

# TTA004B

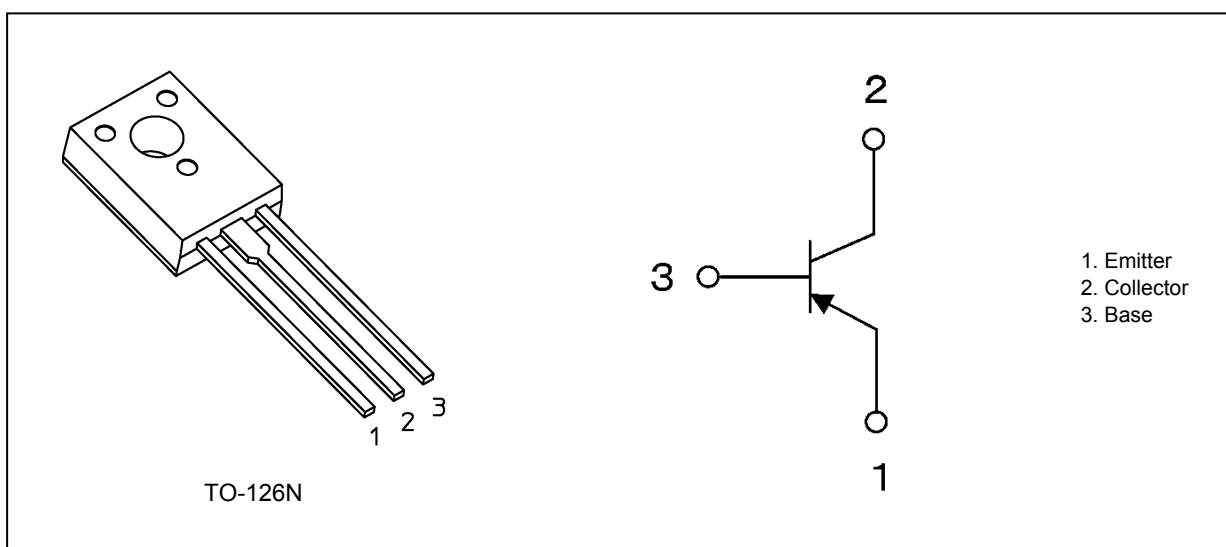
## 1. Applications

- Audio-Frequency Amplifiers

## 2. Features

- (1) High collector voltage:  $V_{CEO} = -160 \text{ V}$  (min)
- (2) Complementary to TTC004B
- (3) Small collector output capacitance:  $C_{ob} = 17 \text{ pF}$  (typ.)
- (4) High transition frequency:  $f_T = 100 \text{ MHz}$  (typ.)

## 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

2013-05

#### 4. Absolute Maximum Ratings (Note) ( $T_a = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-160	V
Collector-emitter voltage	$V_{CEO}$	-160	
Emitter-base voltage	$V_{EBO}$	-6	
Collector current (DC) (Note 1)	$I_C$	-1.5	A
Collector current (pulsed) (Note 1)	$I_{CP}$	-2.5	
Base current	$I_B$	-0.5	
Collector power dissipation ( $T_a = 25\text{ }^{\circ}\text{C}$ )	$P_C$	1.5	W
Collector power dissipation ( $T_c = 25\text{ }^{\circ}\text{C}$ )	$P_C$	10	
Junction temperature	$T_j$	150	$^{\circ}\text{C}$
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  $150\text{ }^{\circ}\text{C}$ .

#### 5. Electrical Characteristics

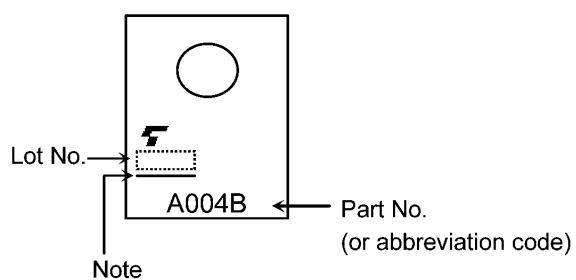
##### 5.1. Static Characteristics ( $T_a = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = -160\text{ V}$ , $I_E = 0\text{ A}$	—	—	-100	nA
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -6\text{ V}$ , $I_C = 0\text{ A}$	—	—	-100	
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -10\text{ mA}$ , $I_B = 0\text{ A}$	-160	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = -5\text{ V}$ , $I_C = -1\text{ mA}$	80	—	—	—
	$h_{FE(2)}$	$V_{CE} = -5\text{ V}$ , $I_C = -0.1\text{ A}$	140	—	280	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -0.5\text{ A}$ , $I_B = -50\text{ mA}$	—	—	-0.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -0.5\text{ A}$ , $I_B = -50\text{ mA}$	—	—	-1.3	V

