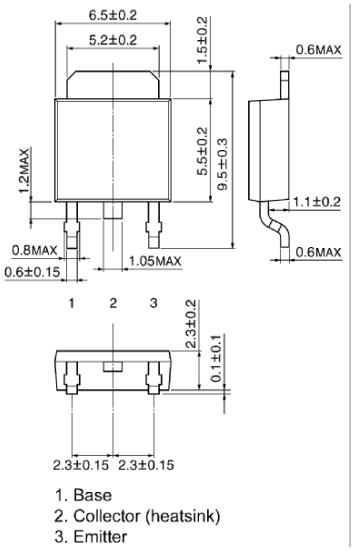
TOSHIBA Transistor Silicon PNP Diffused Type (PCT process)

# TTB002

## ○ Audio Frequency Power Amplifier Application

- Low collector saturation voltage : $V_{CE\ (sat)}$ = −0.5 V (max)
- High power dissipation : $P_C$ = 30 W (Tc = 25°C)

Unit: mm




| | |
|---|---|
| JEDEC | ― |
| JEITA | ― |
| TOSHIBA | 2-7J1A |

Weight : 0.36 g (typ.)

## Absolute Maximum Ratings (Ta = 25°C)

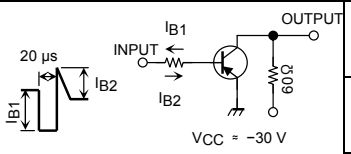
| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | -60 | V |
| Collector-emitter voltage | | $V_{CEO}$ | -60 | V |
| Emitter-base voltage | | $V_{EBO}$ | -7 | V |
| Collector current (Note1) | DC | $I_C$ | -3 | A |
| | Pulse | $I_{CP}$ | -6 | A |
| Base current | | $I_B$ | -0.5 | A |
| Collector power dissipation | Tc = 25°C | $P_C$ | 30 | W |
| Junction temperature (Note 2) | | $T_j$ | 175 | °C |
| Storage temperature range (Note 2) | | $T_{stg}$ | -55 to 175 | °C |

Note 1: Ensure that the junction temperature does not exceed 175°C during use of the device.

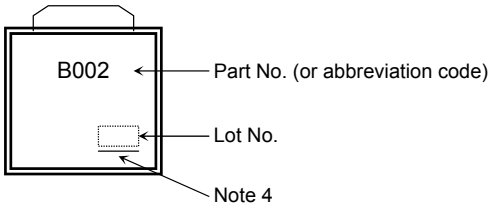
Note 2: Junction temperature is guaranteed up to 175°C based on AEC Q101.

Note 3: 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).

## Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cut-off current | | $I_{CBO}$ | $V_{CB}$ = -60 V, $I_E$ = 0 | — | — | -100 | nA |
| Emitter cut-off current | | $I_{EBO}$ | $V_{EB}$ = -7 V, $I_C$ = 0 | — | — | -100 | nA |
| Collector-emitter breakdown voltage | | $V_{(BR)\ CEO}$ | $I_C$ = -10 mA, $I_B$ = 0 | -60 | — | — | V |
| DC current gain | | $h_{FE}$ (1) | $V_{CE}$ = -5 V, $I_C$ = -0.5 A | 100 | — | 250 | |
| | | $h_{FE}$ (2) | $V_{CE}$ = -5 V, $I_C$ = -3 A | 20 | — | — | |
| Collector-emitter saturation voltage | | $V_{CE\ (sat)}$ (1) | $I_C$ = -0.6 A, $I_B$ = -0.06 A | — | — | -0.5 | V |
| | | $V_{CE\ (sat)}$ (2) | $I_C$ = -3 A, $I_B$ = -0.3 A | — | — | -1.7 | V |
| Base-emitter voltage | | $V_{BE}$ | $V_{CE}$ = −5 V, $I_C$ = −0.5 A | — | — | -1 | V |
| Transition frequency | | $f_T$ | $V_{CE}$ = −5 V, $I_C$ = −0.5 A | — | 9 | — | MHz |
| Collector output capacitance | | $C_{ob}$ | $V_{CB}$ = −10 V, $I_E$ = 0, f = 1 MHz | — | 90 | — | pF |
| Switching time | Turn-on time | $t_{on}$ |  | — | 0.6 | — | μs |
| | Storage time | $t_{stg}$ | | — | 1.7 | — | |
| | Fall time | $t_f$ | $I_{B1}$ = 25 mA, $I_{B2}$ = 50 mA<br>Duty cycle ≤ 1% | — | 0.2 | — | |

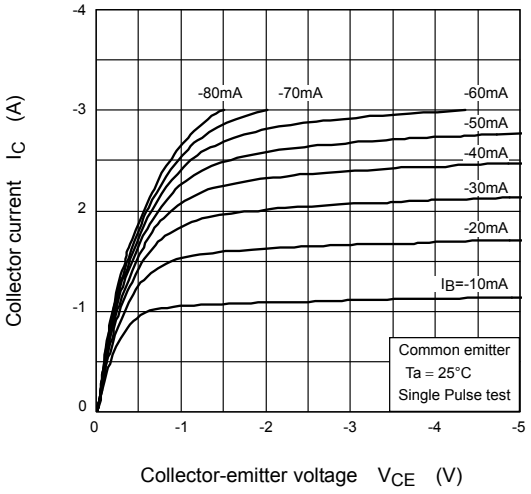
## Marking



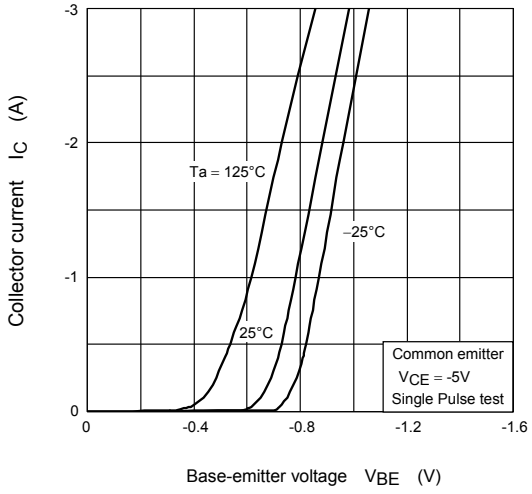

Note 4: A line under a Lot No. identifies the indication of product Labels
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

