Bipolar Transistors Silicon PNP Epitaxial Type

# TTA008B

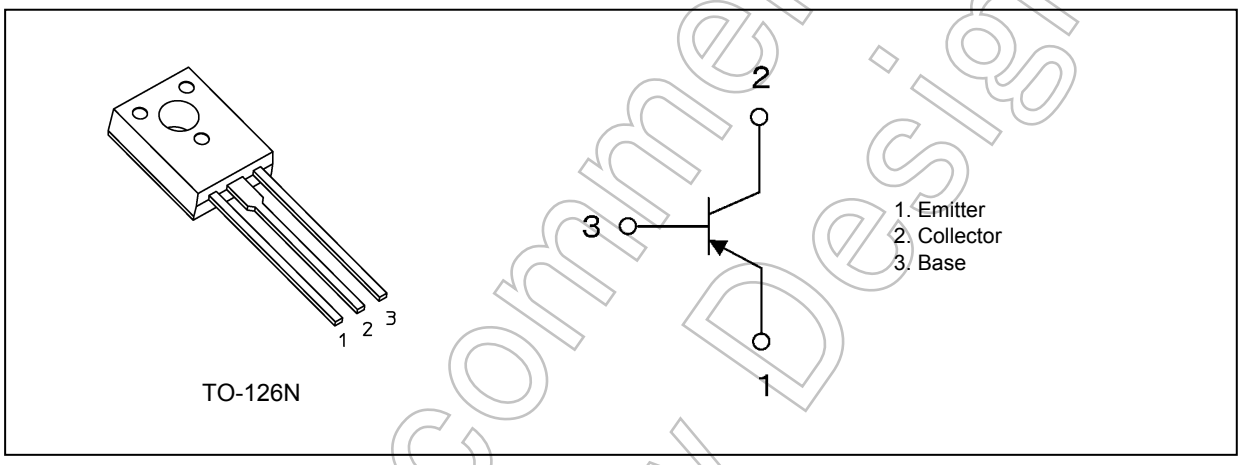
## 1. Applications

- Power Amplifiers
- Power Switching

## 2. Features

(1) High DC current gain : $h_{FE}$ = 100 to 200 ($I_C$ = -0.5 A)
(2) Low collector emitter saturation voltage : $V_{CE(sat)}$ = -0.5 V (max) ($I_C$ = -1A)
(3) High-speed switching : $t_{stg}$ = 300 ns (typ.) ($I_C$ = -1A)
(4) Complementary to TTC015B

## 3. Packaging and Internal Circuit (Note)




Note: Although this device is encapsulated in epoxy resin, it does not provide any guarantee to the maximum isolation voltage. Therefore, as with the case with non-isolated devices, care should be taken with regard to electrical isolation from surrounding parts.



Start of commercial production
2013-09



2015-01-22
Rev.1.0

## 4. Absolute Maximum Ratings (Note) ($T_a$ = 25 °C unless otherwise specified)

| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | -80 | V |
| Collector-emitter voltage | | $V_{CEO}$ | -80 | |
| Emitter-base voltage | | $V_{EBO}$ | -7 | |
| Collector current (DC) | (Note 1) | $I_C$ | -2 | A |
| Collector current (pulsed) | (Note 1) | $I_{CP}$ | -4 | |
| Base current | | $I_B$ | -0.5 | |
| Collector power dissipation | | $P_C$ | 1.5 | W |
| Collector power dissipation | ($T_c$ = 25 °C) | $P_C$ | 10 | |
| Junction temperature | | $T_j$ | 150 | °C |
| Storage temperature | | $T_{stg}$ | -55 to 150 | |

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: Ensure that the junction temperature does not exceed 150°C.

