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

DTB123EK / DTB123ES

●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 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 the device design easy.

●Structure

PNP epitaxial planar silicon transistor
(Resistor built-in type)

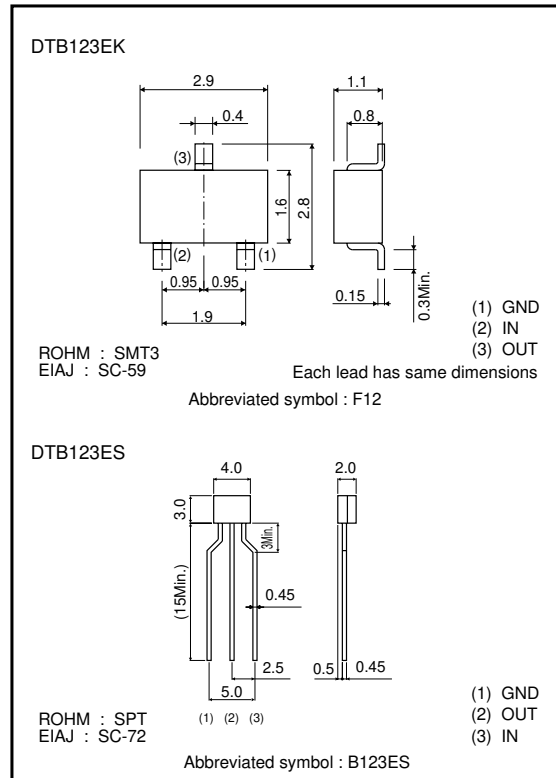
●Packaging specifications

Part No.	Package	SMT3		SPT	
		Code	Basic ordering unit (pieces)	Code	Basic ordering unit (pieces)
	Package	SMT3	SPT		
	Packaging type	Taping	Taping		
	Code	T146	TP		
	Basic ordering unit (pieces)	3000	5000		
DTB123EK		○	—		
DTB123ES		—	○		

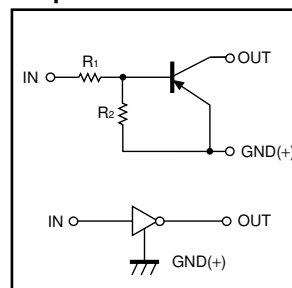
●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
		DTB123EK	DTB123ES	
Supply voltage	V _{CC}	-50		V
Input voltage	V _{IN}	-12 to +10		V
Output current	I _C	-500		mA
Power dissipation	P _D	200	300	mW
Junction temperature	T _J	150		°C
Storage temperature	T _{stg}	-55 to +150		°C

●External dimensions (Unit : mm)



●Equivalent circuit



R₁=R₂=2.2kΩ

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	-	-	-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_i	1.54	2.2	2.86	$k\Omega$	-
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

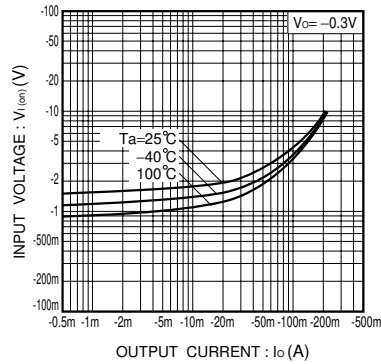


Fig.1 Input voltage vs. output current (ON characteristics)

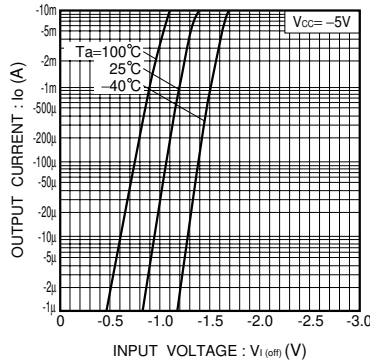


Fig.2 Output current vs. input voltage (OFF characteristics)

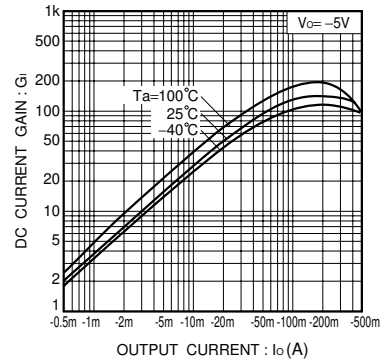


Fig.3 DC current gain vs. output current

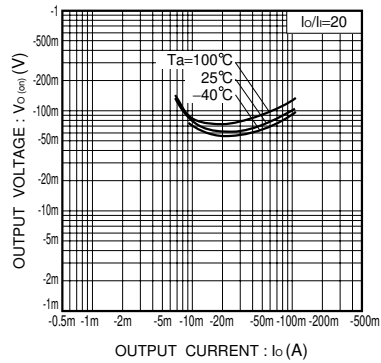


Fig.4 Output voltage vs. output current

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