

# TTD1509B

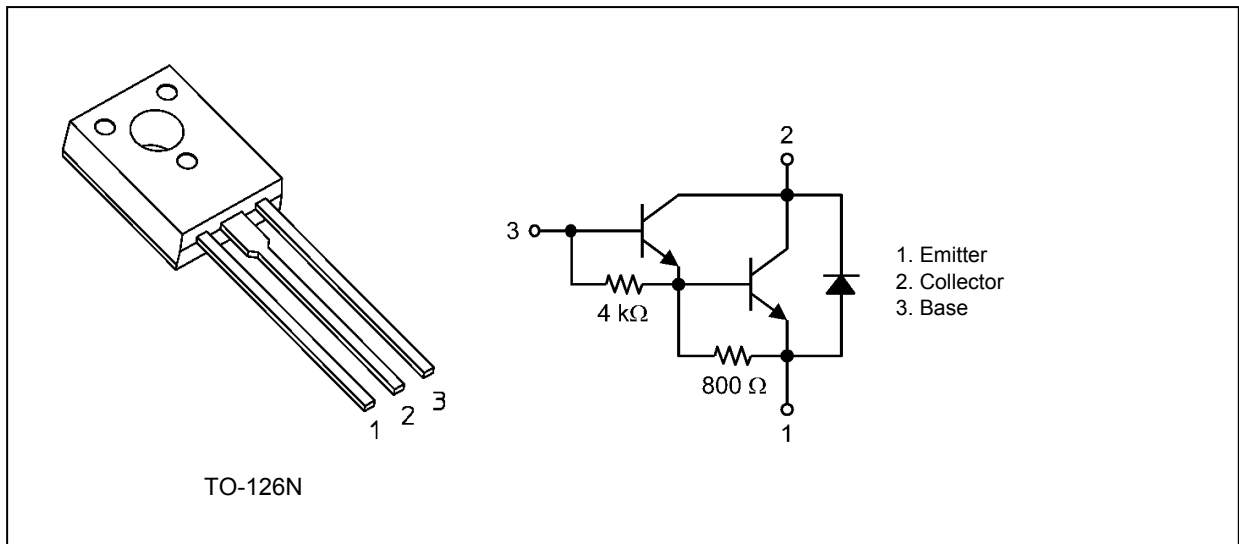
## 1. Applications

- Micromotor Drivers
- Hammer Drivers
- Switching
- Power Amplifiers

## 2. Features

- (1) High DC current gain :  $h_{FE} = 2000$  (min) ( $V_{CE} = 2$  V,  $I_C = 1$  A)
- (2) Low collector-emitter saturation voltage :  $V_{CE(sat)} = 1.5$  V (max) ( $I_C = 1$  A,  $I_B = 1$  mA)
- (3) Complementary to TTB1067B

## 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) ( $T_a = 25\text{ }^\circ\text{C}$  unless otherwise specified)**

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CB0}$	80	V
Collector-emitter voltage	$V_{CE0}$	80	
Emitter-base voltage	$V_{EB0}$	8	
Collector current (DC)	$I_C$	2	A
Collector current (pulsed)	$I_{CP}$	3	
Base current	$I_B$	0.5	
Collector power dissipation	$P_C$	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  $150\text{ }^\circ\text{C}$ .

