

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

## 2SC3324

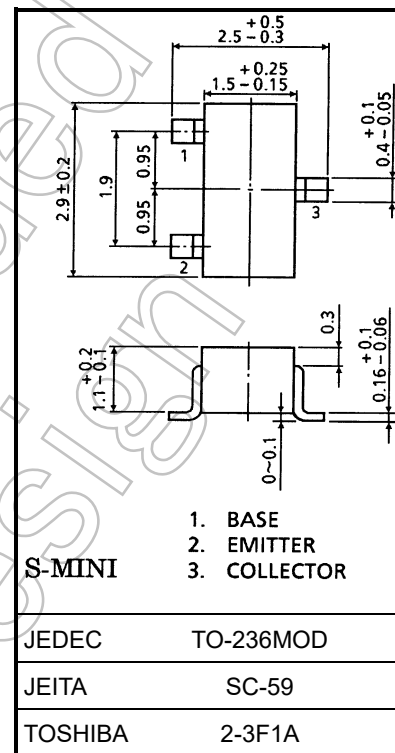
## Audio Frequency General Purpose Amplifier Applications

Unit: mm

- High voltage:  $V_{CEO} = 120\text{ V}$
- Excellent  $h_{FE}$  linearity:  $h_{FE} (I_C = 0.1\text{ mA}) / h_{FE} (I_C = 2\text{ mA}) = 0.95$  (typ.)
- High  $h_{FE}$ :  $h_{FE} = 200$  to  $700$
- Low noise:  $NF (2) = 0.2\text{ dB}$  (typ.),  $3\text{ dB}$  (max)
- Complementary to 2SA1312
- Small package

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

| Characteristics             | Symbol             | Rating     | Unit             |
|-----------------------------|--------------------|------------|------------------|
| Collector-base voltage      | $V_{CBO}$          | 120        | V                |
| Collector-emitter voltage   | $V_{CEO}$          | 120        | V                |
| Emitter-base voltage        | $V_{EBO}$          | 5          | V                |
| Collector current           | $I_C$              | 100        | mA               |
| Base current                | $I_B$              | 20         | mA               |
| Collector power dissipation | $P_C$ (Note 1,2)   | 200        | mW               |
| Junction temperature        | $T_j$ (Note 2)     | 150        | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ (Note 2) | -55 to 150 | $^\circ\text{C}$ |



Weight: 0.012 g (typ.)

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.

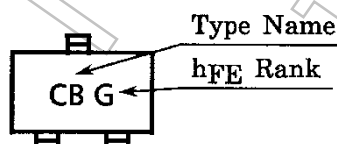
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Note 1: Mounted on a FR4 board. (25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 0.8 mm<sup>2</sup> × 3)

Note 2: There are products which can support  $P_C$ : 150mW,  $T_j$ : 125  $^\circ\text{C}$ ,  $T_{stg}$ : -55 to 125  $^\circ\text{C}$ .

Please contact our sales for detail information.

