

# MT3S111

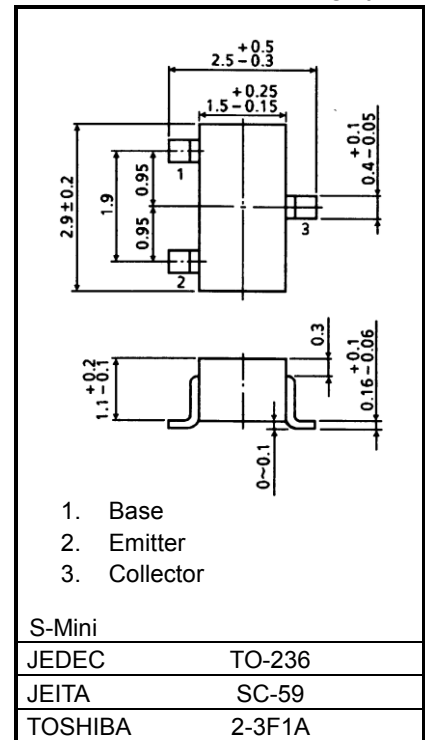
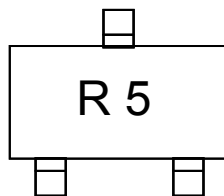
VHF-UHF Low-Noise, Low-Distortion Amplifier Applications

Unit: mm

## Features

- Low-Noise Figure: NF=0.9 dB (typ.) (@ f=1 GHz)
- High Gain:  $|S_{21e}|^2=12$  dB (typ.) (@ f=1 GHz)

## Marking



## Absolute Maximum Ratings (Ta = 25°C)

| Characteristics             | Symbol         | Rating     | Unit |
|-----------------------------|----------------|------------|------|
| Collector-emitter voltage   | $V_{CES}$      | 13         | V    |
| Collector-emitter voltage   | $V_{CEO}$      | 6          | V    |
| Emitter-base voltage        | $V_{EBO}$      | 0.6        | V    |
| Collector-current           | $I_C$          | 100        | mA   |
| Base-current                | $I_B$          | 10         | mA   |
| Collector power dissipation | $P_C$          | 160        | mW   |
| Collector power dissipation | $P_C$ (Note 1) | 700        | mW   |
| Junction temperature        | $T_j$          | 150        | °C   |
| Storage temperature range   | $T_{stg}$      | -55 to 150 | °C   |

Weight: 0.012 g (typ.)

Note 1: The device is mounted on a ceramic board (25.4 mm x 25.4 mm x 0.8 mm (t))

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).

Start of commercial production  
2007-12

**Microwave Characteristics (Ta = 25°C)**

| Characteristics   | Symbol           | Test Condition   | Min | Typ. | Max | Unit |
|---|------------------|--|-----|------|-----|------|
| Transition frequency  | $f_T$            | $V_{CE}=5\text{ V}, I_C=30\text{ mA}$  | 9   | 11.5 | —   | GHz  |
| Insertion gain  | $ S_{21e} ^2(1)$ | $V_{CE}=5\text{ V}, I_C=30\text{ mA}, f=500\text{ MHz}$                        | —   | 17.5 | —   | dB   |
|   | $ S_{21e} ^2(2)$ | $V_{CE}=5\text{ V}, I_C=30\text{ mA}, f=1\text{ GHz}$                          | 10  | 12   | —   | dB   |
| Noise figure  | NF(1)            | $V_{CE}=5\text{ V}, I_C=30\text{ mA}, f=500\text{ MHz}$                        | —   | 0.65 | —   | dB   |
|   | NF(2)            | $V_{CE}=5\text{ V}, I_C=30\text{ mA}, f=1\text{ GHz}$                          | —   | 0.9  | 1.2 | dB   |
| 3 <sup>rd</sup> order intermodulation distortion output intercept point | OIP <sub>3</sub> | $V_{CE}=5\text{ V}, I_C=30\text{ mA}, f=500\text{ MHz}, \Delta f=1\text{ MHz}$ | —   | 32   | —   | dBmW |

