

TTA1452B

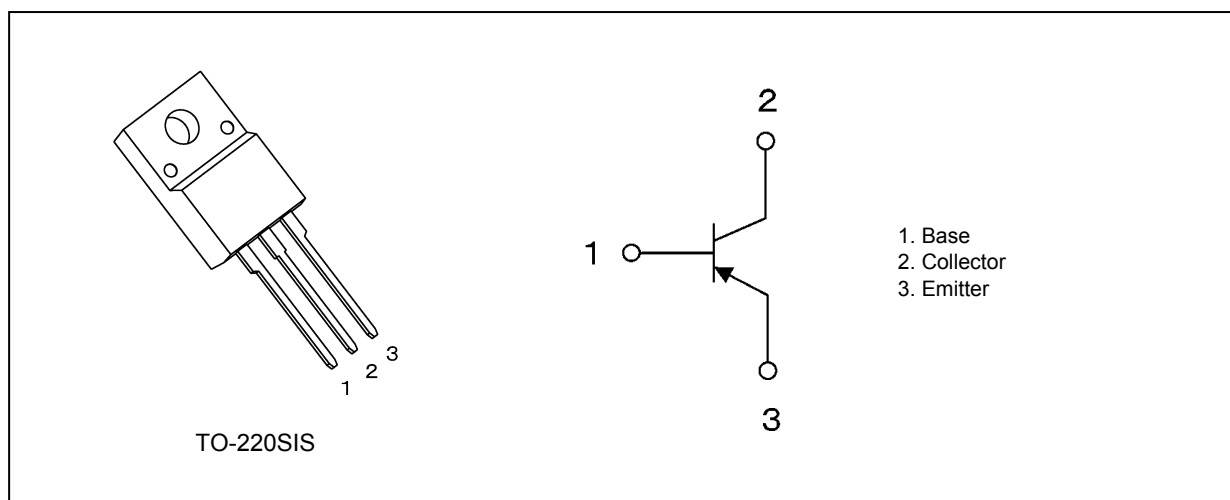
1. Applications

- 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: $t_{stg} = 1 \text{ } \mu\text{s (typ.)}$
- (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. 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} | $V_{CB} = -80\text{ V}, I_E = 0\text{ A}$ | — | — | -5 | μA |
| Emitter cut-off current | I_{EBO} | $V_{EB} = -6\text{ V}, I_C = 0\text{ A}$ | — | — | -5 | |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C = -50\text{ mA}, I_B = 0\text{ A}$ | -80 | — | — | V |
| DC current gain | $h_{FE(1)}$ | $V_{CE} = -1\text{ V}, I_C = -1\text{ A}$ | 120 | — | 240 | — |
| | $h_{FE(2)}$ | $V_{CE} = -1\text{ V}, I_C = -6\text{ A}$ | 40 | — | — | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -6\text{ A}, I_B = -0.3\text{ A}$ | — | -0.19 | -0.4 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C = -6\text{ A}, I_B = -0.3\text{ A}$ | — | -0.9 | -1.2 | |

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

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|-------------------------------|-----------|---|-----|------|-----|---------------|
| Transition frequency | f_T | $V_{CE} = -5\text{ V}, I_C = -1\text{ A}$ | — | 50 | — | MHz |
| Collector output capacitance | C_{ob} | $V_{CB} = -10\text{ V}, I_E = 0\text{ A}, f = 1\text{ MHz}$ | — | 400 | — | pF |
| Switching time (turn-on time) | t_{on} | See Figure 5.2.1. | — | 0.3 | — | μs |
| Switching time (storage time) | t_{stg} | $V_{CC} \approx -30\text{ V}, R_L = 5\ \Omega,$ $-I_{B1} = I_{B2} = 0.3\text{ A},$ | — | 1.0 | — | |
| Switching time (fall time) | t_f | Duty cycle $\leq 1\%$ | — | 0.5 | — | |

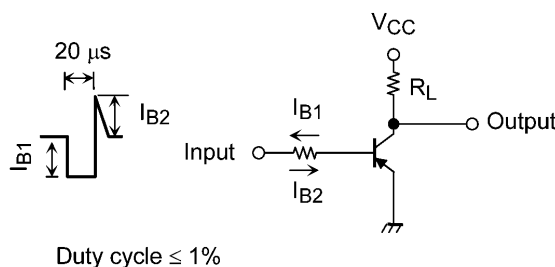


Fig. 5.2.1 Switching Time Test Circuit

6. Marking (Note)

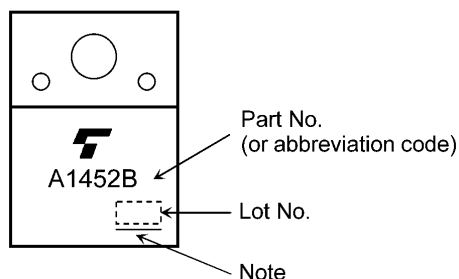


Fig. 6.1 Marking

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)

