

Bipolar Transistors Silicon PNP Epitaxial Type

TTA1452B

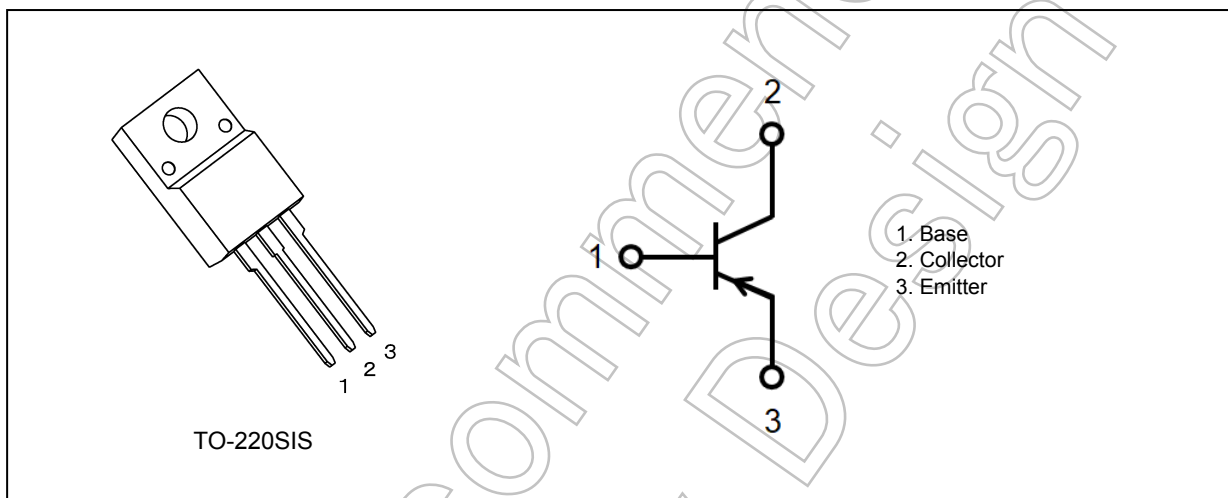
1. Applications

- High-Current Switching

2. Features

- (1) Low collector-emitter saturation voltage: $V_{CE(sat)} = -0.4 \text{ V (max)}$ ($I_C = -6 \text{ A}$, $I_B = -0.3 \text{ A}$)
- (2) High speed switching: $t_{stg} = 1 \mu\text{s (typ.)}$
- (3) Complementary to TTC3710B

3. Packaging and Internal Circuit



4. Absolute Maximum Ratings (Note) ($T_a = 25 \text{ }^\circ\text{C}$ 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}	-6	
Collector current (DC)	I_C	-12	A
Collector current (pulsed)	I_{CP}	-15	
Base current	I_B	-2	
Collector power dissipation	P_C	2	W
Collector power dissipation ($T_c = 25 \text{ }^\circ\text{C}$)	P_C	30	
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to 150	
Mounting torque	TOR	0.6	N · m

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 $150 \text{ }^\circ\text{C}$.

Start of commercial production

2012-09

5. Thermal Characteristics

Characteristics	Symbol	Max	Unit
Junction-to-case thermal resistance	$R_{th(j-c)}$	4.16	$^{\circ}C/W$
Junction-to-ambient thermal resistance	$R_{th(j-a)}$	62.5	

6. Electrical Characteristics

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = -80 V, I_E = 0 A$	—	—	-5	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = -6 V, I_C = 0 A$	—	—	-5	
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = -50 mA, I_B = 0 A$	-80	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = -1 V, I_C = -1 A$	120	—	240	—
	$h_{FE(2)}$	$V_{CE} = -1 V, I_C = -6 A$	40	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -6 A, I_B = -0.3 A$	—	-0.19	-0.4	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -6 A, I_B = -0.3 A$	—	-0.9	-1.2	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Transition frequency	f_T	$V_{CE} = -5 V, I_C = -1 A$	—	50	—	MHz
Collector output capacitance	C_{ob}	$V_{CB} = -10 V, I_E = 0 A, f = 1 MHz$	—	400	—	pF
Switching time (turn-on time)	t_{on}	See Figure 6.2.1.	—	0.3	—	μs
Switching time (storage time)	t_{stg}	$V_{CC} = -30 V, R_L = 5 \Omega,$ $-I_{B1} = I_{B2} = 0.3 A,$	—	1.0	—	
Switching time (fall time)	t_f	Duty cycle $\leq 1\%$	—	0.5	—	

