

Features

- 17.3 dB Gain at 500 Mz
- 21 dBm P1dB at 500 MHz
- 40 dBm Output IP3 at 500 MHz
- 1.6 dB NF at 500 MHz
- 75 Ohm Input / Output Match
- Bandwidth 5 ~ 1000 MHz
- Single Supply 5 V

Description

The ASL360, 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 | 2150 |
| Frequency | MHz | 5 | 50 | 500 | 860 | 2150 |
| Noise Figure | dB | 1.8 | 1.5 | 1.6 | 1.7 | 2.3 |
| Gain | dB | 17.9 | 17.3 | 17.3 | 17.2 | 15.4 |
| S11 | dB | -18 | -17 | -15 | -15 | -10 |
| S22 | dB | -16 | -17 | -17 | -15 | -8 |
| Output P1dB | dBm | 19 | 21 | 21 | 17 | 17 |
| Output IP3 | dBm | 34.5 ¹⁾ | 41.5 ²⁾ | 40 ²⁾ | 34 ²⁾ | 36.5 ²⁾ |
| Output IP2 ^{1),2),3)} | dBm | 36 | 53 | 53 | 62 | - |
| CSO ⁴⁾ | dBc | 60 | | | | |
| CTB ⁴⁾ | dBc | 75 | | | | |
| Current | mA | 110 | | | | |
| Device Voltage | V | 5 | | | | |

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

2) OIP3 and OIP2 are measured with two tones at an output power of +5 dBm/tone separated by 6 MHz.

3) OIP2 is measured at F1+F2 Frequency.

4) 60 channels, +33 dBmV per channel (measured at output).

Application Circuit

- 50 ~ 1000 MHz
- 5 ~ 200 MHz
- 950 ~ 2150 MHz (SMATV)
- 50 ~ 1000 MHz (Push-Pull / 1:1 transformer)
- 5 ~ 200 MHz (Push-Pull / 1:1 transformer)

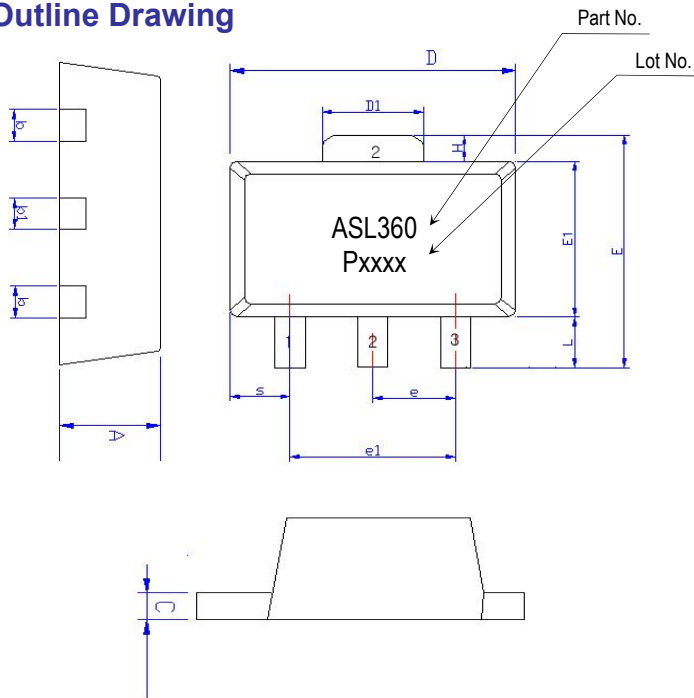
Product Specifications

| Parameters | Units | Min | Typ | Max |
|-------------------|-------|------|------|-----|
| Testing Frequency | MHz | | 500 | |
| Gain | dB | 16.3 | 17.3 | |
| S11 | dB | -12 | -15 | |
| S22 | dB | -15 | -17 | |
| Output IP3 | dBm | 37 | 40 | |
| Noise Figure | dB | | 1.6 | 1.8 |
| Output P1dB | dBm | 20 | 21 | |
| Current | mA | 95 | 110 | 125 |
| Device Voltage | V | | 5 | |