## Marking



Start of commercial production  
1982-12

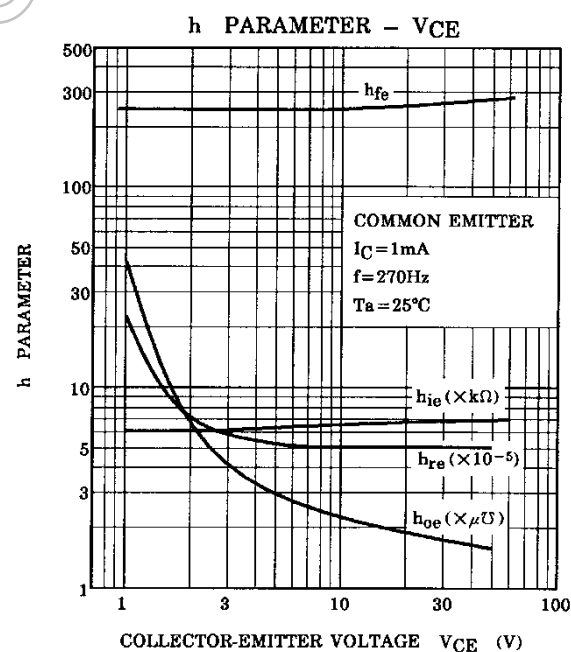
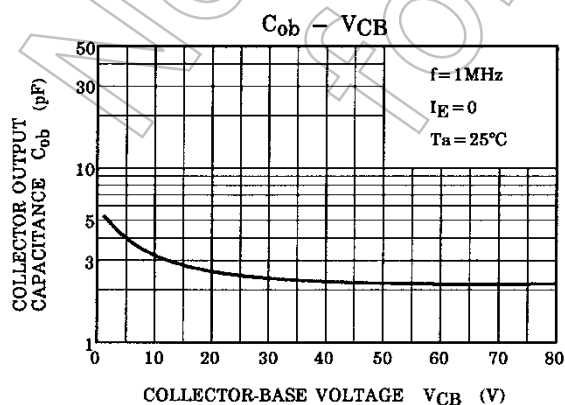
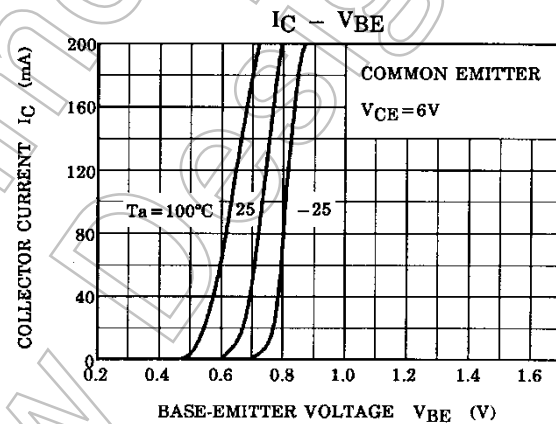
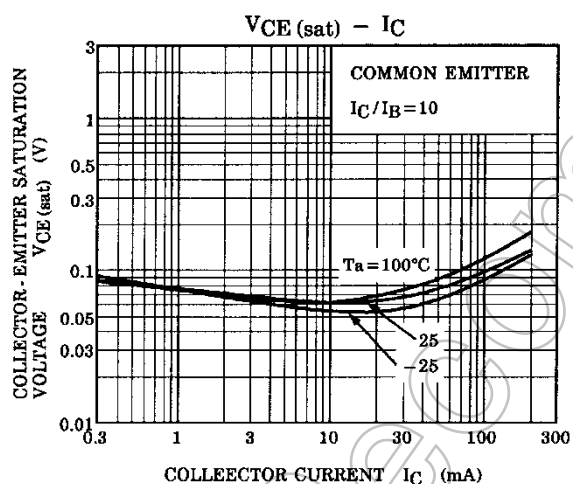
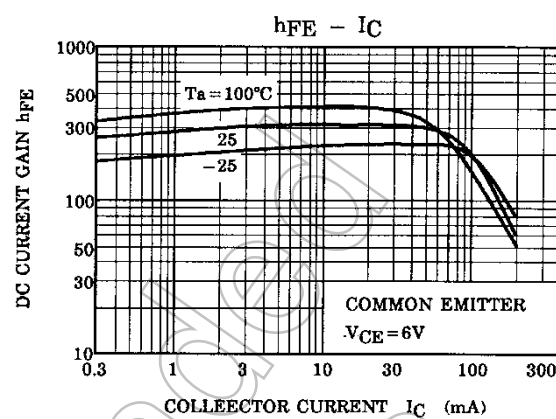
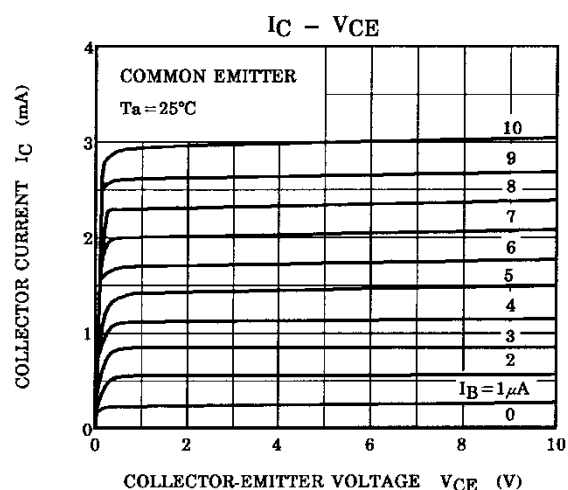
### Electrical Characteristics (Ta = 25°C)