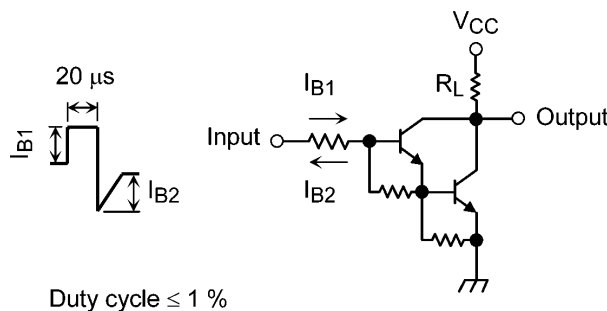
**5. Electrical Characteristics**

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

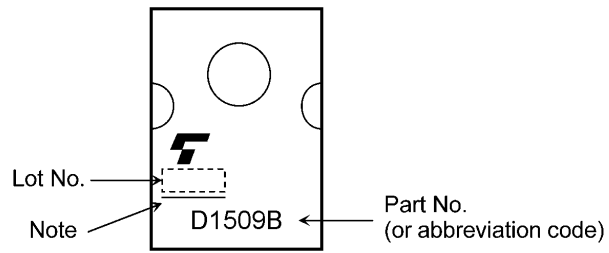
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CB0}$	$V_{CB} = 80\text{ V}, I_E = 0\text{ A}$	—	—	100	nA
Emitter cut-off current	$I_{EB0}$	$V_{EB} = 8\text{ V}, I_C = 0\text{ A}$	0.8	—	4	mA
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0\text{ A}$	80	—	—	V
DC current gain	$h_{FE}$	$V_{CE} = 2\text{ V}, I_C = 1\text{ A}$	2000	—	—	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 1\text{ mA}$	—	—	1.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 1\text{ mA}$	—	—	2.0	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	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0\text{ A}, f = 1\text{ MHz}$	—	20	—	pF
Transition frequency	$f_T$	$V_{CE} = 2\text{ V}, I_C = 0.5\text{ A}$	—	100	—	MHz
Switching time (rise time)	$t_r$	See Figure 5.2.1.	—	0.4	—	$\mu\text{s}$
Switching time (storage time)	$t_{stg}$	$V_{CC} \approx 30\text{ V}, R_L = 30\ \Omega,$ $I_{B1} = 1\text{ mA}, I_{B2} = 1\text{ mA}$	—	4.0	—	
Switching time (fall time)	$t_f$		—	0.6	—	



**Fig. 5.2.1 Switching Time Test Circuit**

**6. Marking (Note)****Fig. 6.1 Marking**

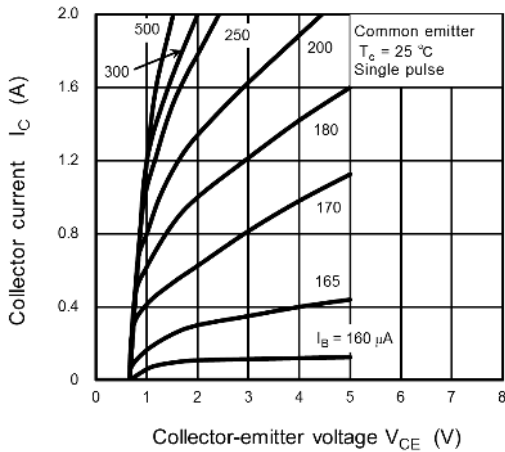
Note: A line under a Lot No. identifies the indication of product Labels.

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

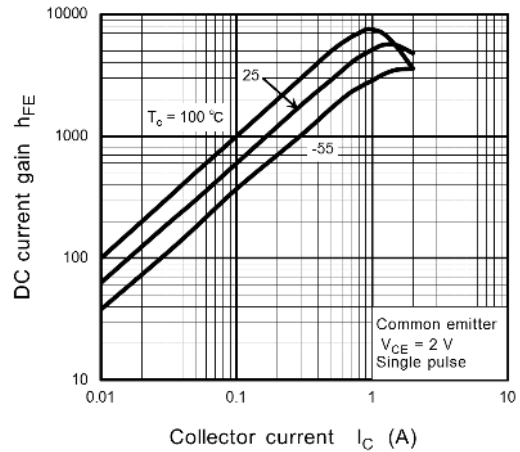
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

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.

