

TOSHIBA Transistor Silicon NPN Triple Diffused Type

2SD2440

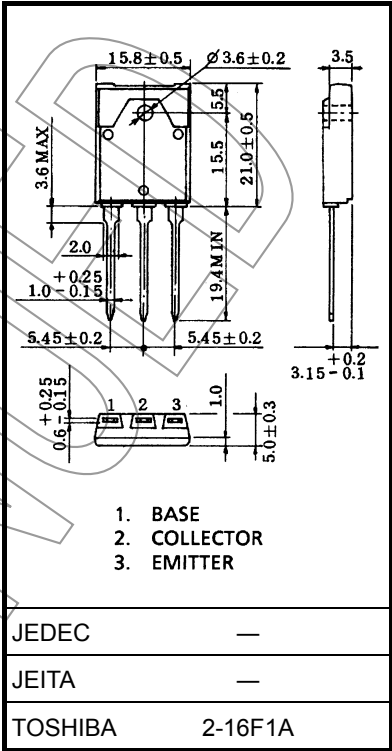
Switching Application

Unit: mm

- High breakdown voltage:  $V_{CBO} = 100\text{ V}$   
:  $V_{EBO} = 18\text{ V}$
- Low saturation voltage:  $V_{CE(sat)} = 1.2\text{ V (max)}$  ( $I_C = 5\text{ A}$ ,  $I_B = 1\text{ A}$ )
- High speed:  $t_f = 1\text{ }\mu\text{s (typ.)}$  ( $I_C = 5\text{ A}$ ,  $I_B = \pm 0.5\text{ A}$ )
- High DC current gain:  $h_{FE} = 200\text{ (min)}$  ( $V_{CE} = 5\text{ V}$ ,  $I_C = 0.5\text{ A}$ )

Absolute Maximum Ratings (Ta = 25°C)

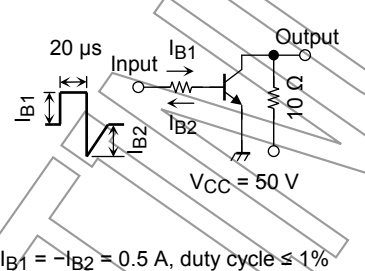
| Characteristics                            |       | Symbol    | Rating     | Unit |
|--|-------|-----------|------------|------|
| Collector-base voltage                     |       | $V_{CBO}$ | 100        | V    |
| Collector-emitter voltage                  |       | $V_{CEO}$ | 60         | V    |
| Emitter-base voltage                       |       | $V_{EBO}$ | 18         | V    |
| Collector current                          | DC    | $I_C$     | 6          | A    |
|  | Pulse | $I_{CP}$  | 12         |      |
| Base current                               |       | $I_B$     | 2          | A    |
| Collector power dissipation<br>(Tc = 25°C) |       | $P_C$     | 40         | W    |
| Junction temperature                       |       | $T_j$     | 150        | °C   |
| Storage temperature range                  |       | $T_{stg}$ | -55 to 150 | °C   |



Weight: 5.8 g (typ.)

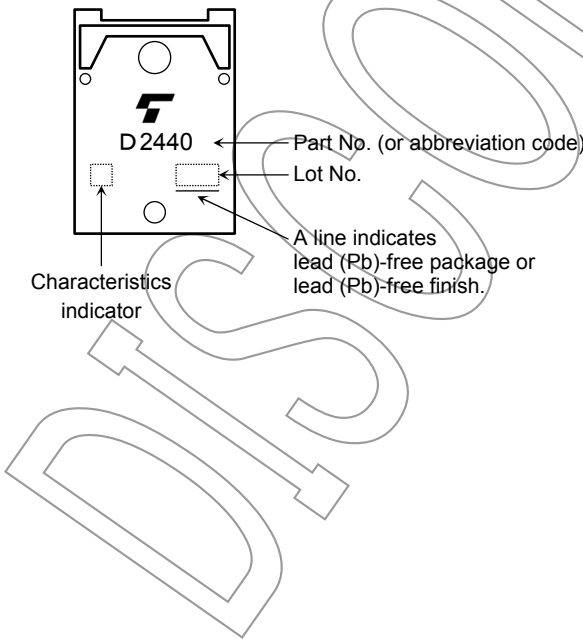
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