##### 5.2. Dynamic Characteristics ( $T_a = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector output capacitance	$C_{ob}$	$V_{CB} = -10\text{ V}$ , $I_E = 0\text{ A}$ , $f = 1\text{ MHz}$	—	17	—	pF
Transition frequency	$f_T$	$V_{CE} = -10\text{ V}$ , $I_C = -100\text{ mA}$	—	100	—	MHz

## 6. Marking (Note)



**Fig. 6.1 Marking**

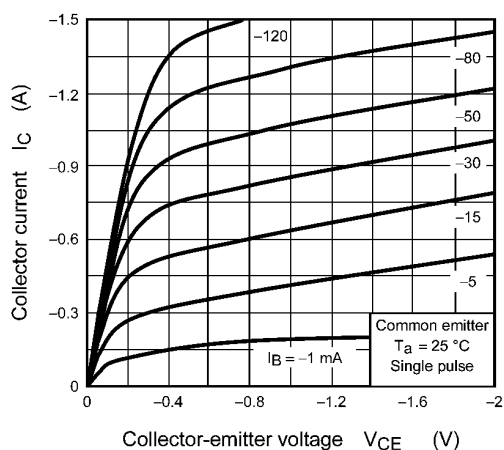
Note: A line under a Lot No. identifies the indication of product Labels.

[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

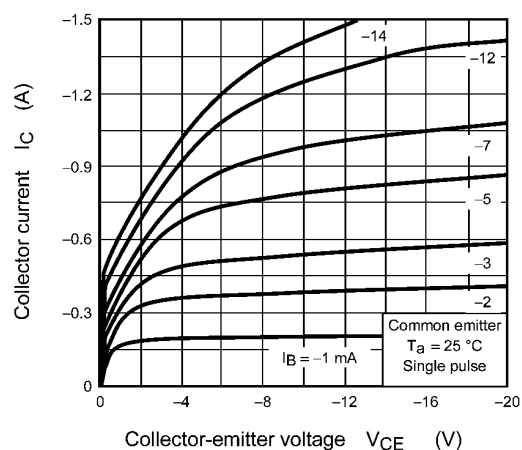
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

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.

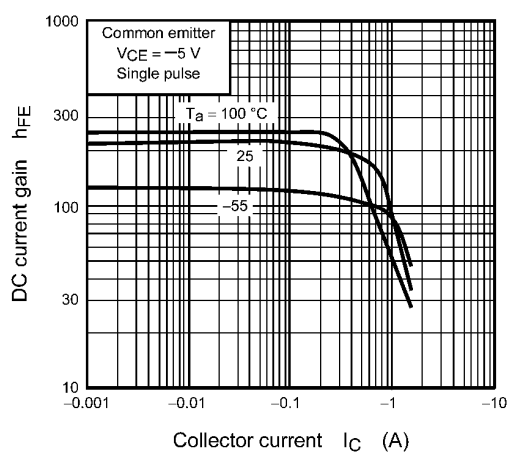
# 7. Characteristics Curves (Note)



