

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

## 2SC941TM

High Frequency Amplifier Applications

AM High Frequency Amplifier Applications

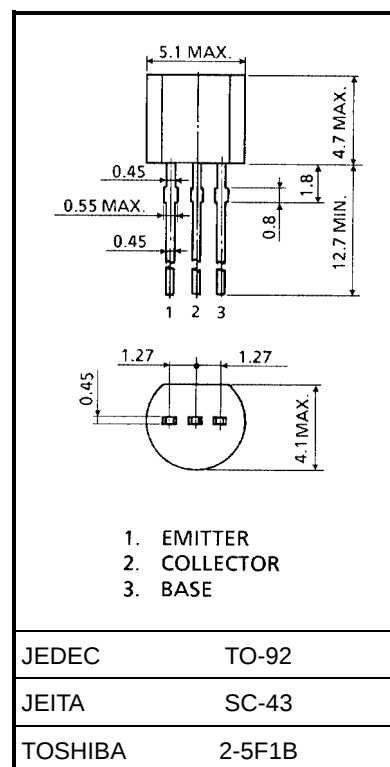
AM Frequency Converter Applications

Unit: mm

- Low noise figure: NF = 3.5dB (max) (f = 1 MHz)

## Maximum Ratings (Ta = 25°C)

| Characteristics             | Symbol    | Rating  | Unit |
|-----------------------------|-----------|---------|------|
| Collector-base voltage      | $V_{CBO}$ | 35      | V    |
| Collector-emitter voltage   | $V_{CEO}$ | 30      | V    |
| Emitter-base voltage        | $V_{EBO}$ | 4       | V    |
| Collector current           | $I_C$     | 100     | mA   |
| Base current                | $I_B$     | 20      | mA   |
| Collector power dissipation | $P_C$     | 400     | mW   |
| Junction temperature        | $T_j$     | 125     | °C   |
| Storage temperature range   | $T_{stg}$ | -55~125 | °C   |



## Electrical Characteristics (Ta = 25°C)

Weight: 0.21 g (typ.)

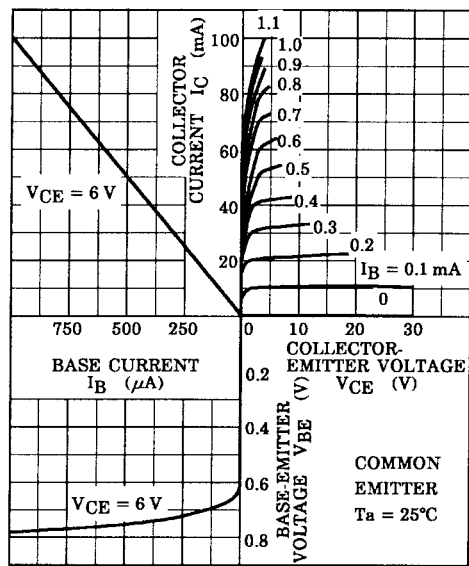
| Characteristics                      | Symbol              | Test Condition                                                                 | Min | Typ. | Max | Unit          |
|--------------------------------------|---------------------|--------------------------------------------------------------------------------|-----|------|-----|---------------|
| Collector cut-off current            | $I_{CBO}$           | $V_{CB} = 20\text{ V}, I_E = 0$                                                | —   | —    | 0.1 | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{EBO}$           | $V_{EB} = 2\text{ V}, I_C = 0$                                                 | —   | —    | 1.0 | $\mu\text{A}$ |
| DC current gain                      | $h_{FE}$<br>(Note)  | $V_{CE} = 12\text{ V}, I_C = 2\text{ mA}$                                      | 40  | —    | 240 |               |
| Collector-emitter saturation voltage | $V_{CE(sat)}$       | $I_C = 10\text{ mA}, I_B = 1\text{ mA}$                                        | —   | —    | 0.4 | V             |
| Base-emitter saturation voltage      | $V_{BE(sat)}$       | $I_C = 10\text{ mA}, I_B = 1\text{ mA}$                                        | —   | —    | 1.0 | V             |
| Transition frequency                 | $f_T$               | $V_{CE} = 10\text{ V}, I_C = 2\text{ mA}$                                      | 80  | 120  | —   | MHz           |
| Reverse transfer capacitance         | $C_{re}$            | $V_{CE} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$                              | —   | 2.2  | 3.0 | pF            |
| Collector-base time constant         | $C_c \cdot f_{bb'}$ | $V_{CE} = 10\text{ V}, I_E = -1\text{ mA}, f = 30\text{ MHz}$                  | —   | 30   | 50  | ps            |
| Noise figure                         | NF                  | $V_{CE} = 10\text{ V}, I_E = -1\text{ mA}, f = 1\text{ MHz}, R_g = 50\ \Omega$ | —   | 2.0  | 3.5 | dB            |

