

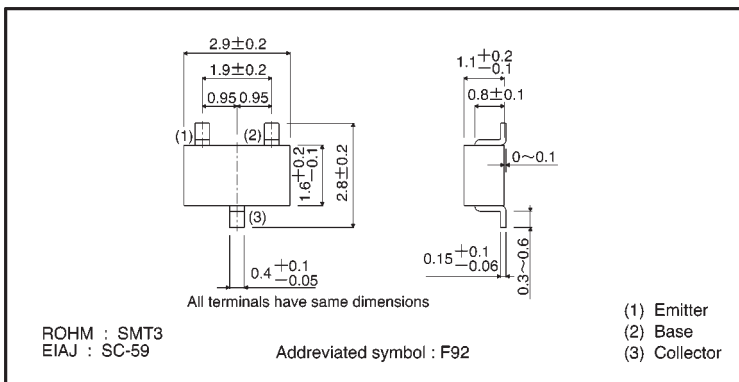
# Digital transistors (built in resistor)

## 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)



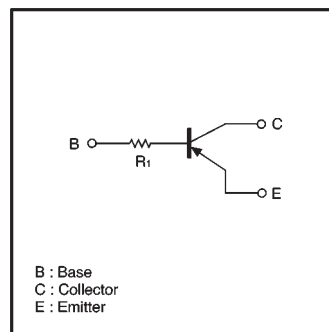
### ●Structure

PNP digital transistor  
(Built-in resistor type)

### ●Absolute maximum ratings (Ta = 25°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	°C
Storage temperature	$T_{stg}$	-55~+150	°C

### ●Equivalent circuit



●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CB0</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>	1.54	2.2	2.86	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
	Packaging type	Taping
	Code	T146
	Basic ordering unit (pieces)	3000
DTB123TK		○

●Electrical characteristic curves

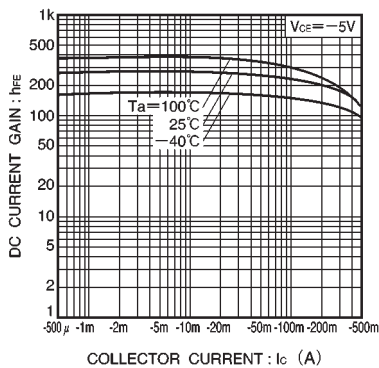


Fig.1 DC current gain vs. collector current

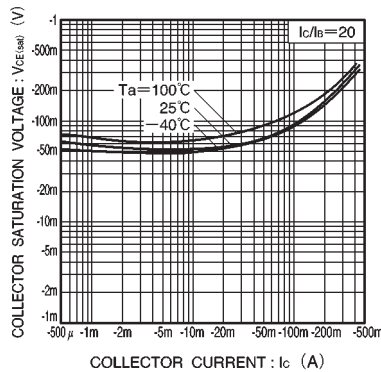


Fig.2 Collector-emitter saturation voltage vs. collector current