Absolute Maximum Ratings

| Parameters | Rating |
|------------------------------------|---------------|
| Operating Case Temperature | -40 to +85°C |
| Storage Temperature | -40 to +150°C |
| Device Voltage | +6V |
| Operating Junction Temperature | +160°C |
| Input RF Power (CW, 75ohm matched) | 5 dBm |
| Maximum Current | 150 mA |
| Thermal Resistance | 43 °C/W |

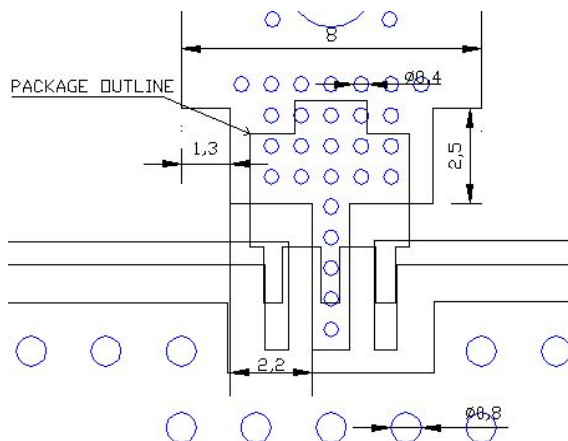
Outline Drawing



| 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

CATV

50 ~ 1000 MHz

+5 V

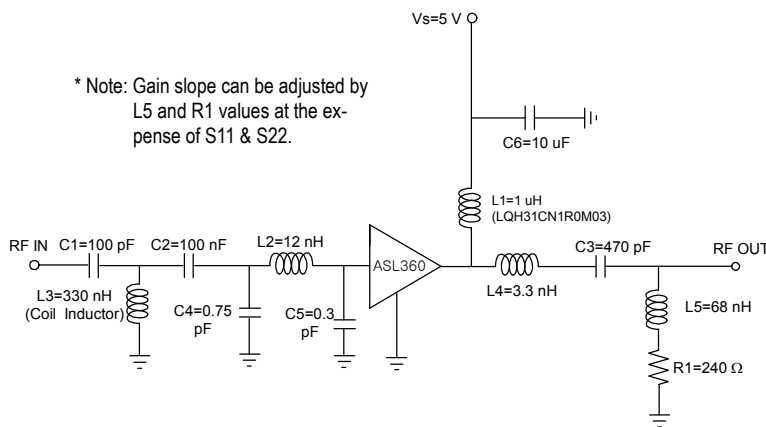
| Frequency (MHz) | 50 | 500 | 860 |
|-----------------------------------|------|------|------|
| Noise Figure (dB) | 1.5 | 1.6 | 1.7 |
| Magnitude S21 (dB) | 17.3 | 17.3 | 17.2 |
| Magnitude S11 (dB) | -17 | -15 | -15 |
| Magnitude S22 (dB) | -17 | -17 | -15 |
| Output P1dB (dBm) | 21 | 21 | 17 |
| Output IP3 ¹⁾ (dBm) | 41.5 | 40 | 34 |
| Output IP2 ^{1),2)} (dBm) | 53 | 53 | 62 |
| CSO ³⁾ (dBc) | 60 | | |
| CTB ³⁾ (dBc) | 75 | | |
| Device Voltage (V) | 5 | | |
| Current (mA) | 110 | | |

1) OIP3 and OIP2 are measured with two tones at an output power of +5 dBm/tone separated by 6 MHz.

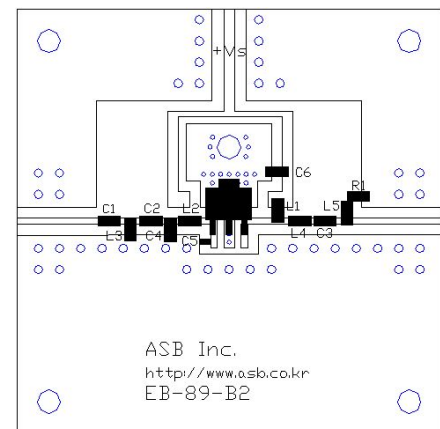
2) OIP2 is measured at F1+F2 Frequency.

