

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type

# 2SC4215

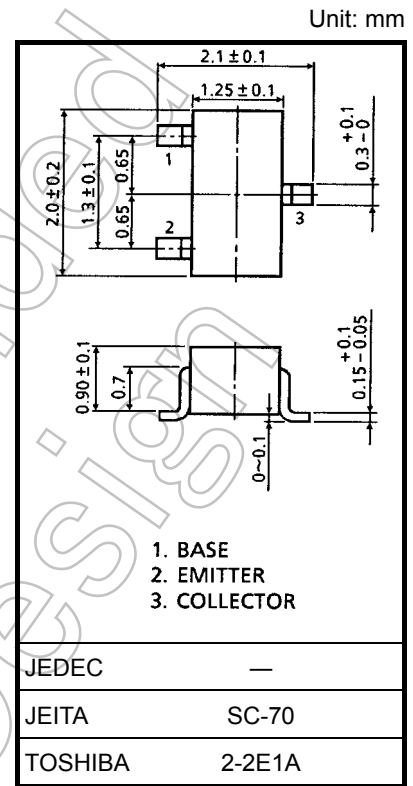
High Frequency Amplifier Applications  
FM, RF, MIX, IF Amplifier Applications

- Small reverse transfer capacitance:  $C_{re} = 0.55 \text{ pF}$  (typ.)
- Low noise figure:  $NF = 2\text{dB}$  (typ.) ( $f = 100 \text{ MHz}$ )

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

| Characteristics             | Symbol    | Rating     | Unit             |
|-----------------------------|-----------|------------|------------------|
| Collector-base voltage      | $V_{CBO}$ | 40         | V                |
| Collector-emitter voltage   | $V_{CEO}$ | 30         | V                |
| Emitter-base voltage        | $V_{EBO}$ | 4          | V                |
| Collector current           | $I_C$     | 20         | mA               |
| Base current                | $I_B$     | 4          | mA               |
| Collector power dissipation | $P_C$     | 100        | mW               |
| Junction temperature        | $T_j$     | 125        | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55 to 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).



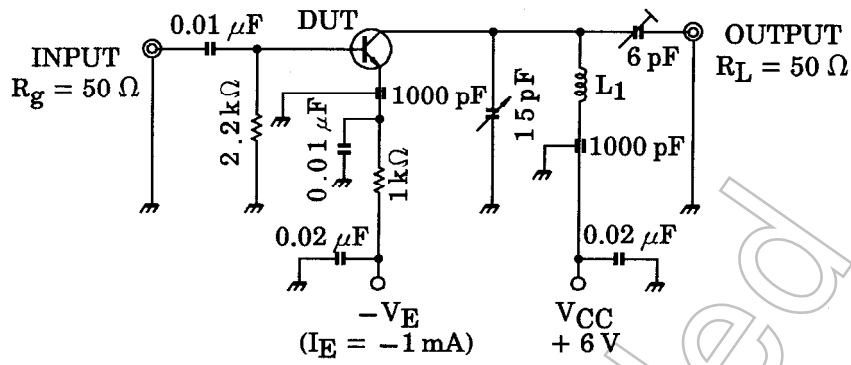
Weight: 0.006 g (typ.)

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

| Characteristics              | Symbol              | Test Condition   | Min | Typ. | Max | Unit          |
|------------------------------|---------------------|--|-----|------|-----|---------------|
| Collector cut-off current    | $I_{CBO}$           | $V_{CB} = 40 \text{ V}, I_E = 0$   | —   | —    | 0.1 | $\mu\text{A}$ |
| Emitter cut-off current      | $I_{EBO}$           | $V_{EB} = 4 \text{ V}, I_C = 0$  | —   | —    | 0.5 | $\mu\text{A}$ |
| DC current gain              | $h_{FE}$<br>(Note)  | $V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$                                     | 40  | —    | 200 |               |
| Reverse transfer capacitance | $C_{re}$            | $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$                                     | —   | 0.55 | —   | pF            |
| Transition frequency         | $f_T$               | $V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$                                     | 260 | 550  | —   | MHz           |
| Collector-base time constant | $C_c \cdot f_{bb'}$ | $V_{CE} = 6 \text{ V}, I_E = -1 \text{ mA}, f = 30 \text{ MHz}$                | —   | —    | 25  | ps            |
| Noise figure                 | NF                  | $V_{CC} = 6 \text{ V}, I_E = -1 \text{ mA}, f = 100 \text{ MHz}$ ,<br>Figure 1 | —   | 2    | 5.0 | dB            |
| Power gain                   | $G_{pe}$            |  | 17  | 23   | —   | dB            |