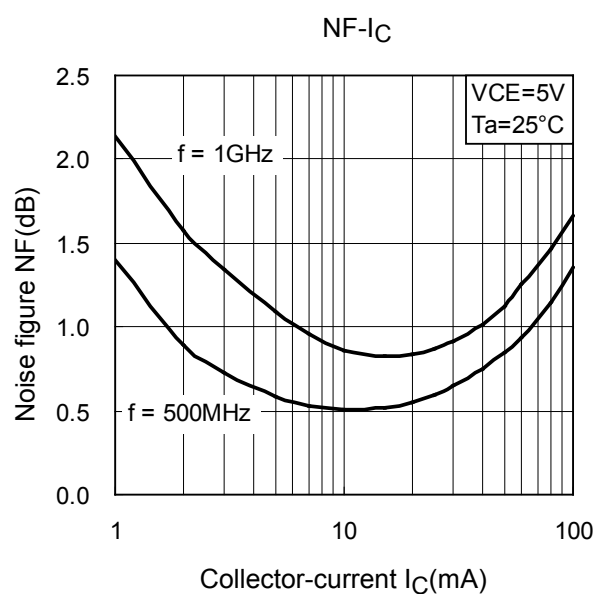
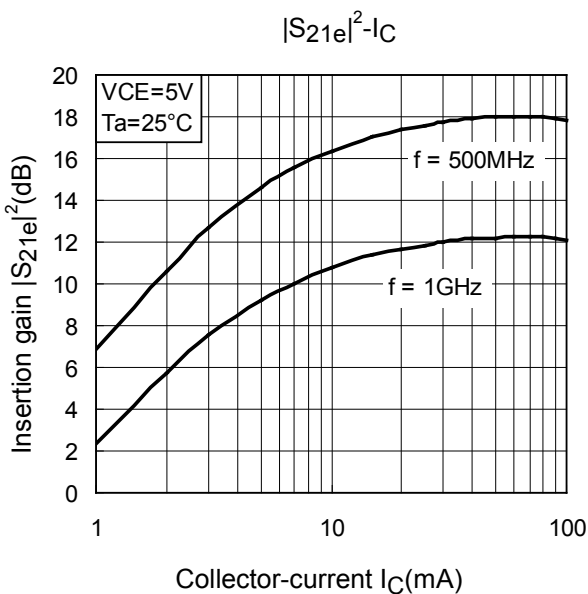
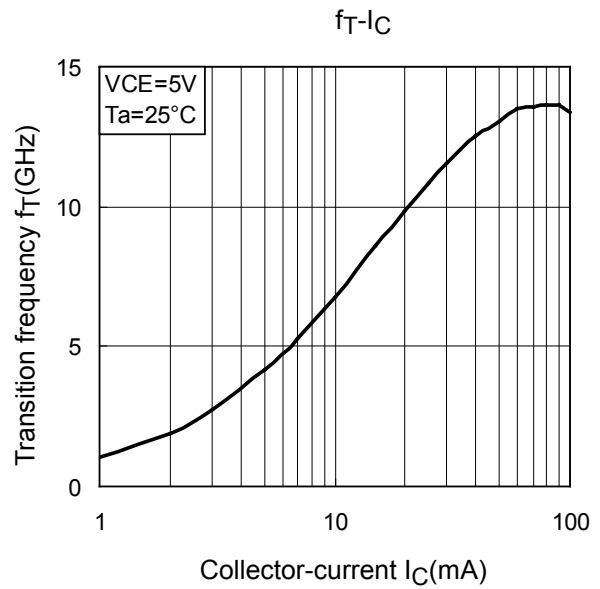
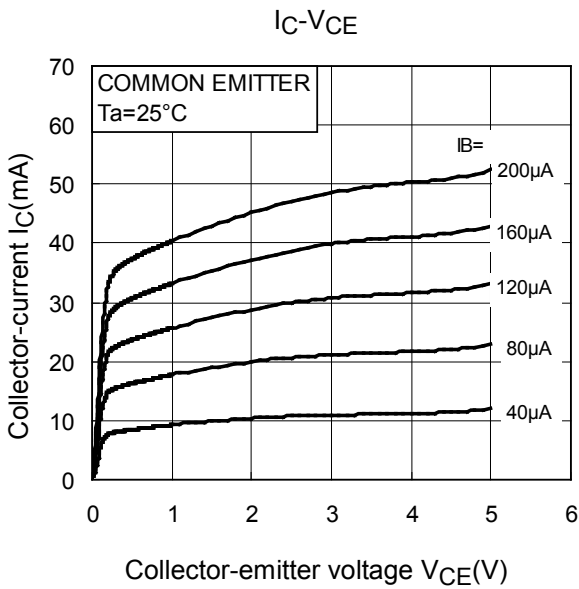
