

TOSHIBA TRANSISTOR   SILICON NPN EPITAXIAL TYPE (PCT PROCESS)   SILICON PNP EPITAXIAL TYPE (PCT PROCESS)

HN3B01F

AUDIO FREQUENCY GENERAL PURPOSE AMPLIFIER APPLICATIONS.

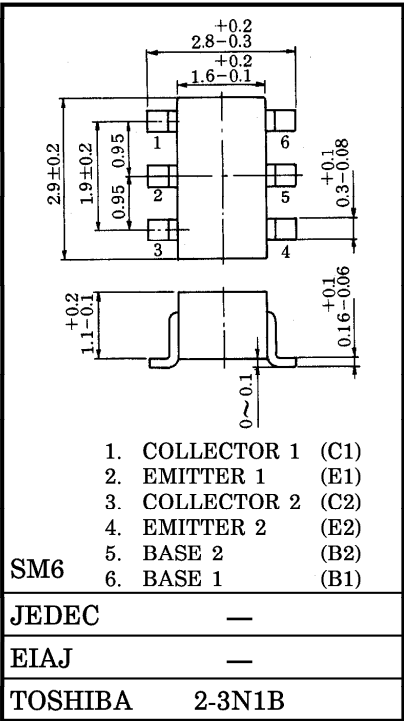
Q1:

- High Voltage and High Current  
:  $V_{CEO}=50V$ ,  $I_C=150mA$  (Max.)
- High  $h_{FE}$  :  $h_{FE}=120\sim400$
- Excellent  $h_{FE}$  Linearity  
:  $h_{FE}(I_C=0.1mA)/h_{FE}(I_C=2mA)=0.95$  (Typ.)

Q2:

- High Voltage and High Current  
:  $V_{CEO}=-50V$ ,  $I_C=-150mA$  (Max.)
- High  $h_{FE}$  :  $h_{FE}=120\sim400$
- Excellent  $h_{FE}$  Linearity  
:  $h_{FE}(I_C=-0.1mA)/h_{FE}(I_C=-2mA)=0.95$  (Typ.)

Unit in mm



Weight : 0.015g

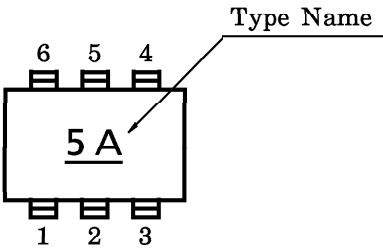
Q1 MAXIMUM RATINGS ( $T_a = 25^{\circ}C$ )

| CHARACTERISTIC            | SYMBOL    | RATING | UNIT |
|---------------------------|-----------|--------|------|
| Collector-Base Voltage    | $V_{CBO}$ | 60     | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | 50     | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | 5      | V    |
| Collector Current         | $I_C$     | 150    | mA   |
| Base Current              | $I_B$     | 30     | mA   |

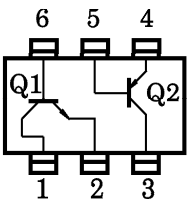
Q2 MAXIMUM RATINGS ( $T_a = 25^{\circ}C$ )

| CHARACTERISTIC            | SYMBOL    | RATING | UNIT |
|---------------------------|-----------|--------|------|
| Collector-Base Voltage    | $V_{CBO}$ | -50    | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | -50    | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | -5     | V    |
| Collector Current         | $I_C$     | -150   | mA   |
| Base Current              | $I_B$     | -30    | mA   |

MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



961001EAA2

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Q1, Q2 COMMON MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC              | SYMBOL    | RATING        | UNIT             |
|-----------------------------|-----------|---------------|------------------|
| Collector Power Dissipation | $P_C^*$   | 300           | mW               |
| Junction Temperature        | $T_j$     | 125           | $^\circ\text{C}$ |
| Storage Temperature Range   | $T_{stg}$ | $-55\sim 125$ | $^\circ\text{C}$ |