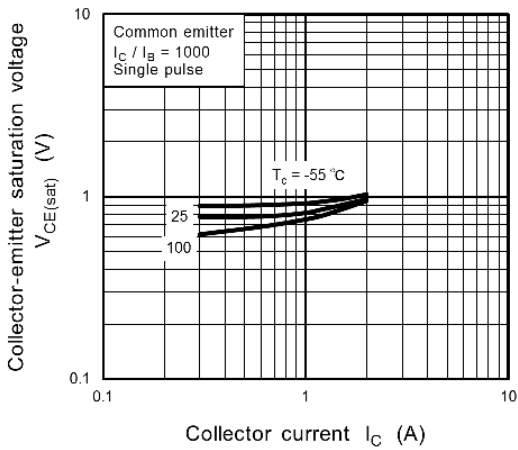
**7. Characteristics Curves (Note)**



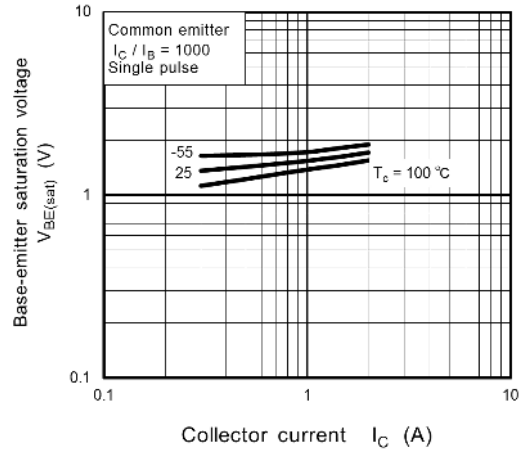
**Fig. 7.1 IC - VCE**



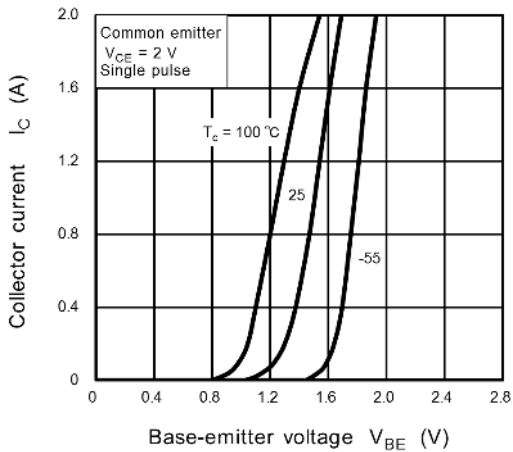
**Fig. 7.2 hFE - IC**



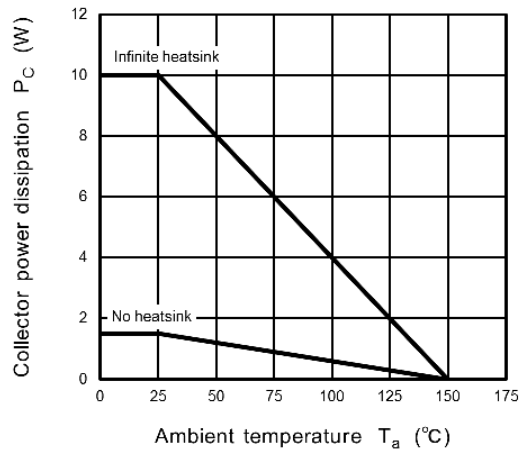
**Fig. 7.3 VCE(sat) - IC**



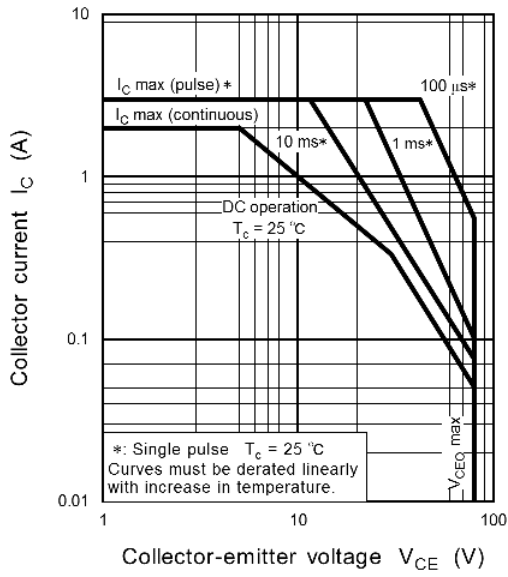
