

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

DTC143TM / DTC143TE / DTC143TUA / DTC143TKA

## ● Applications

Inverter, Interface, Driver

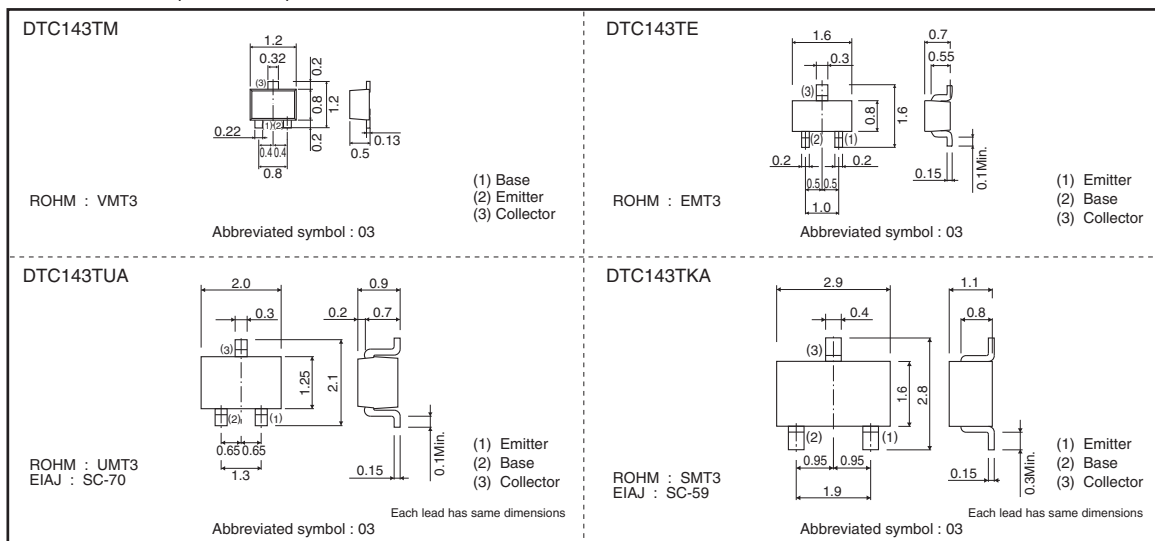
## ● Features

- 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.

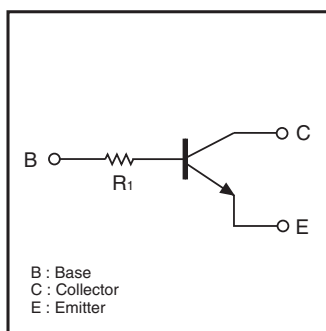
## ● Structure

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

## ● Dimensions (Unit : mm)



## ● Inner circuit



$R_1 = 4.7k\Omega$

## ● 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>CEO</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	$BV_{CBO}$	50	—	—	V	$I_C=50\mu A$
Collector-emitter breakdown voltage	$BV_{CEO}$	50	—	—	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	$I_C/I_B=5mA/0.25mA$
DC current transfer ratio	$h_{FE}$	100	250	600	—	$I_C=1mA, V_{CE}=5V$
Input resistance	$R_i$	3.29	4.7	6.11	k $\Omega$	—
Transition frequency	$f_T$ *	—	250	—	MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$

\* Characteristics of built-in transistor

## ● Electrical characteristic curves

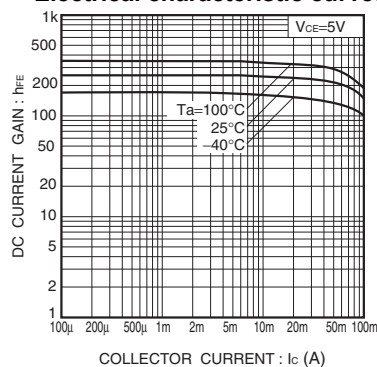


Fig.1 DC current gain vs. collector current

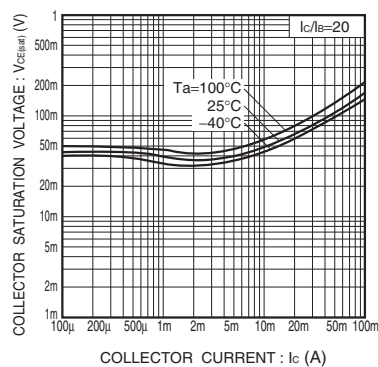


Fig.2 Collector-emitter saturation voltage vs. collector current

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