

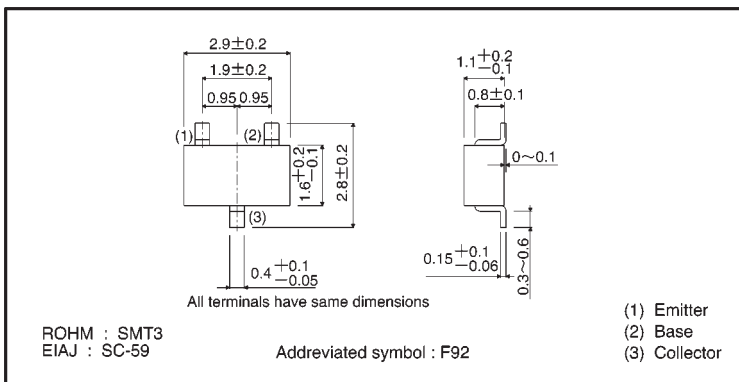
# Digital transistors (built in resistor)

## 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)



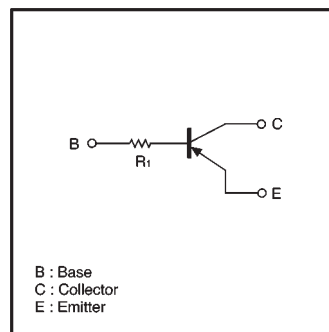
### ●Structure

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	$BV_{CBO}$	-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

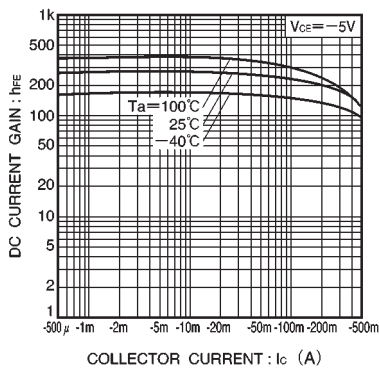


Fig.1 DC current gain vs. collector current

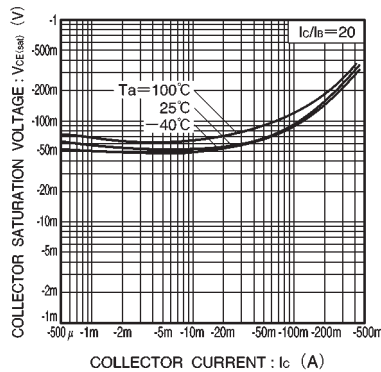


Fig.2 Collector-emitter saturation voltage vs. collector current