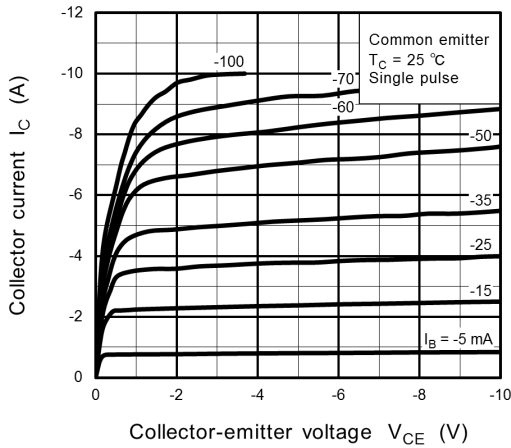


Fig. 7.1 $I_C - V_{CE}$

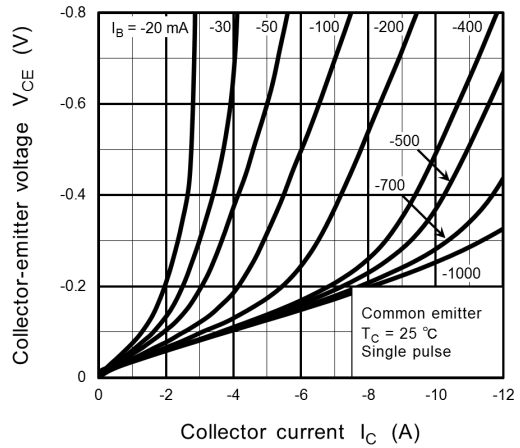


Fig. 7.2 $V_{CE} - I_C$

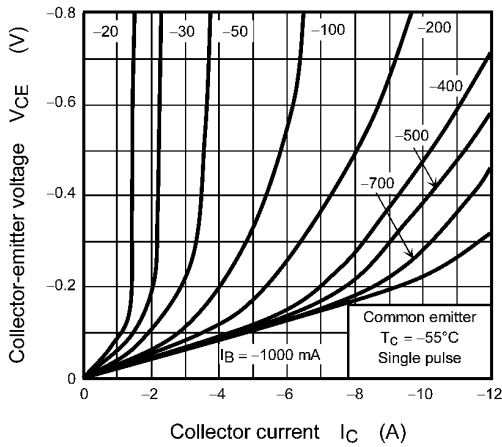


Fig. 7.3 $V_{CE} - I_C$

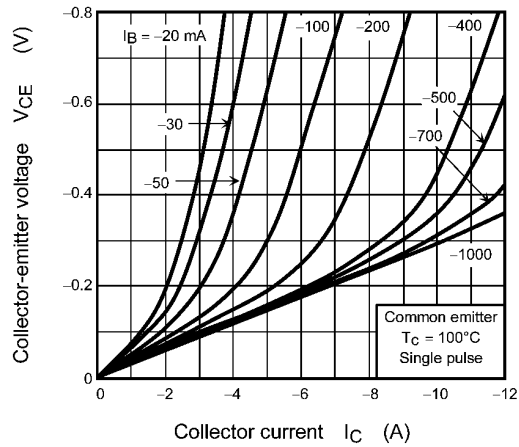


Fig. 7.4 $V_{CE} - I_C$

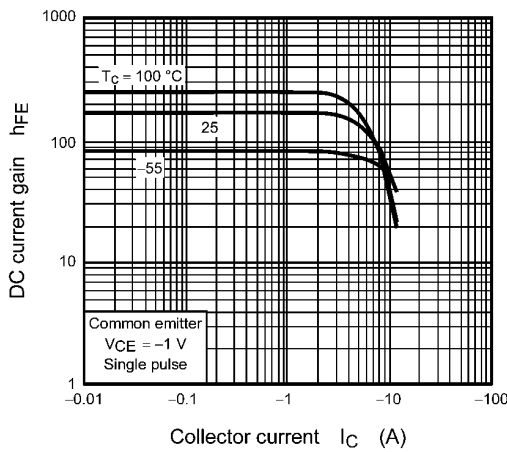