\* Total Rating

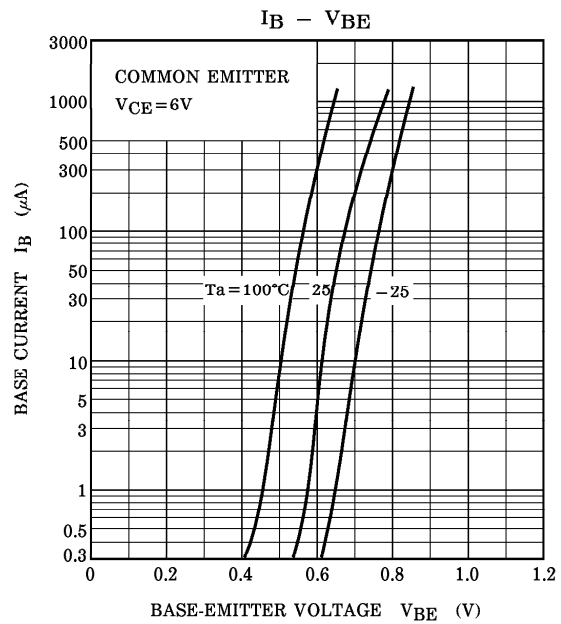
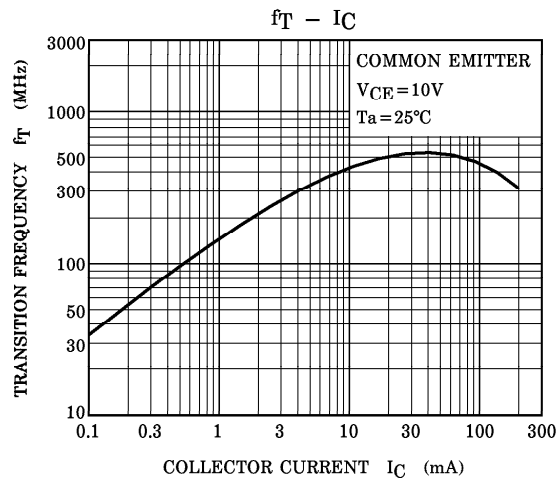
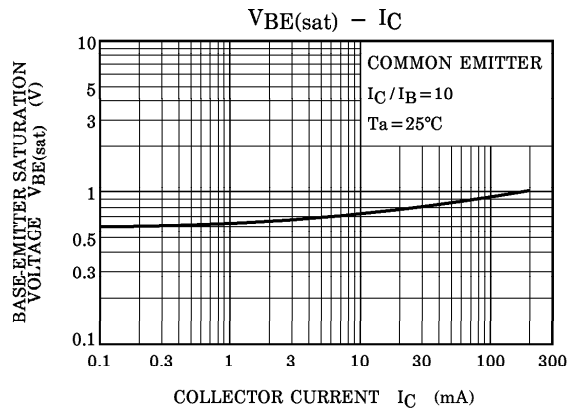
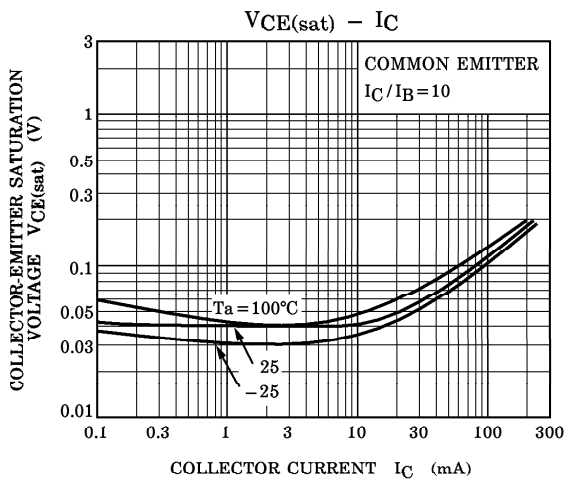
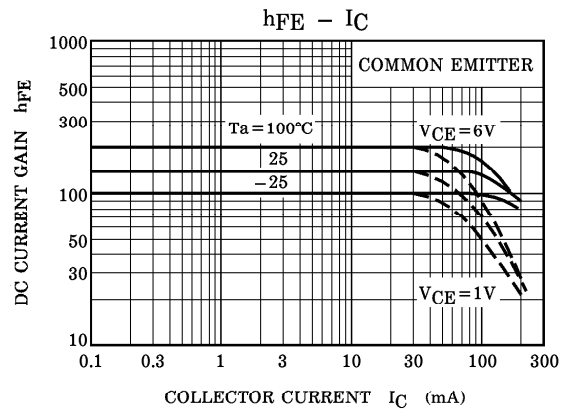
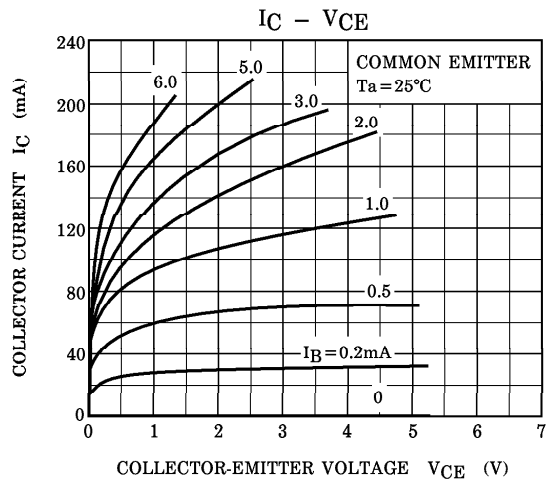
Q1 ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC                       | SYMBOL        | TEST CONDITION                                      | MIN. | TYP. | MAX. | UNIT          |
|--------------------------------------|---------------|-----------------------------------------------------|------|------|------|---------------|
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = 60\text{V}, I_E = 0$                      | —    | —    | 0.1  | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = 5\text{V}, I_C = 0$                       | —    | —    | 0.1  | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = 6\text{V}, I_C = 2\text{mA}$              | 120  | —    | 400  |               |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100\text{mA}, I_B = 10\text{mA}$             | —    | 0.1  | 0.25 | V             |
| Transition Frequency                 | $f_T$         | $V_{CE} = 10\text{V}, I_C = 1\text{mA}$             | —    | 150  | —    | MHz           |
| Collector Output Capacitance         | $C_{ob}$      | $V_{CB} = 10\text{V}, I_E = 0$<br>$f = 1\text{MHz}$ | —    | 2    | —    | pF            |

