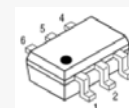


## Features

- 16.5 dB Gain at 2000 MHz
- 18.5 dBm P1dB at 2000 MHz
- 29 dBm Output IP3 at 2000 MHz
- 1.8 dB NF at 2000 MHz
- MTTF > 100 Years
- Single Supply

## Description

The ASW135, 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 a SOT363 package and passes through the stringent DC, RF, and reliability tests.



Package Style: SOT363

## Typical Performance

(Supply Voltage = +3.3 V,  $T_A$  = +25 °C,  $Z_0$  = 50  $\Omega$ )

| Parameters               | Units | Typical |      |      |      |      |  |
|--------------------------|-------|---------|------|------|------|------|--|
| Frequency                | MHz   | 150     | 900  | 2000 | 2400 | 2700 |  |
| Gain                     | dB    | 19.6    | 18.5 | 16.5 | 15.7 | 15.0 |  |
| S11                      | dB    | -10     | -14  | -14  | -15  | -16  |  |
| S22                      | dB    | -15     | -15  | -15  | -14  | -13  |  |
| Output IP3 <sup>1)</sup> | dBm   | 27.5    | 28.5 | 29.0 | 31.0 | 32.5 |  |
| Noise Figure             | dB    | 1.9     | 1.8  | 1.8  | 1.8  | 1.9  |  |
| Output P1dB              | dBm   | 17.5    | 17.5 | 18.5 | 17.0 | 17.0 |  |
| Current                  | mA    | 60      | 60   | 60   | 60   | 60   |  |
| Device Voltage (V)       | V     | +3.3    | +3.3 | +3.3 | +3.3 | +3.3 |  |

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

## Product Specifications

| Parameters         | Units | Min | Typ  | Max |
|--------------------|-------|-----|------|-----|
| Testing Frequency  | MHz   |     | 2000 |     |
| Gain               | dB    |     | 16.5 |     |
| S11                | dB    |     | -14  |     |
| S22                | dB    |     | -15  |     |
| Output IP3         | dBm   |     | 29   |     |
| Noise Figure       | dB    |     | 1.8  |     |
| Output P1dB        | dBm   |     | 18.5 |     |
| Current            | mA    |     | 60   |     |
| Device Voltage (V) | V     |     | +3.3 |     |

## Absolute Maximum Ratings

| Parameters                                | Rating         |
|-------------------------------------------|----------------|
| Operating Case Temperature                | -40 to +85 °C  |
| Storage Temperature                       | -40 to +150 °C |
| Device Voltage (V)                        | +4.3 V         |
| Operating Junction Temperature            | +150 °C        |
| Input RF Power (CW, 50 $\Omega$ matched)* | +20 dBm        |
| Thermal Resistance                        | 125 °C/W       |

\* Please find the max. input power data from [http://www.asb.co.kr/pdf/Maximum\\_Input\\_Power\\_Analysis.pdf](http://www.asb.co.kr/pdf/Maximum_Input_Power_Analysis.pdf)

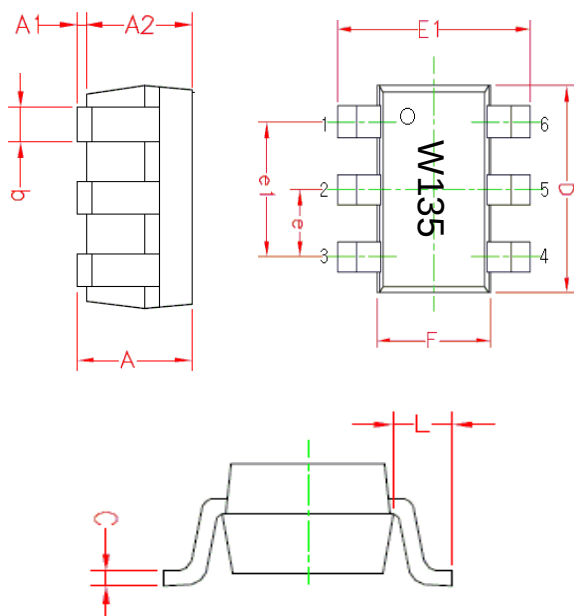
## Application Circuit

- 500 ~ 3500 MHz
- IF (50 ~ 450 MHz)

## Pin Configuration

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

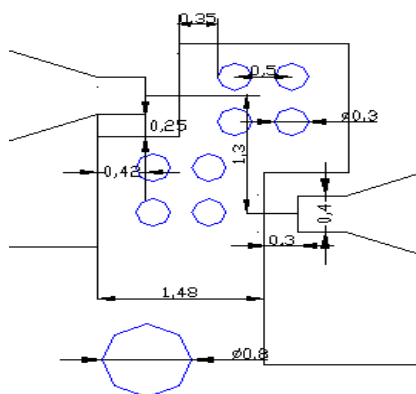
### Outline Drawing



| 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       | RF OUT / Bias | 4       | RF IN     |
| 2       | GND           | 5       | GND       |
| 3       | GND           | 6       | GND       |

### 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.

### ESD Classification & Moisture Sensitivity Level

#### ESD Classification

|     |                      |
|-----|----------------------|
| HBM | Class 1A             |
|     | Voltage Level: 400 V |
| MM  | Class A              |
|     | Voltage Level: 50 V  |

CAUTION: ESD-sensitive device!

#### Moisture Sensitivity Level (MSL)

Level 3 at 260 °C reflow

### APPLICATION CIRCUIT

Wide Band

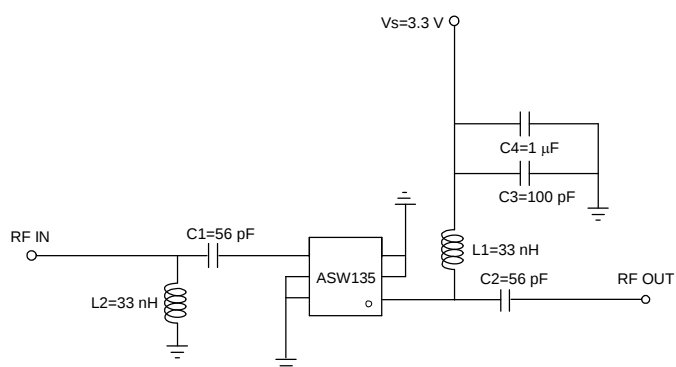
500 ~ 3500 MHz

+3.3 V

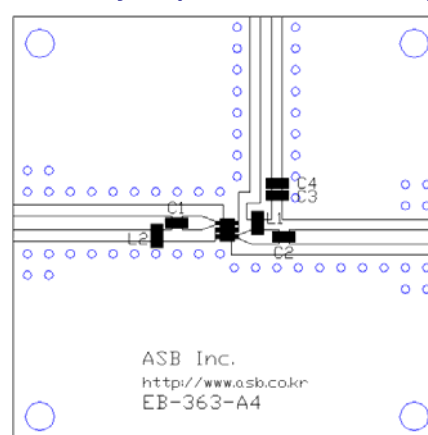
| Frequency (MHz)                | 900  | 2000 | 2400 | 2700 |
|--------------------------------|------|------|------|------|
| Magnitude S21 (dB)             | 18.5 | 16.5 | 15.7 | 15.0 |
| Magnitude S11 (dB)             | -14  | -14  | -15  | -16  |
| Magnitude S22 (dB)             | -15  | -15  | -14  | -13  |
| Output P1dB (dBm)              | 17.5 | 18.5 | 17.0 | 17.0 |
| Output IP3 <sup>1)</sup> (dBm) | 28.5 | 29.0 | 31.0 | 32.5 |
| Noise Figure (dB)              | 1.8  | 1.8  | 1.8  | 1.9  |
| Device Voltage (V)             | +3.3 | +3.3 | +3.3 | +3.3 |
| Current (mA)                   | 60   | 60   | 60   | 60   |