3) 60 channels, +33 dBmV per channel (measured at output).

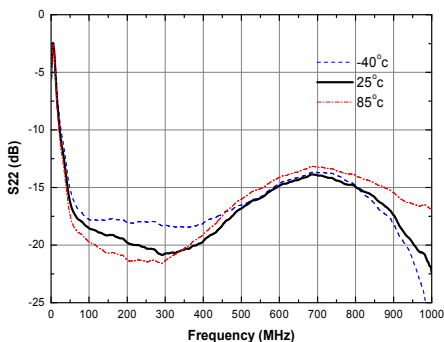
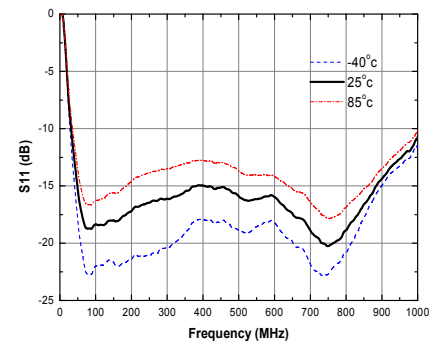
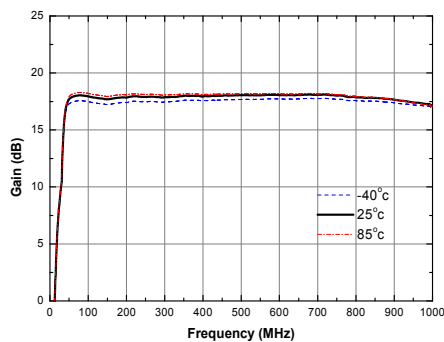
Schematic



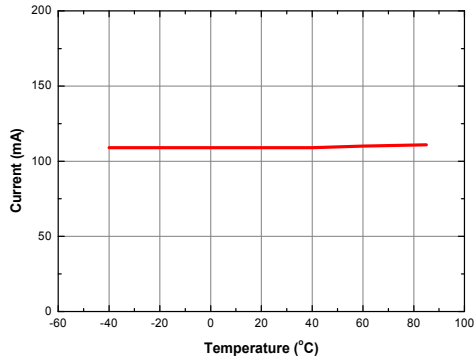
Board Layout (FR4, 40x40 mm², 0.8T)