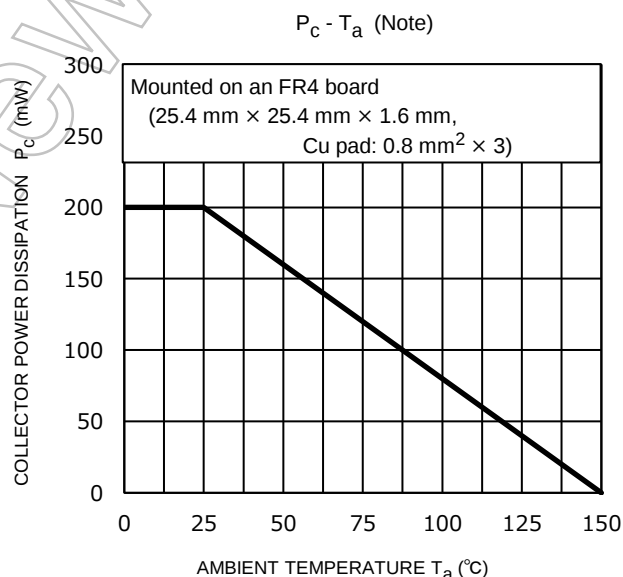
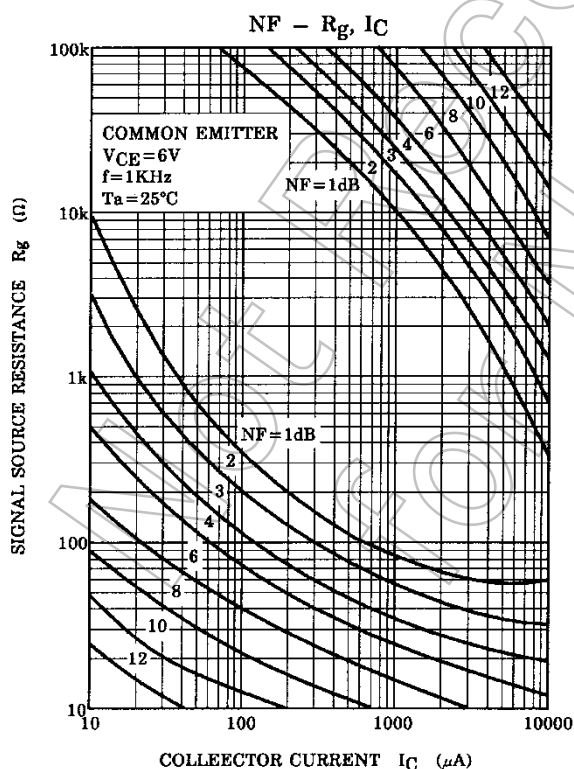
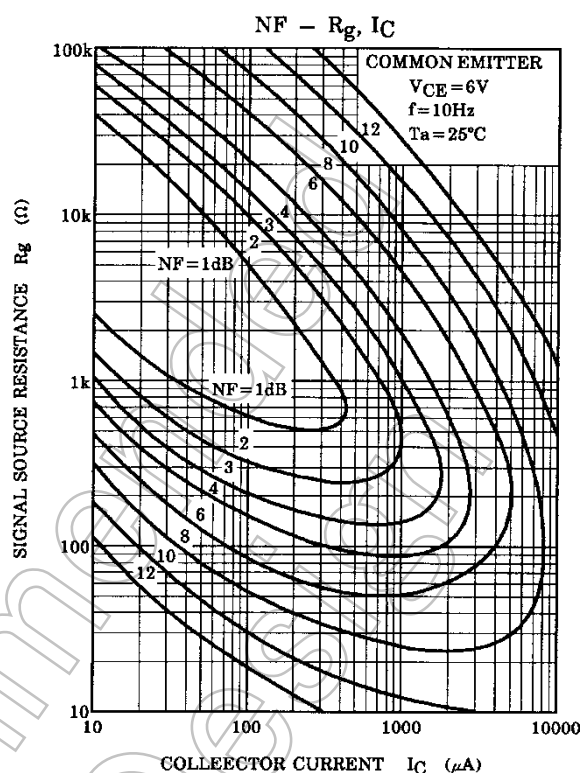
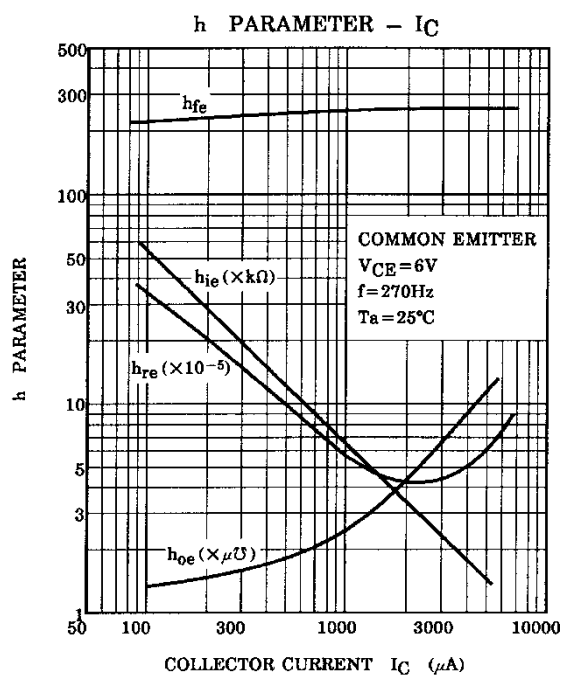
| Characteristics                      | Symbol                    | Test Condition                                                                        | Min | Typ. | Max | Unit |
|--------------------------------------|---------------------------|---------------------------------------------------------------------------------------|-----|------|-----|------|
| Collector cut-off current            | ICBO                      | V <sub>CB</sub> = 120 V, I <sub>E</sub> = 0 A                                         | —   | —    | 0.1 | μA   |
| Emitter cut-off current              | IEBO                      | V <sub>EB</sub> = 5 V, I <sub>C</sub> = 0 A                                           | —   | —    | 0.1 | μA   |
| DC current gain                      | h <sub>FE</sub><br>(Note) | V <sub>CE</sub> = 6 V, I <sub>C</sub> = 2 mA                                          | 200 | —    | 700 | —    |
| Collector-emitter saturation voltage | V <sub>CE (sat)</sub>     | I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1 mA                                         | —   | —    | 0.3 | V    |
| Transition frequency                 | f <sub>T</sub>            | V <sub>CE</sub> = 6 V, I <sub>C</sub> = 1 mA                                          | —   | 100  | —   | MHz  |
| Collector output capacitance         | C <sub>ob</sub>           | V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 A, f = 1 MHz                               | —   | 3    | —   | pF   |
| Noise figure                         | NF (1)                    | V <sub>CB</sub> = 6 V, I <sub>C</sub> = 0.1 mA, f = 100 Hz,<br>R <sub>g</sub> = 10 kΩ | —   | 0.5  | 6   | dB   |
|                                      | NF (2)                    | V <sub>CB</sub> = 6 V, I <sub>C</sub> = 0.1 mA, f = 1 kHz,<br>R <sub>g</sub> = 10 kΩ  | —   | 0.2  | 3   |      |

Note: h<sub>FE</sub> classification GR (G): 200 to 400, BL (L): 350 to 700

( ) marking symbol

## Characteristics Curves





Note: The above characteristics curves are reference only with a junction temperature  $T_j$  of 150  $^\circ C$ .

The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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