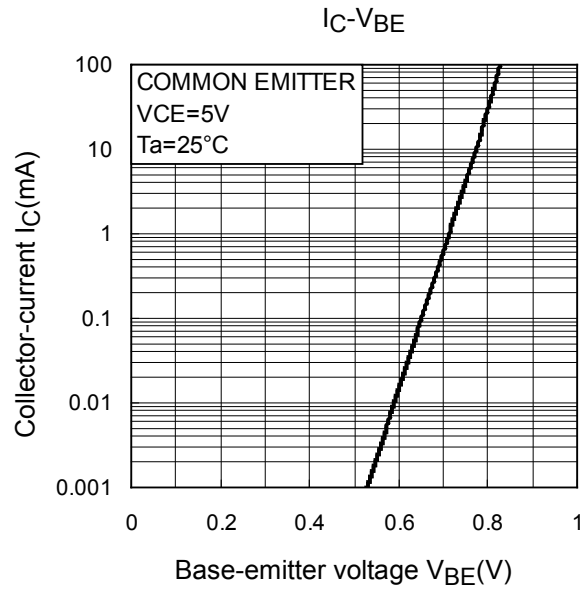
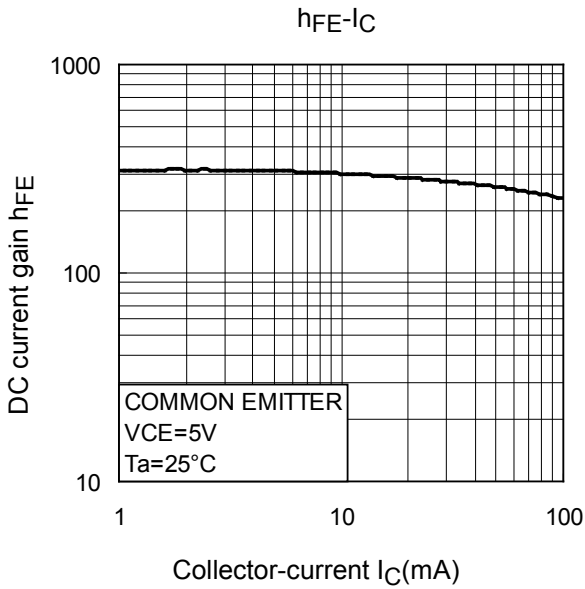
**Electrical Characteristics (Ta = 25°C)**