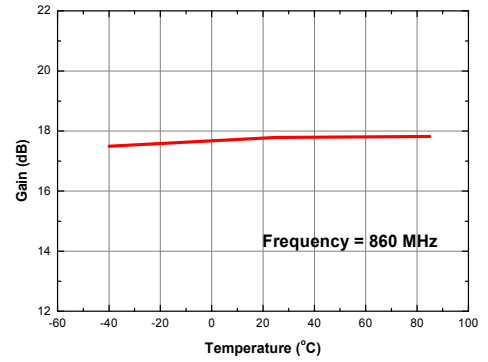
S-parameters



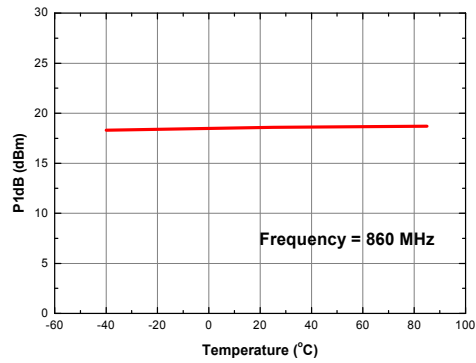
Current vs. Temperature



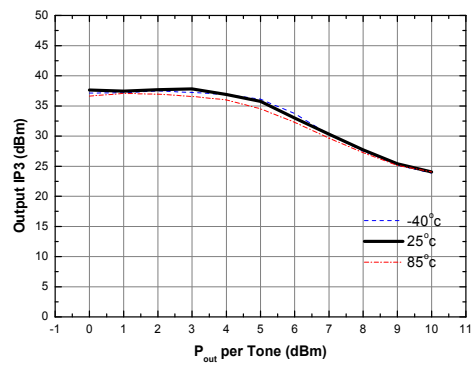
Gain vs. Temperature



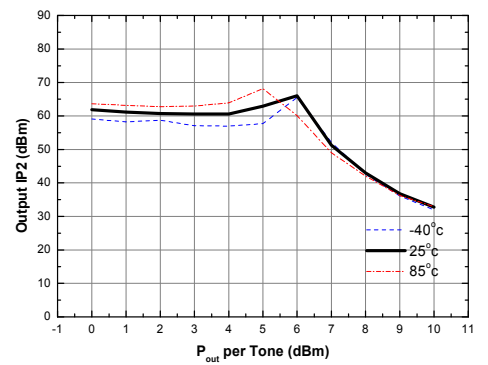
P1dB vs. Temperature



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



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



APPLICATION CIRCUIT

CATV

5 ~ 200 MHz

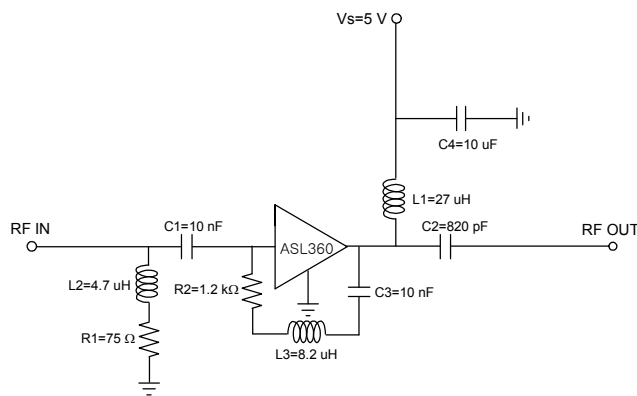
+5 V

| Frequency (MHz) | 5 | 50 | 200 |
|-----------------------------------|------|------|------|
| Noise Figure (dB) | 1.8 | 1.5 | 1.5 |
| Magnitude S21 (dB) | 17.9 | 18.1 | 17.1 |
| Magnitude S11 (dB) | -18 | -20 | -18 |
| Magnitude S22 (dB) | -16 | -20 | -16 |
| Output P1dB (dBm) | 19 | 21.5 | 22 |
| Output IP3 ¹⁾ (dBm) | 34.5 | 42 | 44 |
| Output IP2 ^{1),2)} (dBm) | 36 | 55 | 57 |
| Device Voltage (V) | 5 | | |
| Current (mA) | 110 | | |

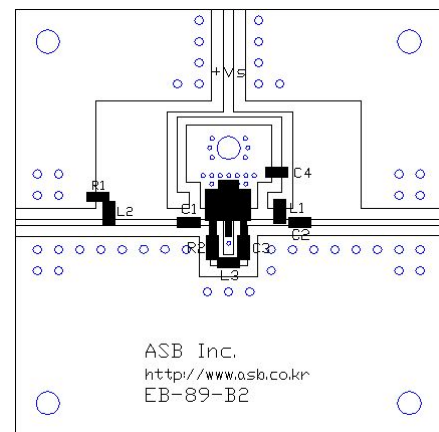
1) OIP3 and OIP2 are measured with two tones at an output power of +8 dBm/tone separated by 1 MHz.

2) OIP2 is measured at F1+F2 Frequency

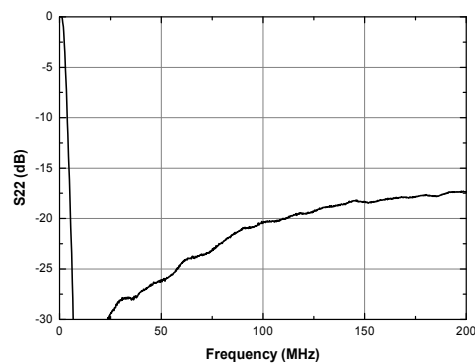
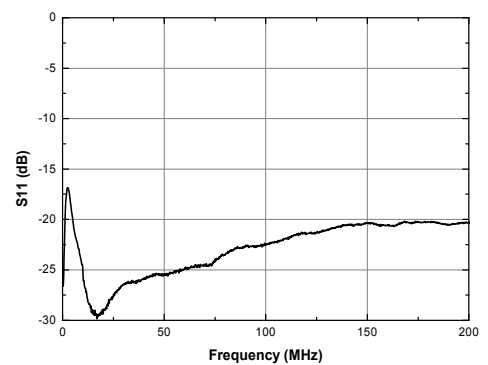
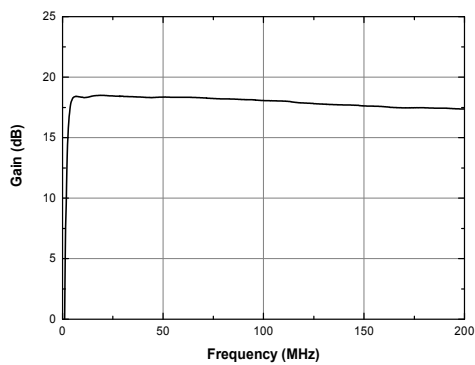
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters



