

TOSHIBA Transistor Silicon NPN Epitaxial Planar Type (PCT process)

2SC2714

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

- Small reverse transfer capacitance: $C_{re} = 0.7 \text{ pF}$ (typ.)
- Low noise figure: $NF = 2.5\text{dB}$ (typ.)

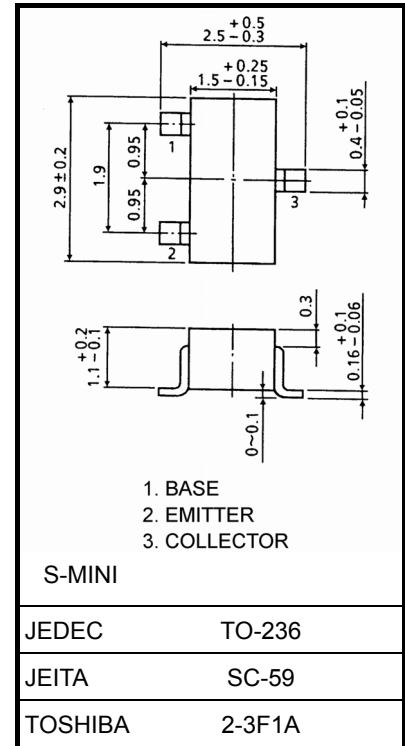
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

| 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).

Unit: mm



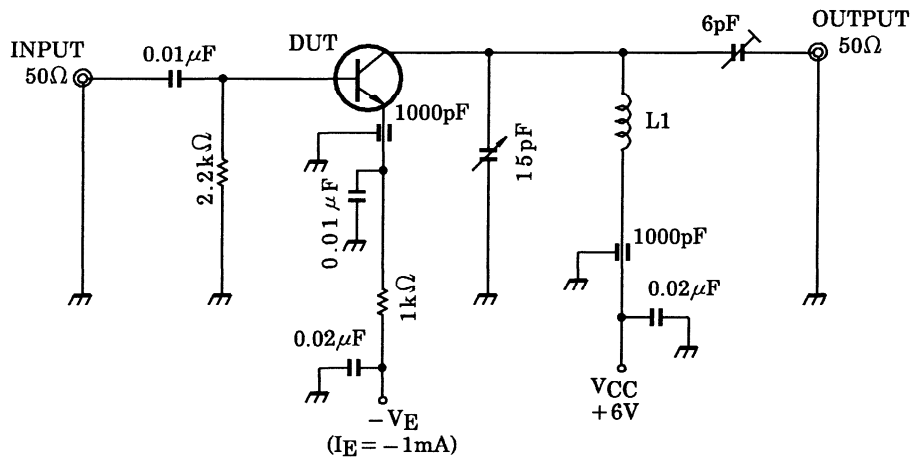
Weight: 12 mg (typ.)

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

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|------------------------------|--------------------|---|-----|------|-----|---------------|
| Collector cut-off current | I_{CBO} | $V_{CB} = 40 \text{ V}, I_E = 0$ | — | — | 0.5 | μA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = 4 \text{ V}, I_C = 0$ | — | — | 0.5 | μA |
| DC current gain | h_{FE} (Note) | $V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$ | 40 | — | 200 | — |
| Reverse transfer capacitance | C_{re} | $V_{CB} = 6 \text{ V}, f = 1 \text{ MHz}$ | — | 0.70 | — | pF |
| Transition frequency | f_T | $V_{CE} = 6 \text{ V}, I_C = 1 \text{ mA}$ | — | 550 | — | MHz |
| Collector-base time constant | $C_c.rbb'$ | $V_{CB} = 6 \text{ V}, I_E = -1 \text{ mA}, f = 30 \text{ MHz}$ | — | — | 30 | ps |
| Noise figure | NF | $V_{CC} = 6 \text{ V}, I_E = -1 \text{ mA}, f = 100 \text{ MHz},$ Figure 1 | — | 2.5 | 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
1982-10



L1: 0.8 mmφ silver plated copper wire, 4T, 10ID, 8 length

Figure1 NF, G_{pe} Test Circuit

y Parameter (typ.)

