

TOSHIBA TRANSISTOR SILICON PNP EPITAXIAL TYPE (PCT PROCESS)

# 2SA970

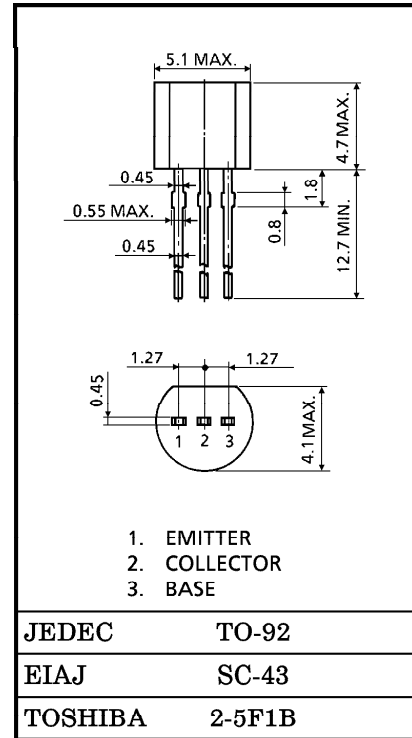
LOW NOISE AUDIO AMPLIFIER APPLICATIONS

Unit in mm

- Low Noise  
: NF=3dB (Typ.)  $R_G=100\Omega$ ,  $V_{CE}=-6V$ ,  $I_C=-100\mu A$ ,  $f=1kHz$   
: NF=0.5dB (Typ.)  $R_G=1k\Omega$ ,  $V_{CE}=-6V$ ,  $I_C=-100\mu A$ ,  $f=1kHz$
- High DC Current Gain :  $h_{FE}=200\sim 700$
- High Breakdown Voltage :  $V_{CEO}=-120V$
- Low Pulse Noise. Low 1/f Noise

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC              | 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 | $P_C$     | 300     | mW   |
| Junction Temperature        | $T_j$     | 125     | °C   |
| Storage Temperature Range   | $T_{stg}$ | -55~125 | °C   |



