

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

MT6L54E

VHF-UHF Band Low Noise Amplifier Application

VHF-UHF Band Oscillator Application

- Two devices are built in to the super-thin and ultra super mini (6 pin) package: ES6

| | | |
|------------------------------------|----------------------|----------|
| | Q1: SSM (TESM) | Q2: TESM |
| Three pin (SSM/TESM) type part No. | MT3S06S (MT3S06T) | MT3S08T |

Absolute Maximum Ratings (Ta = 25°C)

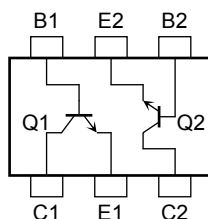
| Characteristics | Symbol | Q1 | Q2 | Unit |
|-----------------------------|----------------|------------|-----|------|
| Collector-base voltage | V_{CBO} | 10 | 20 | V |
| Collector-emitter voltage | V_{CEO} | 5 | 8 | V |
| Emitter-base voltage | V_{EBO} | 1.5 | 1.5 | V |
| Collector current | I_C | 15 | 40 | mA |
| Base current | I_B | 7 | 10 | mA |
| Collector power dissipation | P_C (Note 1) | 100 | | mW |
| Junction temperature | T_j | 125 | | °C |
| Storage temperature range | T_{stg} | -55 to 125 | | °C |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

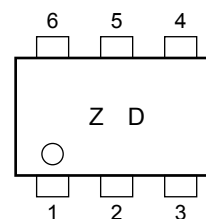
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Total power dissipation of Q1 and Q2

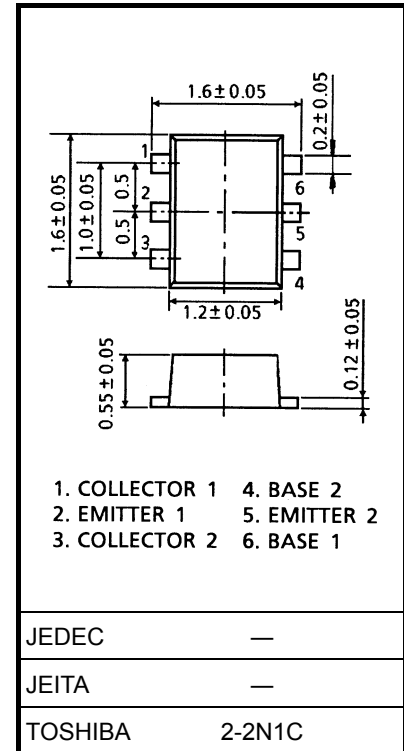
Pin Assignment



Marking



Unit: mm



Weight: 0.003 g (typ.)

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 | μA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = 1\text{ V}, I_C = 0$ | — | — | 1 | μA |
| DC current gain | h_{FE} | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$ | 70 | — | 140 | — |
| Transition frequency | f_T | $V_{CE} = 3\text{ V}, I_C = 5\text{ mA}$ | 7 | 10 | — | GHz |
| Insertion gain | $ S_{21e} ^2 (1)$ | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$ | — | 7.5 | — | dB |
| | $ S_{21e} ^2 (2)$ | $V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 2\text{ GHz}$ | 4.5 | 8 | — | |
| Noise figure | NF (1) | $V_{CE} = 1\text{ V}, I_C = 3\text{ mA}, f = 2\text{ GHz}$ | — | 1.7 | 3 | dB |
| | NF (2) | $V_{CE} = 3\text{ V}, I_C = 3\text{ mA}, f = 2\text{ GHz}$ | — | 1.6 | 3 | |
| Reverse transfer capacitance | C_{re} | $V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$ | — | 0.35 | 0.75 | pF |

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

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|------------------------------|-------------------|---|-----|------|------|---------------|
| Collector cut-off current | I_{CBO} | $V_{CB} = 10\text{ V}, I_E = 0$ | — | — | 0.1 | μA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = 1\text{ V}, I_C = 0$ | — | — | 1 | μA |
| DC current gain | h_{FE} | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$ | 80 | — | 140 | — |
| Transition frequency | f_T | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}$ | 2 | 4.5 | — | GHz |
| Insertion gain | $ S_{21e} ^2 (1)$ | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 1\text{ GHz}$ | — | 9.5 | — | dB |
| | $ S_{21e} ^2 (2)$ | $V_{CE} = 3\text{ V}, I_C = 20\text{ mA}, f = 1\text{ GHz}$ | 9.5 | 12.5 | — | |
| Noise figure | NF | $V_{CE} = 1\text{ V}, I_C = 5\text{ mA}, f = 1\text{ GHz}$ | — | 1.4 | 2.5 | dB |
| Reverse transfer capacitance | C_{re} | $V_{CB} = 1\text{ V}, I_E = 0, f = 1\text{ MHz}$ | — | 0.55 | 0.95 | pF |

Caution

This device electrostatic sensitivity. Please handle with caution.

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20070701-EN GENERAL

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