

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

## HN4C06J

### Audio Frequency General Purpose Amplifier Applications

Unit: mm

- High voltage :  $V_{CEO} = 120V$
- High  $h_{FE}$  :  $h_{FE} = 200$  to  $700$
- Excellent  $h_{FE}$  linearity  
:  $h_{FE}(I_C = 0.1mA) / h_{FE}(I_C = 2mA) = 0.95$  (typ.)
- Low noise :  $NF = 1dB$ (typ.)

### Absolute Maximum Ratings ( $T_a = 25^\circ C$ ) (Q1, Q2 Common)

| 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        | $T_j$     | 150        | $^\circ C$ |
| Storage temperature range   | $T_{stg}$ | -55 to 150 | $^\circ C$ |

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).

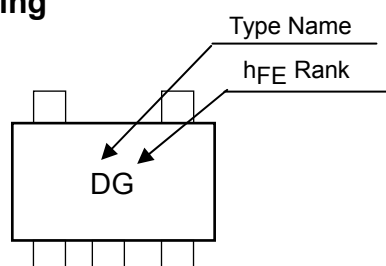
\*Total rating. Power dissipation per element should not exceed 200mW.

### Electrical Characteristics ( $T_a = 25^\circ C$ ) (Q1, Q2 Common)

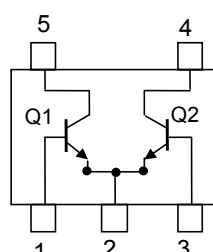
| Characteristic                       | Symbol        | Test Circuit | Test Condition                                            | Min | Typ. | Max | Unit    |
|--------------------------------------|---------------|--------------|-----------------------------------------------------------|-----|------|-----|---------|
| 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 | $\mu A$ |
| DC current gain                      | $h_{FE}$      | —            | $V_{CE} = 6V, I_C = 2mA$                                  | 200 | —    | 700 |         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —            | $I_C = 10mA, I_B = 1mA$                                   | —   | —    | 0.3 | V       |
| Transition frequency                 | $f_T$         | —            | $V_{CE} = 6V, I_C = 1mA$                                  | —   | 100  | —   | MHz     |
| Collector output capacitance         | $C_{ob}$      | —            | $V_{CB} = 10V, I_E = 0, f = 1MHz$                         | —   | 3.0  | —   | pF      |
| Noise figure                         | NF            | —            | $V_{CE} = 6V, I_C = 0.1mA$<br>$f = 1kHz, R_G = 10k\Omega$ | —   | 1.0  | —   | dB      |

Note:  $h_{FE}$  Classification GR(G): 200 to 400, BL (L): 350 to 700 ( ) Marking Symbol.

