

# 100mA / 50V Digital transistors (with built-in resistors)

DTC143TM / DTC143TE / DTC143TUA / DTC143TKA

## ● Applications

Inverter, Interface, Driver

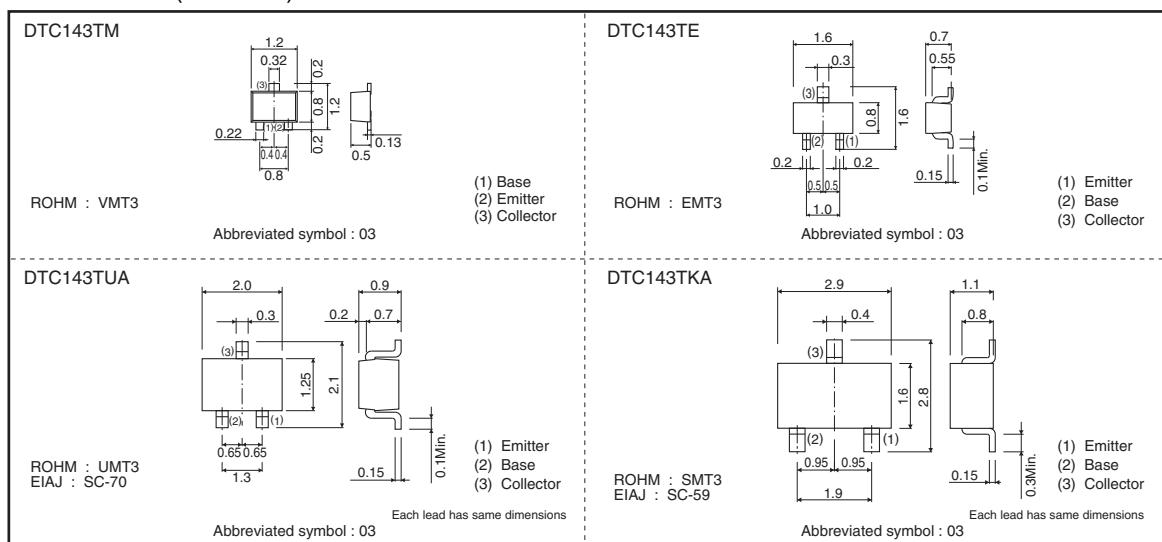
## ● Features

- 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.

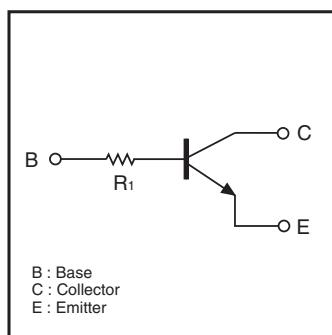
## ● Structure

PNP epitaxial planar silicon transistor (Resistor built-in type)

## ● Dimensions (Unit : mm)



## ● Inner circuit



$R_1 = 4.7\text{k}\Omega$

### ● Packaging specifications

Part No.	Package	VMT3	EMT3	UMT3	SMT3
	Packaging type	Taping	Taping	Taping	Taping
	Code	T2L	TL	T106	T146
	Basic ordering unit (pieces)	8000	3000	3000	3000
DTC143TM	○	—	—	—	—
DTC143TE	—	○	—	—	—
DTC143TUA	—	—	○	—	—
DTC143TKA	—	—	—	—	○

### ● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits				Unit
		DTC143TM	DTC143TE	DTC143TUA	DTC143TKA	
Collector-base voltage	V <sub>CBO</sub>		50			V
Collector-emitter voltage	V <sub>C EO</sub>		50			V
Emitter-base voltage	V <sub>EBO</sub>		5			V
Collector current	I <sub>C</sub>		100			mA
Collector power dissipation	P <sub>C</sub>	150		200		mW
Junction temperature	T <sub>j</sub>		150			°C
Storage temperature	T <sub>stg</sub>		−55 to +150			°C

### ● Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> =50μA
Collector-emitter breakdown voltage	BV <sub>C EO</sub>	50	—	—	V	I <sub>C</sub> =1mA
Emitter-base breakdown voltage	BV <sub>EBO</sub>	5	—	—	V	I <sub>E</sub> =50μA
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> =5mA/0.25mA
DC current transfer ratio	h <sub>FE</sub>	100	250	600	—	I <sub>C</sub> =1mA, V <sub>CE</sub> =5V
Input resistance	R <sub>I</sub>	3.29	4.7	6.11	kΩ	—
Transition frequency	f <sub>T</sub> *	—	250	—	MHz	V <sub>CE</sub> =10V, I <sub>E</sub> =5mA, f=100MHz

\* Characteristics of built-in transistor

### ● Electrical characteristic curves

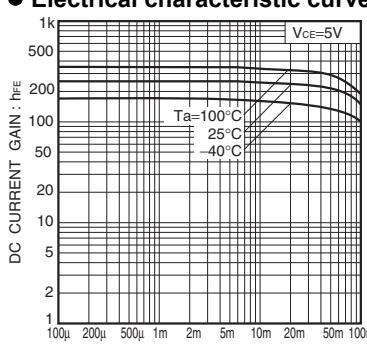


Fig.1 DC current gain vs. collector current

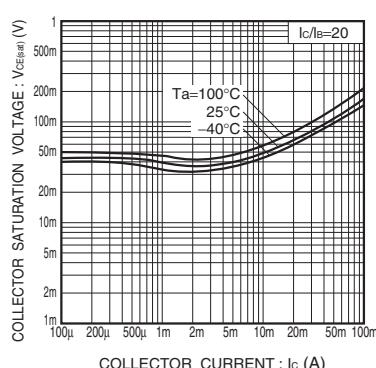


Fig.2 Collector-emitter saturation voltage vs. collector current

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