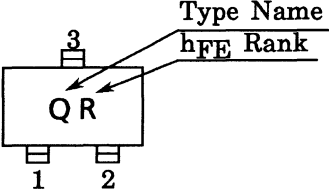
(1) Common emitter ($V_{CE} = 6\text{ V}$, $I_E = -1\text{ mA}$, $f = 100\text{ MHz}$, $T_a = 25^\circ\text{C}$)

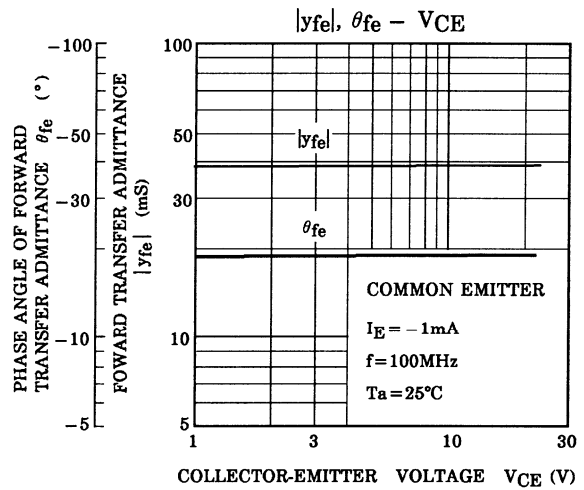
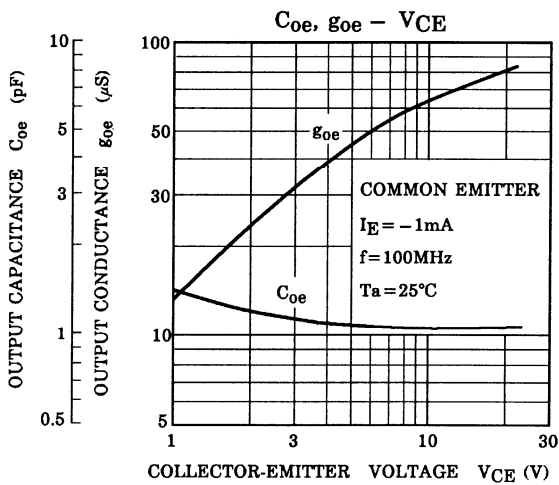
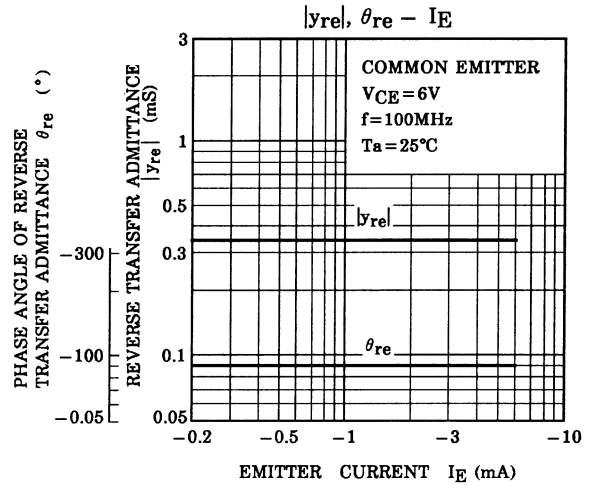
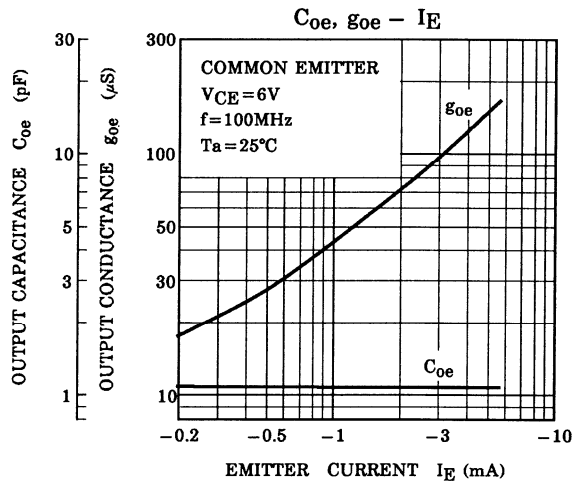
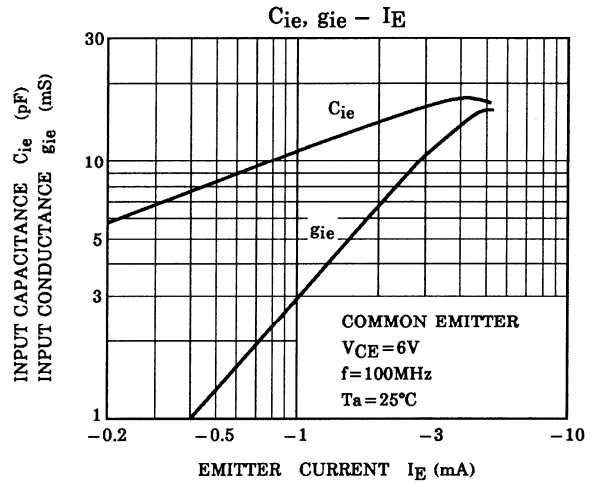
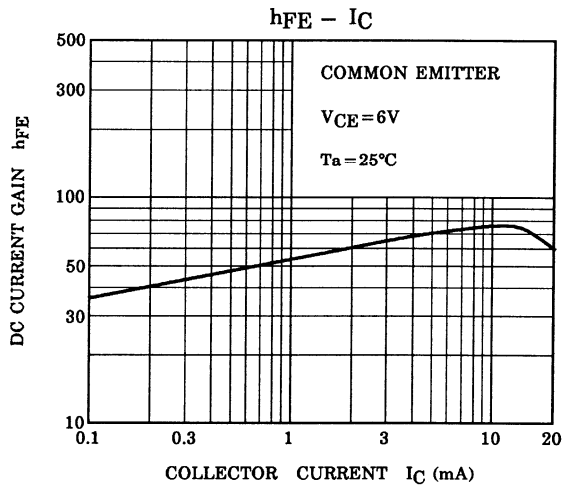
| Characteristics | Symbol | Typ. | Unit |
|--|---------------|------|------|
| Input conductance | g_{ie} | 2.9 | mS |
| Input capacitance | C_{ie} | 10.2 | pF |
| Reverse transfer admittance | $ y_{re} $ | 0.33 | mS |
| Phase angle of reverse transfer admittance | θ_{re} | -90 | ° |
| Forward transfer admittance | $ y_{fe} $ | 40 | mS |
| Phase angle of forward transfer admittance | θ_{fe} | -20 | ° |
| Output conductance | g_{oe} | 45 | μS |
| Output capacitance | C_{oe} | 1.1 | pF |

