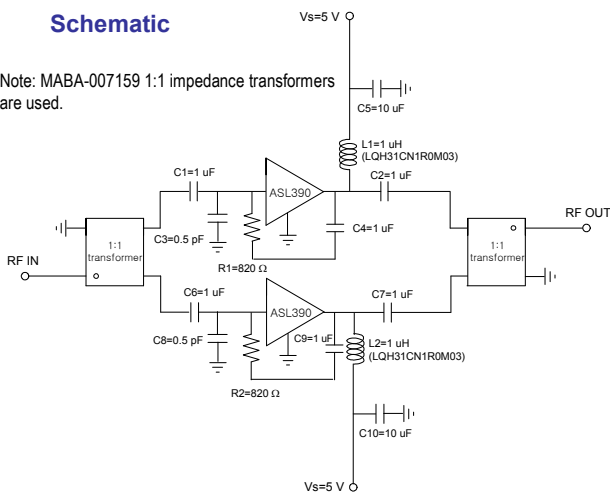
1) OIP3 and OIP2 are measured with two tones at an output power of +9 dBm/tone separated by 6 MHz.

2) OIP2 is measured at F1+F2 Frequency.

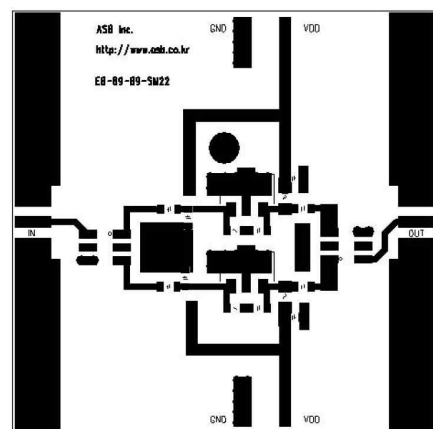
3) Pout=102.5 dBuV for 60 channels VHF signal.

Schematic

Note: MABA-007159 1:1 impedance transformers are used.



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters