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

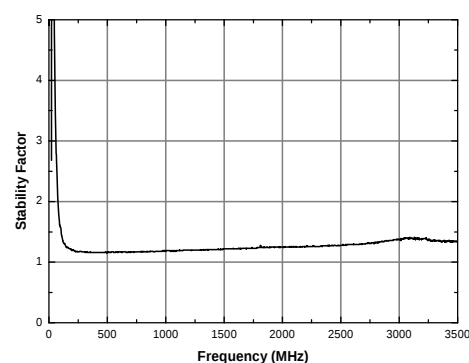
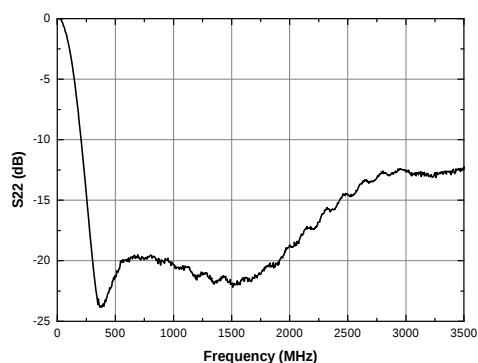
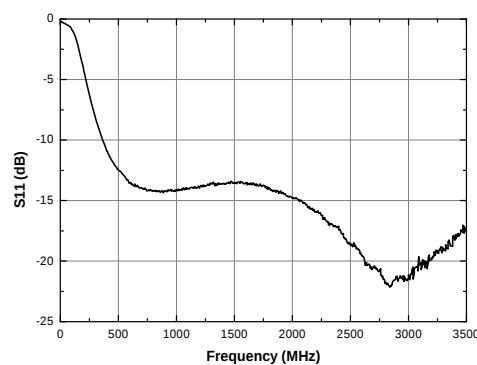
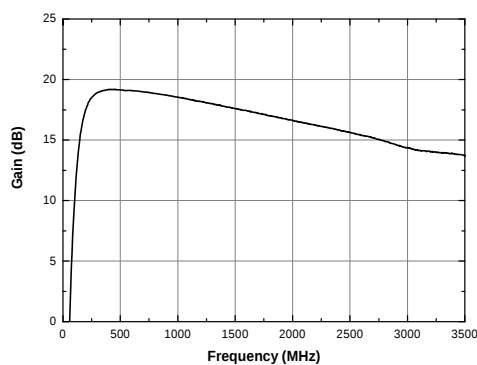
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



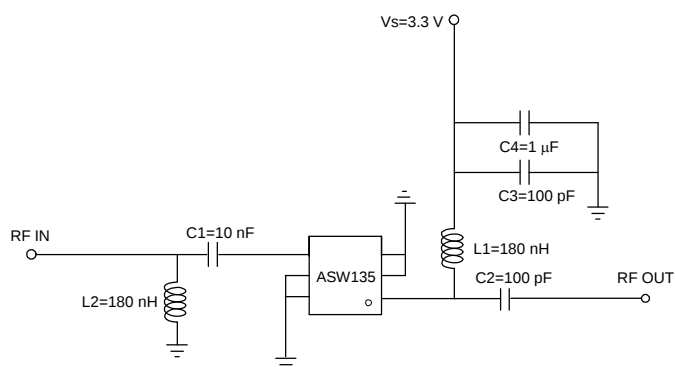
### APPLICATION CIRCUIT

IF  
50 ~ 450 MHz  
+3.3 V

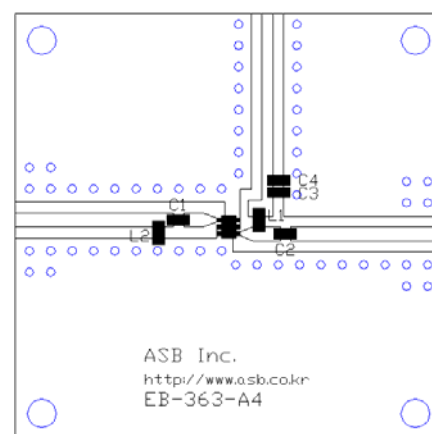
| Frequency (MHz)                | 70   | 150  | 300  | 450  |
|--------------------------------|------|------|------|------|
| Magnitude S21 (dB)             | 20.5 | 19.6 | 19.2 | 19.0 |
| Magnitude S11 (dB)             | -6   | -10  | -12  | -12  |
| Magnitude S22 (dB)             | -15  | -15  | -17  | -18  |
| Output P1dB (dBm)              | 17.0 | 17.5 | 17.5 | 17.5 |
| Output IP3 <sup>1)</sup> (dBm) | 27.5 | 27.5 | 28.5 | 28.5 |
| Noise Figure (dB)              | 2.1  | 1.9  | 1.8  | 1.7  |
| Device Voltage (V)             | +3.3 | +3.3 | +3.3 | +3.3 |
| Current (mA)                   | 60   | 60   | 60   | 60   |