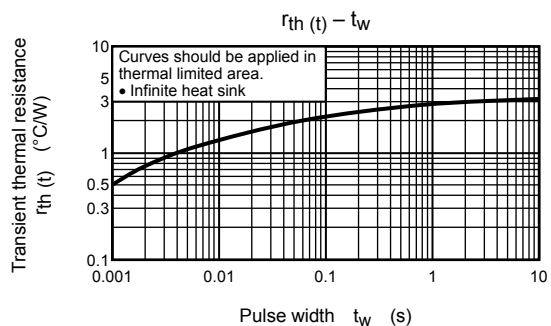
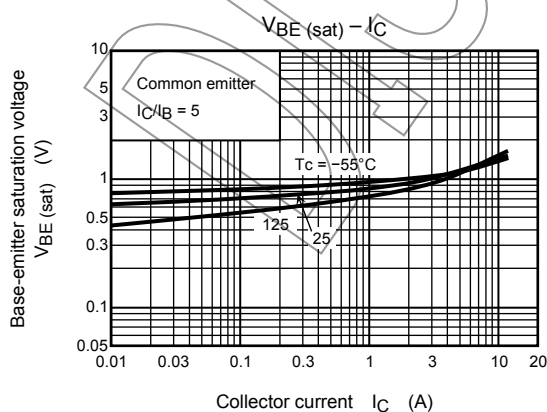
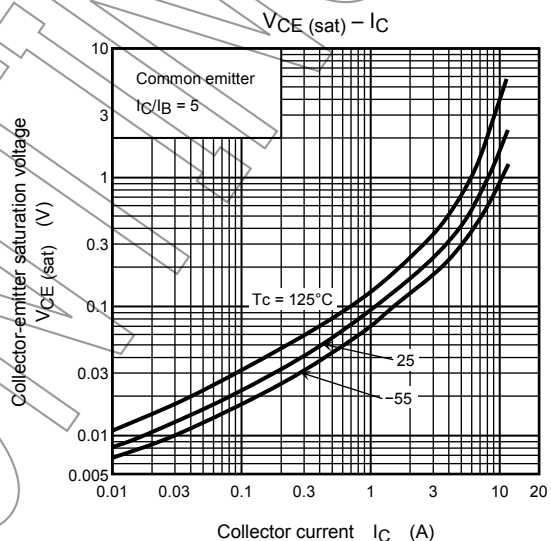
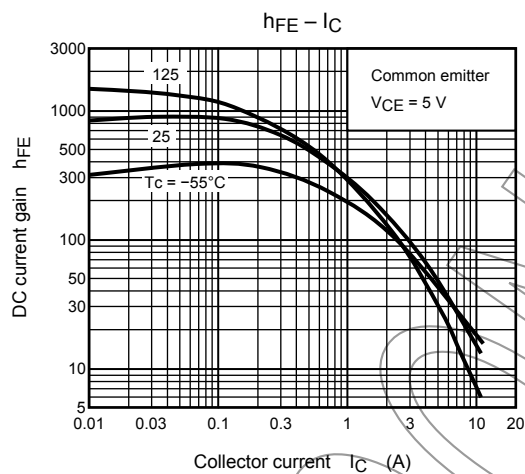
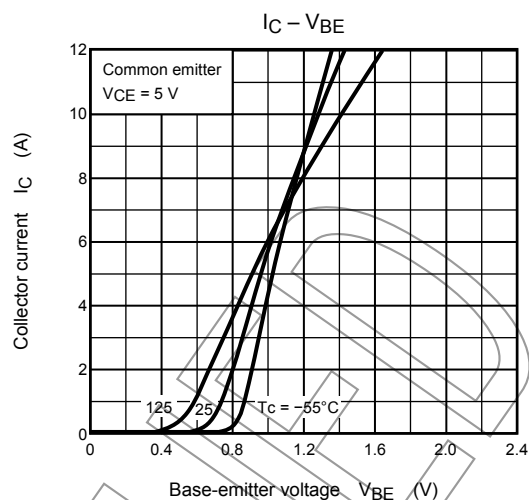
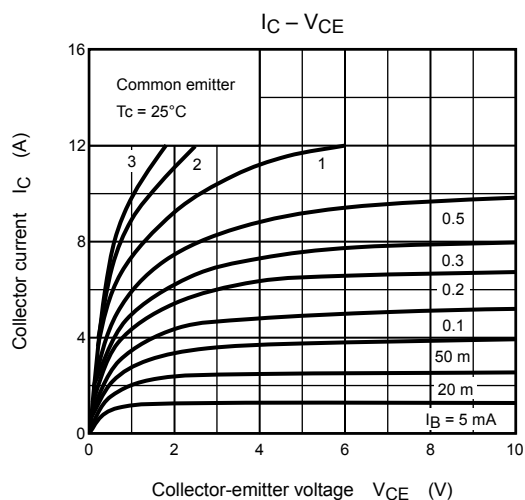
**Electrical Characteristics (Ta = 25°C)**