Note:  $h_{FE}$  classification R: 40 to 80, O: 70 to 140, Y: 100 to 200

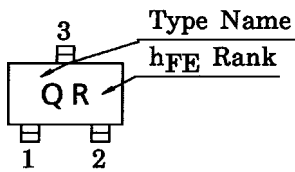
Start of commercial production  
1987-06



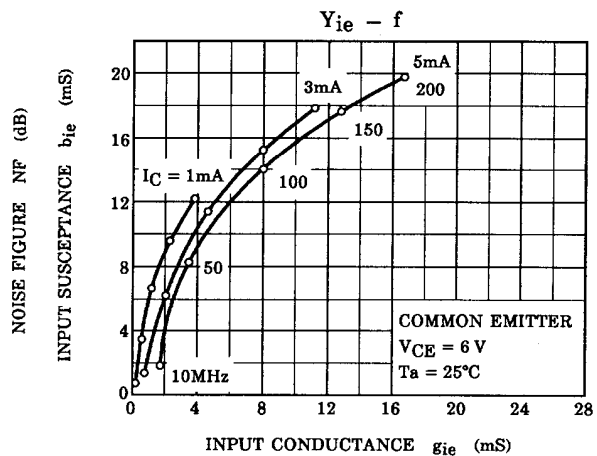
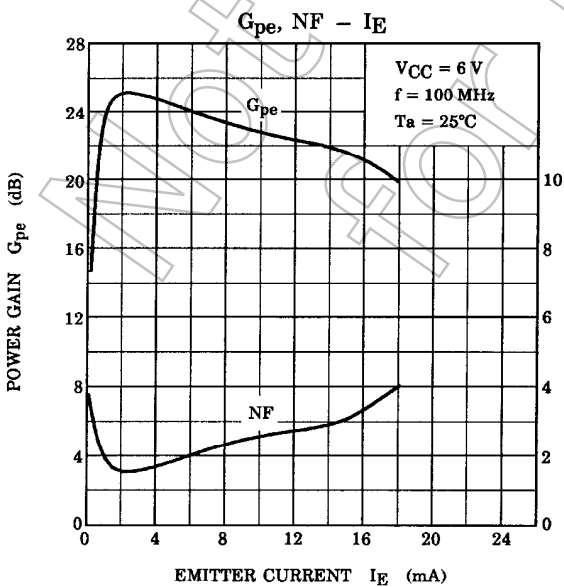
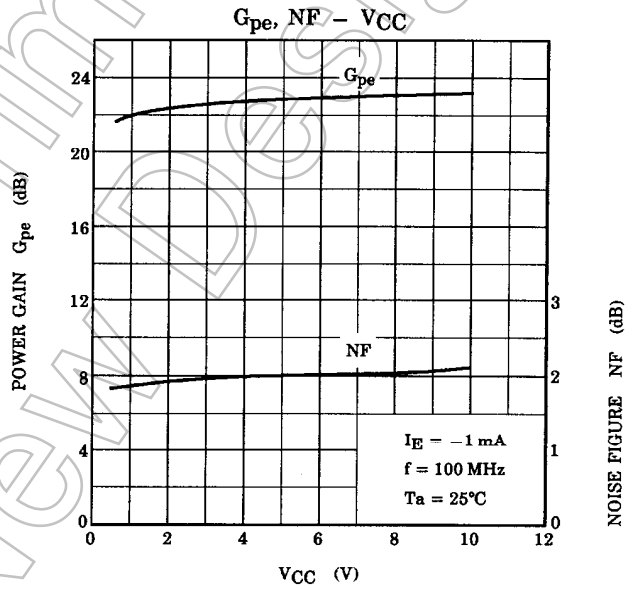
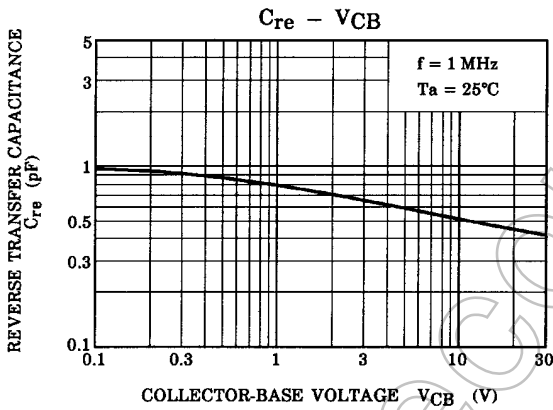
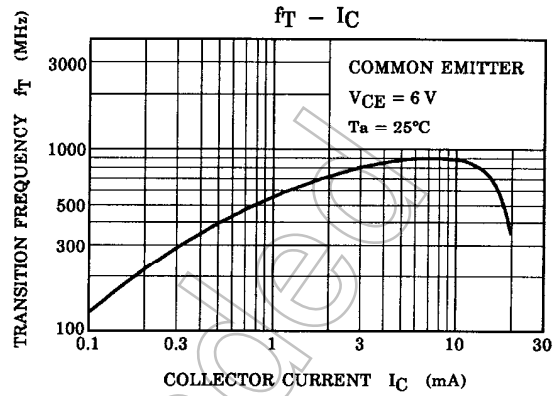
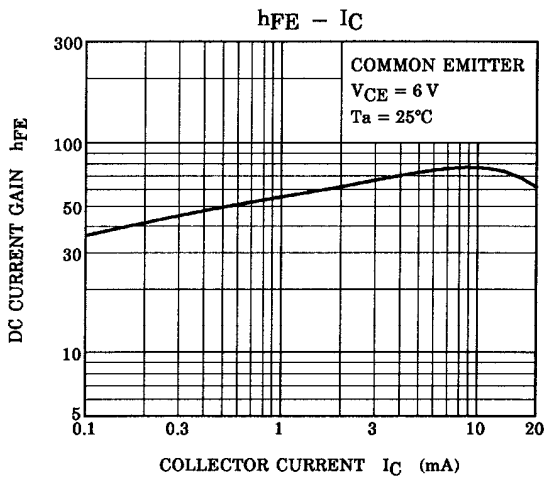
L<sub>1</sub>: 0.8 mmφ silver plated copper wire, 4 T, 10 mm ID, 8 mm length

