

# Digital transistors (built-in resistors)

## DTC143EE / DTC143EUA / DTC143EKA DTC143ESA

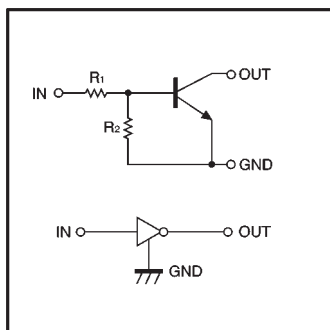
### ●Features

- 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

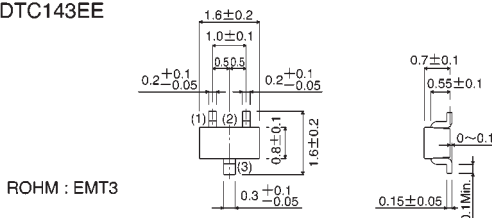
NPN digital transistor  
(Built-in resistor type)

### ●Equivalent circuit



### ●External dimensions (Units: mm)

#### DTC143EE

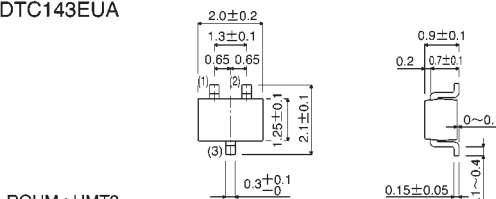


ROHM : EMT3

Abbreviated symbol : 23

(1) GND  
(2) IN  
(3) OUT

#### DTC143EUA



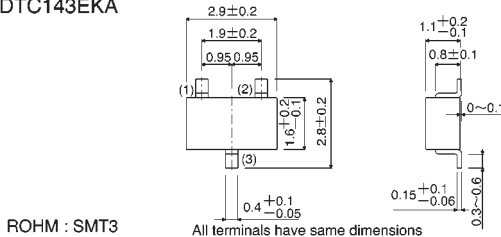
ROHM : UMT3  
EIAJ : SC-70

All terminals have same dimensions

Abbreviated symbol : 23

(1) GND  
(2) IN  
(3) OUT

#### DTC143EKA



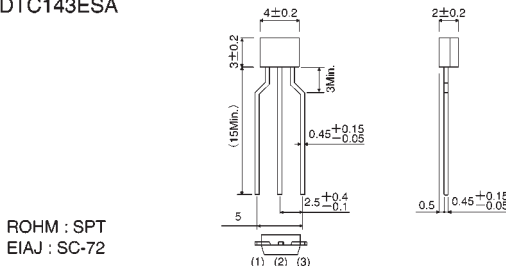
ROHM : SMT3  
EIAJ : SC-59

All terminals have same dimensions

Abbreviated symbol : 23

(1) GND  
(2) IN  
(3) OUT

#### DTC143ESA



ROHM : SPT  
EIAJ : SC-72

(1) GND  
(2) OUT  
(3) IN

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits (DTC143E□)				Unit
		E	UA	KA	SA	
Supply voltage	V <sub>CC</sub>	50				V
Input voltage	V <sub>IN</sub>	-10~+30				V
Output current	I <sub>o</sub>	100				mA
	I <sub>C(Max.)</sub>	100				
Power dissipation	P <sub>d</sub>	150	200		300	mW
Junction temperature	T <sub>j</sub>	150				°C
Storage temperature	T <sub>stg</sub>	-55~+150				°C

●Electrical characteristics (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	—	—	0.5	V	V <sub>CC</sub> =5V, I <sub>O</sub> =100 μA
	V <sub>I(on)</sub>	3	—	—		V <sub>O</sub> =0.3V, I <sub>O</sub> =20mA
Output voltage	V <sub>O(on)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> =10mA/0.5mA
Input current	I <sub>I</sub>	—	—	1.8	mA	V <sub>I</sub> =5V
Output current	I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> =50V, V <sub>I</sub> =0V
DC current gain	G <sub>I</sub>	20	—	—	—	V <sub>O</sub> =5V, I <sub>O</sub> =10mA
Input resistance	R <sub>I</sub>	3.29	4.7	6.11	kΩ	—
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	—	—
Transition frequency	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> =10V, I <sub>E</sub> =-5mA, f=100MHz *

\* Transition frequency of the device

●Packaging specifications

Part No.	Package	EMT3	UMT3	SMT3	SPT
	Packaging type	Taping	Taping	Taping	Taping
	Code	TL	T106	T146	TP
	Basic ordering unit (pieces)	3000	3000	3000	5000
DTC143EE		○	—	—	—
DTC143EUA		—	○	—	—
DTC143EKA		—	—	○	—
DTC143ESA		—	—	—	○

● Electrical characteristic curves

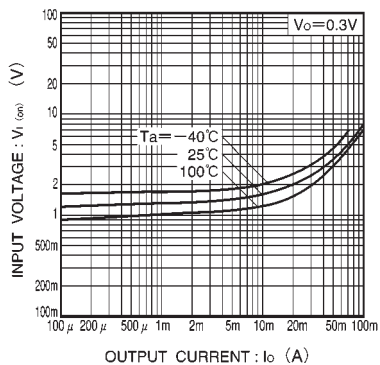


Fig.1 Input voltage vs. output current (ON characteristics)

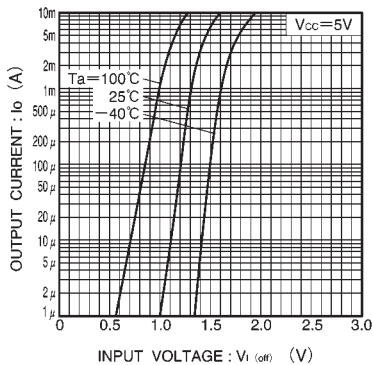


Fig.2 Output current vs. input voltage (OFF characteristics)

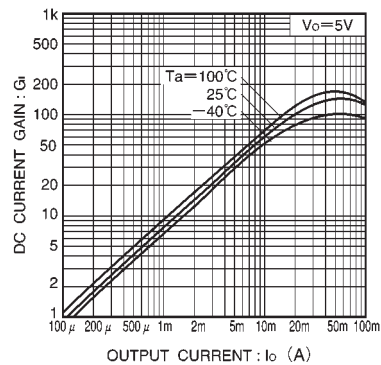


Fig.3 DC current gain vs. output current

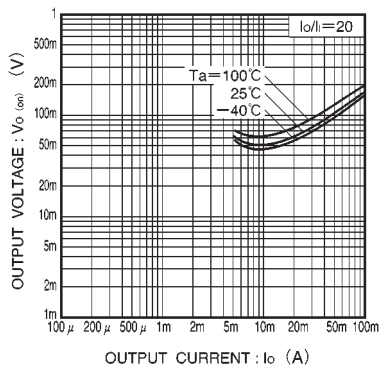


Fig.4 Output voltage vs. output current