

TTD1509B

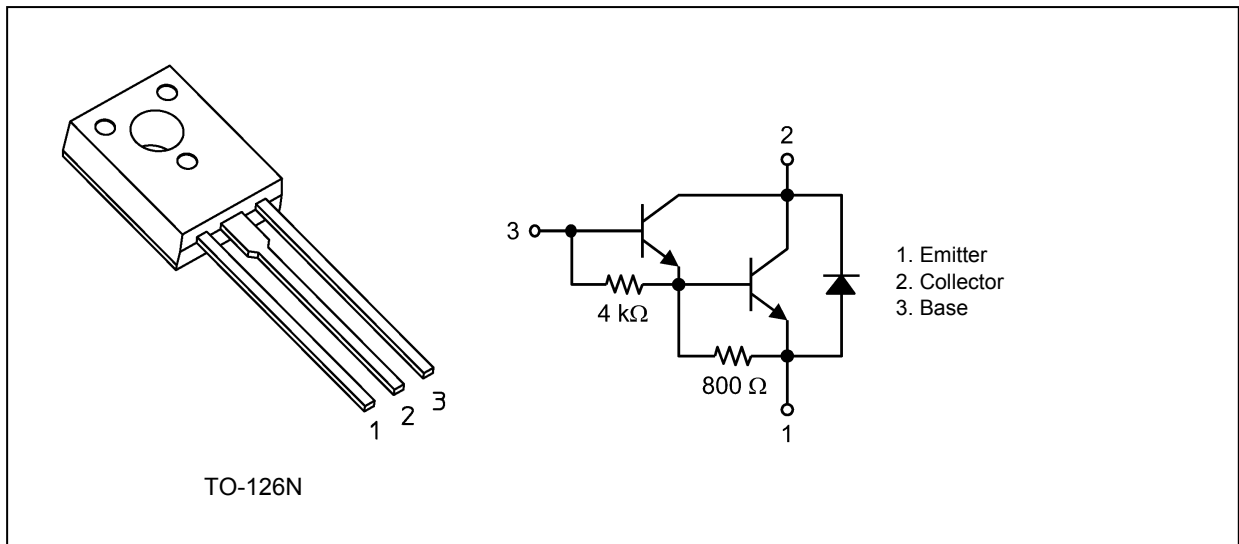
1. Applications

- 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	—	μs
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	—	

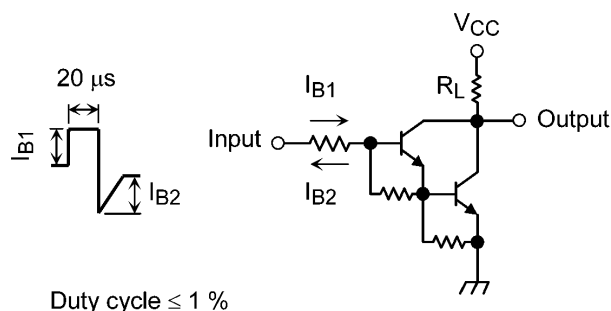


Fig. 5.2.1 Switching Time Test Circuit

6. Marking (Note)

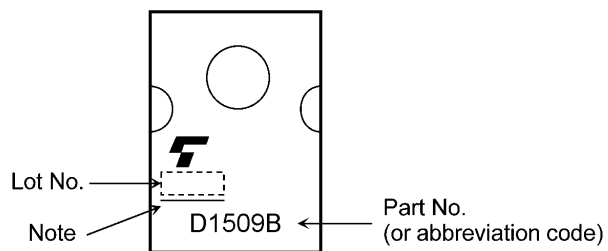


Fig. 6.1 Marking

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)