Weight : 0.21g

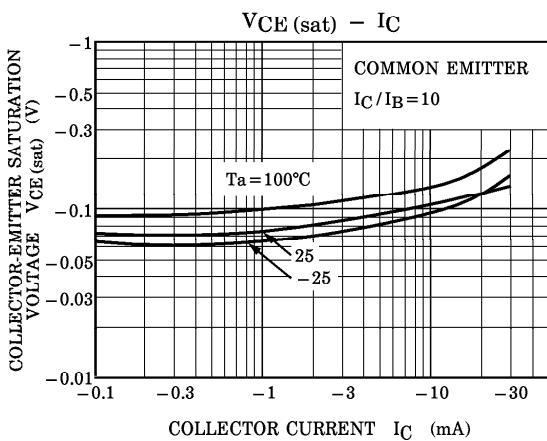
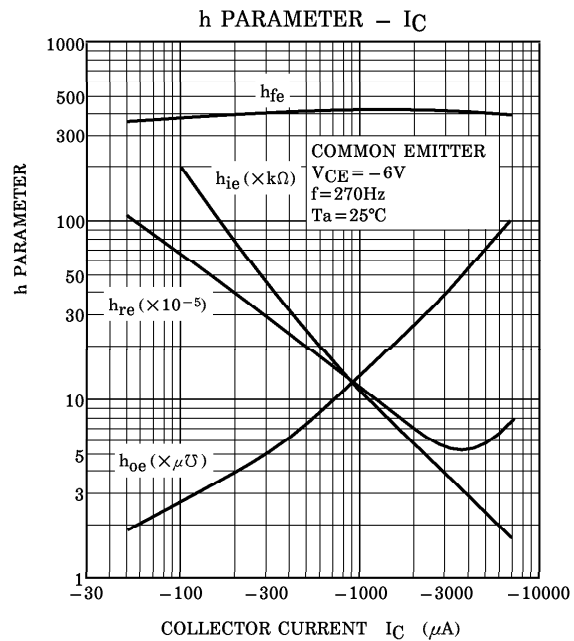
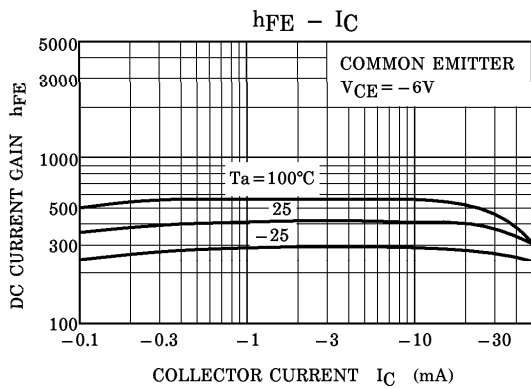
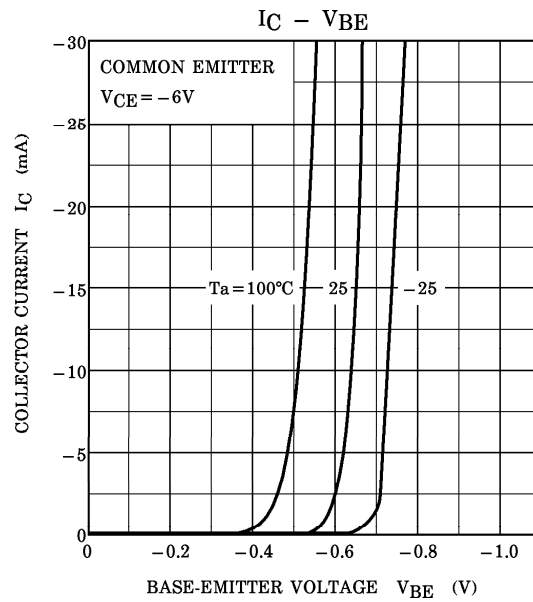
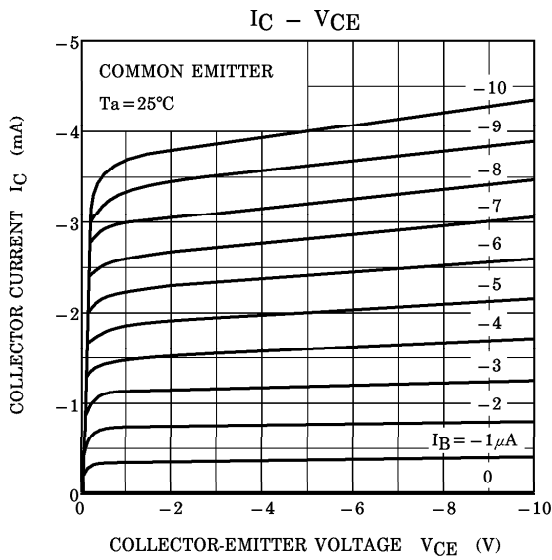
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                       | SYMBOL          | TEST CONDITION                                  | MIN. | TYP. | MAX. | UNIT    |
|--------------------------------------|-----------------|---|------|------|------|---------|
| Collector Cut-off Current            | $I_{CBO}$       | $V_{CB}=-120V, I_E=0$                           | —    | —    | -0.1 | $\mu A$ |
| Emitter Cut-off Current              | $I_{EBO}$       | $V_{EB}=-5V, I_C=0$                             | —    | —    | -0.1 | $\mu A$ |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$   | $I_C=-1mA, I_B=0$                               | -120 | —    | —    | V       |
| DC Current Gain                      | $h_{FE}$ (Note) | $V_{CE}=-6V, I_C=-2mA$                          | 200  | —    | 700  |         |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$   | $I_C=-10mA, I_B=-1mA$                           | —    | —    | -0.3 | V       |
| Base-Emitter Voltage                 | $V_{BE}$        | $V_{CE}=-6V, I_C=-2mA$                          | —    | 0.65 | —    | V       |
| Transition Frequency                 | $f_T$           | $V_{CE}=-6V, I_C=-1mA$                          | —    | 100  | —    | MHz     |
| Collector Output Capacitance         | $C_{ob}$        | $V_{CB}=-10V, I_E=0, f=1MHz$                    | —    | 4.0  | —    | pF      |
| Noise Figure                         | NF              | $V_{CE}=-6V, I_C=-0.1mA, f=10Hz, R_G=10k\Omega$ | —    | —    | 6    | dB      |
|                                      |                 | $V_{CE}=-6V, I_C=-0.1mA, f=1kHz, R_G=10k\Omega$ | —    | —    | 2    |         |
|                                      |                 | $V_{CE}=-6V, I_C=-0.1mA, f=1kHz, R_G=100\Omega$ | —    | 3    | —    |         |