**Fig. 7.4 VBE(sat) - IC**



**Fig. 7.5 IC - VBE**



**Fig. 7.6 PC - Ta**

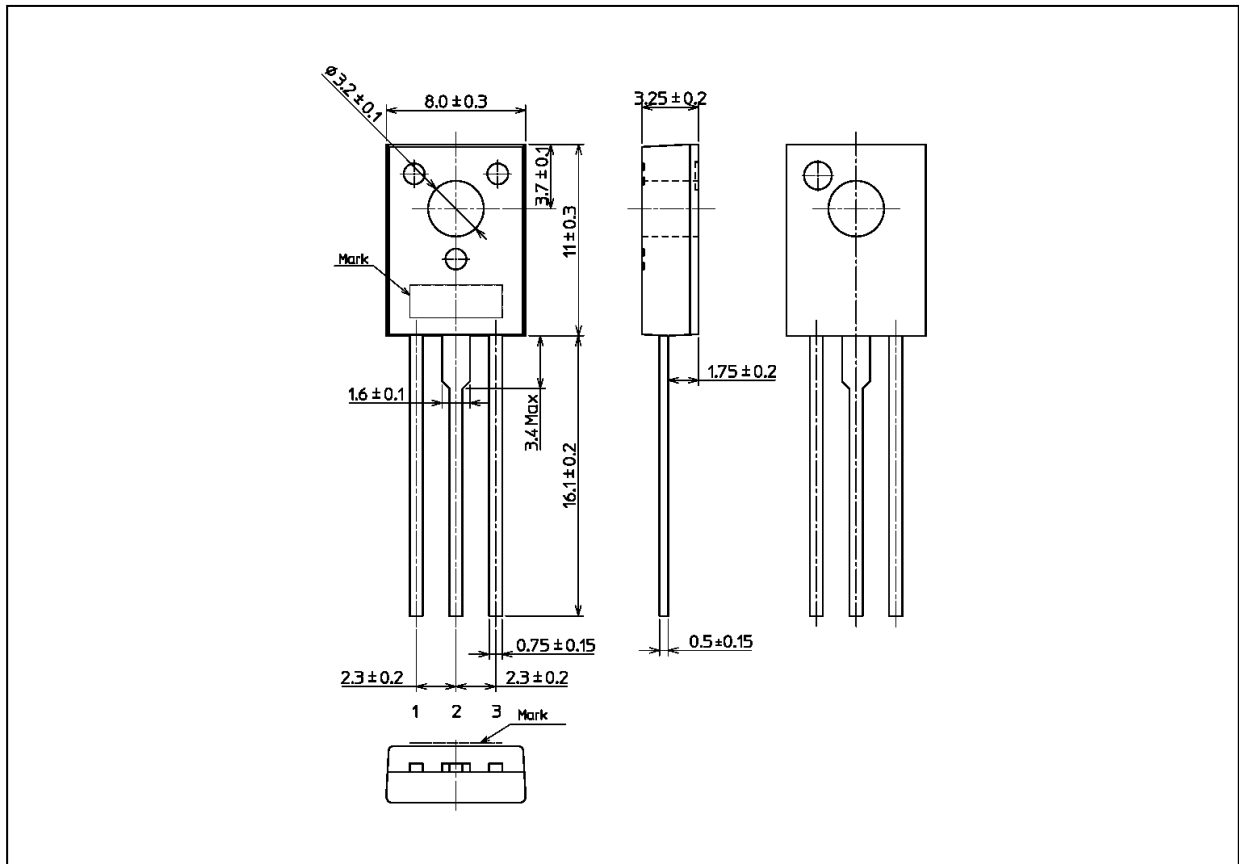


**Fig. 7.7 Safe Operating Area  
(Guaranteed Maximum)**

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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