

**TENTATIVE** TOSHIBA Transistor Silicon PNP·NPN Epitaxial Type (PCT Process)

# HN3B02FU

Audio Frequency General Purpose Amplifier Applications

Unit: mm

### Q1

- High voltage :  $V_{CEO} = -50V$
- High current :  $I_C = -150mA$  (max)
- High  $h_{FE}$  :  $h_{FE} = 120\sim 400$
- Excellent  $h_{FE}$  linearity :  $h_{FE}(I_C = -0.1mA) / (I_C = -2mA) = 0.95$  (typ.)

### Q2

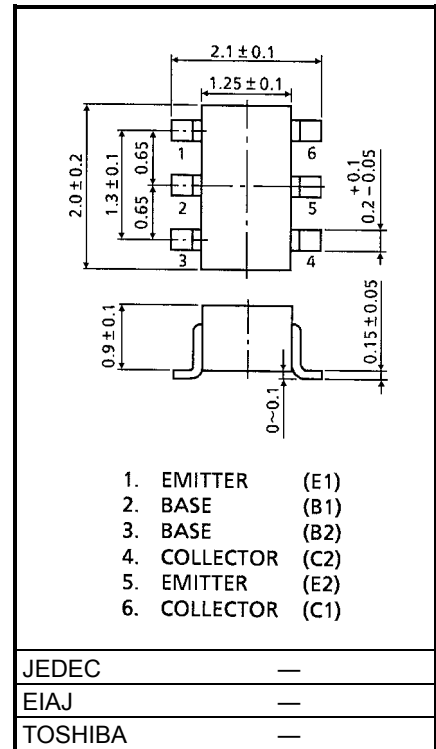
- High voltage :  $V_{CEO} = 60V$
- High current :  $I_C = 150mA$  (max)
- High  $h_{FE}$  :  $h_{FE} = 120\sim 400$
- Excellent  $h_{FE}$  linearity :  $h_{FE}(I_C = 0.1mA) / (I_C = 2mA) = 0.95$  (typ.)

### Q1 Maximum Ratings ( $T_a = 25^\circ C$ )

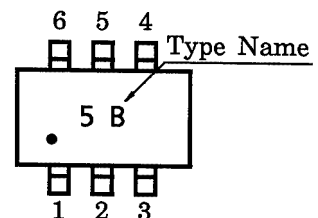
| Characteristic            | Symbol    | Rating | Unit |
|---------------------------|-----------|--------|------|
| Collector-base voltage    | $V_{CBO}$ | -50    | V    |
| Collector-emitter voltage | $V_{CEO}$ | -50    | V    |
| Emitter-base voltage      | $V_{EBO}$ | -5     | V    |
| Collector current         | $I_C$     | -150   | mA   |
| Base current              | $I_B$     | -50    | mA   |

### Q2 Maximum Ratings ( $T_a = 25^\circ C$ )

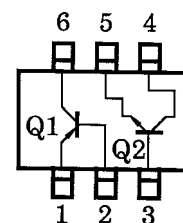
| Characteristic            | Symbol    | Rating | Unit |
|---------------------------|-----------|--------|------|
| Collector-base voltage    | $V_{CBO}$ | 60     | V    |
| Collector-emitter voltage | $V_{CEO}$ | 50     | V    |
| Emitter-base voltage      | $V_{EBO}$ | 5      | V    |
| Collector current         | $I_C$     | 150    | mA   |
| Base current              | $I_B$     | 30     | mA   |



### Marking



### Equivalent Circuit (Top View)



## Q1 Q2 Common Maximum Ratings (Ta = 25°C)

| Characteristic              | Symbol    | Rating  | Unit |
|-----------------------------|-----------|---------|------|
| Collector power dissipation | $P_C$ (*) | 200     | mW   |
| Junction temperature        | $T_j$     | 125     | °C   |
| Storage temperature range   | $T_{stg}$ | -55~125 | °C   |

\*: Total rating

## Q1 Electrical Characteristics (Ta = 25°C)

| Characteristic                       | Symbol        | Test Circuit | Test Condition                     | Min | Typ. | Max  | Unit    |
|--------------------------------------|---------------|--------------|------------------------------------|-----|------|------|---------|
| Collector cut-off current            | $I_{CBO}$     | —            | $V_{CB} = -50V, I_E = 0$           | —   | —    | -0.1 | $\mu A$ |
| Emitter cut-off current              | $I_{EBO}$     | —            | $V_{EB} = -5V, I_C = 0$            | —   | —    | -0.1 | $\mu A$ |
| DC current gain                      | $h_{FE}$      | —            | $V_{CE} = -6V, I_C = -2mA$         | 120 | —    | 400  | —       |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —            | $I_C = -100mA, I_B = -10mA$        | —   | -0.1 | -0.3 | V       |
| Transition frequency                 | $f_T$         | —            | $V_{CE} = -10V, I_C = -1mA$        | —   | 120  | —    | MHz     |
| Collector output capacitance         | $C_{ob}$      | —            | $V_{CB} = -10V, I_E = 0, f = 1MHz$ | —   | 4    | —    | pF      |

## Q2 Electrical Characteristics (Ta = 25°C)

| Characteristic                       | Symbol        | Test Circuit | Test Condition                    | Min | Typ. | Max  | Unit    |
|--------------------------------------|---------------|--------------|-----------------------------------|-----|------|------|---------|
| Collector cut-off current            | $I_{CBO}$     | —            | $V_{CB} = 60V, I_E = 0$           | —   | —    | 0.1  | $\mu A$ |
| Emitter cut-off current              | $I_{EBO}$     | —            | $V_{EB} = 5V, I_C = 0$            | —   | —    | 0.1  | $\mu A$ |
| DC current gain                      | $h_{FE}$      | —            | $V_{CE} = 6V, I_C = 2mA$          | 120 | —    | 400  | —       |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —            | $I_C = 100mA, I_B = 10mA$         | —   | 0.1  | 0.25 | V       |
| Transition frequency                 | $f_T$         | —            | $V_{CE} = 10V, I_C = 1mA$         | —   | 150  | —    | MHz     |
| Collector output capacitance         | $C_{ob}$      | —            | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | —   | 2    | —    | pF      |

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