

# Digital transistors (built in resistor)

## DTB143TK / DTB143TS

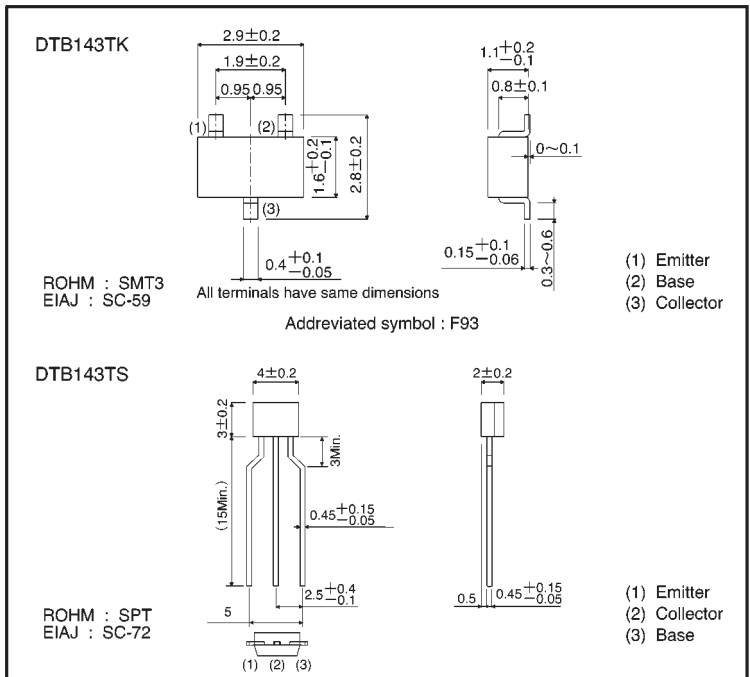
●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- 2) The bias resistors consist of thin-film resistors with complete isolation to allow positive biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- 3) Only the on / off conditions need to be set for operation, making device design easy.

●Structure

PNP digital transistor  
(Built-in resistor type)

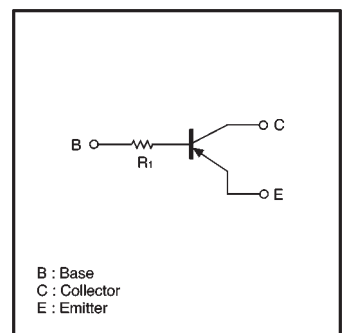
●External dimensions (Units: mm)



●Absolute maximum ratings (Ta = 25°C)

| Parameter                   | Symbol           | Limits(DTB143T□) |     | Unit |
|-----------------------------|------------------|------------------|-----|------|
|                             |                  | K                | S   |      |
| Collector-base voltage      | V <sub>CB0</sub> | -50              |     | V    |
| Collector-emitter voltage   | V <sub>CE0</sub> | -40              |     | V    |
| Emitter-base voltage        | V <sub>EB0</sub> | -5               |     | V    |
| Collector current           | I <sub>c</sub>   | -500             |     | mA   |
| Collector power dissipation | P <sub>c</sub>   | 200              | 300 | mW   |
| Junction temperature        | T <sub>j</sub>   | 150              |     | °C   |
| Storage temperature         | T <sub>stg</sub> | -55~+150         |     | °C   |

●Equivalent circuit



●Electrical characteristics (Ta = 25°C)

| Parameter                            | Symbol               | Min. | Typ. | Max. | Unit | Conditions  |
|--------------------------------------|----------------------|------|------|------|------|---|
| Collector-base breakdown voltage     | BV <sub>CBO</sub>    | -50  | —    | —    | V    | I <sub>C</sub> = -50 μA                                     |
| Collector-emitter breakdown voltage  | BV <sub>CEO</sub>    | -40  | —    | —    | V    | I <sub>C</sub> = -1mA                                       |
| Emitter-base breakdown voltage       | BV <sub>EBO</sub>    | -5   | —    | —    | V    | I <sub>E</sub> = -50 μA                                     |
| Collector cutoff current             | I <sub>CBO</sub>     | —    | —    | -0.5 | μA   | V <sub>CB</sub> = -50V                                      |
| Emitter cutoff current               | I <sub>EBO</sub>     | —    | —    | -0.5 | μA   | V <sub>EB</sub> = -4V                                       |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | —    | —    | -0.3 | V    | I <sub>C</sub> /I <sub>B</sub> = -50mA/-2.5mA               |
| DC current transfer ratio            | h <sub>FE</sub>      | 100  | 250  | 600  | —    | V <sub>CE</sub> = -5V, I <sub>C</sub> = -50mA               |
| Input resistance                     | R <sub>i</sub>       | 3.29 | 4.7  | 6.11 | kΩ   | —   |
| Transition frequency                 | f <sub>t</sub>       | —    | 200  | —    | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = 50mA, f = 100MHz * |

\* Transition frequency of the device

●Packaging specifications

| Part No. | Package                      | SMT3   | SPT    |
|----------|------------------------------|--------|--------|
|          | Packaging type               | Taping | Taping |
|          | Code                         | T146   | TP     |
|          | Basic ordering unit (pieces) | 3000   | 5000   |
| DTB143TK |                              | ○      | —      |
| DTB143TS |                              | —      | ○      |

●Electrical characteristic curves

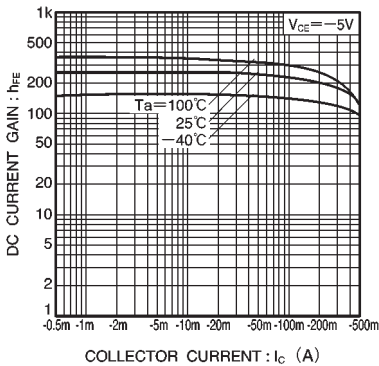


Fig.1 DC current gain vs. collector current

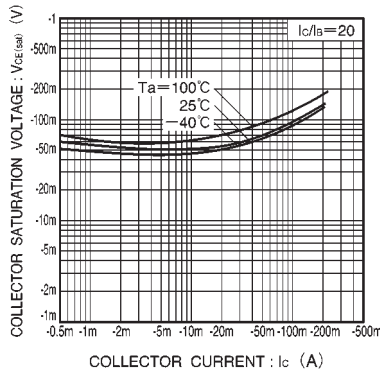


Fig.2 Collector-emitter saturation voltage vs. collector current