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

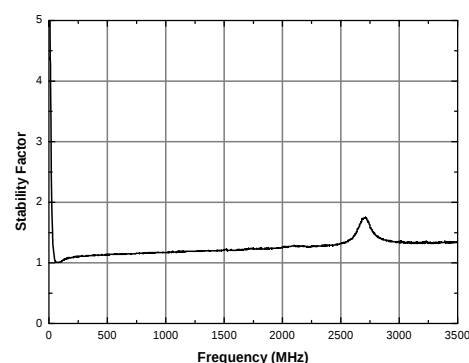
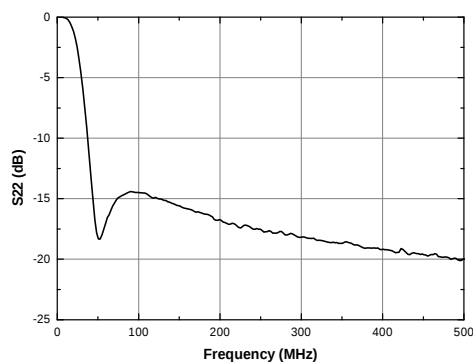
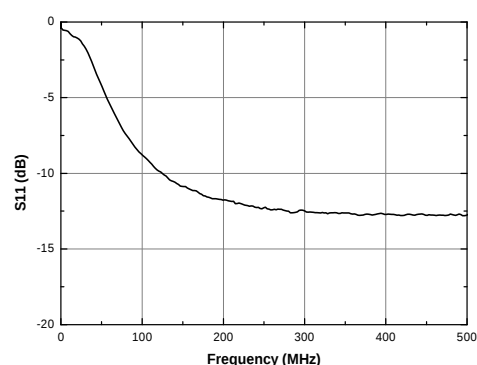
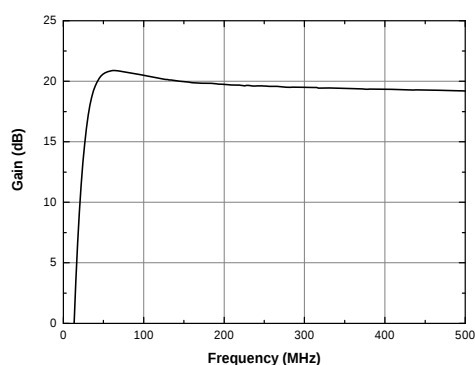
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