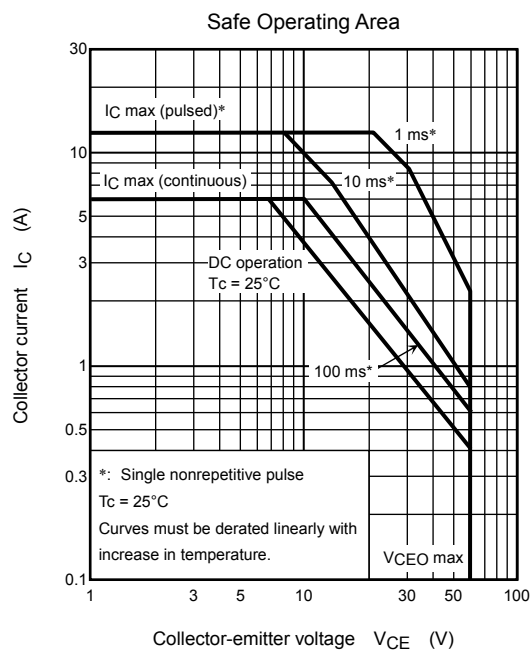
| Characteristics                      |                       | Symbol        | Test Condition  | Min | Typ. | Max | Unit          |
|--------------------------------------|-----------------------|---------------|---|-----|------|-----|---------------|
| Collector cut-off current            |                       | $I_{CBO}$     | $V_{CB} = 100\text{ V}, I_E = 0$  | —   | —    | 10  | $\mu\text{A}$ |
| Collector cut-off current            |                       | $I_{CER}$     | $V_{CE} = 80\text{ V}, R_{BE} = 50\ \Omega$   | —   | —    | 5   | $\text{mA}$   |
| Emitter cut-off current              |                       | $I_{EBO}$     | $V_{EB} = 15\text{ V}, I_C = 0$   | —   | —    | 2   | $\mu\text{A}$ |
| Collector-emitter breakdown voltage  |                       | $V_{(BR)CEO}$ | $I_C = 50\text{ mA}, I_B = 0$   | 60  | —    | —   | $\text{V}$    |
| DC current gain                      | $h_{FE(1)}$<br>(Note) |               | $V_{CE} = 5\text{ V}, I_C = 0.5\text{ A}$   | 200 | —    | 900 |               |
|                                      | $h_{FE(2)}$           |               | $V_{CE} = 5\text{ V}, I_C = 5\text{ A}$   | 20  | —    | 100 |               |
| Collector-emitter saturation voltage |                       | $V_{CE(sat)}$ | $I_C = 5\text{ A}, I_B = 1\text{ A}$  | —   | —    | 1.2 | $\text{V}$    |
| Base-emitter saturation voltage      |                       | $V_{BE(sat)}$ | $I_C = 5\text{ A}, I_B = 1\text{ A}$  | —   | —    | 2.5 | $\text{V}$    |
| Transition frequency                 |                       | $f_T$         | $V_{CE} = 10\text{ V}, I_C = 0.5\text{ A}$  | —   | 5    | —   | $\text{MHz}$  |
| Collector output capacitance         |                       | $C_{ob}$      | $V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$   | —   | 71   | —   | $\text{pF}$   |
| Switching time                       | Turn-on time          | $t_{on}$      |  <p><math>I_{B1} = -I_{B2} = 0.5\text{ A}, \text{duty cycle} \leq 1\%</math></p> | —   | 1    | 2   | $\mu\text{s}$ |
|                                      | Storage time          | $t_{stg}$     |   | —   | 2    | 4   |               |
|                                      | Fall time             | $t_f$         |   | —   | 1    | 3   |               |

Note:  $h_{FE(1)}$  classification GR: 200 to 400, BL: 300 to 600, V: 450 to 900

**Marking**







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20070701-EN

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