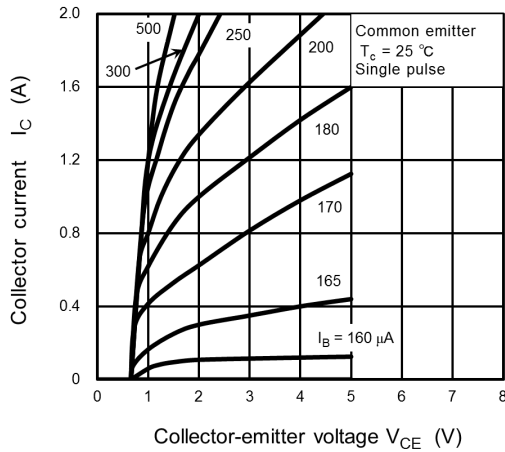


Fig. 7.1 IC - VCE

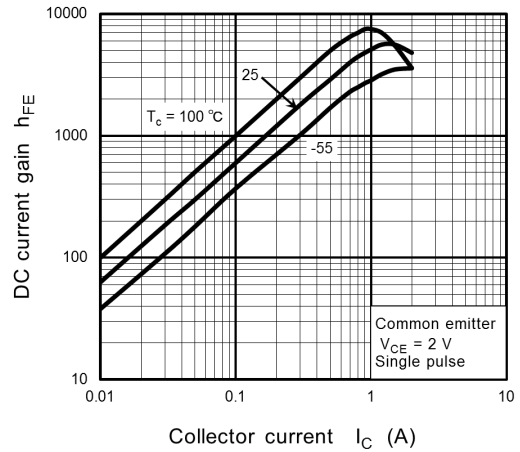


Fig. 7.2 hFE - IC

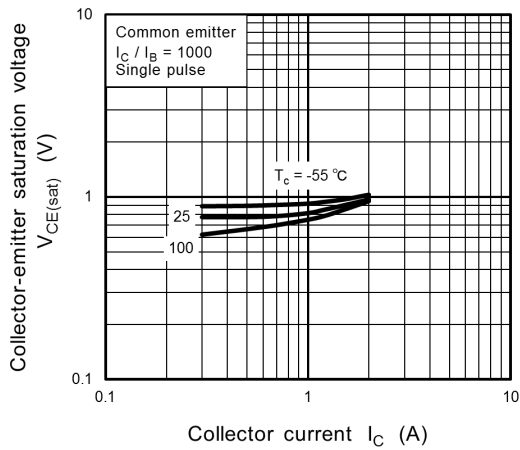


Fig. 7.3 VCE(sat) - IC

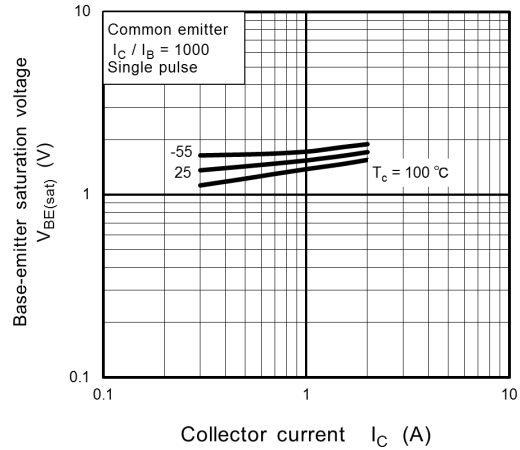


Fig. 7.4 VBE(sat) - IC

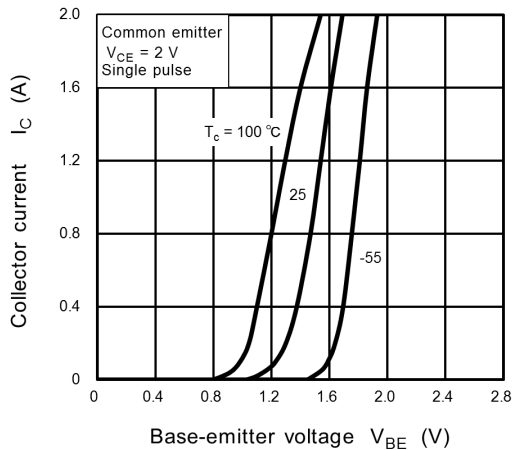


Fig. 7.5 IC - VBE

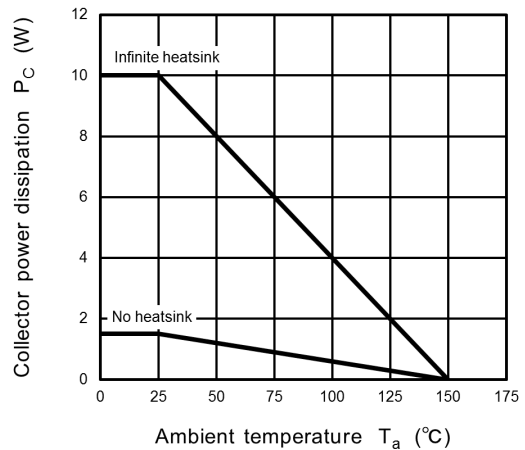


Fig. 7.6 PC - Ta

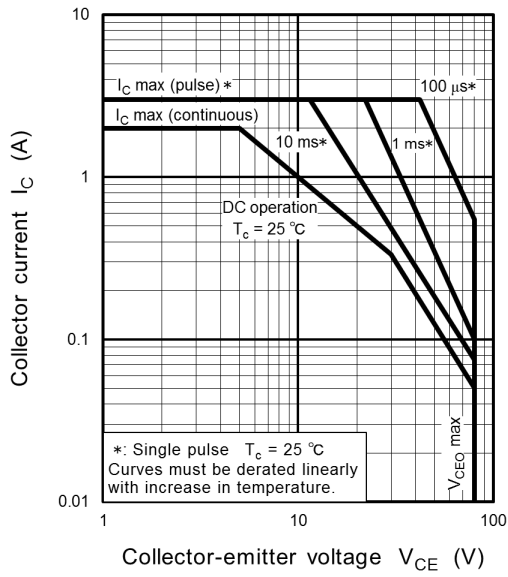


Fig. 7.7 Safe Operating Area (Guaranteed Maximum)

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

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