

TOSHIBA Transistor Silicon NPN Epitaxial Type (Darlington Power Transistor)

## 2SD2695

Micro Motor Drive, Hammer Drive Applications

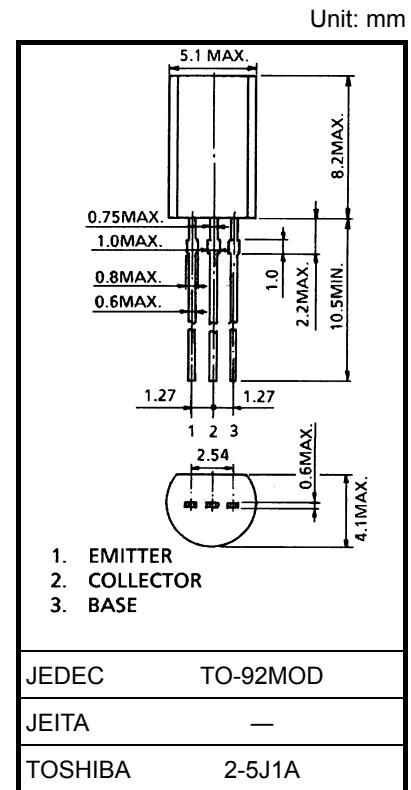
Switching Applications

Power Amplifier Applications

- High DC current gain:  $h_{FE} = 2000$  (min) ( $V_{CE} = 2\text{ V}$ ,  $I_C = 1\text{ A}$ )
- Low saturation voltage:  $V_{CE(sat)} = 1.5\text{ V}$  (max) ( $I_C = 1\text{ A}$ ,  $I_B = 1\text{ mA}$ )
- Zener diode included between collector and base

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

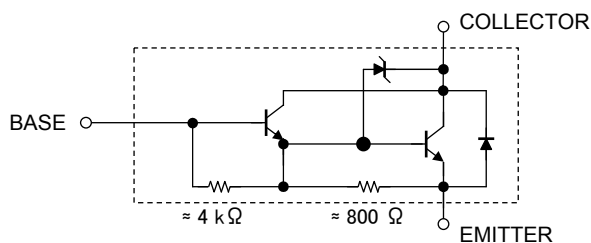
| Characteristics             | Symbol    | Rating      | Unit             |
|-----------------------------|-----------|-------------|------------------|
| Collector-base voltage      | $V_{CBO}$ | 50          | V                |
| Collector-emitter voltage   | $V_{CEO}$ | $60 \pm 10$ | V                |
| Emitter-base voltage        | $V_{EBO}$ | 8           | V                |
| Collector current           | $I_C$     | 2           | A                |
| Base current                | $I_B$     | 0.5         | A                |
| Collector power dissipation | $P_C$     | 0.9         | W                |
| Junction temperature        | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage temperature range   | $T_{stg}$ | -55 to 150  | $^\circ\text{C}$ |



Weight: 0.36 g (typ.)

Note1: 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).