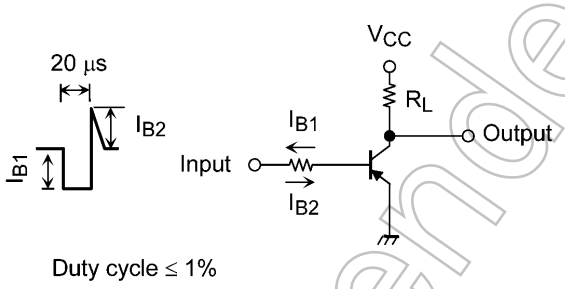
## 5. Electrical Characteristics

### 5.1. Static Characteristics ($T_a$ = 25 °C unless otherwise specified)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Collector cut-off current | $I_{CBO}$ | $V_{CB}$ = -80 V, $I_E$ = 0 A | — | — | -100 | nA |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$ = -7 V, $I_C$ = 0 A | — | — | -100 | |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C$ = -10 mA, $I_B$ = 0 A | -80 | — | — | V |
| DC current gain | $h_{FE(1)}$ | $V_{CE}$ = -2 V, $I_C$ = -1 mA | 80 | — | — | — |
| | $h_{FE(2)}$ | $V_{CE}$ = -2 V, $I_C$ = -0.5 A | 100 | — | 200 | |
| | $h_{FE(3)}$ | $V_{CE}$ = -2 V, $I_C$ = -1 A | 60 | — | — | |
| Collector-emitter saturation voltage | $V_{CE(sat)(1)}$ | $I_C$ = -0.5 A, $I_B$ = -50 mA | — | — | -0.3 | V |
| | $V_{CE(sat)(2)}$ | $I_C$ = -1 A, $I_B$ = -100 mA | — | — | -0.5 | |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C$ = -1 A, $I_B$ = -100 mA | — | — | -1.5 | |

## 5.2. Dynamic Characteristics ($T_a$ = 25 °C unless otherwise specified)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Collector output capacitance | $C_{ob}$ | $V_{CB}$ = -10 V, $I_E$ = 0 A, f = 1 MHz | — | 25 | — | pF |
| Transition frequency | $f_T$ | $V_{CE}$ = -2 V, $I_C$ = -0.5 A | — | 100 | — | MHz |
| Switching time (rise time) | $t_r$ | See Figure 5.2.1 | — | 30 | — | ns |
| Switching time (storage time) | $t_{stg}$ | $V_{CC}$ ≈ -24 V, $R_L$ = 24 Ω, $I_{B1}$ = 0.1 A, $I_{B2}$ = 0.1 A | — | 300 | — | |
| Switching time (fall time) | $t_f$ | | — | 40 | — | |




Duty cycle ≤ 1%

**Fig. 5.2.1 Switching Time Test Circuit**

## 6. Marking (Note)

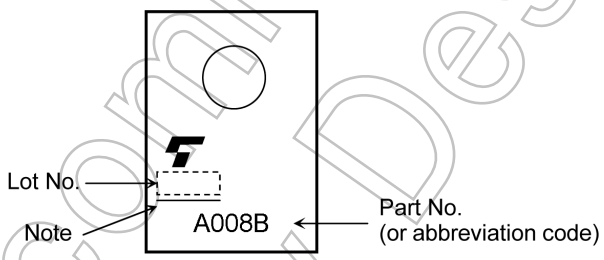



**Fig. 6.1 Marking**

Note: 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 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