Fig. 7.5 $h_{FE} - I_C$

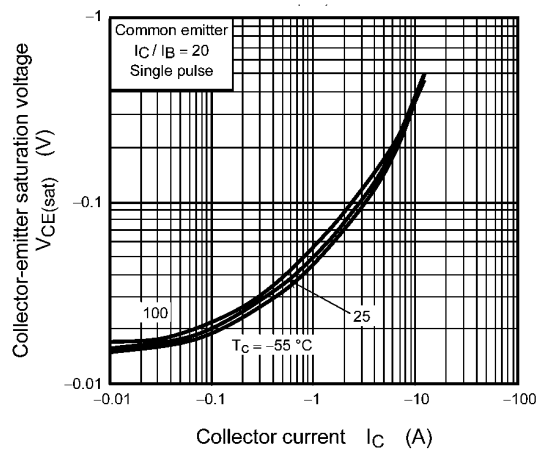


Fig. 7.6 $V_{CE(sat)} - I_C$

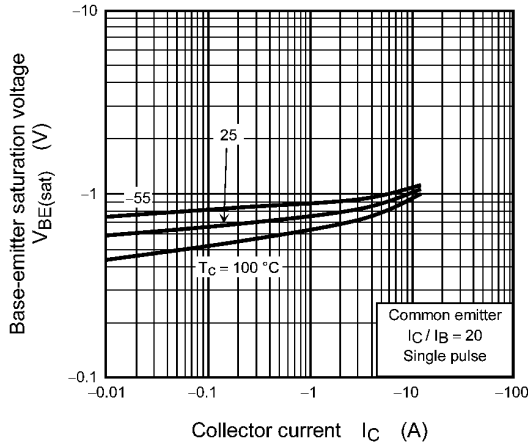


Fig. 7.7 $V_{BE(sat)} - I_C$

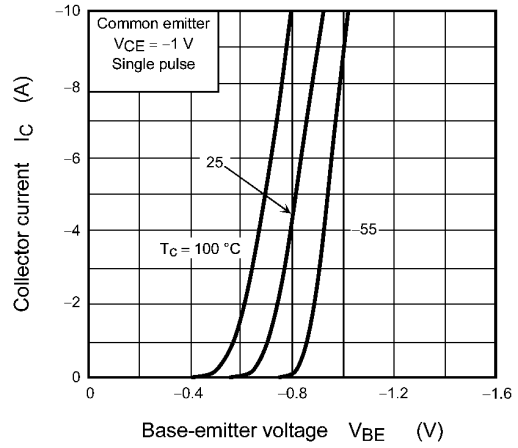


Fig. 7.8 $I_C - V_{BE}$

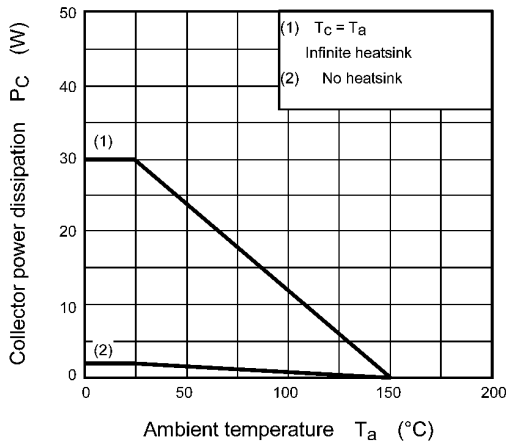
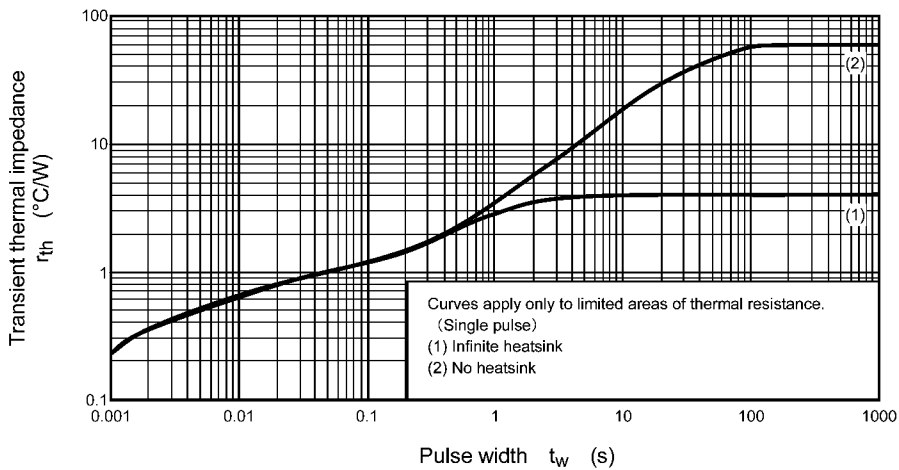