Note:  $h_{FE}$  classification R: 40~80, O: 70~140, Y: 120~240

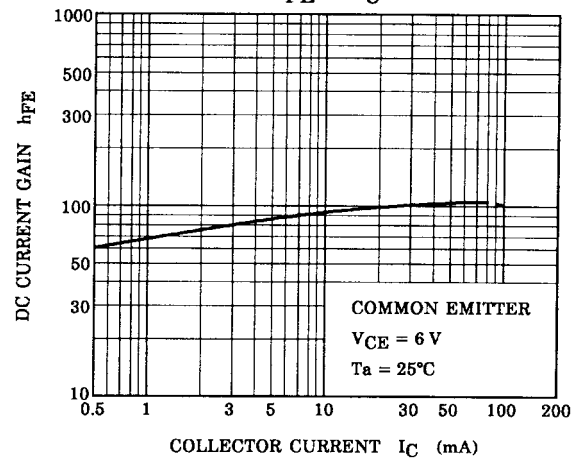
**Y Parameters (typ.) (common emitter  $V_{CE} = 6\text{ V}$ ,  $I_E = -1\text{ mA}$ ,  $f = 1\text{ MHz}$ )**

| Characteristics                            | Symbol        | 2SC941-R | 2SC941-O | 2SC941-Y | Unit          |
|--------------------------------------------|---------------|----------|----------|----------|---------------|
| Input conductance                          | $g_{ie}$      | 0.5      | 0.35     | 0.22     | mS            |
| Input capacitance                          | $C_{ie}$      | 50       | 48       | 46       | pF            |
| Output conductance                         | $g_{oe}$      | 4        | 5        | 6.5      | $\mu\text{S}$ |
| Output capacitance                         | $C_{oe}$      | 3.7      | 3.4      | 3.2      | pF            |
| Forward transfer admittance                | $ y_{fe} $    | 36       | 36       | 36       | mS            |
| Phase angle of forward transfer admittance | $\theta_{fe}$ | -1.6     | -1.6     | -1.6     | °             |
| Reverse transfer admittance                | $ y_{re} $    | 14       | 14       | 14       | $\mu\text{S}$ |
| Phase angle of reverse transfer admittance | $\theta_{re}$ | -90      | -90      | -90      | °             |