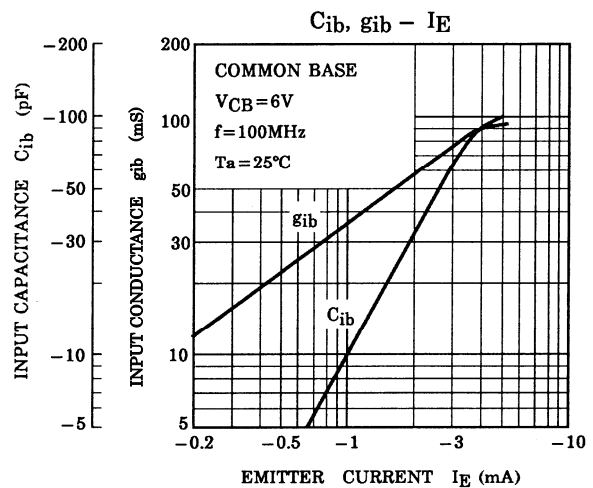
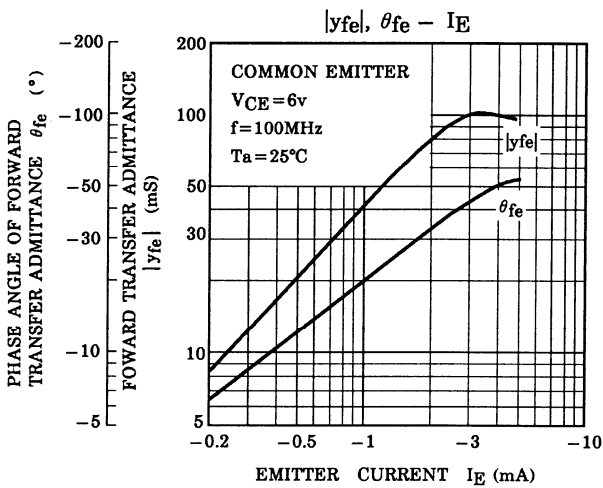
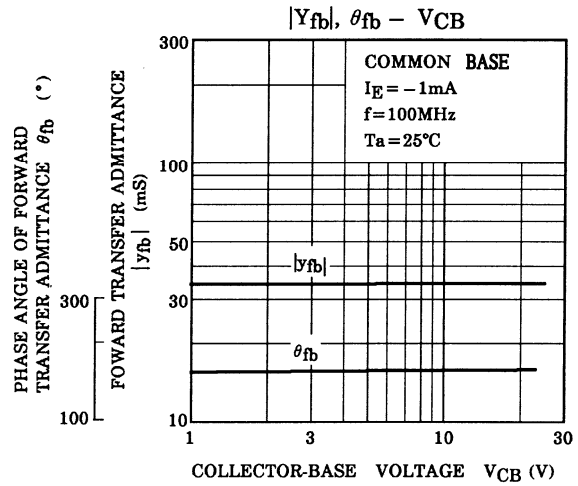
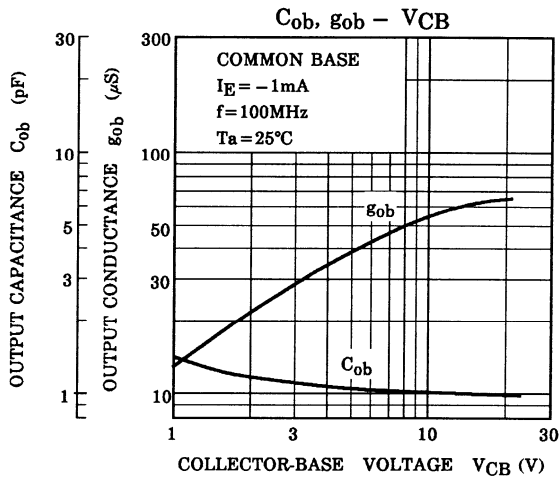
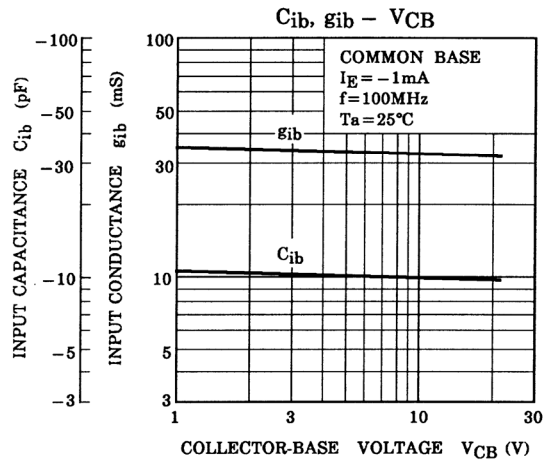
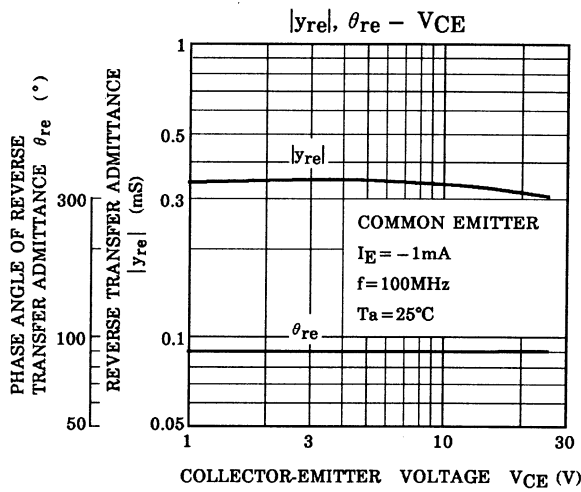
(2) Common base ($V_{CE} = 6\text{ V}$, $I_E = -1\text{ mA}$, $f = 100\text{ MHz}$, $T_a = 25^\circ\text{C}$)