## 7. Characteristics Curves (Note)

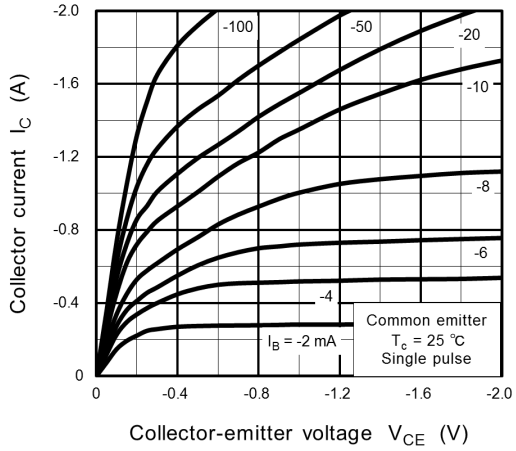



Fig. 7.1 $I_C$ - $V_{CE}$

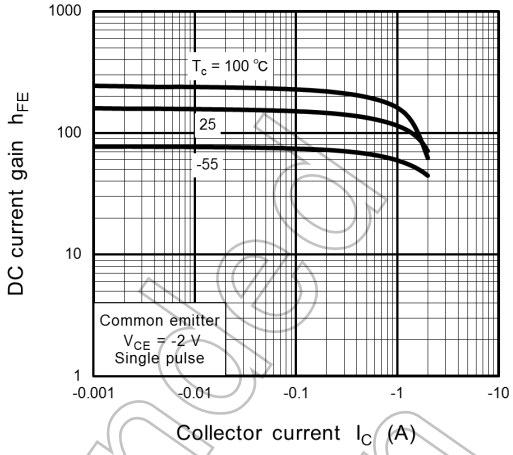



Fig. 7.2 $h_{FE}$ - $I_C$

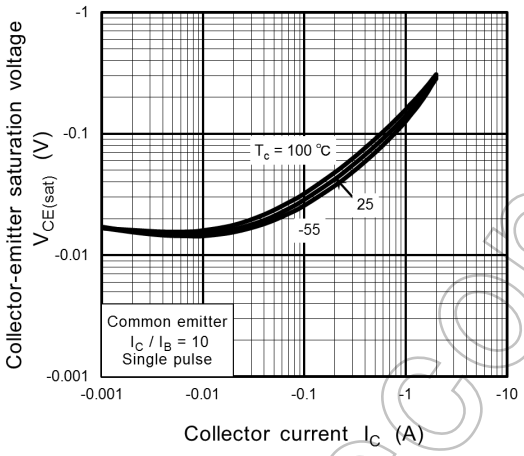



Fig. 7.3 $V_{CE(sat)}$ - $I_C$

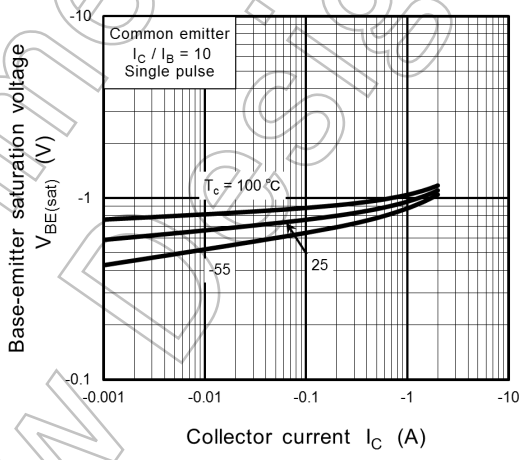



Fig. 7.4 $V_{BE(sat)}$ - $I_C$

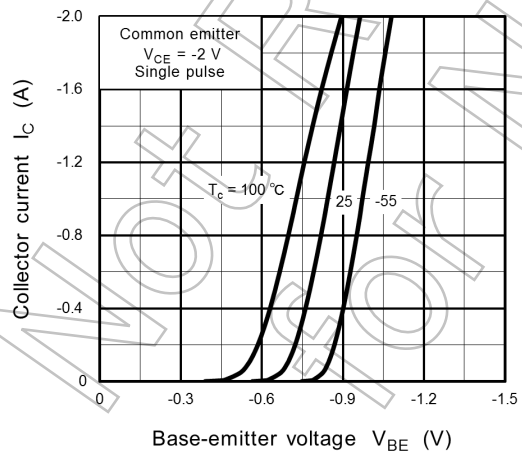