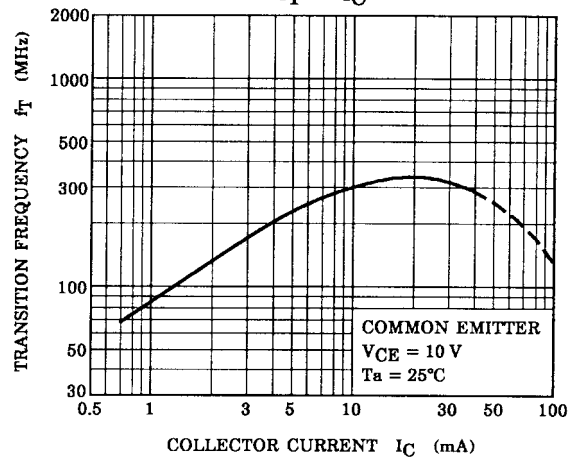
STATIC CHARACTERISTICS



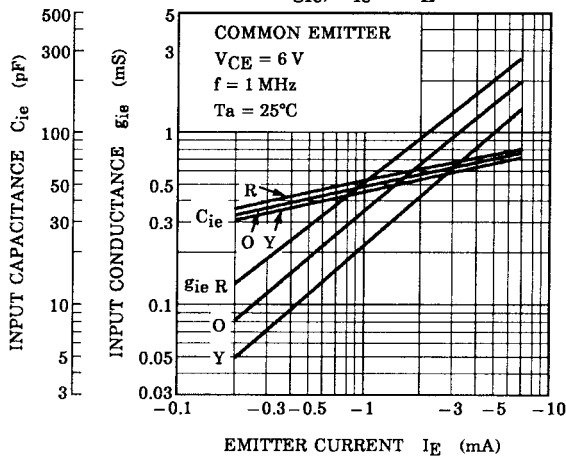
$h_{FE} - I_C$



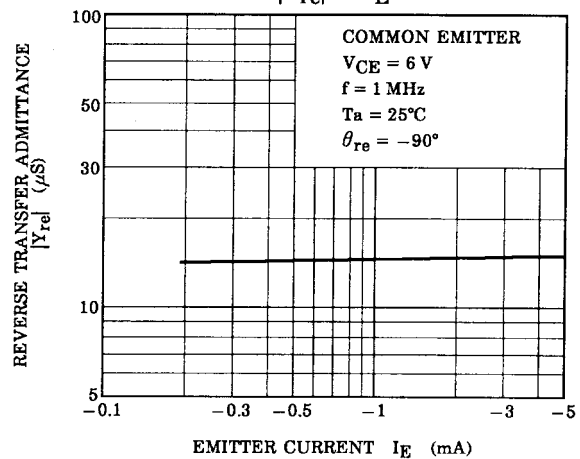
$f_T - I_C$

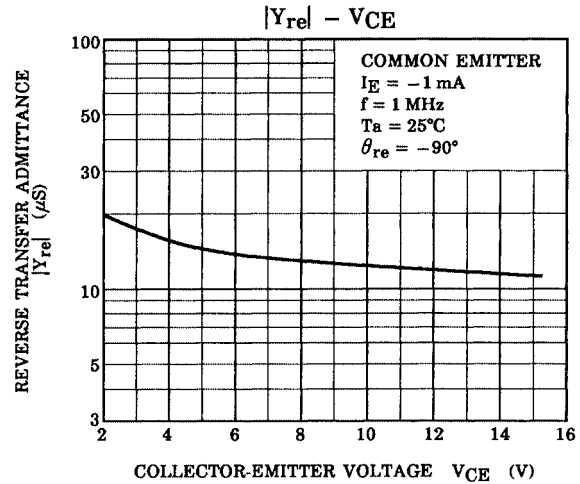
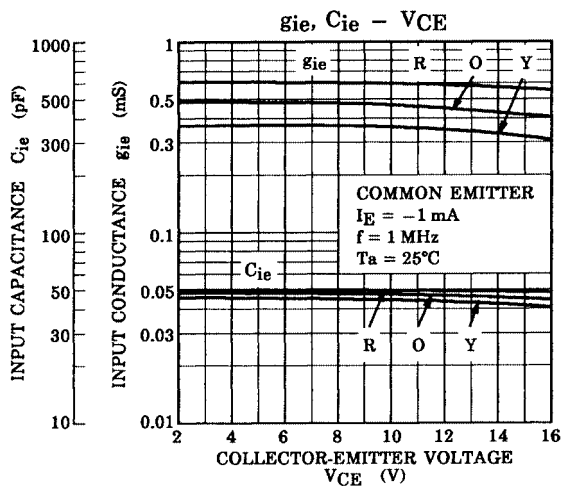