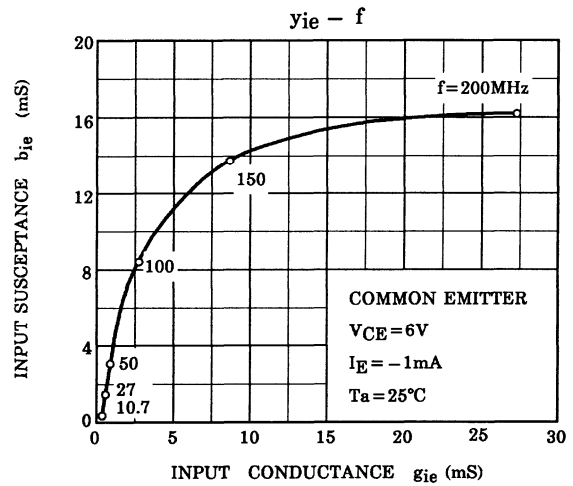
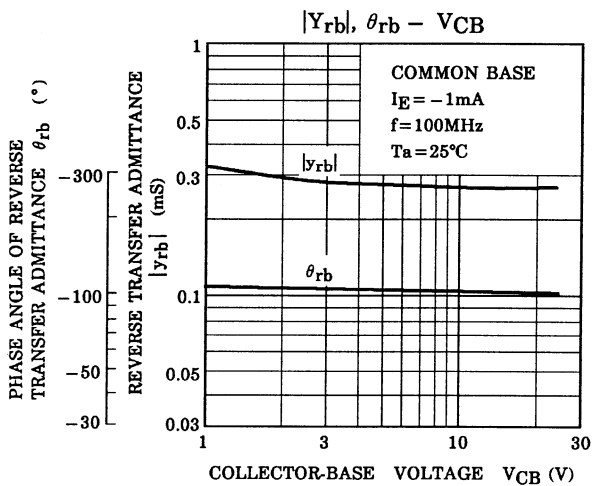
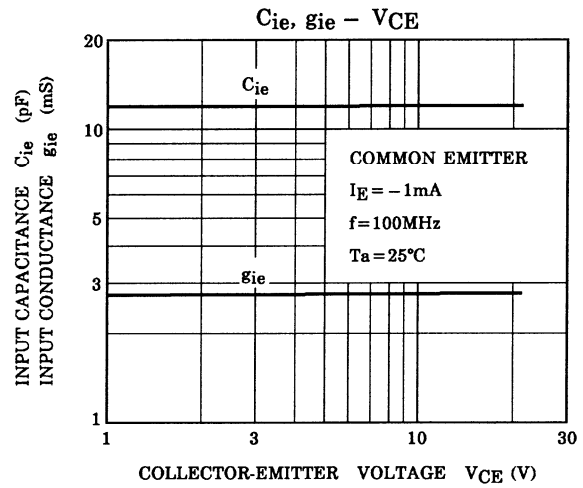
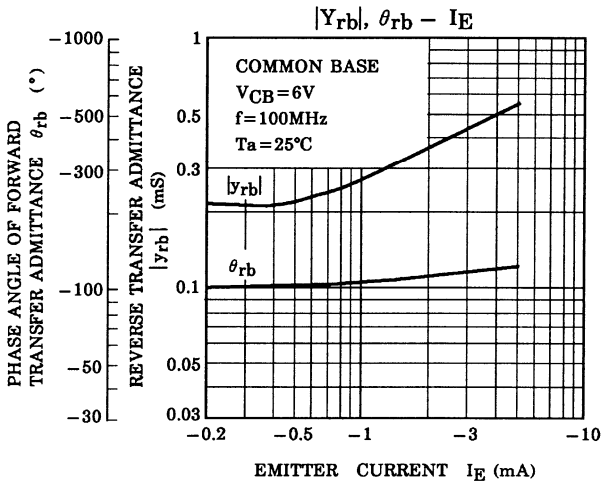
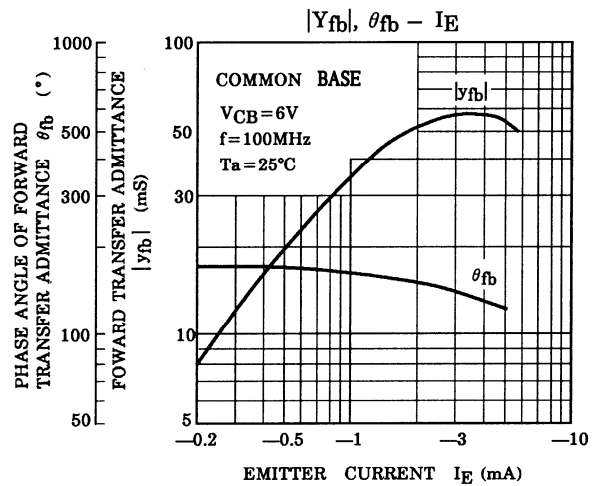
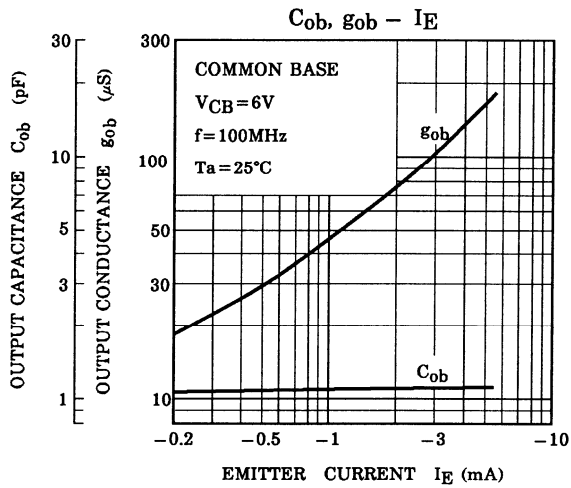
| Characteristics | Symbol | Typ. | Unit |
|--|---------------|------|------|
| Input conductance | g_{ib} | 34 | mS |
| Input capacitance | C_{ib} | -10 | pF |
| Reverse transfer admittance | $ y_{rb} $ | 0.27 | mS |
| Phase angle of reverse transfer admittance | θ_{rb} | -105 | ° |
| Forward transfer admittance | $ y_{fb} $ | 34 | mS |
| Phase angle of forward transfer admittance | θ_{fb} | 165 | ° |
| Output conductance | g_{ob} | 45 | μS |
| Output capacitance | C_{ob} | 1.1 | pF |