Fig. 7.5 $I_C$ - $V_{BE}$

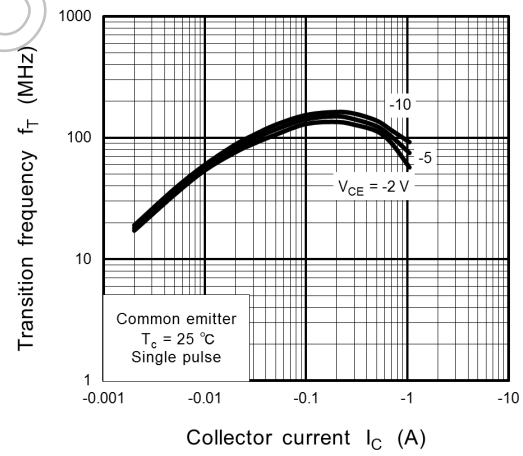



Fig. 7.6 $f_T$ - $I_C$

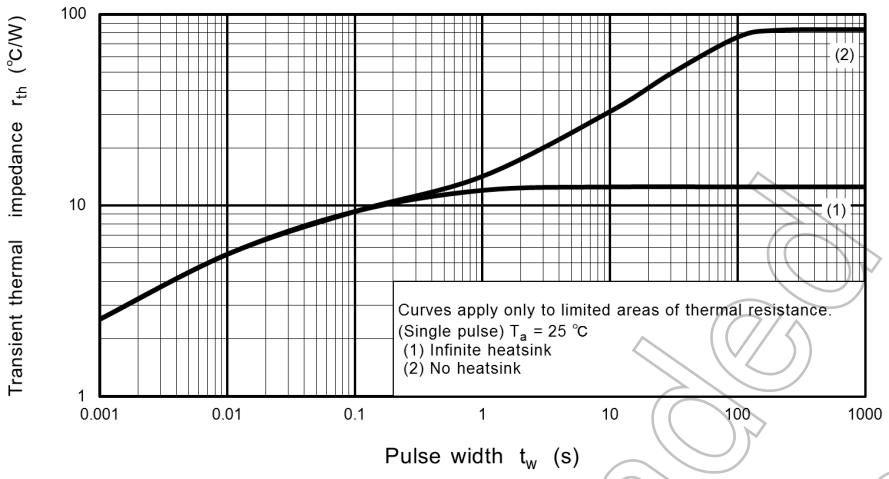



**Fig. 7.7 $r_{th}$ - $t_w$ (Guaranteed Maximum)**

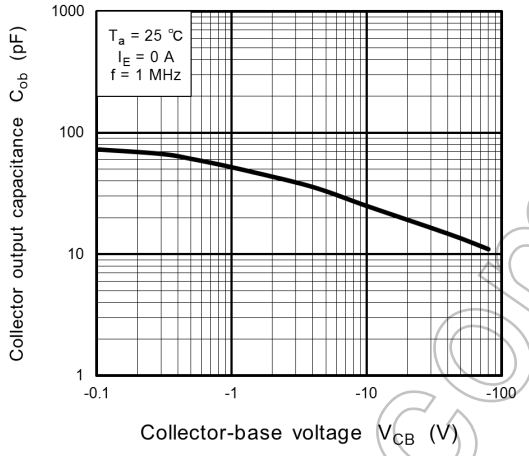



**Fig. 7.8 $C_{ob}$ - $V_{CB}$**

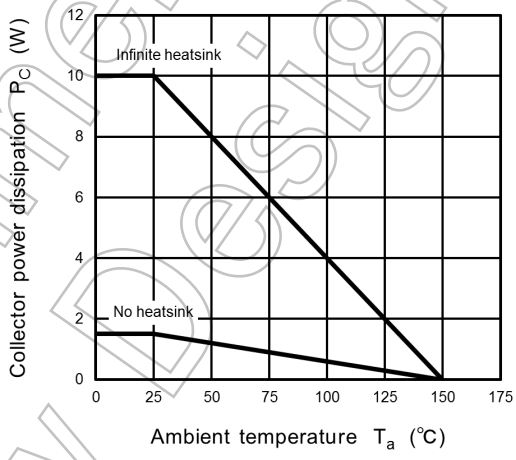



**Fig. 7.9 $P_C$ - $T_a$**

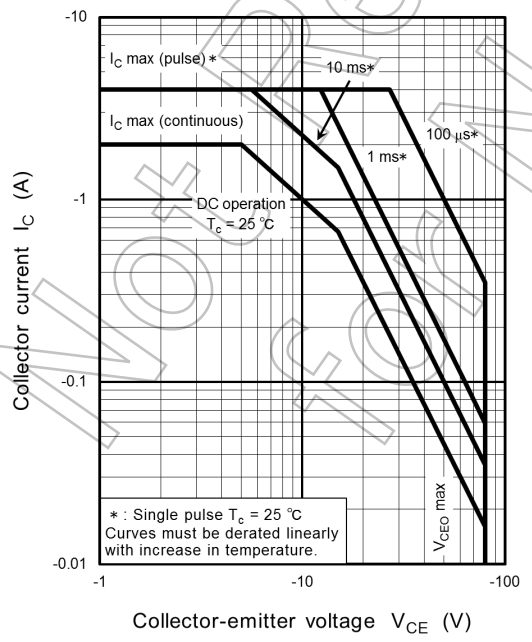