### Marking

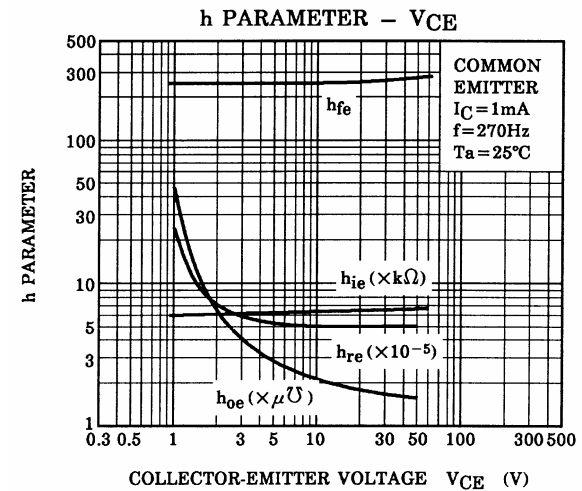
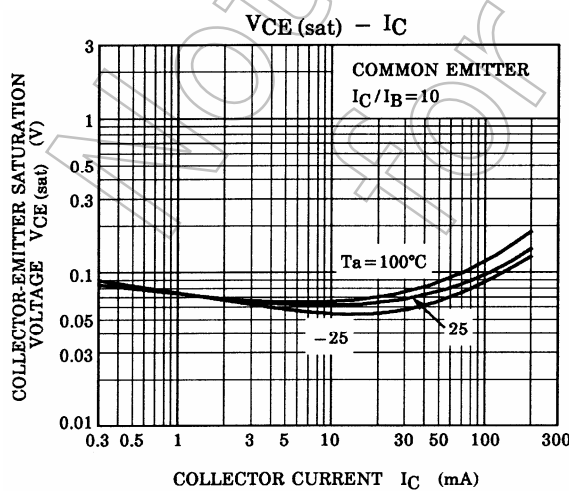
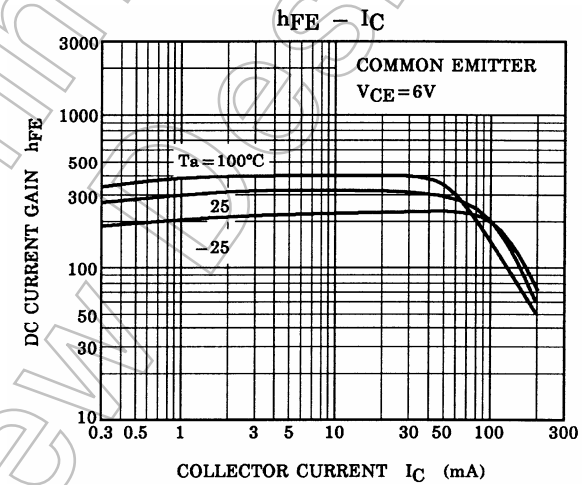
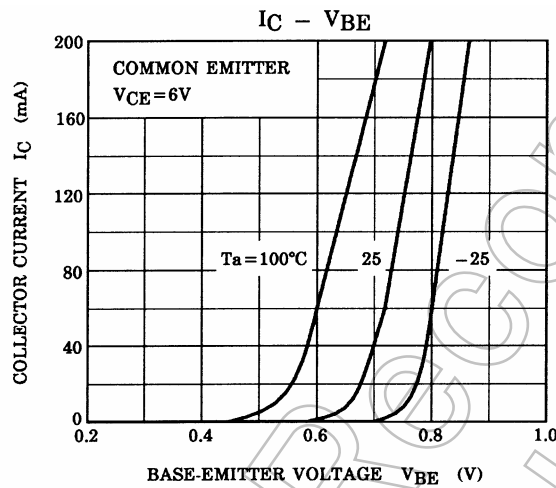
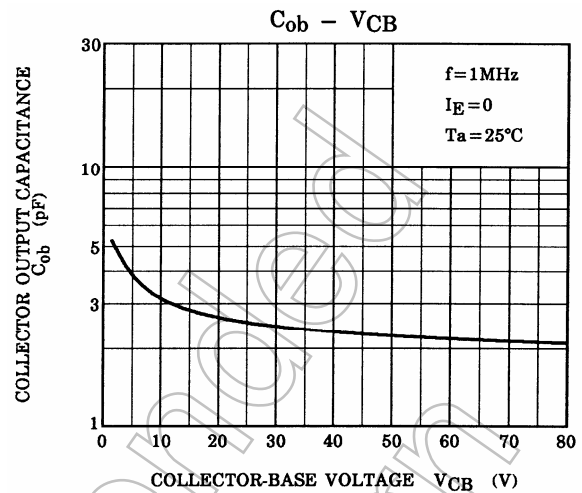
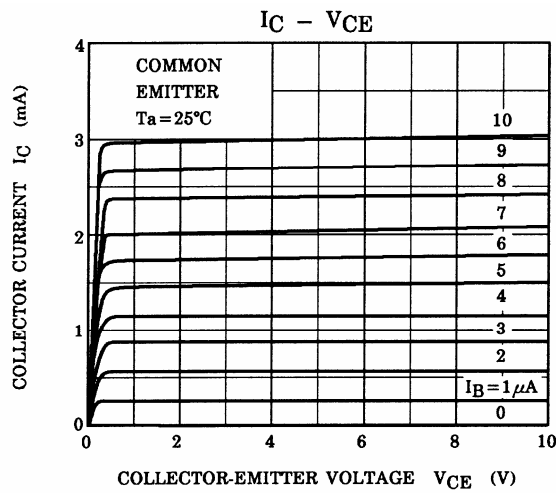