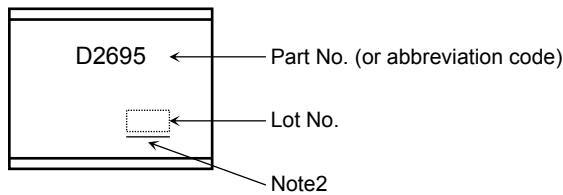
### Equivalent Circuit



## Electrical Characteristics (Ta = 25°C)

| Characteristics                      |              | Symbol         | Test Condition   | Min   | Typ. | Max | Unit          |
|--------------------------------------|--------------|----------------|--|---|------|-----|---------------|
| Collector cut-off current            |              | $I_{CBO}$      | $V_{CB} = 45\text{ V}, I_E = 0$                                | —   | —    | 10  | $\mu\text{A}$ |
| Emitter cut-off current              |              | $I_{EBO}$      | $V_{EB} = 8\text{ V}, I_C = 0$                                 | —   | —    | 4   | $\text{mA}$   |
| Collector-emitter breakdown voltage  |              | $V_{(BR) CEO}$ | $I_C = 10\text{ mA}, I_B = 0$                                  | 50  | 60   | 70  | $\text{V}$    |
| DC current gain                      |              | $h_{FE}$       | $V_{CE} = 2\text{ V}, I_C = 1\text{ A (pulsed)}$               | 2000  | —    | —   |               |
| Collector-emitter saturation voltage |              | $V_{CE (sat)}$ | $I_C = 1\text{ A}, I_B = 1\text{ mA (pulsed)}$                 | —   | —    | 1.5 | $\text{V}$    |
| Base-emitter saturation voltage      |              | $V_{BE (sat)}$ | $I_C = 1\text{ A}, I_B = 1\text{ mA (pulsed)}$                 | —   | —    | 2.0 | $\text{V}$    |
| Transition frequency                 |              | $f_T$          | $V_{CE} = 2\text{ V}, I_C = 0.5\text{ A (pulsed)}$             | —   | 100  | —   | $\text{MHz}$  |
| Collector output capacitance         |              | $C_{ob}$       | $V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$              | —   | 20   | —   | $\text{pF}$   |
| Unclamped inductive load energy      |              | $E_{S/B}$      | $L = 10\text{ mH}, I_C = 2.0\text{ A}, I_B = \pm 50\text{ mA}$ | 20  | —    | —   | $\text{mJ}$   |
| Switching time                       | Turn-on time | $t_{on}$       |  | —   | 0.4  | —   | $\mu\text{s}$ |
|                                      | Storage time | $t_{stg}$      |  | —   | 4.0  | —   |               |
|                                      | Fall time    | $t_f$          |  | $I_{B1} = 1\text{ mA}, I_{B2} = 1\text{ mA}$<br>duty cycle $\leq 1\%$ | —    | 0.6 |               |

