

# 2SC5091FT

## VHF~UHF Band Low Noise Amplifier Applications

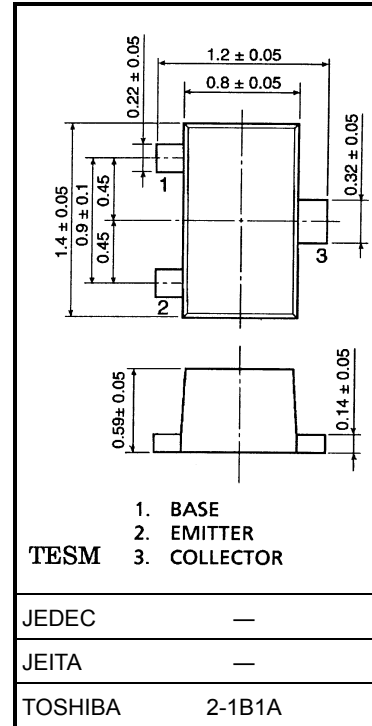
- Low noise figure, high gain.
- $NF = 1.1\text{dB}$ ,  $|S_{21e}|^2 = 13\text{dB}$  ( $f = 1\text{GHz}$ )

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Characteristics             | Symbol    | Rating  | Unit             |
|-----------------------------|-----------|---------|------------------|
| Collector-base voltage      | $V_{CBO}$ | 20      | V                |
| Collector-emitter voltage   | $V_{CEO}$ | 8       | V                |
| Emitter-base voltage        | $V_{EBO}$ | 1.5     | V                |
| Base current                | $I_B$     | 20      | mA               |
| Collector current           | $I_C$     | 40      | mA               |
| Collector power dissipation | $P_C$     | 100     | mW               |
| Junction temperature        | $T_j$     | 125     | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55~125 | $^\circ\text{C}$ |

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).

Unit: mm



Weight: 0.0022 g (typ.)

### Microwave Characteristics ( $T_a = 25^\circ\text{C}$ )

| Characteristics      | Symbol            | Test Condition                                                 | Min | Typ. | Max | Unit |
|----------------------|-------------------|----------------------------------------------------------------|-----|------|-----|------|
| Transition frequency | $f_T$             | $V_{CE} = 8\text{V}$ , $I_C = 20\text{mA}$                     | 7   | 10   | —   | GHz  |
| Insertion gain       | $ S_{21e} ^2$ (1) | $V_{CE} = 8\text{V}$ , $I_C = 20\text{mA}$ , $f = 1\text{GHz}$ | 10  | 13   | —   | dB   |
|                      | $ S_{21e} ^2$ (2) | $V_{CE} = 8\text{V}$ , $I_C = 20\text{mA}$ , $f = 2\text{GHz}$ | —   | 7    | —   |      |
| Noise figure         | NF (1)            | $V_{CE} = 8\text{V}$ , $I_C = 5\text{mA}$ , $f = 1\text{GHz}$  | —   | 1.1  | 2.5 | dB   |
|                      | NF (2)            | $V_{CE} = 8\text{V}$ , $I_C = 5\text{mA}$ , $f = 2\text{GHz}$  | —   | 1.7  | —   |      |

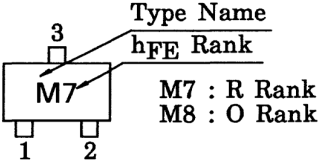
### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

| Characteristics              | Symbol               | Test Condition                                                 | Min | Typ. | Max  | Unit          |
|------------------------------|----------------------|----------------------------------------------------------------|-----|------|------|---------------|
| Collector cut-off current    | $I_{CBO}$            | $V_{CB} = 10\text{V}$ , $I_E = 0$                              | —   | —    | 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              | $h_{FE}$<br>(Note 1) | $V_{CE} = 8\text{V}$ , $I_C = 20\text{mA}$                     | 50  | —    | 160  |               |
| Output capacitance           | $C_{ob}$             | $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$ (Note 2) | —   | 0.7  | —    | pF            |
| Reverse transfer capacitance | $C_{re}$             |                                                                | —   | 0.5  | 0.95 | pF            |

Note 1:  $h_{FE}$  classification R: 50~100, O: 80~160

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

**Marking**



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20070701-EN GENERAL

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