

Transistors

# 500mA / 50V Digital transistors (with built-in resistors)

## DTD143EK / DTD143EC / DTD143ES

●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)

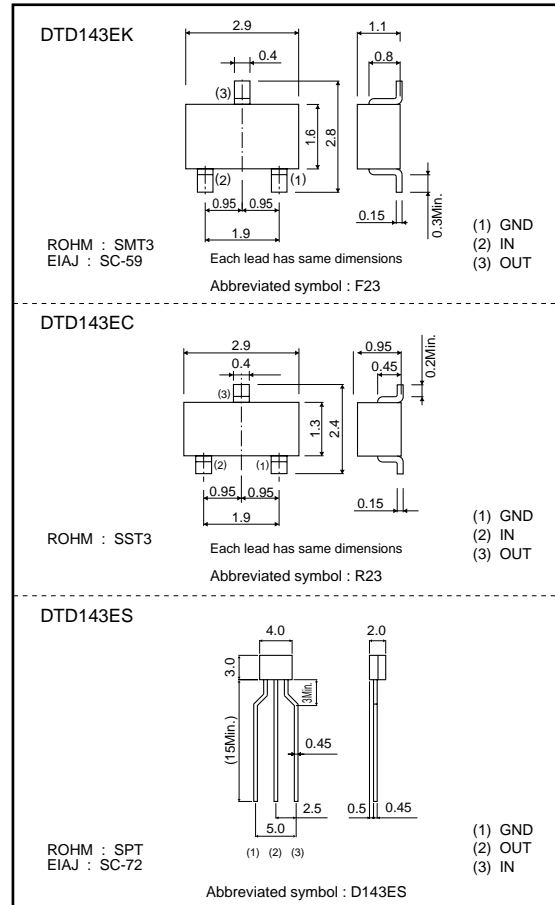
●Packaging specifications

Part No.	Package	SMT3	SST3	SPT
		Package type	Taping	Taping
	Code	T146	T116	TP
	Basic ordering unit (pieces)	3000	3000	5000
DTD143EK		○	—	—
DTD143EC		—	○	—
DTD143ES		—	—	○

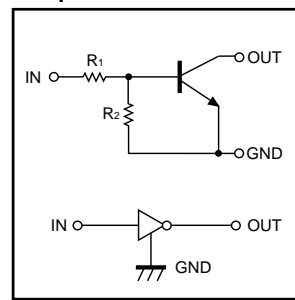
●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits			Unit
		DTD143EK	DTD143EC	DTD143ES	
Supply voltage	V <sub>CC</sub>	50			V
Input voltage	V <sub>IN</sub>	-10 to +30			V
Output current	I <sub>c</sub>	500			mA
Power dissipation	P <sub>D</sub>	200	300		mW
Junction temperature	T <sub>j</sub>	150			°C
Storage temperature	T <sub>stg</sub>	-55 to +150			°C

●External dimensions (Unit : mm)



●Equivalent circuit



R<sub>1</sub>=R<sub>2</sub>=4.7kΩ

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	–	–	0.5	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	3	–	–		$V_o=0.3V, I_o=20mA$
Output voltage	$V_{O(on)}$	–	0.1	0.3	V	$I_o / I_i=50mA / 2.5mA$
Input current	$I_i$	–	–	1.8	mA	$V_i=5V$
Output current	$I_o(off)$	–	–	0.5	$\mu A$	$V_{CC}=50V, V_i=0V$
DC current gain	$G_i$	47	–	–	–	$V_o=5V, I_o=50mA$
Input resistance	$R_1$	3.29	4.7	6.11	$k\Omega$	–
Resistance ratio	$R_2 / R_1$	0.8	1	1.2	–	–
Transition frequency	$f_T$ *	–	200	–	MHz	$V_{CE}=10V, I_E=-50mA, f=100MHz$

\* Characteristics of built-in transistor

●Electrical characteristic curves

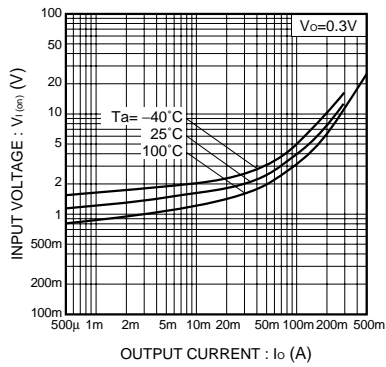


Fig.1 Input voltage vs. output current (ON characteristics)

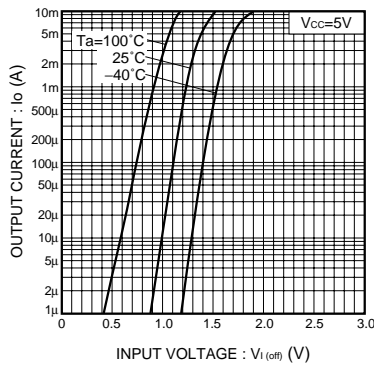


Fig.2 Output current vs. input voltage (OFF characteristics)

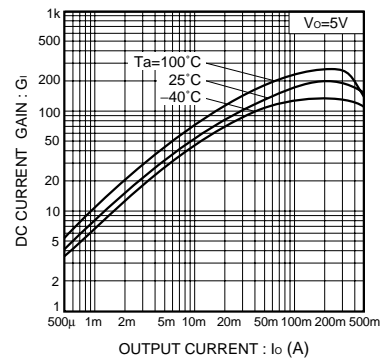


Fig.3 DC current gain vs. output current

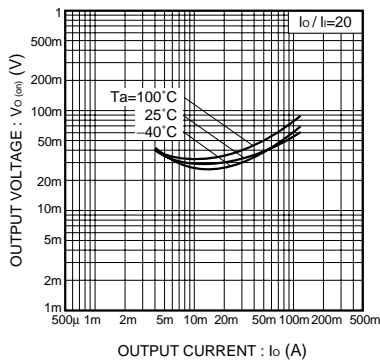


Fig.4 Output voltage vs. output current

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