Bipolar Transistors Silicon NPN Epitaxial Type

# TTC004B

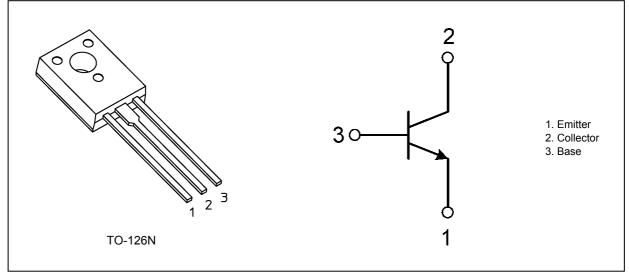
#### 1. Applications

Audio-Frequency Amplifiers

#### 2. Features

- (1) High collector voltage:  $V_{CEO} = 160 \text{ V} \text{ (min)}$
- (2) Complementary to TTA004B
- (3) Small collector output capacitance:  $C_{ob} = 12 \text{ pF}$  (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.

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

Characteristics			Rating	Unit
Collector-base voltage		V <sub>CBO</sub>	160	V
Collector-emitter voltage		V <sub>CEO</sub>	160	
Emitter-base voltage		V <sub>EBO</sub>	6	
Collector current (DC)	(Note 1)	Ι <sub>C</sub>	1.5	A
Collector current (pulsed)	(Note 1)	I <sub>CP</sub>	2.5	
Base current		I <sub>B</sub>	0.5	
Collector power dissipation		P <sub>C</sub>	1.5	W
Collector power dissipation $(T_c = 25)^{\circ}$	°C)	Pc	10	
Junction temperature		Tj	150	°C
Storage temperature		T <sub>stg</sub>	-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

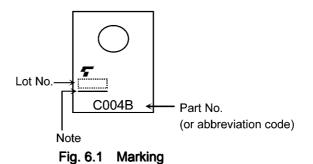
#### 5.1. Static Characteristics (Ta = 25 °C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 160 V, I <sub>E</sub> = 0 A			100	nA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0 A			100	
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0 A	160		_	V
DC current gain	h <sub>FE(1)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 1 mA	80	_	_	—
	h <sub>FE(2)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 0.1 A	140		280	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 0.5 A, I <sub>B</sub> = 50 mA	_	_	0.5	V
Base-emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = 0.5 A, I <sub>B</sub> = 50 mA	_	_	1.3	V

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

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 A, f = 1 MHz	_	12	—	pF
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 100 mA	_	100	_	MHz

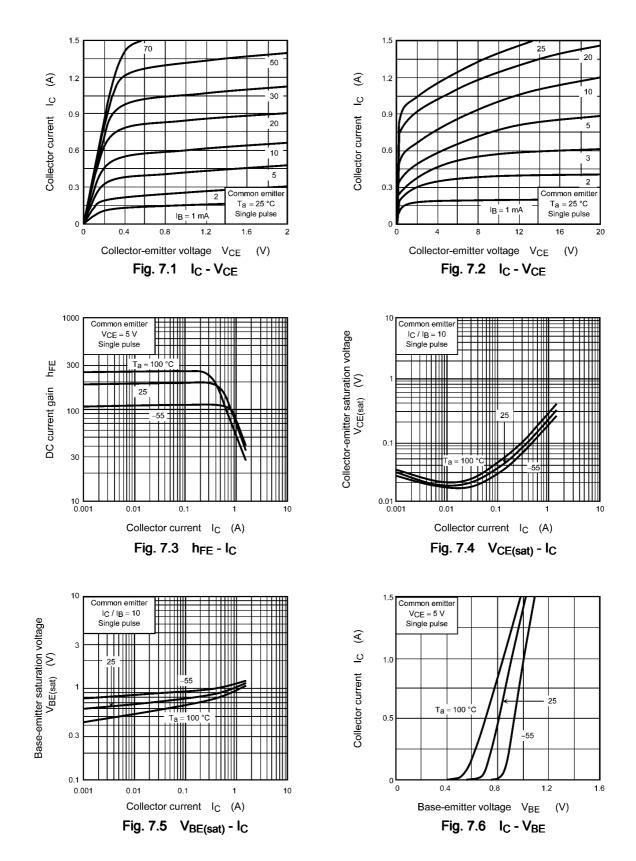
### 6. Marking (Note)

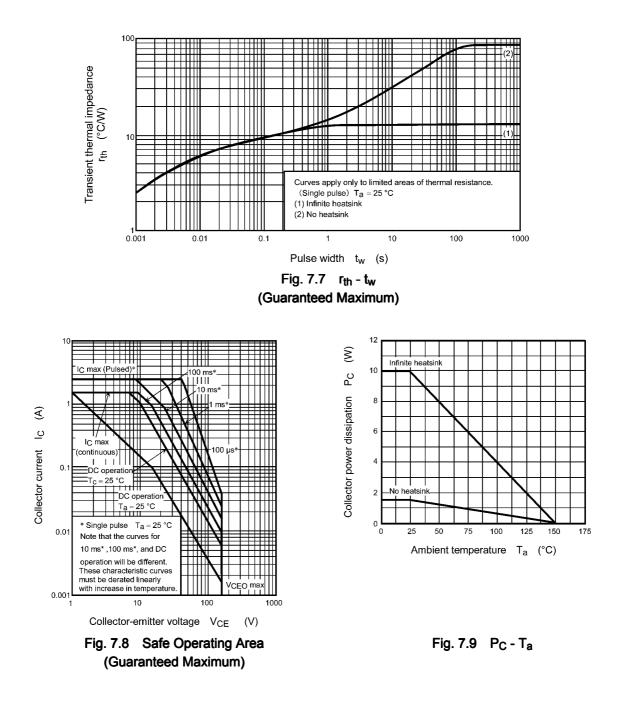


Note: A line under a Lot No. identifies the indication of product Labels. [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]] Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the

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)



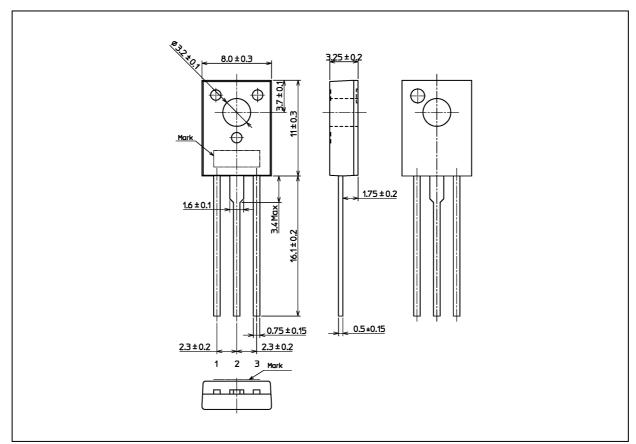


Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

# TTC004B

## Package Dimensions

Unit: mm



Weight: 0.84 g (typ.)

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

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