APPLICATION CIRCUIT

SMATV

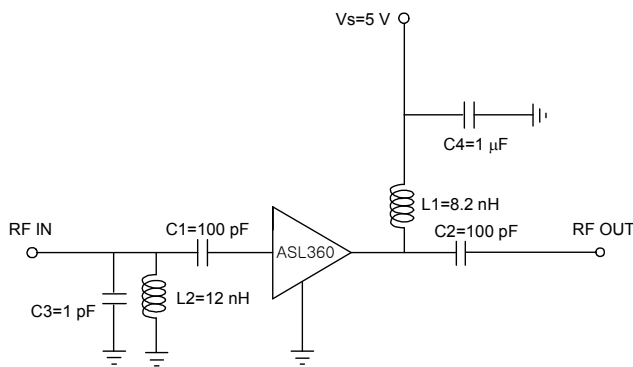
950 ~ 2150 MHz

+5 V

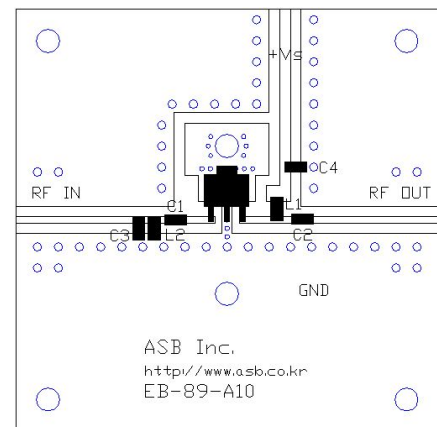
| Frequency (MHz) | 950 | 1500 | 2150 |
|--------------------------------|------|------|------|
| Noise Figure (dB) | 1.8 | 2.3 | 2.3 |
| Magnitude S21 (dB) | 17.3 | 16.6 | 15.4 |
| Magnitude S11 (dB) | -7 | -8 | -10 |
| Magnitude S22 (dB) | -12 | -12 | -8 |
| Output P1dB (dBm) | 18 | 17 | 17 |
| Output IP3 ¹⁾ (dBm) | 34.5 | 37 | 36.5 |
| Device Voltage (V) | 5 | | |
| Current (mA) | 110 | | |

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

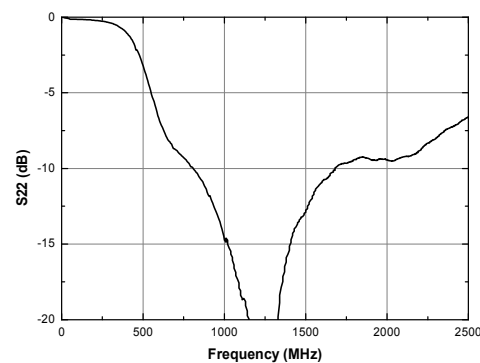
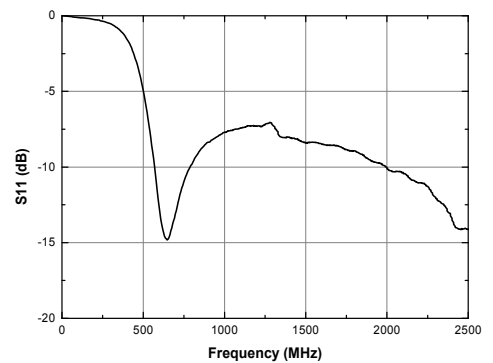
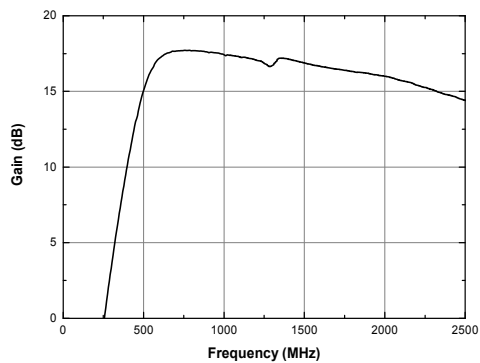
Schematic