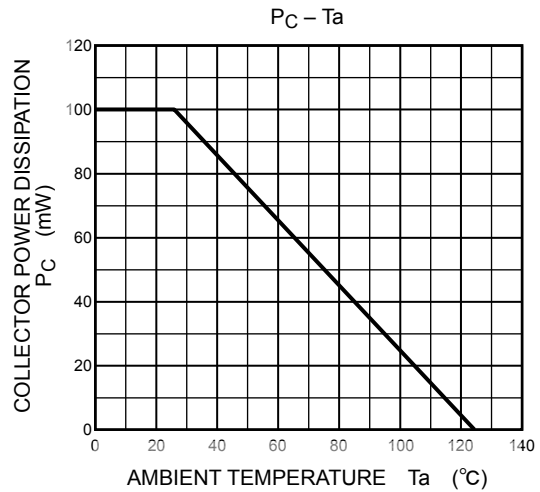
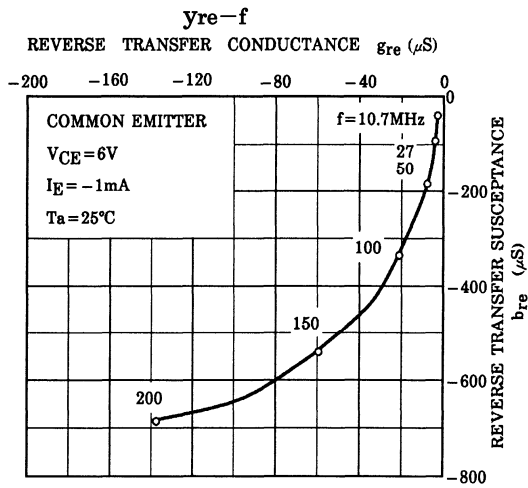
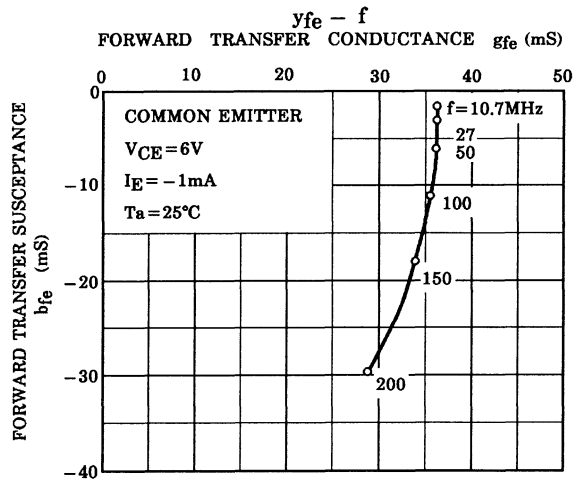
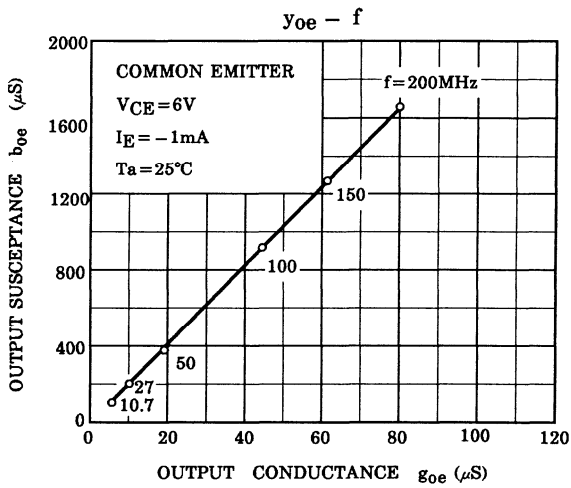
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