### APPLICATION CIRCUIT

SMATV

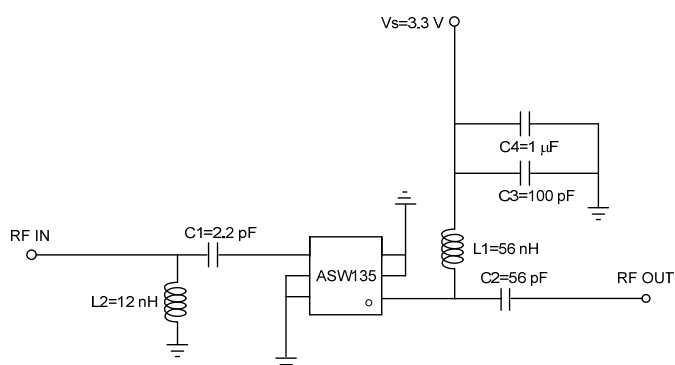
950 ~ 2150 MHz

+3.3 V

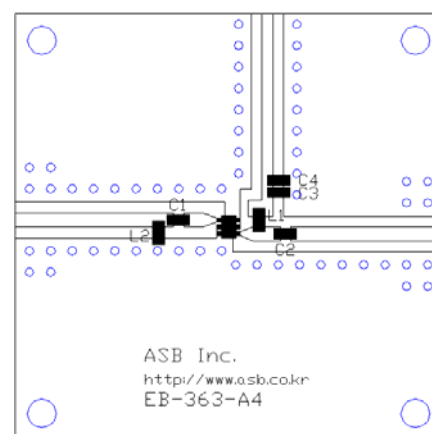
| Frequency (MHz)                | 950  | 1600 | 2150 |
|--------------------------------|------|------|------|
| Magnitude S21 (dB)             | 18.0 | 17.3 | 16.0 |
| Magnitude S11 (dB)             | -8   | -13  | -17  |
| Magnitude S22 (dB)             | -9   | -14  | -12  |
| Output P1dB (dBm)              | 16   | 18   | 18   |
| Output IP3 <sup>1)</sup> (dBm) | 32   | 32   | 32   |
| Noise Figure (dB)              | 2.7  | 2.2  | 2.4  |
| Device Voltage (V)             | +3.3 | +3.3 | +3.3 |
| Current (mA)                   | 60   | 60   | 60   |

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

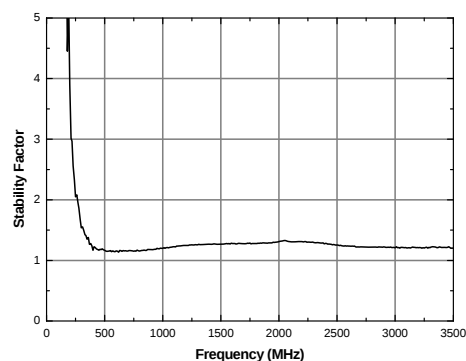
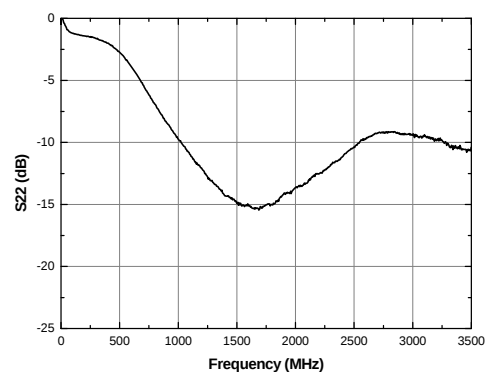
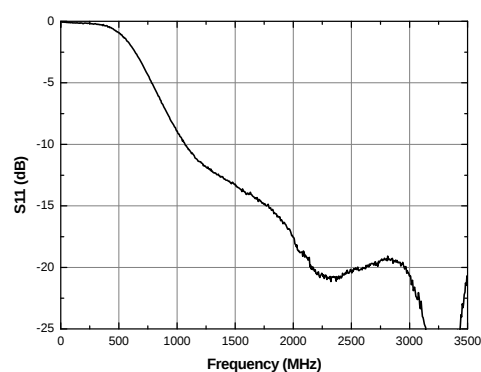
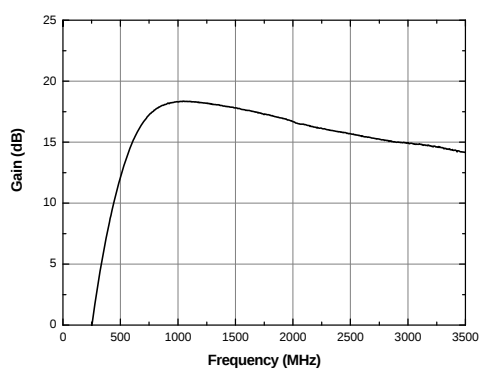
### Schematic



### Board Layout (FR4, 40x40 mm<sup>2</sup>, 0.8T)



### S-parameters & K-factor



**Recommended Soldering Reflow Profile**