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters



APPLICATION CIRCUIT

CATV Push-Pull

1 : 1 transformer

50 ~ 1000 MHz

+5 V

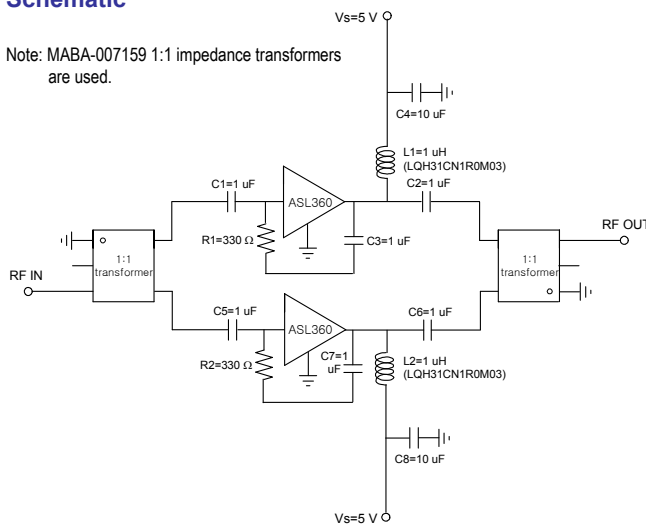
| Frequency (MHz) | 50 | 500 | 860 |
|-----------------------------------|------|------|------|
| Magnitude S21 (dB) | 12.3 | 12 | 11.7 |
| Magnitude S11 (dB) | -18 | -16 | -17 |
| Magnitude S22 (dB) | -18 | -14 | -14 |
| Output P1dB (dBm) | 24.5 | 25 | 25.5 |
| Output IP3 ¹⁾ (dBm) | 40 | 44.5 | 42.5 |
| Output IP2 ^{1),2)} (dBm) | 65 | 66 | 64 |
| Noise Figure (dB) | 2.7 | 2.7 | 2.7 |
| Device Voltage (V) | 5 | | |
| Current (mA) | 220 | | |

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

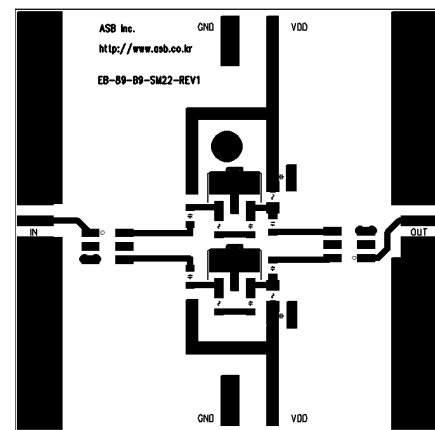
2) OIP2 is measured at F1+F2 Frequency.