| Characteristics              | Symbol    | Test Condition   | Min | Typ. | Max | Unit |
|------------------------------|-----------|--|-----|------|-----|------|
| Collector cut-off current    | $I_{CBO}$ | $V_{CB}=5\text{ V}, I_E=0\text{ A}$                          | —   | —    | 0.1 | μA   |
| DC current gain              | $h_{FE}$  | $V_{CE}=5\text{ V}, I_C=30\text{ mA}$                        | 200 | —    | 400 | —    |
| Output capacitance           | $C_{ob}$  | $V_{CB}=5\text{ V}, I_E=0\text{ A}, f=1\text{ MHz}$          | —   | 1.45 | —   | pF   |
| Reverse transfer capacitance | $C_{re}$  | $V_{CB}=5\text{ V}, I_E=0\text{ A}, f=1\text{ MHz}$ (Note 2) | —   | 0.9  | 1.2 | pF   |

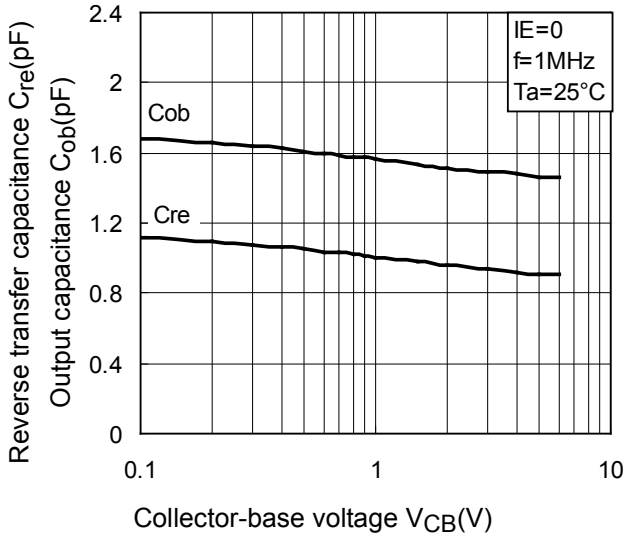
Note 2:  $C_{re}$  is measured using a 3-terminal method with capacitance bridge

**Caution:**

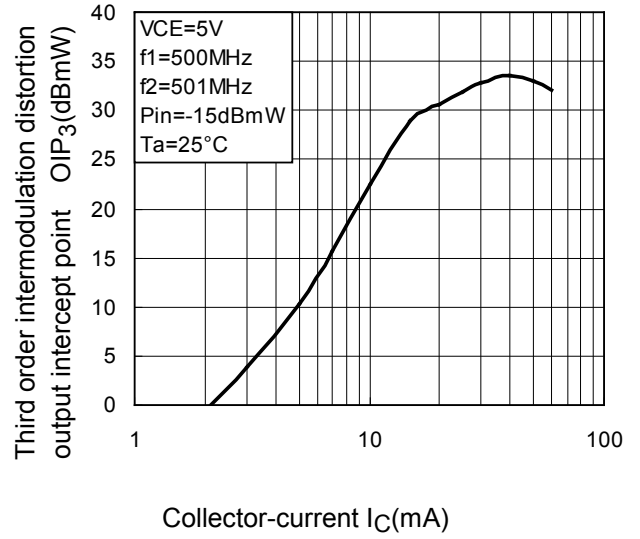
This device is sensitive to electrostatic discharge due to the high frequency transistor process of  $f_T=60\text{ GHz}$  class which is used for this product.  
Please make tool and equipment earthed enough when you handle.



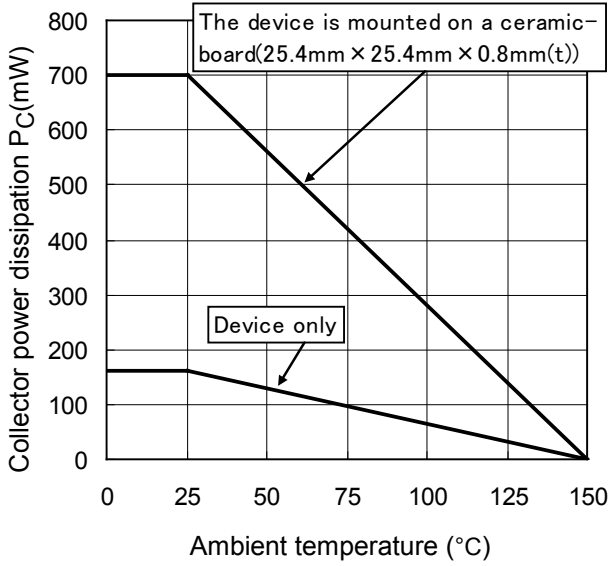
$C_{re}, C_{ob}-V_{CB}$



OIP<sub>3</sub>-I<sub>C</sub>



$P_C-T_a$



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