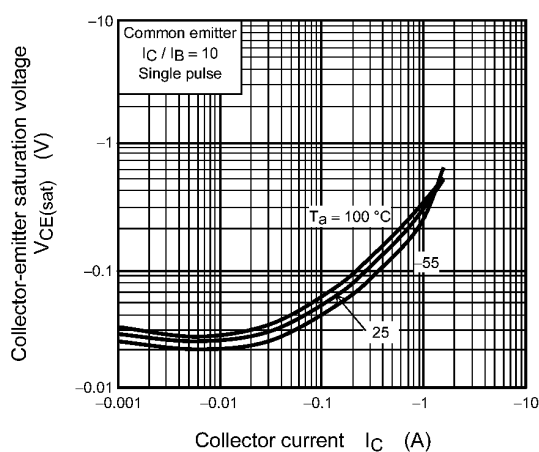
**Fig. 7.1  $I_C - V_{CE}$**



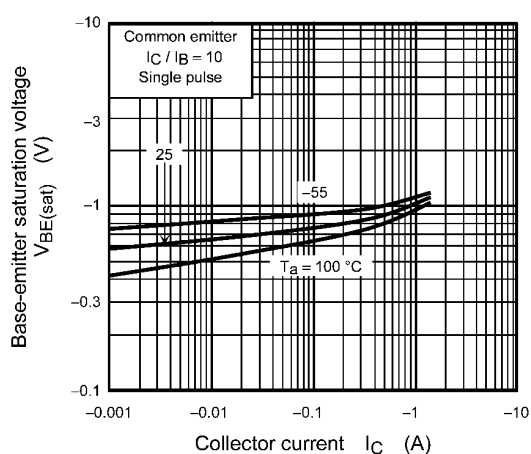
**Fig. 7.2  $I_C - V_{CE}$**



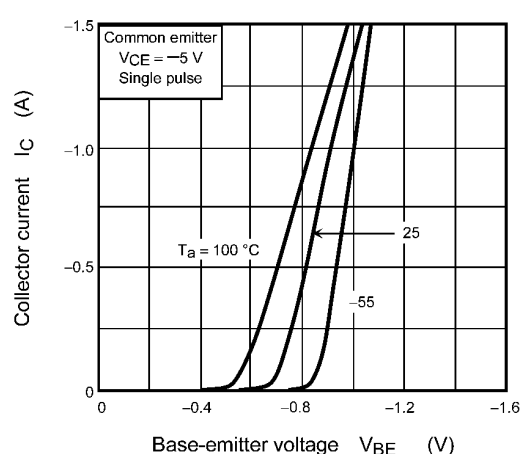
**Fig. 7.3  $h_{FE} - I_C$**



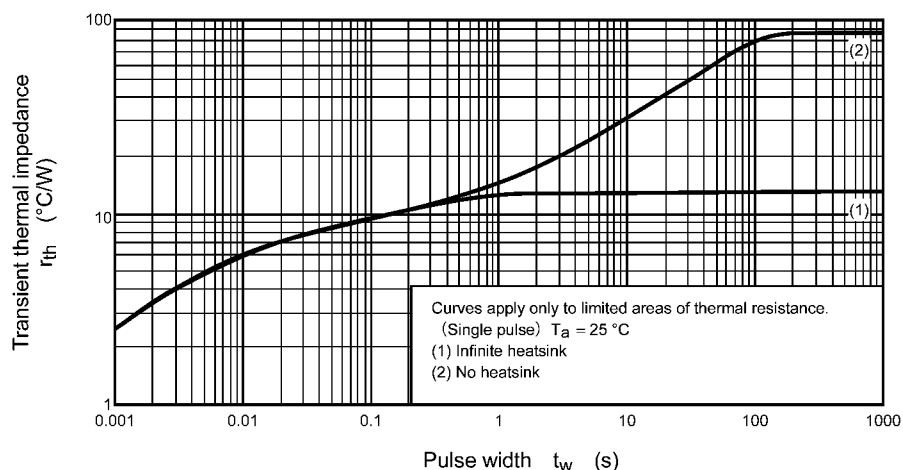
**Fig. 7.4  $V_{CE(sat)} - I_C$**



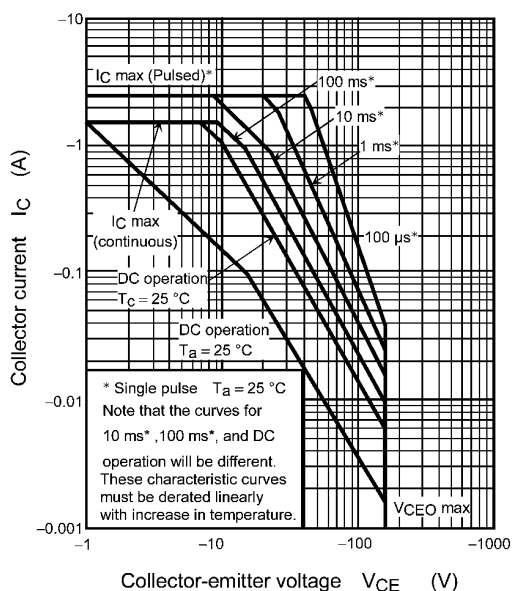