Schematic

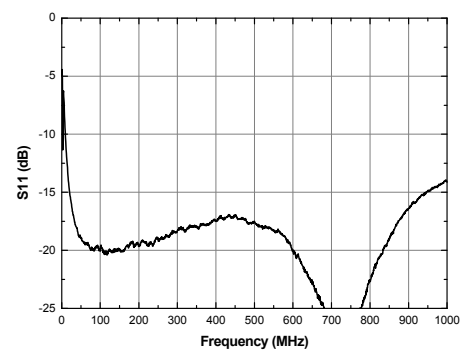
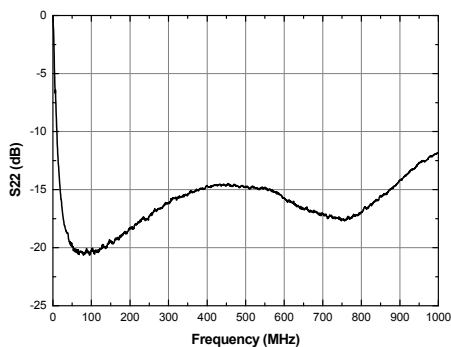
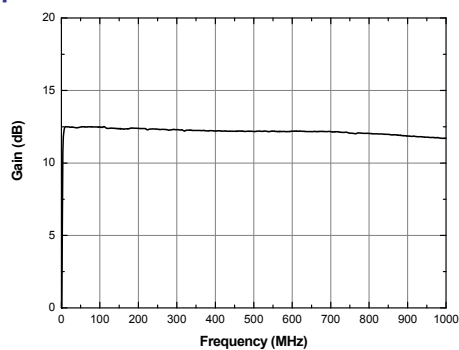
Note: MABA-007159 1:1 impedance transformers are used.



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters



APPLICATION CIRCUIT

CATV Push-Pull

1 : 1 transformer

5 ~ 200 MHz

+5 V

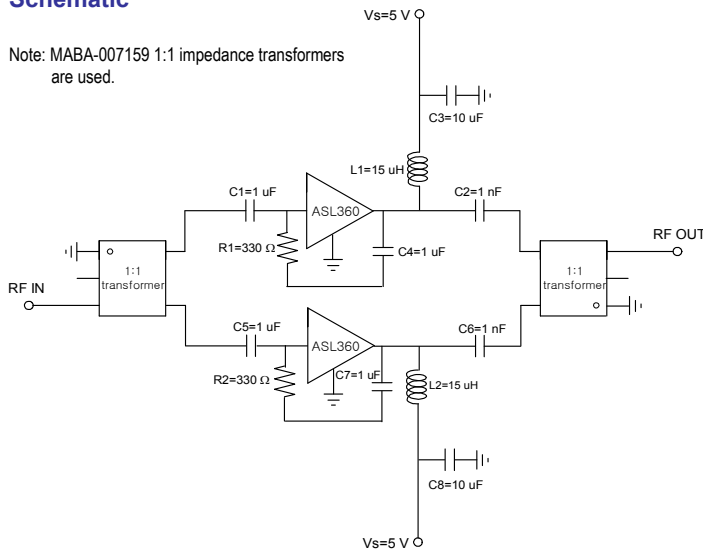
| Frequency (MHz) | 5 | 50 | 200 |
|-----------------------------------|------|------|------|
| Magnitude S21 (dB) | 13.2 | 12.3 | 12.2 |
| Magnitude S11 (dB) | -20 | -18 | -17 |
| Magnitude S22 (dB) | -20 | -18 | -17 |
| Output P1dB (dBm) | 22.5 | 24.5 | 25 |
| Output IP3 ¹⁾ (dBm) | 32 | 42 | 44.5 |
| Output IP2 ^{1),2)} (dBm) | 48 | 56 | 72 |
| Noise Figure (dB) | 3.3 | 2.7 | 2.8 |
| Device Voltage (V) | 5 | | |
| Current (mA) | 220 | | |

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

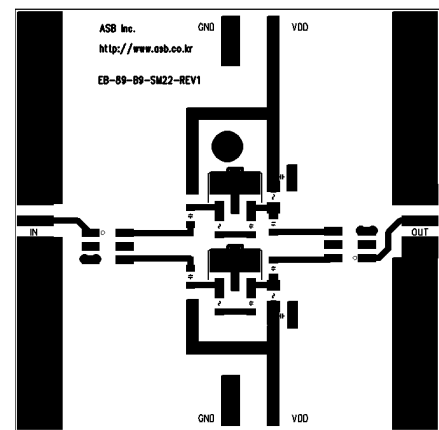
2) OIP2 is measured at F1+F2 Frequency.

Schematic

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



Board Layout (FR4, 40x40 mm², 0.8T)



S-parameters

