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

DTD143EK / DTD143EC / DTD143ES

●Applications
Inverter, Interface, Driver

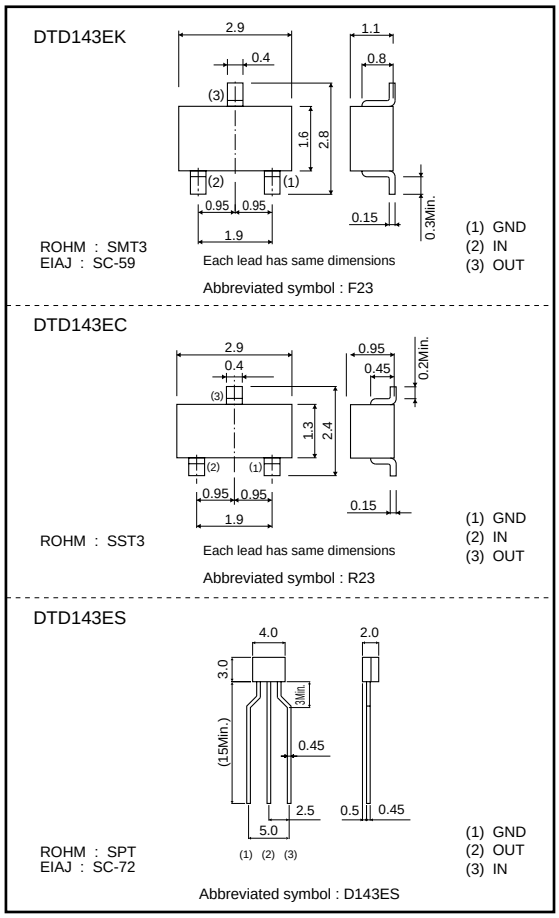
●Features
1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
2) The bias resistors consist of thin film resistors with complete isolation to allow negative biasing of the input. They also have the advantage 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

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

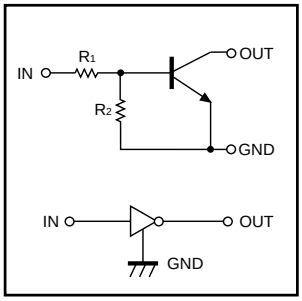
●External dimensions (Unit : mm)



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits			Unit
		DTD143EK	DTD143EC	DTD143ES	
Supply voltage	V_{CC}	50			V
Input voltage	V_{IN}	–10 to +30			V
Output current	I_C	500			mA
Power dissipation	P_D	200		300	mW
Junction temperature	Tj	150			°C
Storage temperature	Tstg	–55 to +150			°C

●Equivalent circuit



R_1=R_2=4.7kΩ

●**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=100μA
	$V_{I\ (on)}$	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_1	3.29	4.7	6.11	kΩ	–
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**

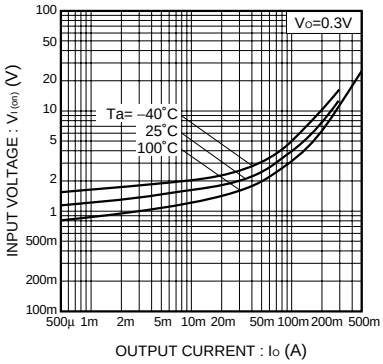


Fig.1 Input voltage vs. output current (ON characteristics)

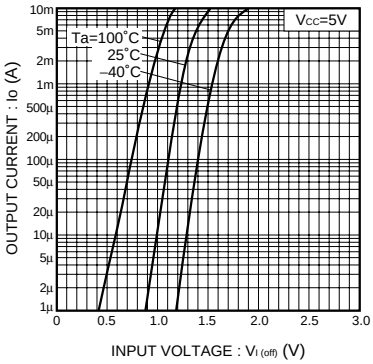


Fig.2 Output current vs. input voltage (OFF characteristics)

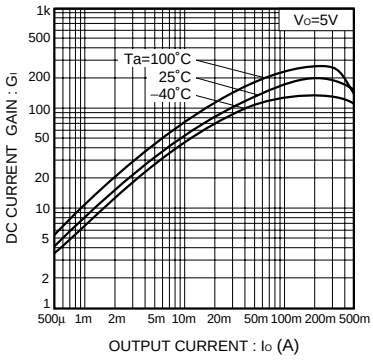


Fig.3 DC current gain vs. output current

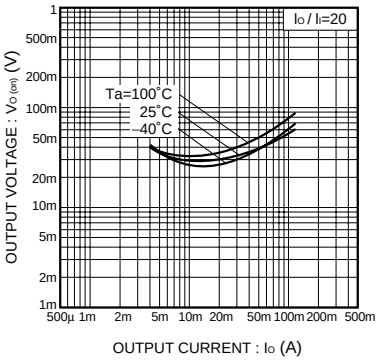


Fig.4 Output voltage vs. output current

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