

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT Process) Silicon NPN Epitaxial Type (PCT Process)

HN1B01FU

Audio Frequency General Purpose Amplifier Applications

Unit: mm

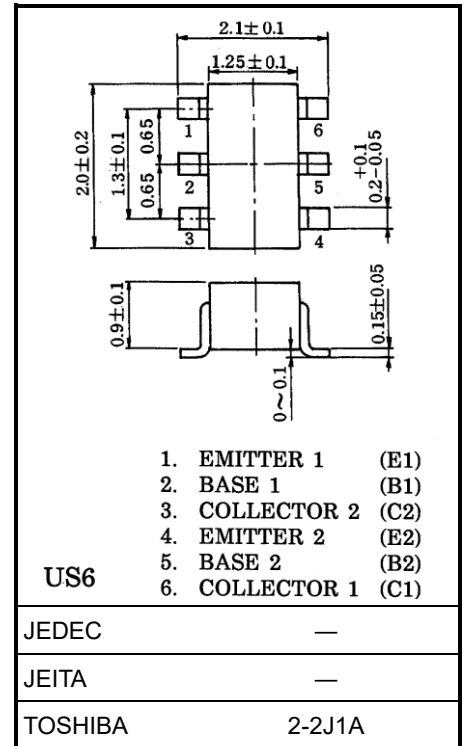
Q1:

- AEC-Q101 Qualified (Note1).
- High voltage and high current
: $V_{CEO} = -50\text{ V}$, $I_C = -150\text{ mA}$ (max)
- High h_{FE} : $h_{FE} = 120$ to 400
- Excellent h_{FE} linearity
: $h_{FE}(I_C = -0.1\text{ mA}) / h_{FE}(I_C = -2\text{ mA}) = 0.95$ (typ.)

Q2:

- AEC-Q101 Qualified (Note1).
- High voltage and high current
: $V_{CEO} = 50\text{ V}$, $I_C = 150\text{ mA}$ (max)
- High h_{FE} : $h_{FE} = 120$ to 400
- Excellent h_{FE} linearity
: $h_{FE}(I_C = 0.1\text{ mA}) / h_{FE}(I_C = 2\text{ mA}) = 0.95$ (typ.)

Note1: For detail information, please contact our sales.

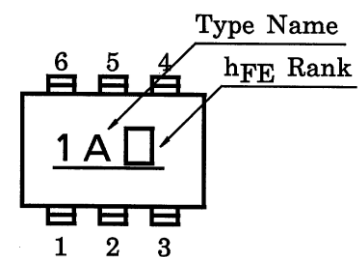


Weight: 6.8mg

Q1 Absolute Maximum Ratings (Ta = 25°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 |

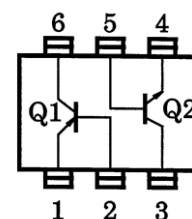
Marking



Q2 Absolute Maximum Ratings (Ta = 25°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 |

Equivalent Circuit (Top View)



Start of commercial production
1991-01

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

| Characteristic | Symbol | Rating | Unit |
|-----------------------------|-------------------------|------------|------|
| Collector power dissipation | P _C (Note 1) | 200 | mW |
| Junction temperature | T _j | 150 | °C |
| Storage temperature range | T _{stg} | -55 to 150 | °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).

Note 1: Total rating, Mounted on a FR4 board. (25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 0.32 mm² × 6)

Q1 Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|------------------------|--------------|--|-----|------|------|------|
| Collector cut-off current | I _{CBO} | — | V _{CB} = -50 V, I _E = 0 A | — | — | -0.1 | μA |
| Emitter cut-off current | I _{EBO} | — | V _{EB} = -5 V, I _C = 0 A | — | — | -0.1 | μA |
| DC current gain | h _{FE} (Note) | — | V _{CE} = -6 V, I _C = -2 mA | 120 | — | 400 | — |
| Collector-emitter saturation voltage | V _{CE (sat)} | — | I _C = -100 mA, I _B = -10 mA | — | -0.1 | -0.3 | V |
| Transition frequency | f _T | — | V _{CE} = -10 V, I _C = -1 mA | — | 120 | — | MHz |
| Collector output capacitance | C _{ob} | — | V _{CB} = -10 V, I _E = 0 A, f = 1 MHz | — | 4 | — | pF |