**Fig. 7.5  $V_{BE(sat)} - I_C$**



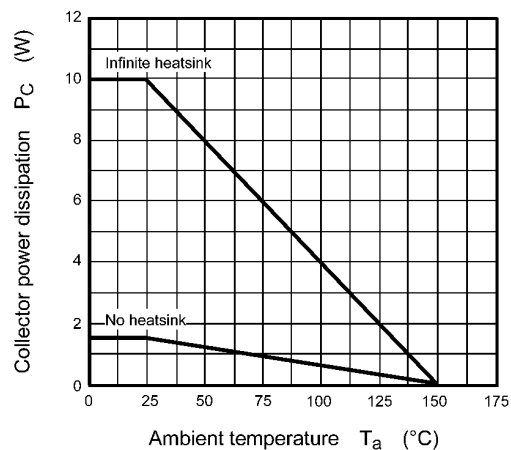
**Fig. 7.6  $I_C - V_{BE}$**



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



**Fig. 7.8 Safe Operating Area**  
(Guaranteed Maximum)

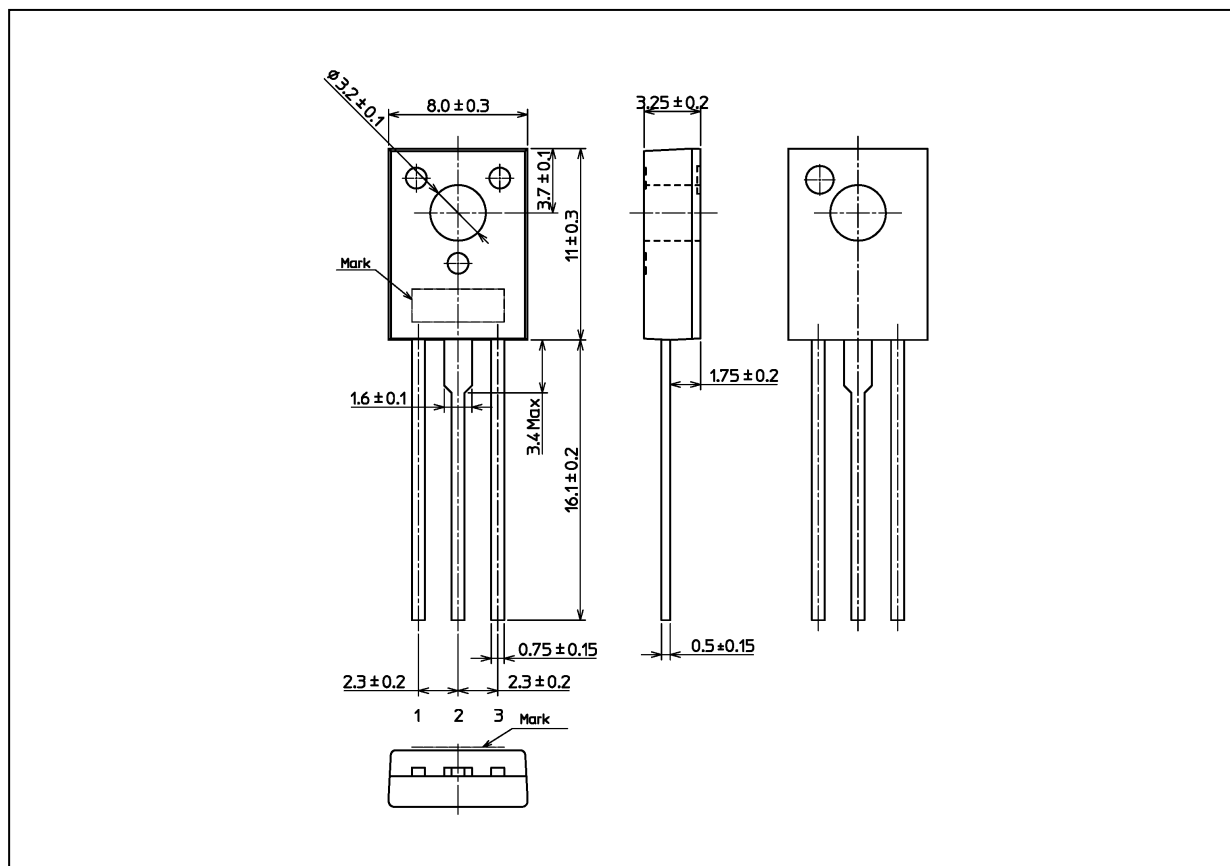


**Fig. 7.9  $P_C - T_a$**

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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