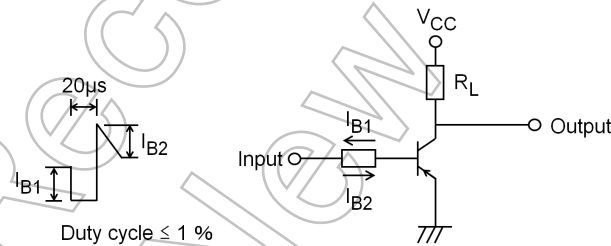


Fig. 6.2.1 Switching Time Test Circuit

7. Marking (Note)

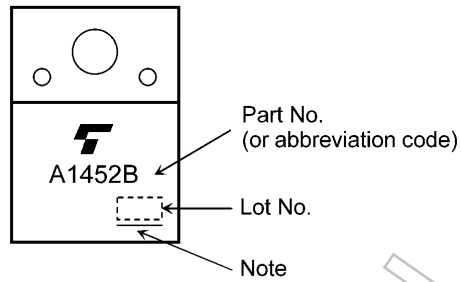


Fig. 7.1 Marking

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.

Not Recommended for New Design

8. Characteristics Curves (Note)

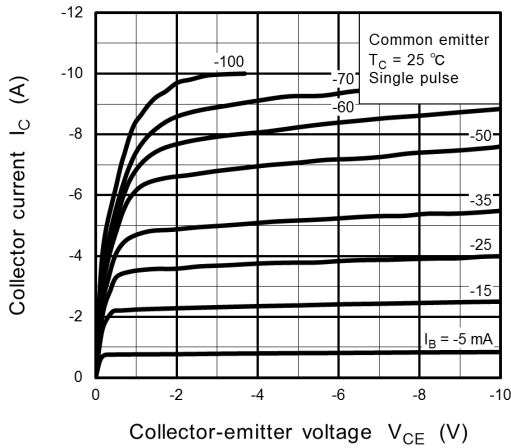


Fig. 8.1 $I_C - V_{CE}$

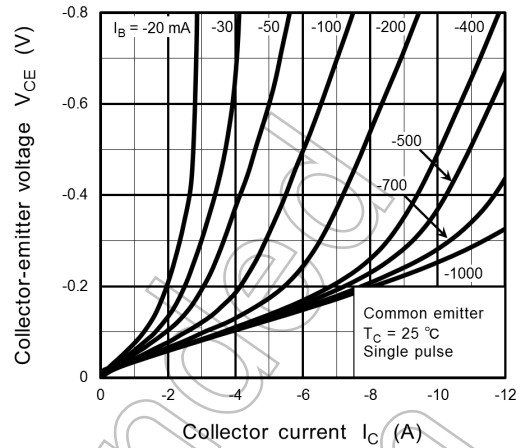


Fig. 8.2 $V_{CE} - I_C$

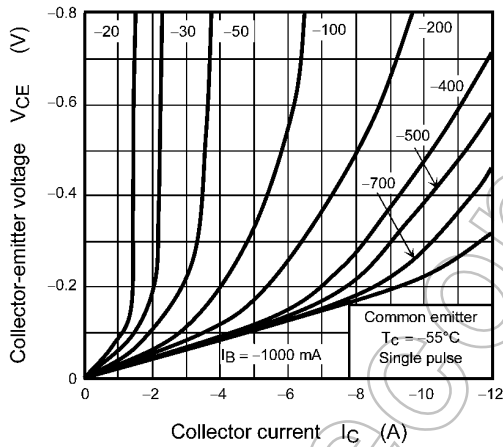


Fig. 8.3 $V_{CE} - I_C$

