Digital transistors (built-in resistor)

DTD123TK / DTD123TS

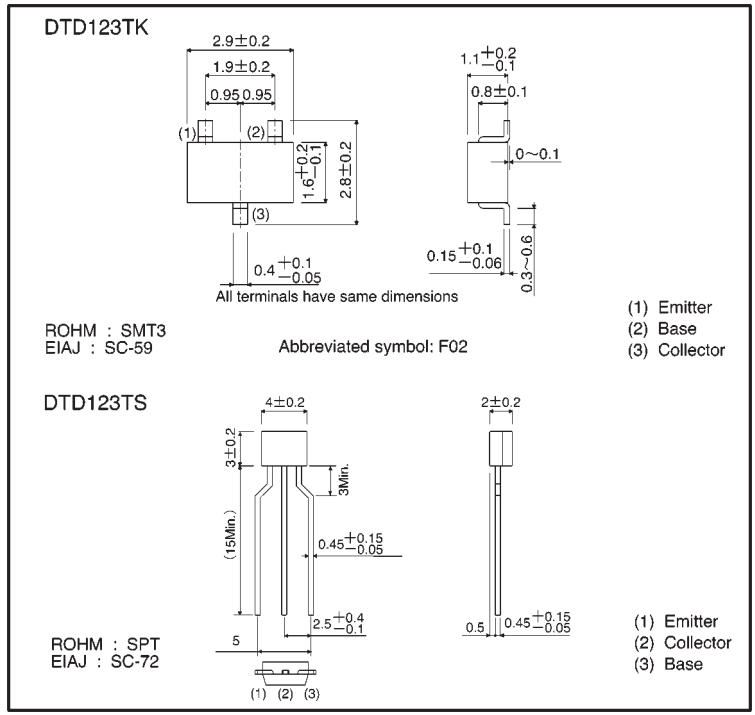
●Features

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 negative 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

NPN digital transistor
(Built-in resistor type)

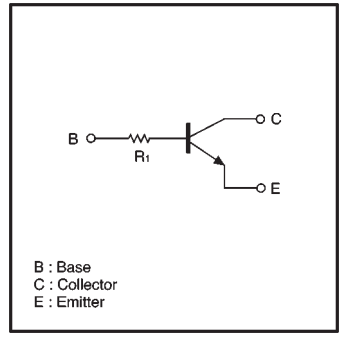
●External dimensions (Units: mm)



●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits(DTD123T□)		Unit
		K	S	
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	300	mW
Junction temperature	Tj	150		℃
Storage temperature	Tstg	−55~+150		℃

●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 μA
Collector-emitter breakdown voltage	BV_{CEO}	40	—	—	V	I_C=1mA
Emitter-base breakdown voltage	BV_{EBO}	5	—	—	V	I_E=50 μA
Collector cutoff current	I_{CBO}	—	—	0.5	μA	V_{CB}=50V
Emitter cutoff current	I_{EBO}	—	—	0.5	μA	V_{EB}=4V
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	—	0.3	V	I_C/I_B=50m/2.5mA
DC current transfer ratio	h_{FE}	100	250	600	—	V_{CE}=5V, I_C=50mA
Input resistance	R_1	1.54	2.2	2.86	kΩ	—
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	SPT
	Packaging type	Taping	Taping
	Code	T146	TP
	Basic ordering unit (pieces)	3000	5000
DTD123TK		○	—
DTD123TS		—	○

●Electrical characteristic curves

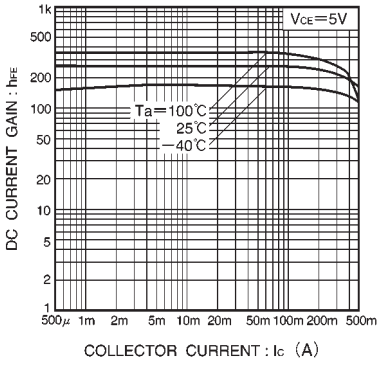


Fig.1 DC current gain vs. collector current

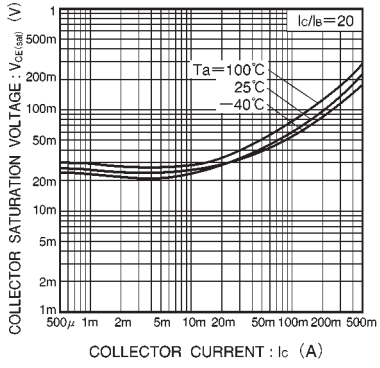


Fig.2 Collector-emitter saturation voltage vs. collector current

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