Fig. 7.9 $P_C - T_a$



**Fig. 7.10 $r_{th} - t_w$
(Guaranteed Maximum)**

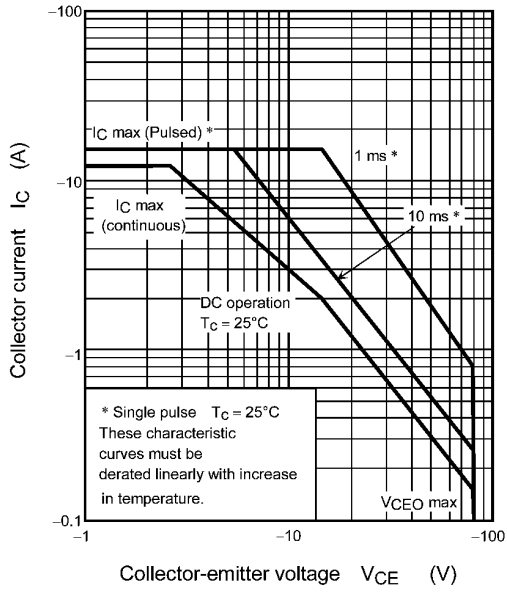
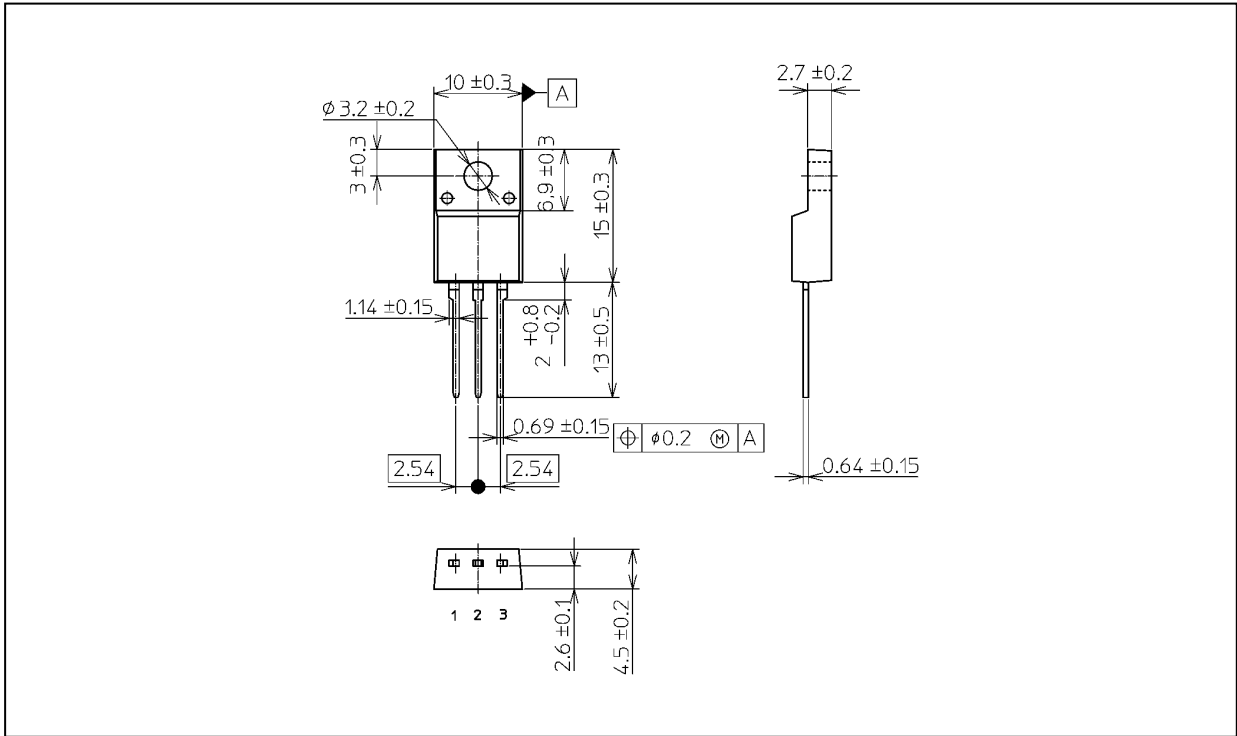


Fig. 7.11 Safe Operating Area (Guaranteed Maximum)

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

Package Dimensions

Unit: mm



Weight: 1.7 g (typ.)

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

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