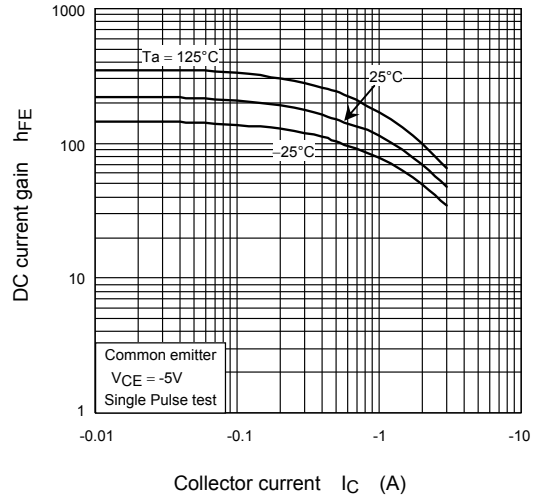
$I_C - V_{CE}$



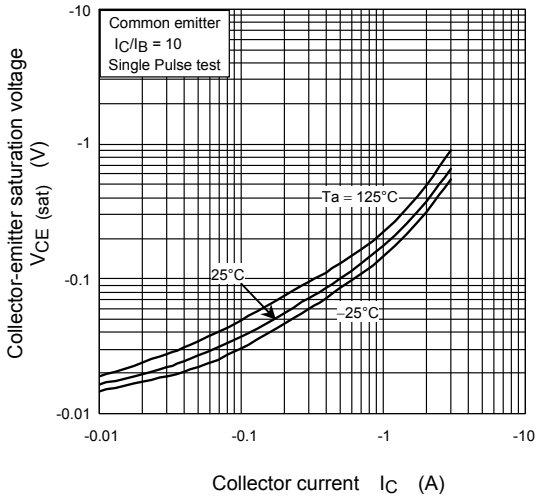

$I_C - V_{BE}$



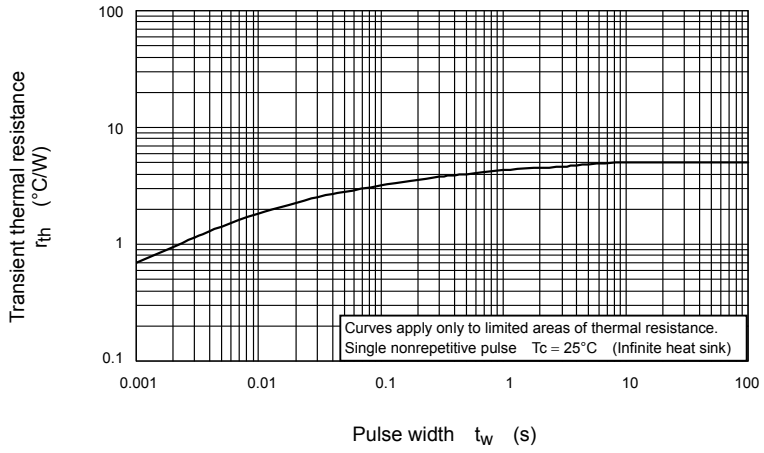

$h_{FE} - I_C$



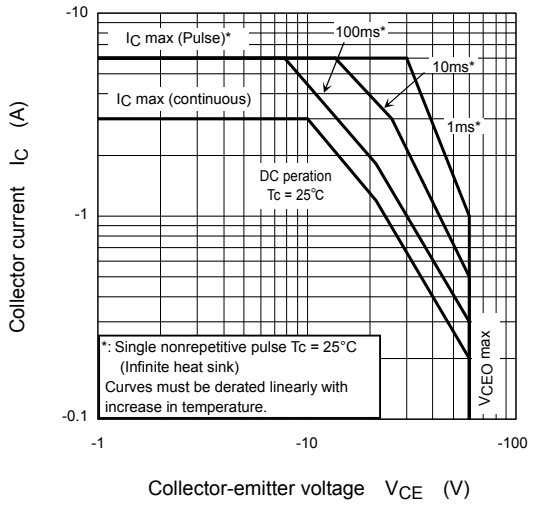

$V_{CE\ (sat)} - I_C$



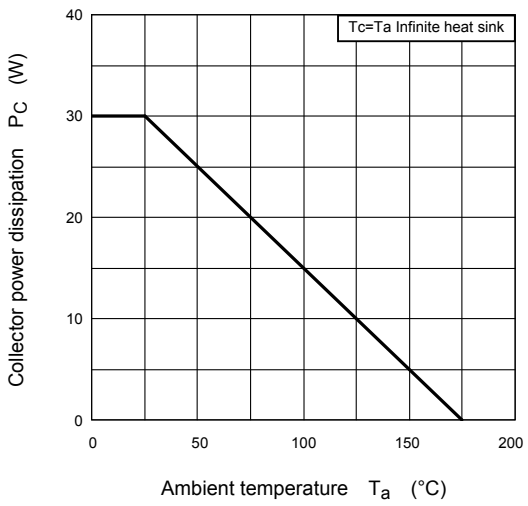
$r_{th} - t_w$




Safe Operating Area




$P_C - T_a$



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