## Marking

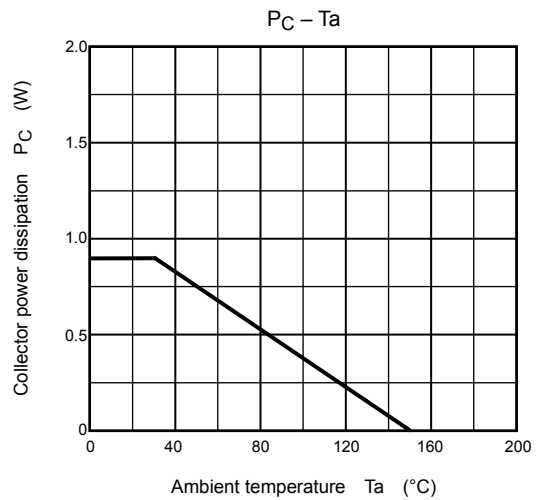
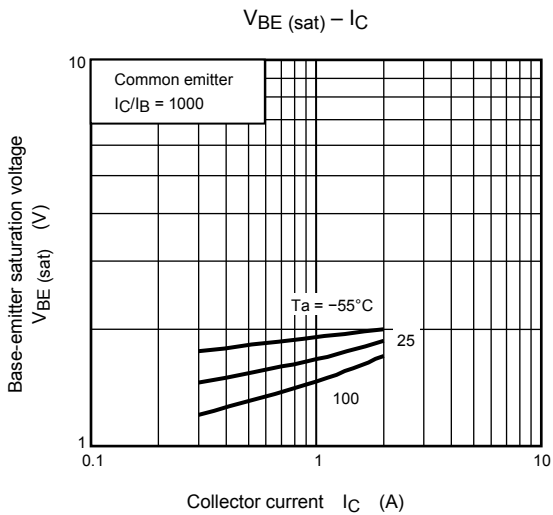
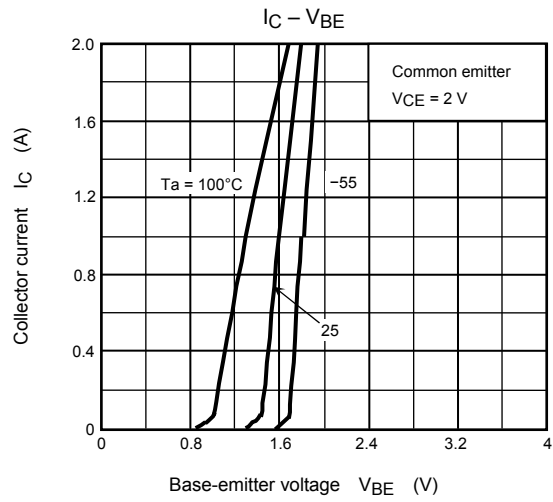
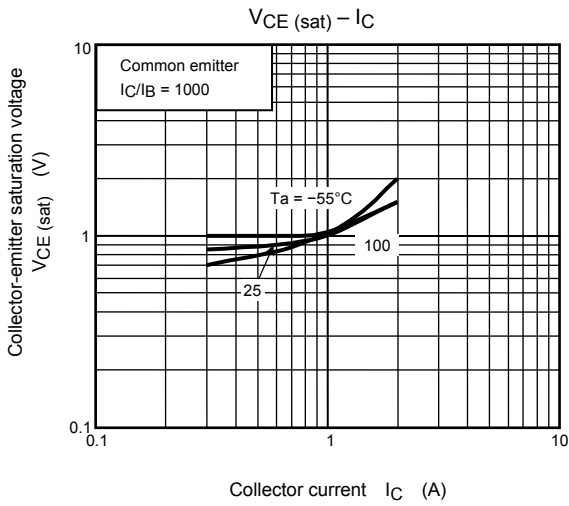
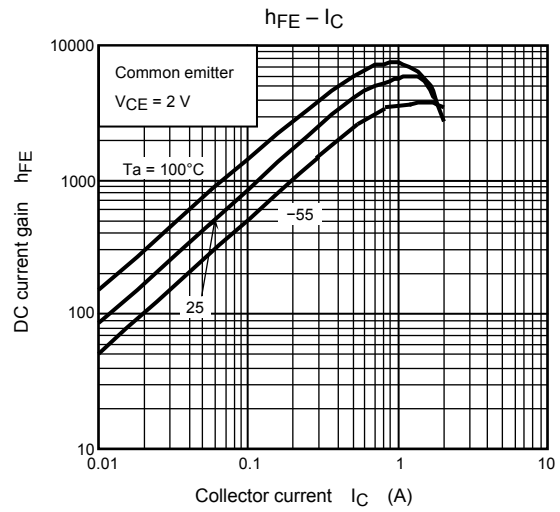
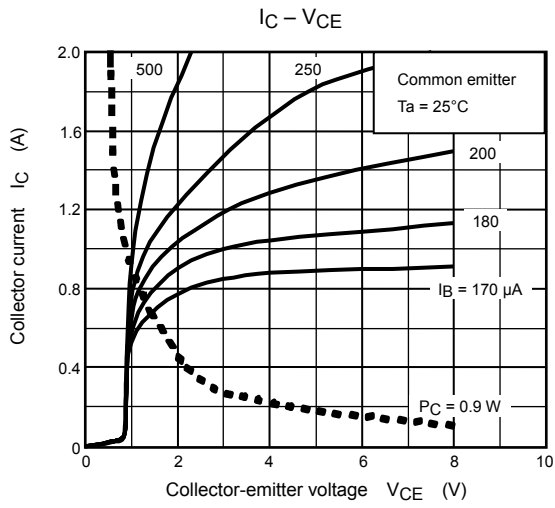


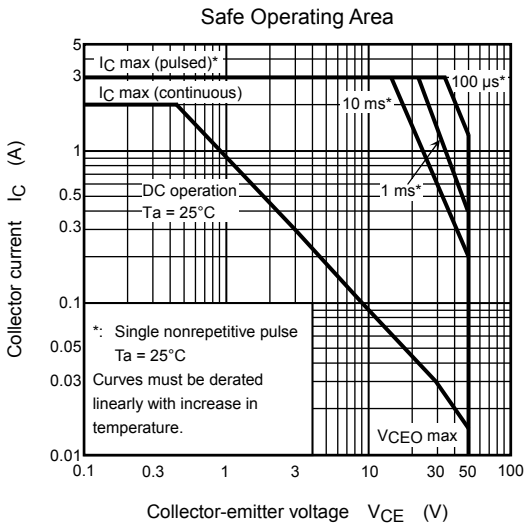
Note2: A line under a Lot No. identifies the indication of product Labels.

Not underlined:  $[[\text{Pb}]]/\text{INCLUDES} > \text{MCV}$

Underlined:  $[[\text{G}]]/\text{RoHS COMPATIBLE}$  or  $[[\text{G}]]/\text{RoHS} [[\text{Pb}]]$

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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