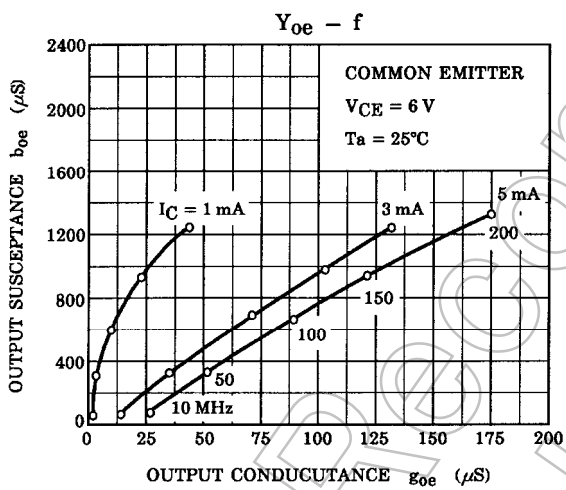
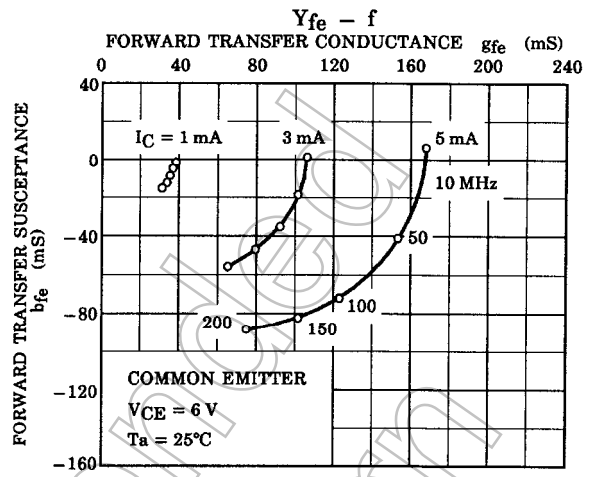
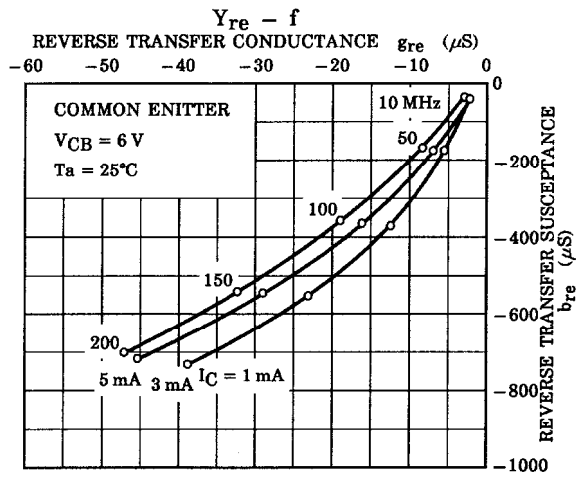
Figure 1 NF, G<sub>pe</sub> Test Circuit

Marking



Not Recommended for New Design





Not for New Design

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