### Equivalent Circuit (Top View)

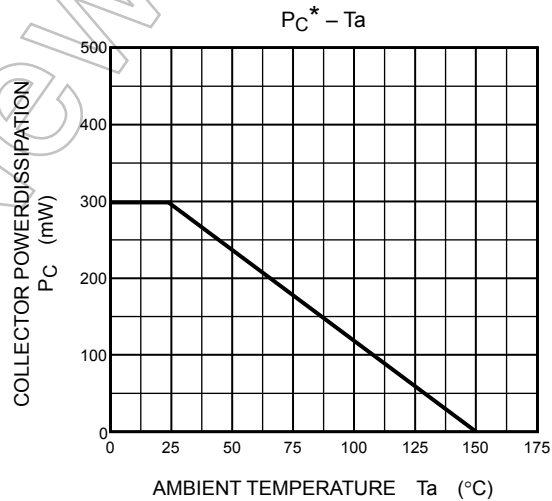
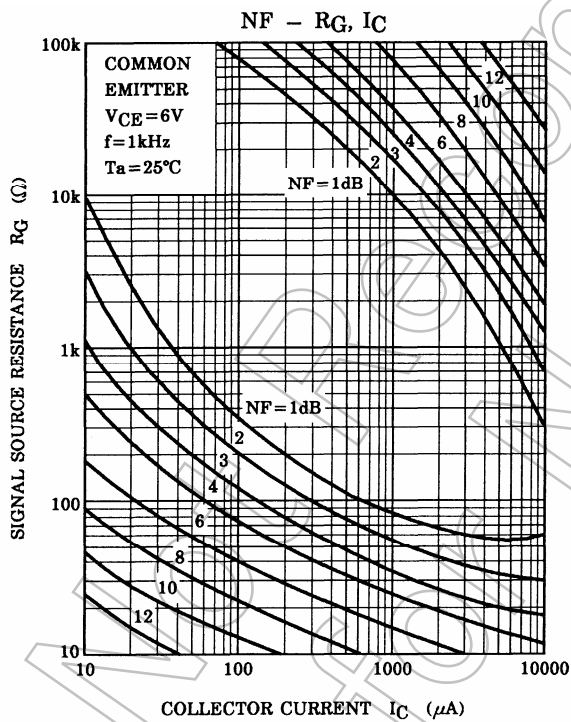
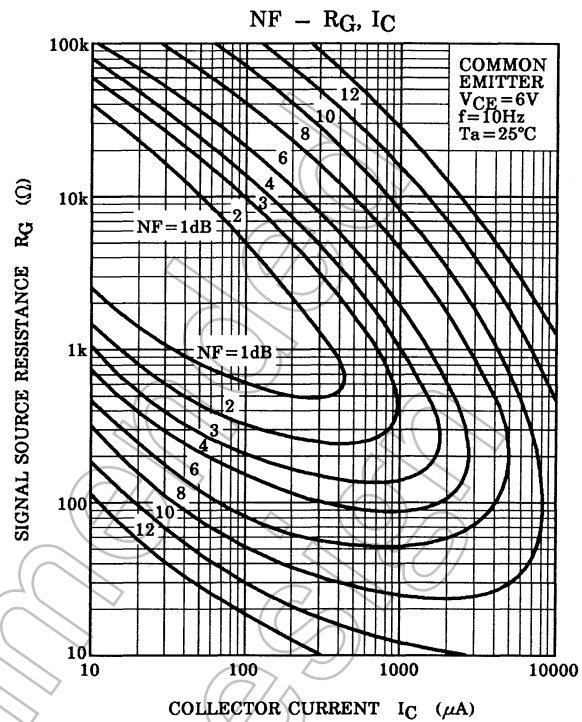
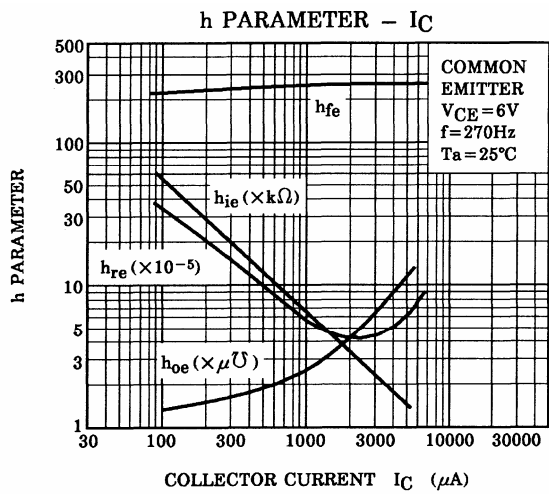


Start of commercial production  
2000-03

(Q1,Q2 Common)



(Q1,Q2 Common)



\*: Total Rating

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