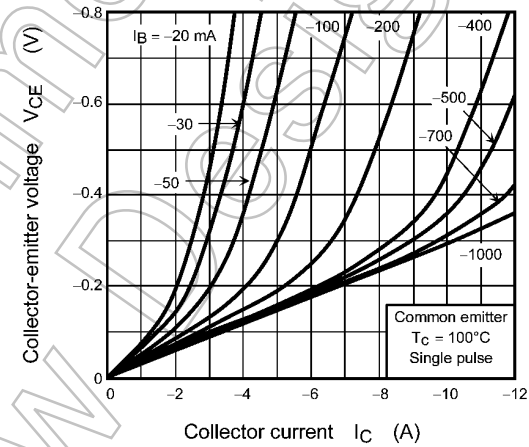


Fig. 8.4 $V_{CE} - I_C$

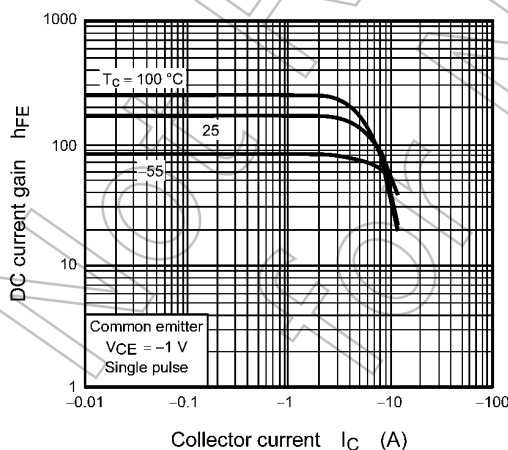


Fig. 8.5 $h_{FE} - I_C$

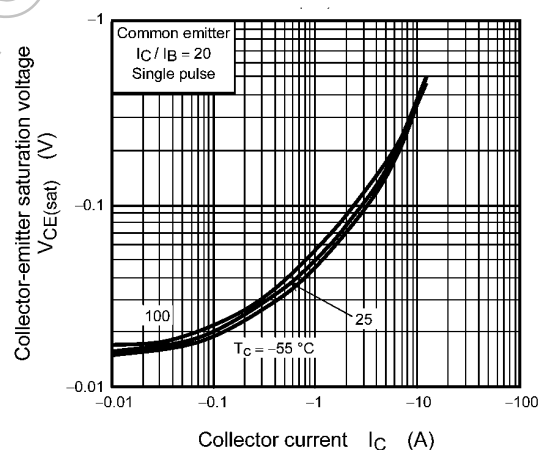


Fig. 8.6 $V_{CE(sat)} - I_C$

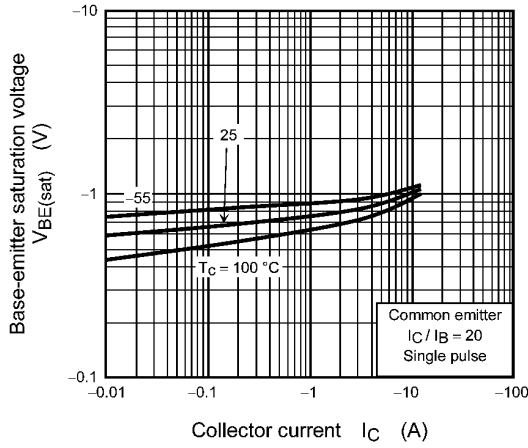


Fig. 8.7 $V_{BE(sat)} - I_C$

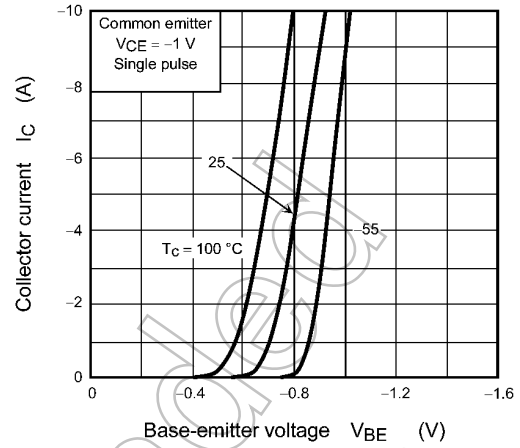


Fig. 8.8 $I_C - V_{BE}$

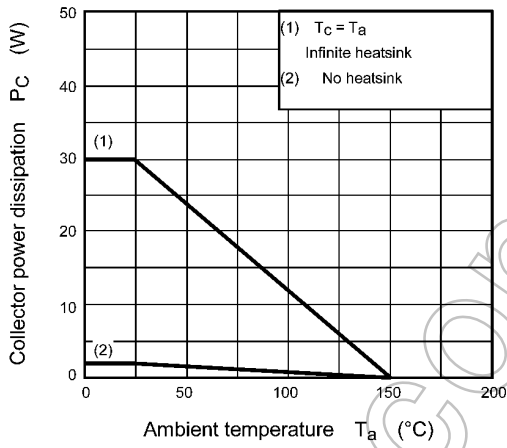
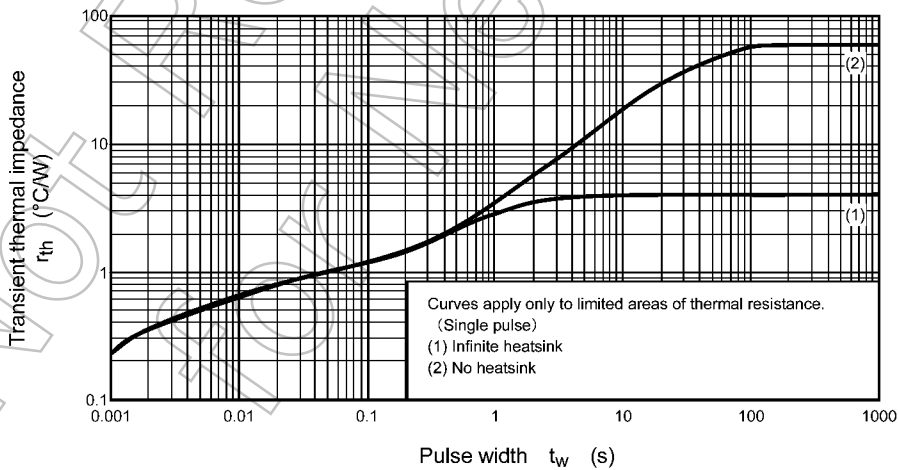
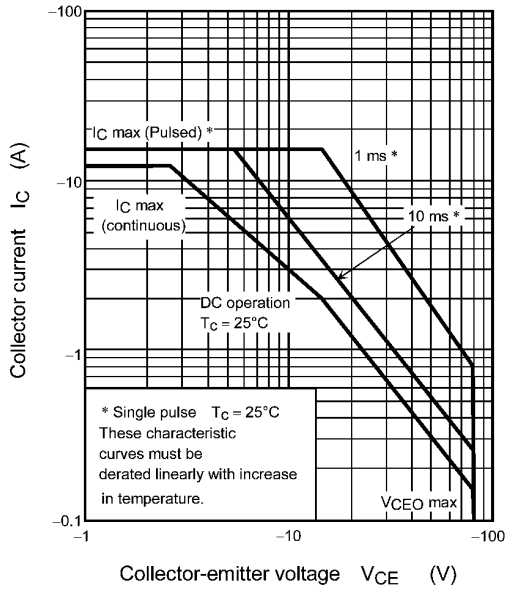


