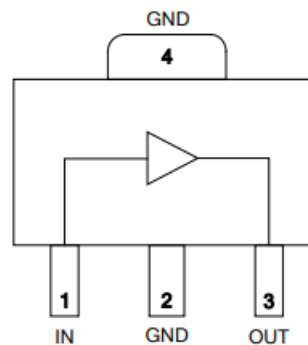


## 100MHz to 7000MHz Gain Block MMIC Amplifier

### Features

- 100MHz to 7GHz operational
- Typical 17.5dB Small Signal Gain up to 7GHz
- $\pm 1$ dB Wideband flat Gain up to 7GHz
- 17dB Gain at 3.5GHz
- +35dBm OIP3 at 3.5GHz
- OIP3  $\geq +33.5$ dBm between 0.4GHz and 4.5GHz
- 3-5V single typical supply, 10mA~89mA operational
- Linearity and thermal compensation with Integrated Active Bias Circuit
- Industry Standard SOT-89 Package
- ESD protection all ports above 1000V HBM



Functional Block Diagram

### Applications

- |                                |                    |
|--------------------------------|--------------------|
| ■ 5G mobile application/m-MIMO | ■ TDD/FDD System   |
| ■ WLAN / WiMAX / WiBro         | ■ GSM / CDMA / PCS |
| ■ WCDMA / LTE                  | ■ CATV             |
| ■ GPS / COMPASS                | ■ ISM              |

## Pin Description

| Pin No. | Symbol | Description        |
|---------|--------|--------------------|
| 1       | IN     | RF input           |
| 3       | OUT    | RF output and bias |
| 2, 4    | GND    | Ground connected   |

## Absolute Maximum Ratings

| Parameter                     | Rating      | Unit |
|-------------------------------|-------------|------|
| Input RF Power                | +20         | dBm  |
| Supply Voltage                | 6           | V    |
| Device Current                | 150         | mA   |
| Operating Ambient Temperature | -40 to +85  | °C   |
| Storage Temperature           | -40 to +150 | °C   |



### Caution!

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

## Electrical Specifications

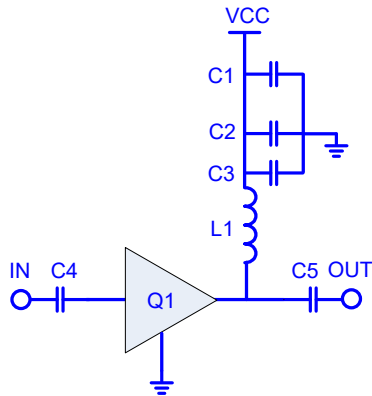
| Parameter                   | Condition <sup>(1)</sup>   | Specification |      |      | Unit |
|-----------------------------|----------------------------|---------------|------|------|------|
|                             |                            | Min.          | Typ. | Max. |      |
| Operational Frequency Range |                            | 0.1           |      | 7000 | MHz  |
| Test Frequency              |                            |               | 4000 |      | MHz  |
| Small Signal Gain           |                            |               | 16.8 |      | dB   |
| Gain Flatness               | 500M~7000M                 | ±1            |      |      | dB   |
| P1dB Output Power           |                            |               | 20.5 |      | dBm  |
| Input Return Loss           |                            |               | 30.4 |      | dB   |
| Output Return Loss          |                            |               | 10.9 |      | dB   |
| Reverse Isolation           |                            |               | 25.3 |      | dB   |
| OIP3                        | Pout=1dBm/ tone, Δf = 1MHz |               | 35.3 |      | dBm  |
| Supply Voltage              |                            | 3             | 5    | 6    | V    |
| Device Current              | VCC=5V                     |               | 89   |      | mA   |
|                             | VCC=3V                     |               | 10   |      | mA   |

Notes: Test condition unless otherwise noted: VCC=+5V, Temp=+25°C, 50Ω system.

## Device Current vs. VCC

| VCC (V)      | 3  | 3.2 | 3.4 | 3.6 | 3.8 | 4  | 4.2 | 4.4 | 4.6 | 4.8 | 5  |
|--------------|----|-----|-----|-----|-----|----|-----|-----|-----|-----|----|
| Current (mA) | 10 | 17  | 24  | 32  | 40  | 48 | 57  | 65  | 73  | 81  | 89 |

## 100MHz~7000MHz Application



## Bill of material

| Reference Des. | Value  | Description                | Manuf.  | Part Number   |
|----------------|--------|----------------------------|---------|---------------|
| Q1             |        | SKY65017-70LF , SOT-89     | tokmas  | SKY65017-70LF |
| C1             | 10uF   | CAP, SMD, 10uF, 0402       | various |               |
| C2             | 1000pF | CAP, SMD, 1000pF, 0402     | various |               |
| C3             | 10pF   | CAP, SMD, 10pF, 0402       | various |               |
| C4, C5         | 100pF  | CAP, SMD, 100pF, 0402      | various |               |
| L1             | 180nH  | Coli IND, SMD, 180nH, 0603 | TDK     |               |

