

Digital transistors (built-in resistors)

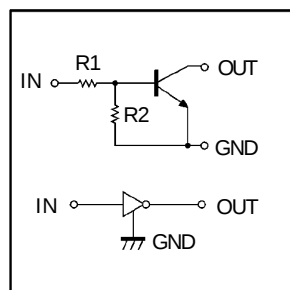
• Features

- 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 thinfilm resistors with complete isolation to allow positive 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.

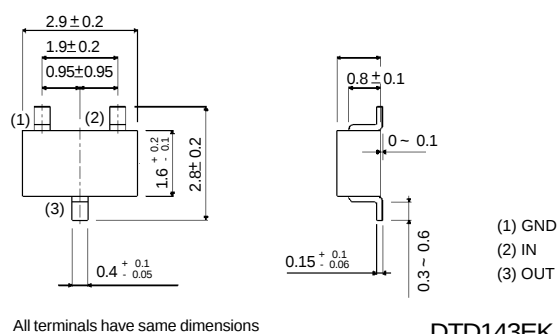
• Structure

PNP digital transistor (with built-in resistors)

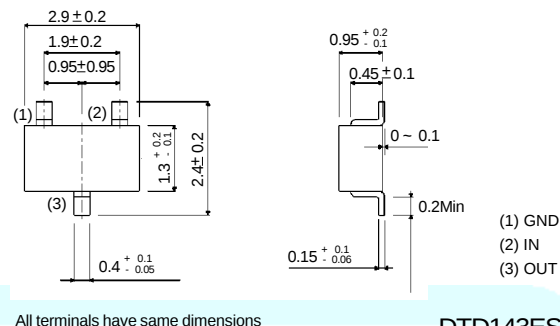
• Equivalent circuit



DTD143EK
DTD143ES



EIAJ: SC—59



EIAJ: SOT—23

• Absolute maximum ratings($T_a=25^\circ\text{C}$)

Parameter	symbol	limits(DTC143E□)		unit
		K	S	
Supply voltage	V_{CC}	50		V
Input voltage	V_{IN}	-10~+30		V
Output current	I_C	500		mA
Power dissipation	P_d	200	300	mW
Junction temperature	T_j	150		$^\circ\text{C}$
Storage temperature	T_{stg}	-55~+150		$^\circ\text{C}$

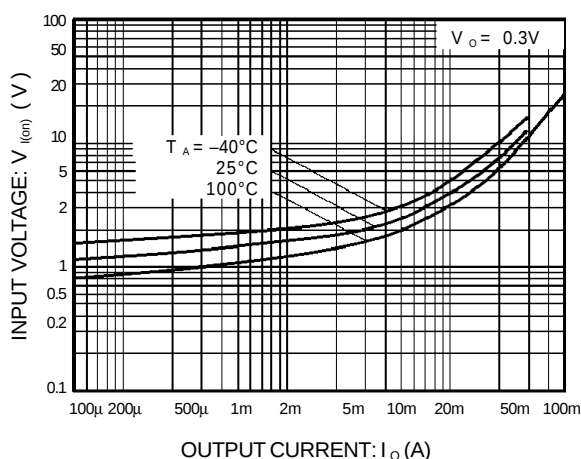
DTD143EK DTD143ES

● Electrical characteristics($T_a=25^\circ\text{C}$)

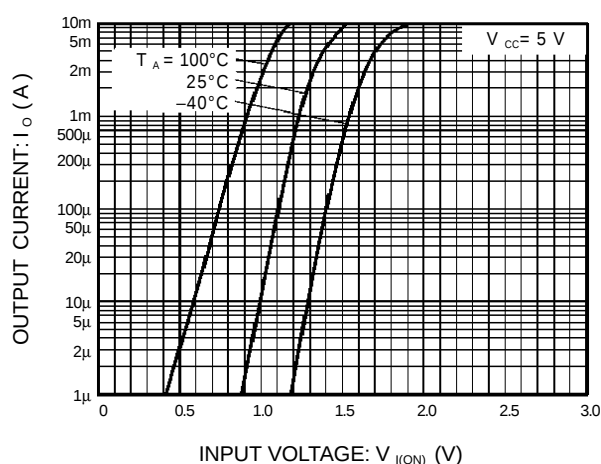
Parameter	symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.5	V	$V_{CC}=5V, I_O=100\mu A$
	$V_{I(on)}$	3	—	—		$V_O=0.3V, I_O=20mA$
Output Voltage	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I=50mA/2.5mA$
Input current	I_I	—	—	1.8	mA	$V_I=5V$
Output current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC}=50V, V_I=0V$
DC current gain	G_I	47	—	—	—	$V_O=5V, I_O=50mA$
Input resistance	R_I	3.29	4.7	6.11	$K\Omega$	—
Resistance ratio	R_2/R_I	0.8	1	1.2	—	—
Transition frequency	f_T	—	200	—	MHz	$V_{CE}=10V, I_E=-50mA, f=100MHz^*$

*Transition frequency of the device

ELECTRICAL CHARACTERISTIC CURVES



**Figure 1. Input voltage vs. output current
(ON characteristics)**



**Figure 2. Output current vs. input voltage
(OFF characteristics)**

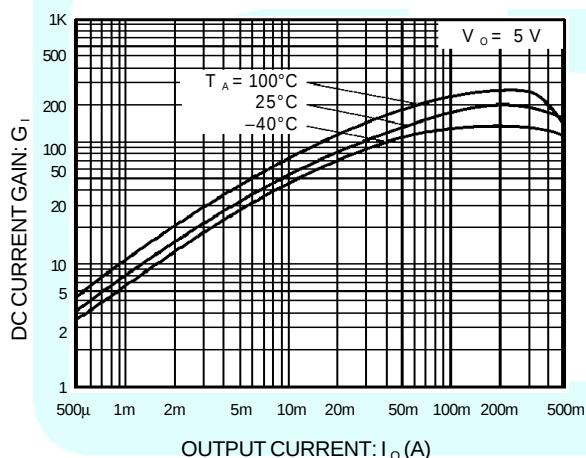


Figure 3. DC current gain vs. output current

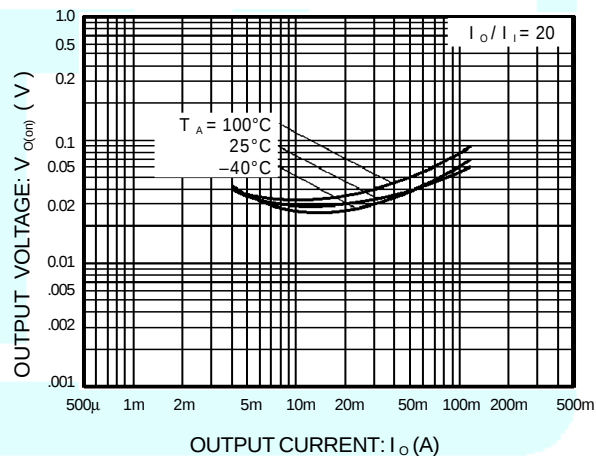


Figure 4. Output voltage vs. output current