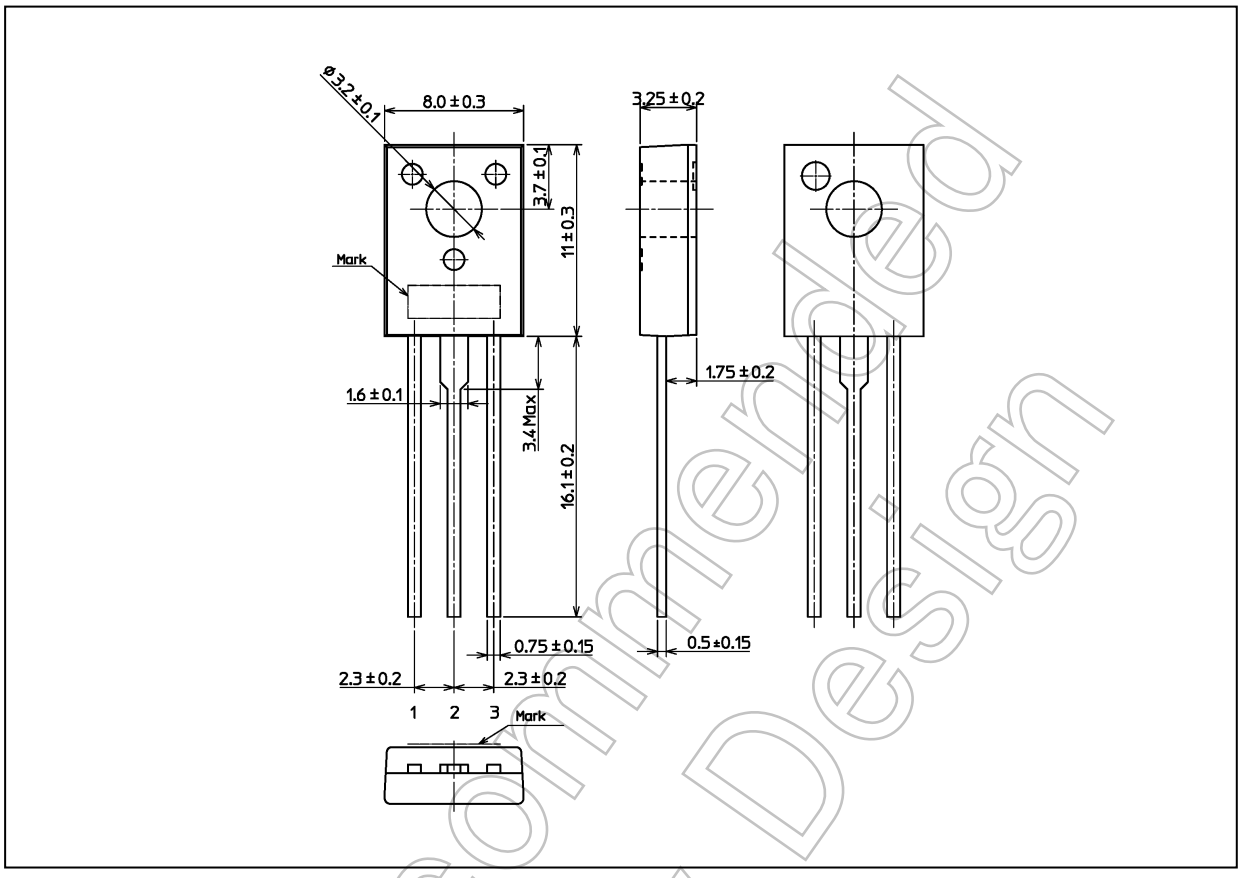



**Fig. 7.10 Safe Operating Area (Guaranteed Maximum)**

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

## Package Dimensions

Unit: mm




Weight: 0.84 g (typ.)

| Package Name(s) |
|---|
| TOSHIBA: 2-8U1A |
| Nickname: TO-126N |

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