## Typical performance on EVB

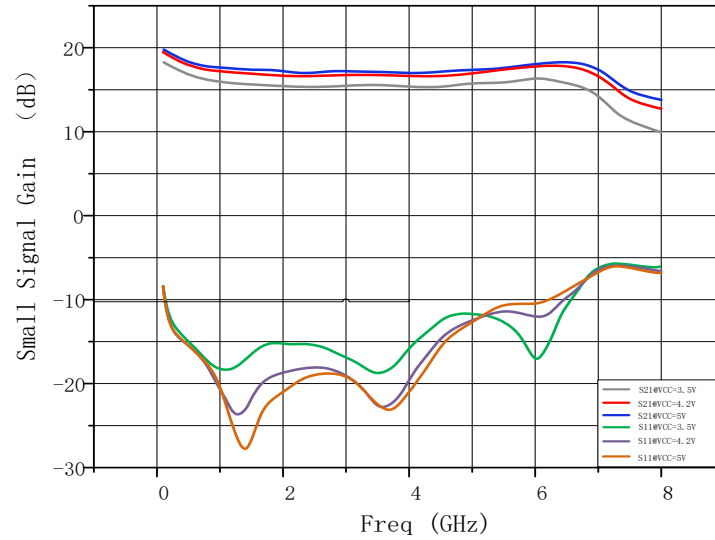
| Parameter         | Typical Value |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Unit |
|-------------------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Frequency         | 0.5           | 1    | 1.5  | 2    | 2.5  | 3    | 3.5  | 4    | 4.5  | 5    | 5.5  | 6    | 6.5  | 7    | 7.5  | 8    | GHz  |
| Small Signal Gain | 18.3          | 17.6 | 17.2 | 17.1 | 16.7 | 17   | 17   | 16.8 | 16.9 | 17.5 | 17.9 | 18.6 | 18.1 | 17.3 | 14.8 | 13.7 | dB   |
| Input Return Loss | 15            | 19.4 | 16.2 | 14.3 | 14.2 | 15.4 | 18.4 | 30.4 | 22.6 | 15.8 | 13.7 | 16.2 | 8    | 6.4  | 6.2  | 6.8  | dB   |
| Reverse Isolation | 21.9          | 23.1 | 23.6 | 24.1 | 24.4 | 24.5 | 24.9 | 25.3 | 25.3 | 25   | 24   | 25   | 24   | 26.1 | 27.1 | 27.5 | dB   |
| P1dB              | 20            | 20.8 | 20.7 | 20.6 | 20.9 | 20.7 | 20.9 | 20.5 | 20.6 | 20.3 | 20.3 | 20.1 | 17.4 | 15.5 | 15.2 | 14.5 | dBm  |
| OIP3              | 34            | 34   | 34   | 33.5 | 35   | 34.3 | 35   | 35.3 | 34.6 | 31   | 23   | 21.5 | —    | —    | —    | —    | dBm  |

Notes:

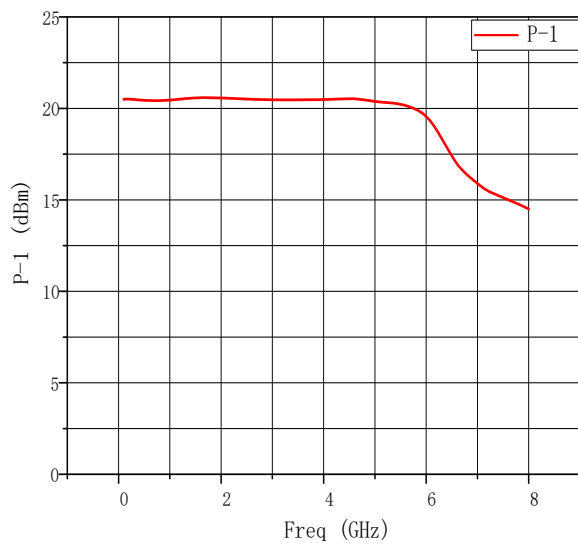
1. Test condition unless otherwise noted: VCC=+5V, Temp=+25°C, 50Ω system.
2. OIP3 measured with two tones at an output power of 1dBm/ tone separated by 1MHz.

## Performance plots

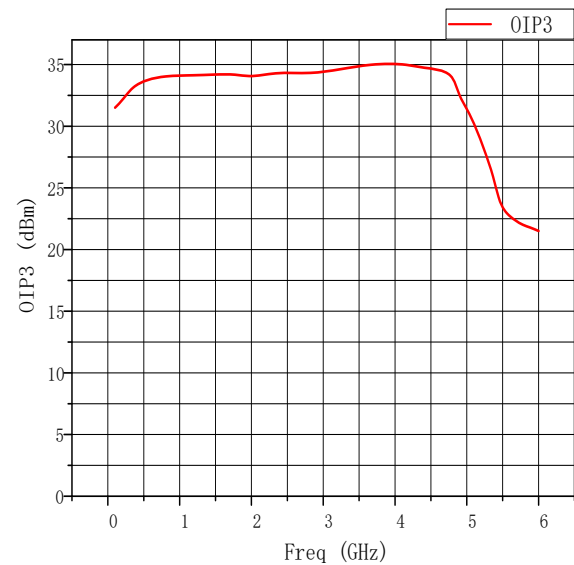
Small Signal Gain vs. Frequency



P1dB vs. Frequency



OIP3 vs. Frequency



## Package Diagram

(Units: millimeters)