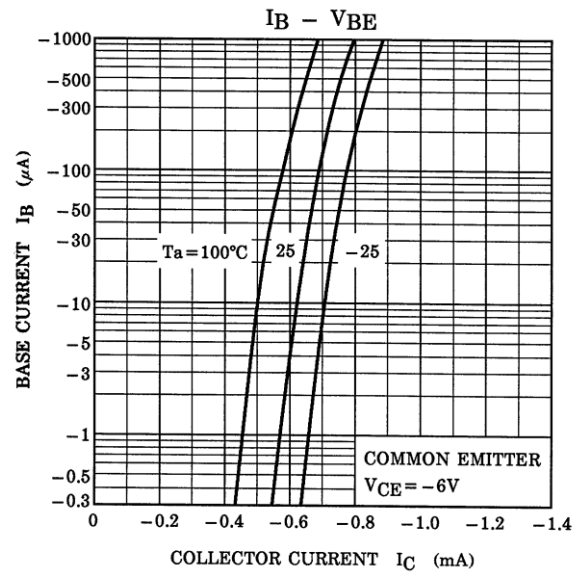
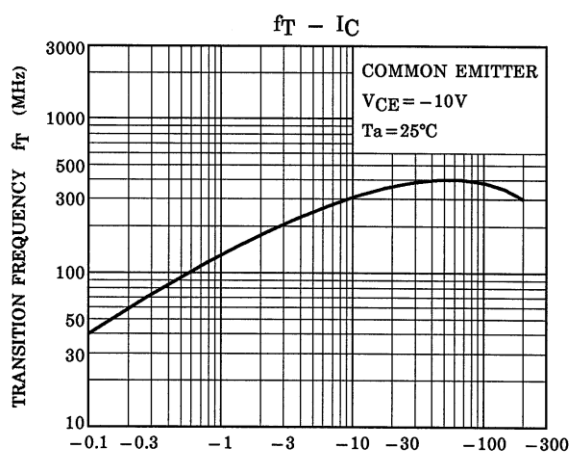
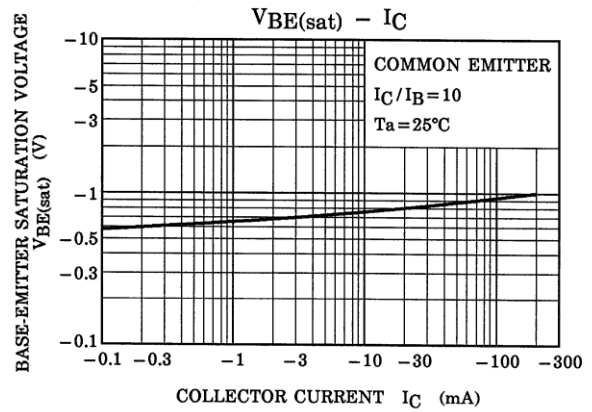
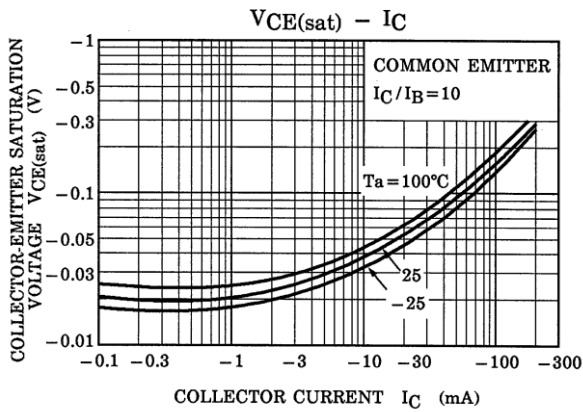
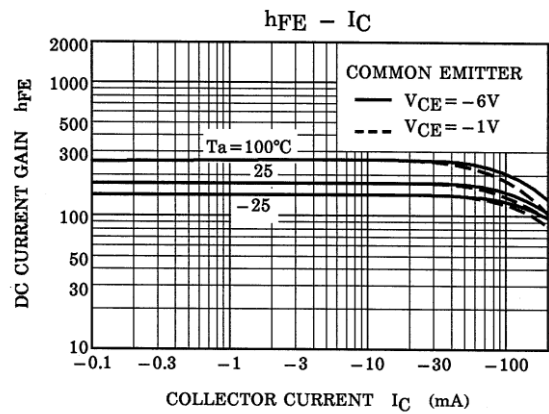
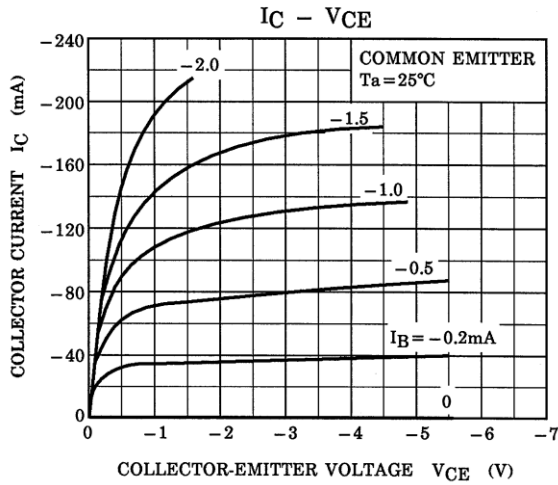
Q2 Electrical Characteristics (Ta = 25°C)

