

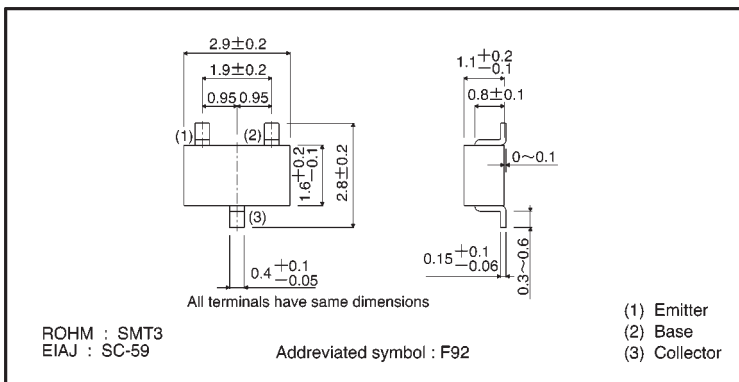
# Digital transistors (built in resistor)

## DTB123TK

### ●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.
- 4) Higher mounting densities can be achieved.

### ●External dimensions (Units: mm)



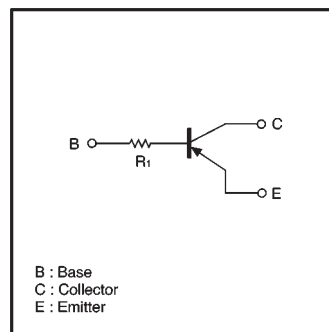
### ●Structure

PNP digital transistor  
(Built-in resistor type)

### ●Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )

| Parameter                   | Symbol    | Limits   | Unit             |
|-----------------------------|-----------|----------|------------------|
| Collector-base voltage      | $V_{CBO}$ | -50      | V                |
| Collector-emitter voltage   | $V_{CEO}$ | -40      | V                |
| Emitter-base voltage        | $V_{EBO}$ | -5       | V                |
| Collector current           | $I_c$     | -500     | mA               |
| Collector power dissipation | $P_c$     | 200      | mW               |
| Junction temperature        | $T_j$     | 150      | $^\circ\text{C}$ |
| Storage temperature         | $T_{stg}$ | -55~+150 | $^\circ\text{C}$ |

### ●Equivalent circuit



●Electrical characteristics (Ta = 25°C)

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit       | Conditions                                |
|--------------------------------------|---------------|------|------|------|------------|---|
| Collector-base breakdown voltage     | $BV_{CBO}$    | -50  | —    | —    | V          | $I_C = -50 \mu A$                         |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | -40  | —    | —    | V          | $I_C = -1mA$                              |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | -5   | —    | —    | V          | $I_E = -50 \mu A$                         |
| Collector cutoff current             | $I_{CBO}$     | —    | —    | -0.5 | $\mu A$    | $V_{CB} = -50V$                           |
| Emitter cutoff current               | $I_{EBO}$     | —    | —    | -0.5 | $\mu A$    | $V_{EB} = -4V$                            |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | —    | —    | -0.3 | V          | $I_C/I_B = -50mA/-2.5mA$                  |
| DC current transfer ratio            | $h_{FE}$      | 100  | 250  | 600  | —          | $V_{CE} = -5V, I_C = -50mA$               |
| Input resistance                     | $R_i$         | 1.54 | 2.2  | 2.86 | k $\Omega$ |   |
| Transition frequency                 | $f_T$         | —    | 200  | —    | MHz        | $V_{CE} = -10V, I_E = 50mA, f = 100MHz$ * |

\* Transition frequency of the device

●Packaging specifications

|          |                              |        |
|----------|------------------------------|--------|
| Part No. | Package                      | SMT3   |
|          | Packaging type               | Taping |
|          | Code                         | T146   |
|          | Basic ordering unit (pieces) | 3000   |
| DTB123TK |                              | ○      |

●Electrical characteristic curves

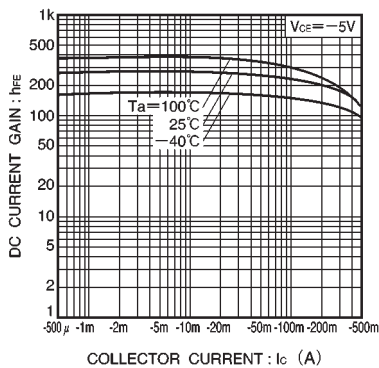


Fig.1 DC current gain vs. collector current

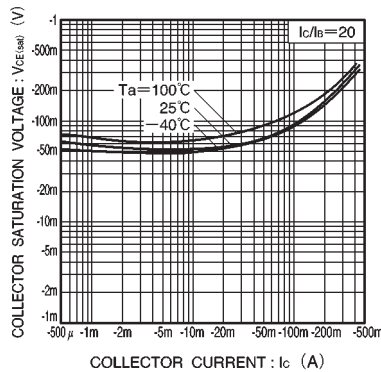


Fig.2 Collector-emitter saturation voltage vs. collector current

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