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

DTD123EK / DTD123ES

●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.

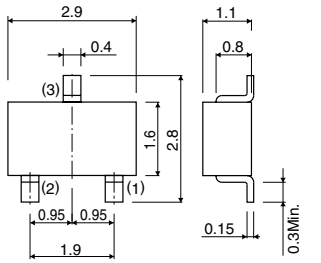
●Structure
NPN epitaxial planar silicon transistor
(Resistor built-in type)

●Package specifications

Part No.	Package	SMT3	SPT
	Packaging type	Taping	Taping
	Code	T146	TP
	Basic ordering unit (pieces)	3000	5000
DTD123EK		○	–
DTD123ES		–	○

●External dimensions (Unit : mm)

DTD123EK

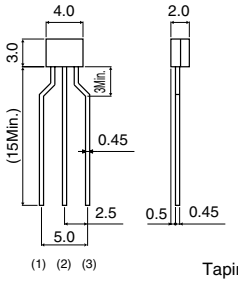


(1) GND
(2) IN
(3) OUT
Each lead has same dimension

ROHM : SMT3
EIAJ : SC-59

Abbreviated symbol: F22

DTD123ES



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

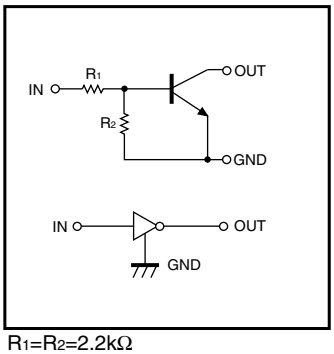
ROHM : SPT
EIAJ : SC-72

Abbreviated symbol: D123ES

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		DTD123EK	DTD123ES	
Supply voltage	V_{CC}	50		V
Input voltage	V_{IN}	−10 to +12		V
Output current	I_C	500		mA
Power dissipation	Pd	200	300	mW
Junction temperature	Tj	150		℃
Storage temperature	Tstg	−55 to +150		℃

●Equivalent circuit



R_1=R_2=2.2kΩ

●**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	–	–	3.8	mA	V_I=5V
Output current	$I_{O(off)}$	–	–	0.5	μA	V_{CC}=50V, V_I=0V
DC current gain	G_I	39	–	–	–	V_O=5V, I_O=50mA
Input resistance	R_1	1.54	2.2	2.86	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 characteristics curves**

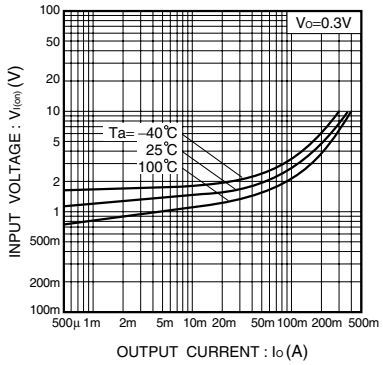


Fig.1 Input voltage vs. output current (ON characteristics)

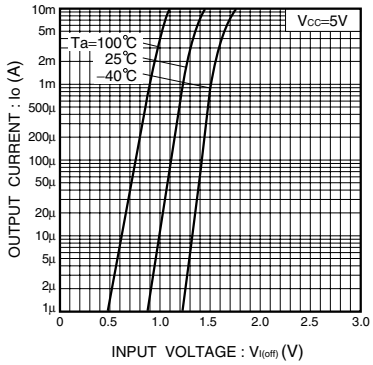


Fig.2 Output current vs. input voltage (OFF characteristics)

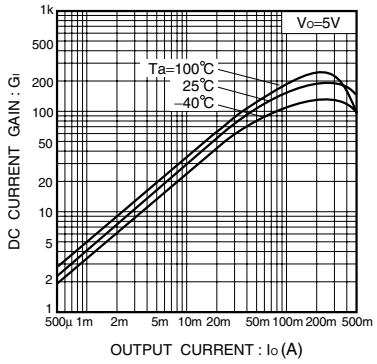


Fig.3 DC current gain vs. output current

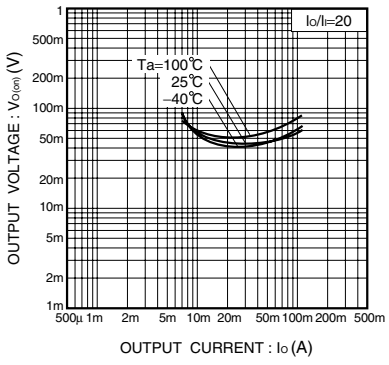


Fig.4 Output voltage vs. output current

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