Fig. 8.9 $P_C - T_a$



**Fig. 8.10 $r_{th} - t_w$
(Guaranteed Maximum)**



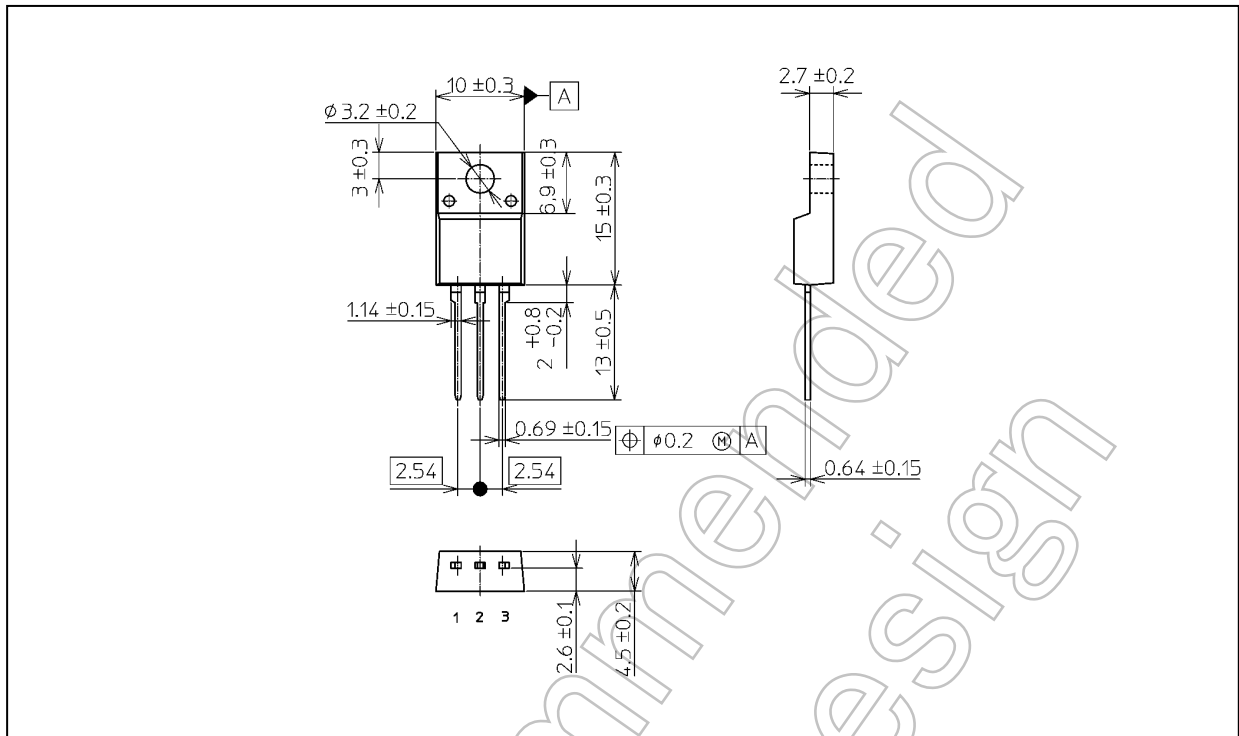
**Fig. 8.11 Safe Operating Area
(Guaranteed Maximum)**

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

Not Recommended for New Design

Package Dimensions

Unit: mm



Weight: 1.7 g (typ.)

Package Name(s)
TOSHIBA: 2-10U1S
Nickname: TO-220SIS

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