| Characteristic | Symbol | Test Circuit | Test Condition | Min | Typ. | Max | Unit |
|--------------------------------------|------------------------|--------------|---|-----|------|------|------|
| Collector cut-off current | I _{CBO} | — | V _{CB} = 60 V, I _E = 0 A | — | — | 0.1 | μA |
| Emitter cut-off current | I _{EBO} | — | V _{EB} = 5 V, I _C = 0 A | — | — | 0.1 | μA |
| DC current gain | h _{FE} (Note) | — | V _{CE} = 6 V, I _C = 2 mA | 120 | — | 400 | — |
| Collector-emitter saturation voltage | V _{CE (sat)} | — | I _C = 100 mA, I _B = 10 mA | — | 0.1 | 0.25 | V |
| Transition frequency | f _T | — | V _{CE} = 10 V, I _C = 1 mA | — | 150 | — | MHz |
| Collector output capacitance | C _{ob} | — | V _{CB} = 10 V, I _E = 0 A, f = 1 MHz | — | 2 | — | pF |

Note: h_{FE} Classification Y (Y): 120 to 240, GR (G): 200 to 400

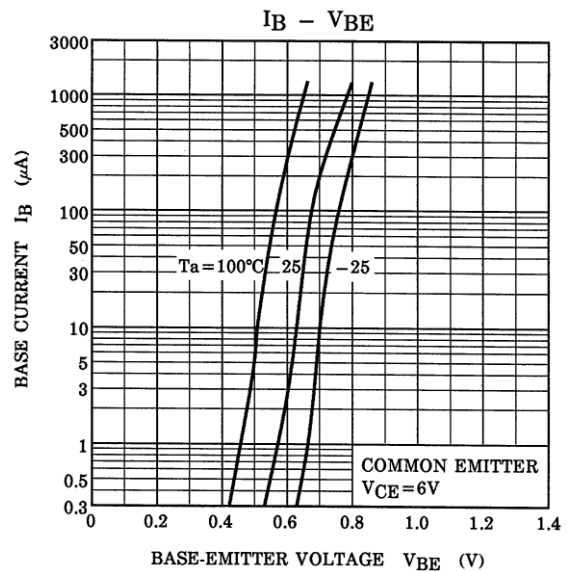
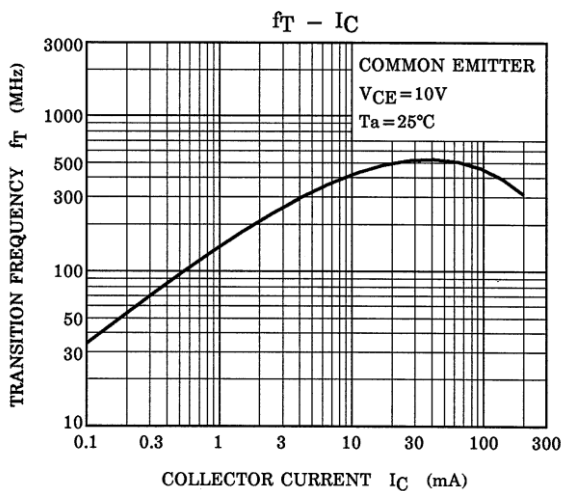
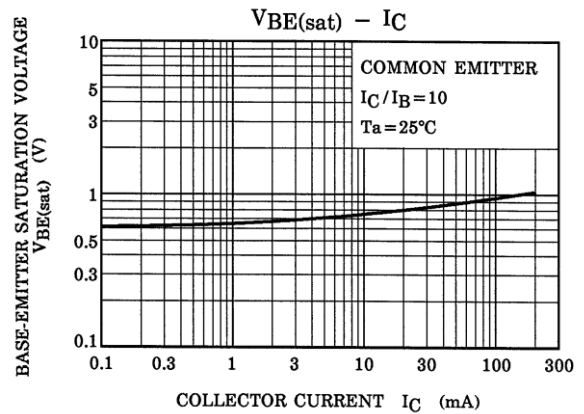
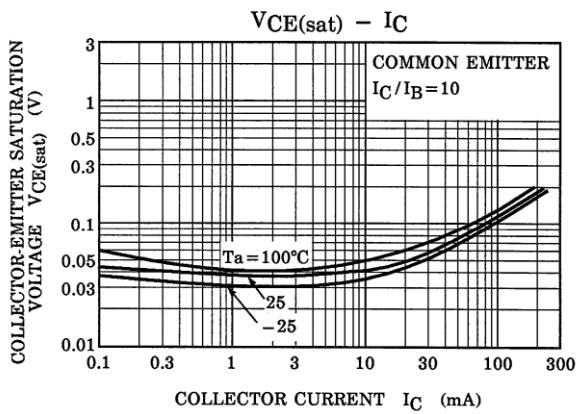
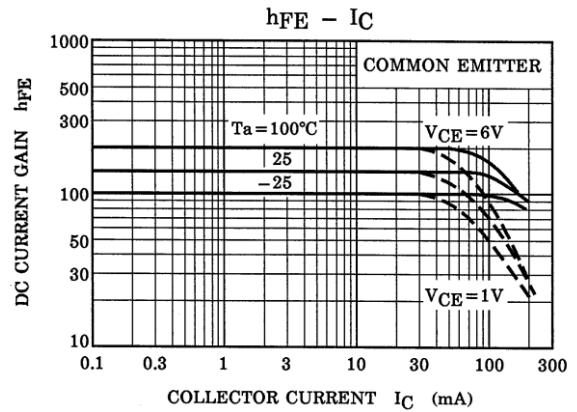
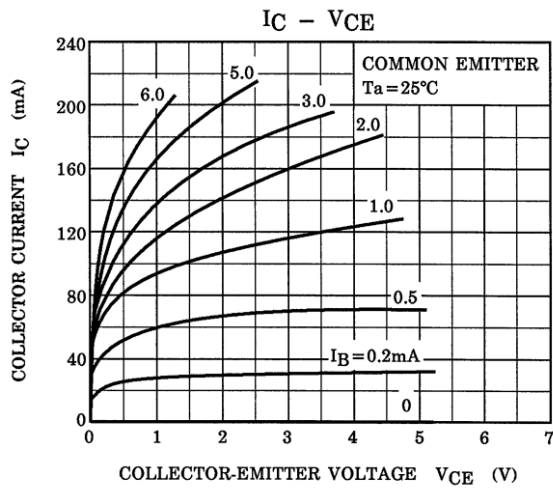
() Marking Symbol

Characteristics Curves Q1 (PNP transistor)



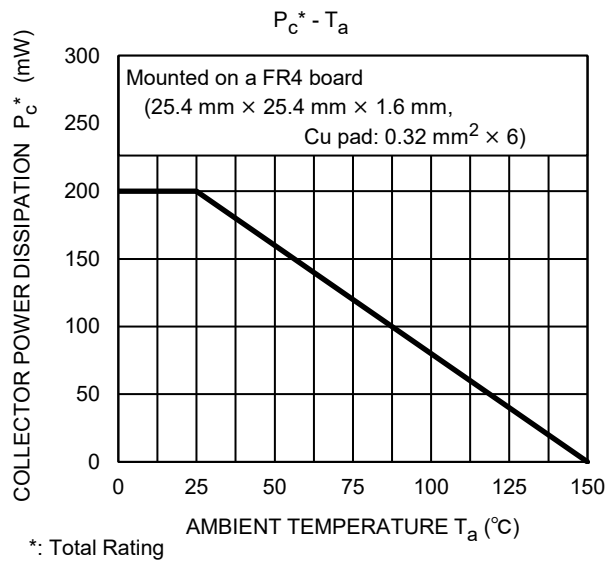
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Characteristics Curves Q2 (NPN transistor)



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

Characteristics Curves (Q1, Q2 Common)



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