500mA / 40V Digital transistors (with built-in resistors)

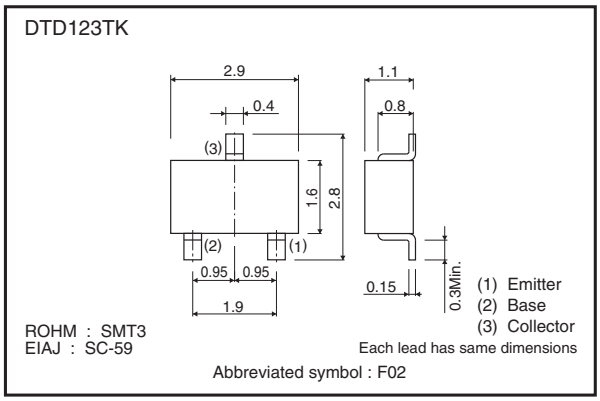
DTD123TK

● Applications
Inverter, Interface, Driver

● 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 the device design easy.

● Structure
NPN epitaxial planar silicon transistor
(Resistor built-in type)

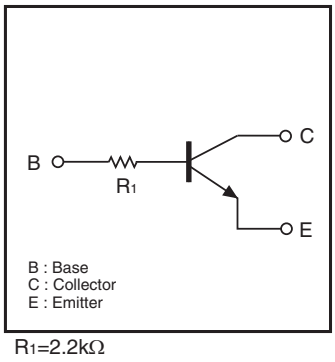
● Dimensions (Unit : mm)



● Packaging specifications

Part No.	Package	SMT3
	Packaging type	Taping
	Code	T146
	Basic ordering unit (pieces)	3000
DTD123TK		○

● Inner circuit



R1=2.2kΩ

● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
		DTD123TK	
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	Tj	150	°C
Storage temperature	Tstg	−55 to +150	°C

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● Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	50	–	–	V	I_C=50μA
Collector-emitter breakdown voltage	BV_{CEO}	40	–	–	V	I_C=1mA
Emitter-base breakdown voltage	BV_{EBO}	5	–	–	V	I_E=50μA
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

* Characteristics of built-in transistor

● Electrical characteristic curves

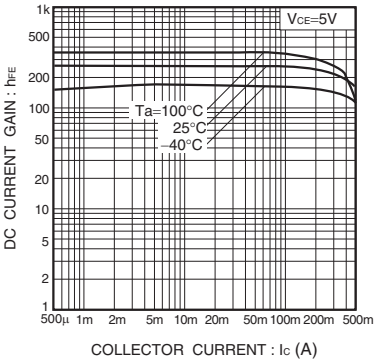

Fig.1 DC current gain vs. collector current

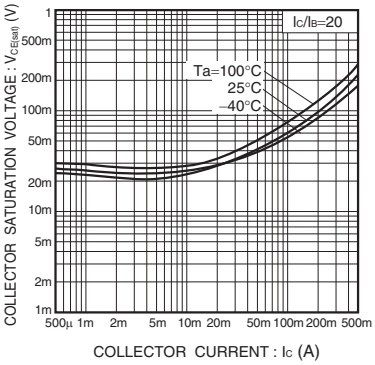

Fig.2 Collector-emitter saturation voltage vs. collector current

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