

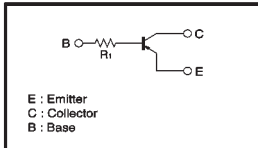
# Digital transistor (built-in resistor)

## DTB114TK

### ●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors.
- 2) The bias resistors consist of thin-film resistors with complete isolation to allow positive biasing of the input, and parasitic effects are almost completely eliminated.
- 3) Only the on / off conditions need to be set for operation, making device design easy.
- 4) Higher mounting densities can be achieved.

### ●Circuit schematic



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

Parameter	Symbol	Limits	Unit
Collector-base voltage	V <sub>CB0</sub>	-50	V
Collector-emitter voltage	V <sub>CE0</sub>	-40	V
Emitter-base voltage	V <sub>EB0</sub>	-5	V
Collector current	I <sub>C</sub>	-500	mA
Collector power dissipation	P <sub>C</sub>	200	mW
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55~+150	°C

### ●Package, marking, and packaging specifications

Part No.	DTB114TK
Package	SMT3
Marking	E94
Packaging code	T146
Basic ordering unit (pieces)	3000

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	V <sub>CB0</sub>	-50	—	—	V	I <sub>C</sub> =-50 μA
Collector-emitter breakdown voltage	V <sub>CE0</sub>	-40	—	—	V	I <sub>C</sub> =-1mA
Emitter-base breakdown voltage	V <sub>EB0</sub>	-5	—	—	V	I <sub>E</sub> =-50 μA
Collector cutoff current	I <sub>CB0</sub>	—	—	-0.5	μA	V <sub>CB</sub> =-50V
Emitter cutoff current	I <sub>EB0</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>E</sub> =-50mA/-2.5mA
DC current transfer ratio	h <sub>FE</sub>	100	250	600	—	I <sub>C</sub> =-50mA, V <sub>CE</sub> =-5V
Input resistance	R <sub>I</sub>	7	10	13	kΩ	—
Transition frequency	f <sub>T</sub>	—	200	—	MHz	V <sub>CE</sub> =-10V, I <sub>E</sub> =5mA, f=100MHz *

\* Transition frequency of the device.

(96-294-B114T)

# Digital transistor (built in resistors and zener diode), driver (60V, 1A)

## DTDG23YP

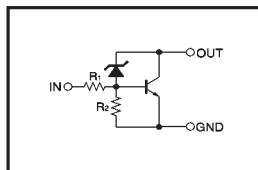
### ●Features

- 1) High DC current gain. (Min. 300 at V<sub>O</sub>/I<sub>O</sub>=2V/0.5A)
- 2) Low output voltage. (Typ. 0.4V at I<sub>O</sub>/I<sub>I</sub>=500/50mA)
- 3) Built-in zener diode gives strong protection against reverse

### ●Structure

NPN digital transistor  
(with built in resistors and zener diode)

### ●Circuit schematic



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

Parameter	Symbol	Limits	Unit
Supply voltage	V <sub>CC</sub>	60±10	V
Input voltage	V <sub>IN</sub>	-6~+40	V
Collector current	I <sub>C</sub>	1	A
	I <sub>C(max)</sub>	2	A (Pulse) *1
Power dissipation	P <sub>d</sub>	1.5	W *2
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55~+150	°C

\*1 P<sub>w</sub>≤10ms, Duty cycle≤2% \*2 On 40×40×0.7mm ceramic board.

### ●Package, marking, and packaging specifications

Part No.	DTDG23YP
Package	MPT3
Marking	E02
Packaging code	T100
Basic ordering unit (pieces)	1000

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(on)</sub>	—	—	0.3	V	V <sub>CC</sub> =5V, I <sub>O</sub> =100 μA
	V <sub>I(off)</sub>	2	—	—	V	V <sub>O</sub> =0.4V, I <sub>O</sub> =100mA
Output voltage	V <sub>O(on)</sub>	—	—	0.4	V	I <sub>O</sub> /I <sub>I</sub> =500mA/5mA
Input current	I <sub>I</sub>	—	—	3.6	mA	V <sub>I</sub> =5V
Output current	I <sub>O(on)</sub>	—	—	0.5	μA	V <sub>CC</sub> =40V, V <sub>I</sub> =0V
DC current gain	G <sub>I</sub>	300	—	—	—	V <sub>O</sub> =2V, I <sub>O</sub> =500mA
Transition frequency	f <sub>T</sub>	—	80	—	MHz	V <sub>CE</sub> =5V, I <sub>E</sub> =-0.1A, f=30MHz *
Input resistance	R <sub>I</sub>	1.54	2.2	2.86	kΩ	—
Emitter-base resistance	R <sub>E</sub>	7	10	13	kΩ	—

\* Transition frequency of the device.

(96-378-DS23YP)