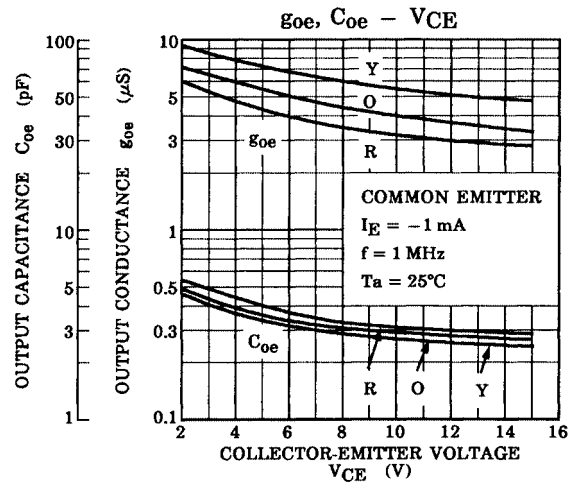
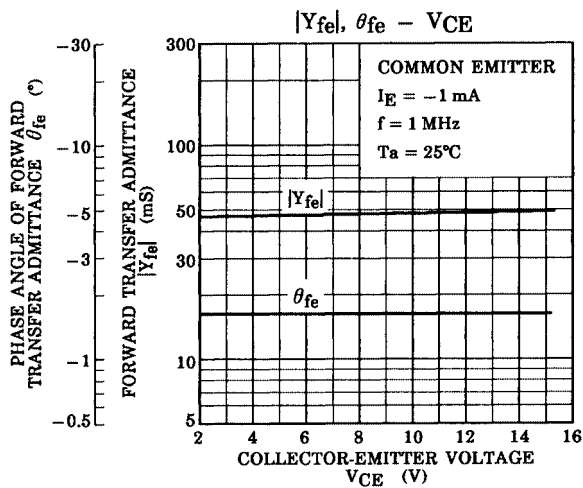
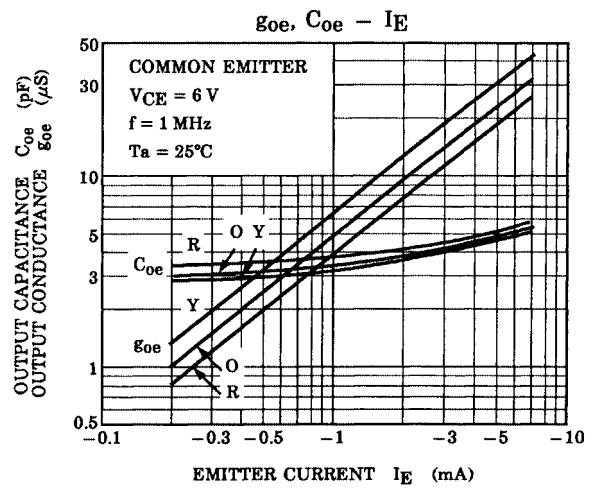
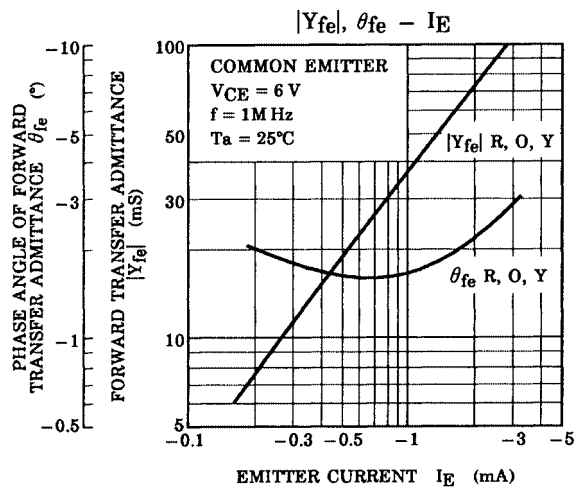


$g_{ie}, C_{ie} - I_E$



$|Y_{re}| - I_E$





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