

**Preliminary**

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

# MT6L61AS

VHF-UHF Band Low Noise Amplifier Application

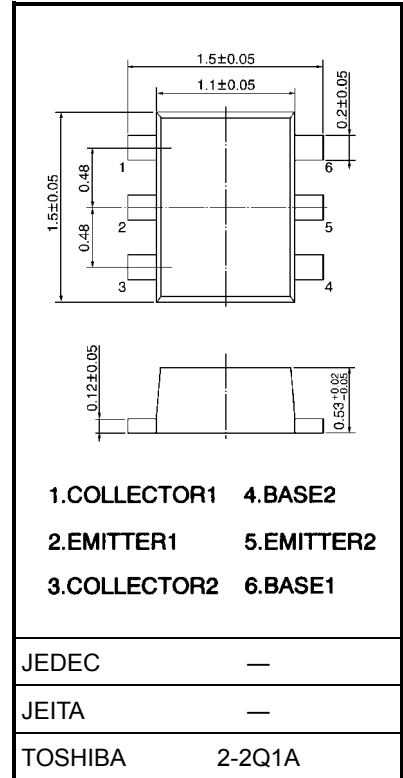
VHF-UHF Band Oscillator Application

Unit: mm

- Two devices are built into the sES6 package, which is smaller and thinner than the super-thin and ultra-super mini (6-pin) ES6 package.

### Mounted Devices

|                             |         |          |
|-----------------------------|---------|----------|
|                             | Q1      | Q2       |
| Three pin SSM type part No. | MT3S07S | MT3S04AS |



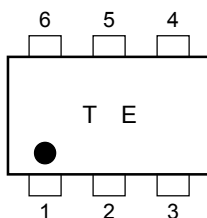
Weight: 2.1 mg

### Maximum Ratings (Ta = 25°C)

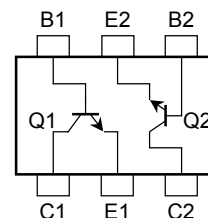
| Characteristics             | Symbol                  | Rating  |    | Unit |
|-----------------------------|-------------------------|---------|----|------|
|                             |                         | Q1      | Q2 |      |
| Collector-base voltage      | V <sub>CB0</sub>        | 10      | 10 | V    |
| Collector-emitter voltage   | V <sub>CEO</sub>        | 5       | 5  | V    |
| Emitter-base voltage        | V <sub>EBO</sub>        | 1.5     | 2  | V    |
| Collector current           | I <sub>C</sub>          | 25      | 40 | mA   |
| Base current                | I <sub>B</sub>          | 10      | 10 | mA   |
| Collector power dissipation | P <sub>C</sub> (Note 1) | 150     |    | mW   |
| Junction temperature        | T <sub>j</sub>          | 125     |    | °C   |
| Storage temperature range   | T <sub>stg</sub>        | -55~125 |    | °C   |

Note 1: Total power dissipation of Q1 and Q2 mounted on the circuit board.

### Marking



### Pin Assignment



**Electrical Characteristics Q1-Side (Ta = 25°C)**

| Characteristics              | Symbol            | Test Condition                                              | Min | Typ. | Max  | Unit          |
|------------------------------|-------------------|-------------------------------------------------------------|-----|------|------|---------------|
| Collector cut-off current    | $I_{CBO}$         | $V_{CB} = 5\text{ V}, I_E = 0$                              | —   | —    | 0.1  | $\mu\text{A}$ |
| Emitter cut-off current      | $I_{EBO}$         | $V_{EB} = 1\text{ V}, I_C = 0$                              | —   | —    | 1    | $\mu\text{A}$ |
| DC current gain              | $h_{FE}$          | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$                    | 70  | —    | 140  | —             |
| Transition frequency         | $f_T$             | $V_{CE} = 3\text{ V}, I_C = 10\text{ mA}$                   | 10  | 12   | —    | GHz           |
| Insertion gain               | $ S_{21e} ^2 (1)$ | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$  | —   | 6.5  | —    | dB            |
|                              | $ S_{21e} ^2 (2)$ | $V_{CE} = 3\text{ V}, I_C = 15\text{ mA}, f = 2\text{ GHz}$ | 4   | 7    | —    |               |
| Noise figure                 | NF (1)            | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$  | —   | 1.6  | 3    | dB            |
|                              | NF (2)            | $V_{CE} = 3\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$  | —   | 1.5  | 3    |               |
| Reverse transfer capacitance | $C_{re}$          | $V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$ (Note 2)   | —   | 0.45 | 0.85 | pF            |

**Electrical Characteristics Q2-Side (Ta = 25°C)**

| Characteristics              | Symbol            | Test Condition                                              | Min | Typ. | Max  | Unit          |
|------------------------------|-------------------|-------------------------------------------------------------|-----|------|------|---------------|
| Collector cut-off current    | $I_{CBO}$         | $V_{CB} = 5\text{ V}, I_E = 0$                              | —   | —    | 0.1  | $\mu\text{A}$ |
| Emitter cut-off current      | $I_{EBO}$         | $V_{EB} = 1\text{ V}, I_C = 0$                              | —   | —    | 1    | $\mu\text{A}$ |
| DC current gain              | $h_{FE}$          | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$                    | 80  | —    | 160  | —             |
| Transition frequency         | $f_T (1)$         | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$                    | 2   | 5    | —    | GHz           |
|                              | $f_T (2)$         | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$                    | 5   | 7    | —    |               |
| Insertion gain               | $ S_{21e} ^2 (1)$ | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 1\text{ GHz}$  | —   | 8.5  | —    | dB            |
|                              | $ S_{21e} ^2 (2)$ | $V_{CE} = 3\text{ V}, I_C = 20\text{ mA}, f = 1\text{ GHz}$ | 7.5 | 11   | —    |               |
| Noise figure                 | NF (1)            | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 1\text{ GHz}$  | —   | 1.3  | 2.2  | dB            |
|                              | NF (2)            | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$  | —   | 1.2  | 2    |               |
| Reverse transfer capacitance | $C_{re}$          | $V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$ (Note 2)   | —   | 0.9  | 1.25 | pF            |

Note 2:  $C_{re}$  is measured by 3 terminal method with capacitance bridge.

**Handling Precaution**

When handling individual devices (which are not yet mounted on a circuit board), be sure that the environment is protected against electrostatic electricity. Operators should wear anti-static clothing, and containers and other objects that come into direct contact with devices should be made of anti-static materials.

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