Note :  $h_{FE}$  Classification GR : 200~400, BL : 350~700

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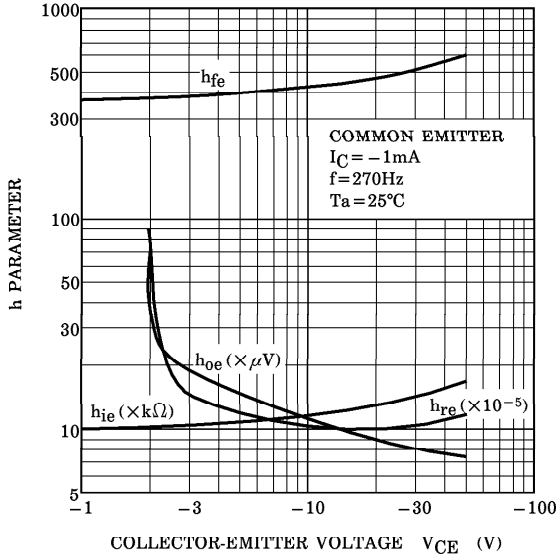
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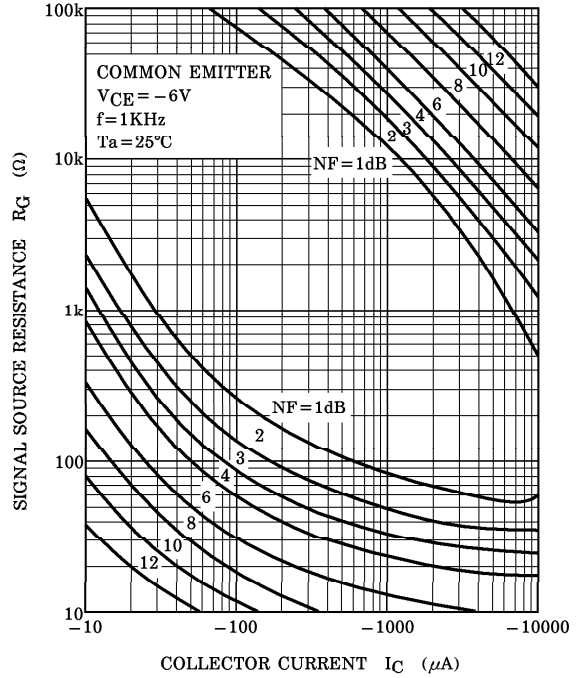
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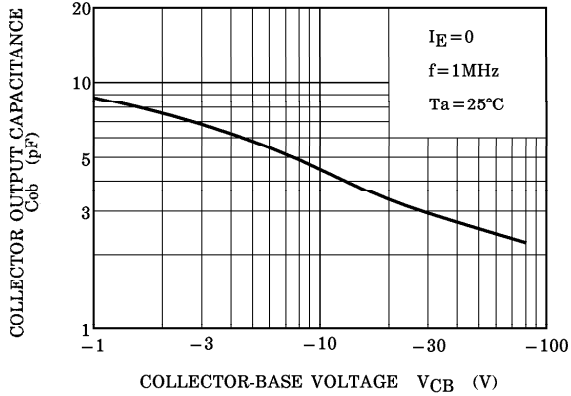
h PARAMETER - V<sub>CE</sub>



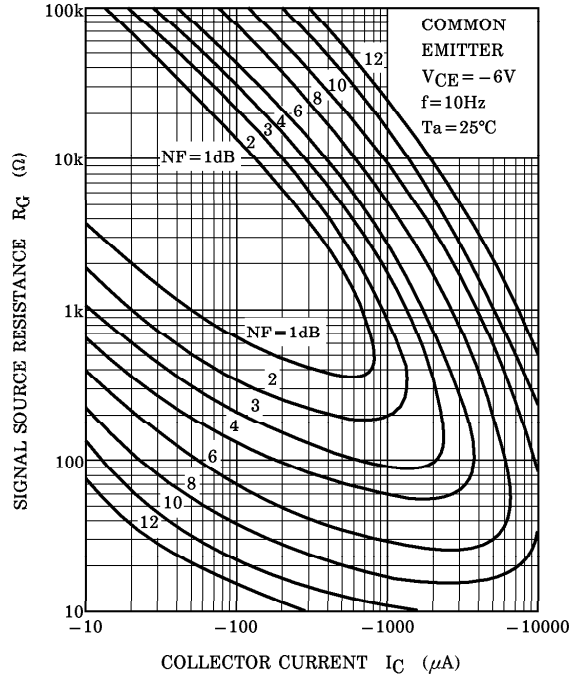
NF - R<sub>G</sub>, I<sub>C</sub>



C<sub>ob</sub> - V<sub>CB</sub>



NF - R<sub>G</sub>, I<sub>C</sub>



P<sub>C</sub> - T<sub>a</sub>