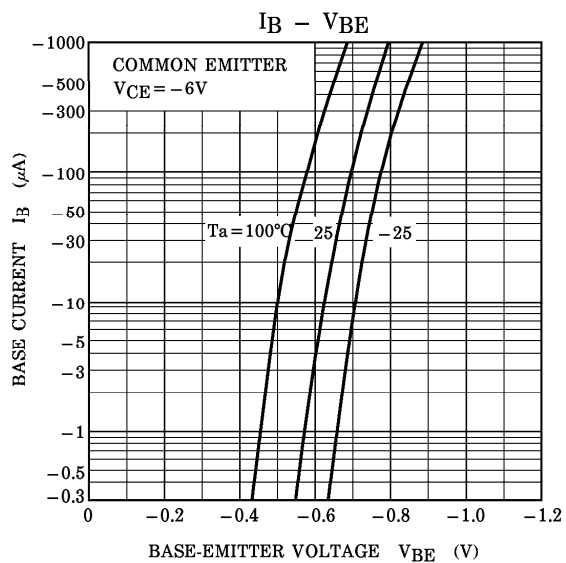
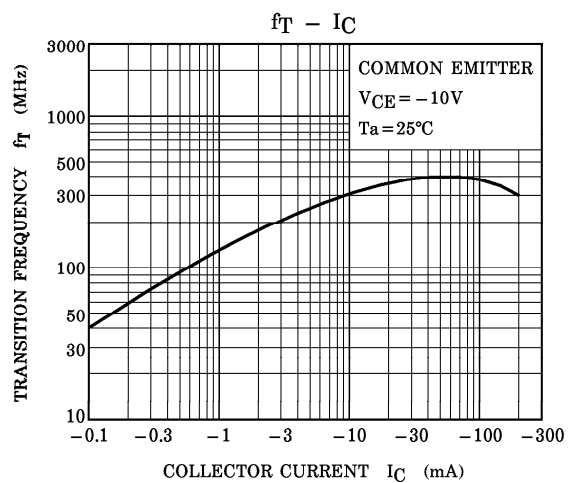
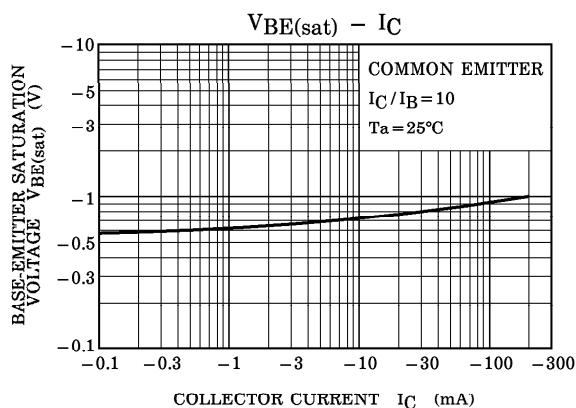
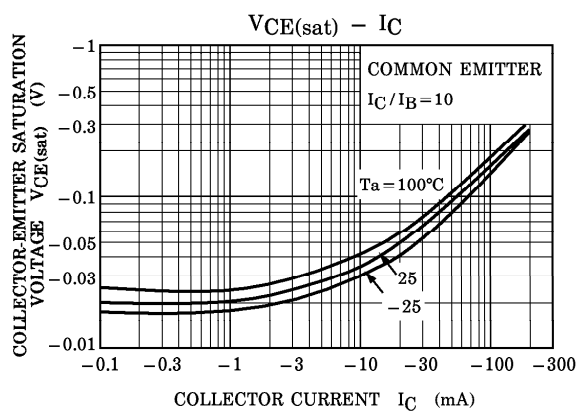
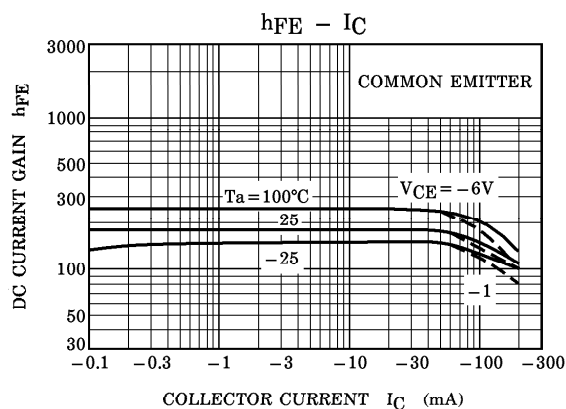
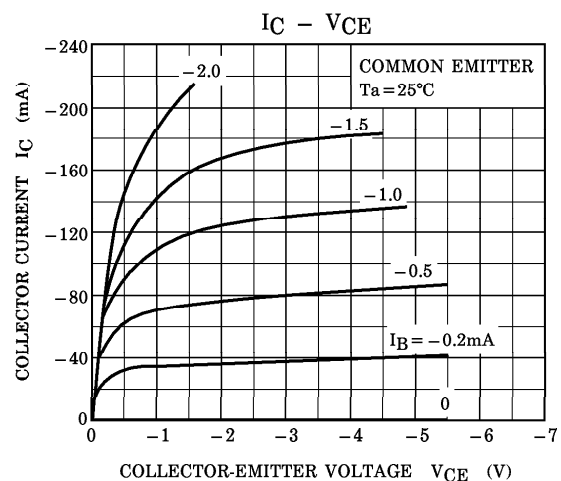
Q2 ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC                       | SYMBOL        | TEST CONDITION                                       | MIN. | TYP. | MAX. | UNIT          |
|--------------------------------------|---------------|------------------------------------------------------|------|------|------|---------------|
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = -50\text{V}, I_E = 0$                      | —    | —    | -0.1 | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = -5\text{V}, I_C = 0$                       | —    | —    | -0.1 | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = -6\text{V}, I_C = -2\text{mA}$             | 120  | —    | 400  |               |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -100\text{mA}, I_B = -10\text{mA}$            | —    | -0.1 | -0.3 | V             |
| Transition Frequency                 | $f_T$         | $V_{CE} = -10\text{V}, I_C = -1\text{mA}$            | —    | 120  | —    | MHz           |
| Collector Output Capacitance         | $C_{ob}$      | $V_{CB} = -10\text{V}, I_E = 0$<br>$f = 1\text{MHz}$ | —    | 4    | —    | pF            |

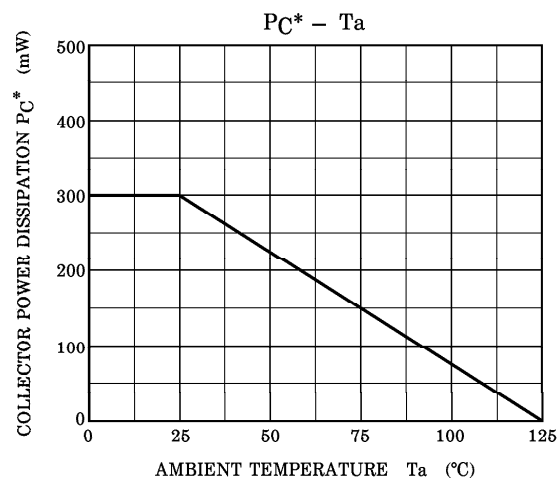
Q1 (NPN TRANSISTOR)



## Q2 (PNP TRANSISTOR)



(Q1, Q2 COMMON)



\*: Total Rating