

Transistors

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

DTB143EK / DTB143EC / DTB143ES

●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.

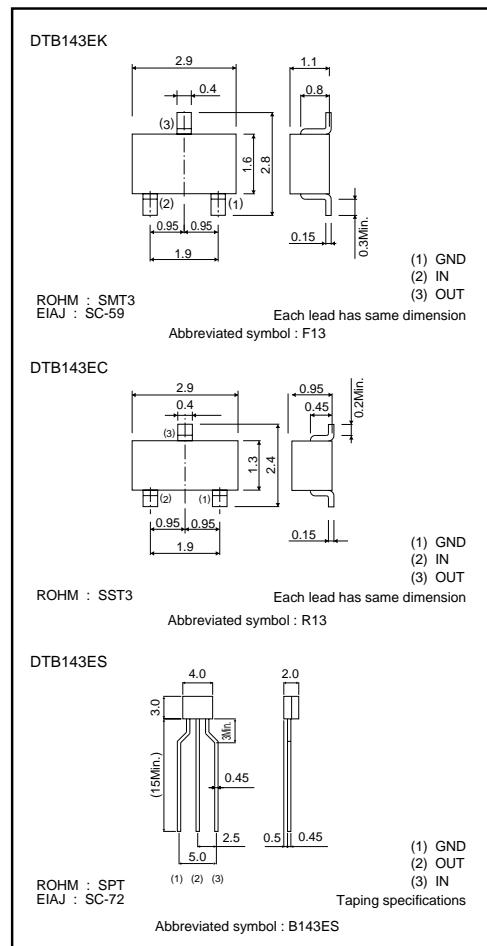
●Structure

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

●Packaging specifications

	Package	SMT3	SST3	SPT
Part No.	Package type	Taping	Taping	Taping
	Code	T146	T116	TP
DTB143EK	Basic ordering unit (pieces)	3000	3000	5000
DTB143EC		○	—	—
DTB143ES		—	—	○

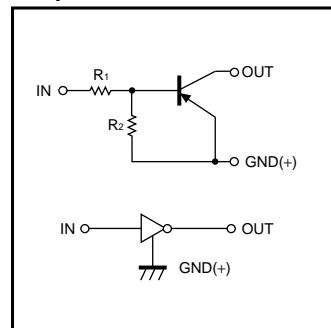
●External dimensions (Unit : mm)



●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits			Unit
		DTB143EK	DTB143EC	DTB143ES	
Supply voltage	V _{CC}	—	—50	—	V
Input voltage	V _{IN}	—	—30 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

●Equivalent circuit



R₁=R₂=4.7kΩ

Transistors

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(\text{off})}$	—	—	-0.5	V	$V_{CC} = -5V, I_o = -100\mu A$
	$V_{I(\text{on})}$	-3	—	—		$V_o = -0.3V, I_o = -20mA$
Output voltage	$V_{O(\text{on})}$	—	-0.1	-0.3	V	$I_o/I_{I(\text{on})} = -50mA/-2.5mA$
Input current	I_I	—	—	-1.8	mA	$V_I = -5V$
Output current	$I_{O(\text{off})}$	—	—	-0.5	μA	$V_{CC} = -5V, V_I = 0V$
DC current gain	G_I	47	—	—	—	$V_o = -5V, I_o = -50mA$
Input resistance	R_I	3.29	4.7	6.11	k Ω	—
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

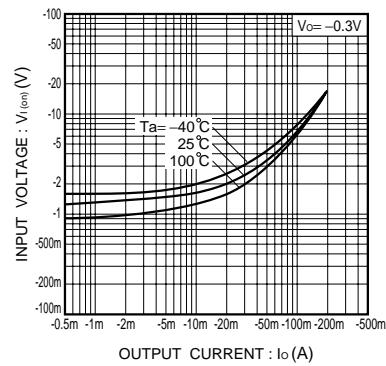


Fig.1 Input voltage vs. output current (ON characteristics)

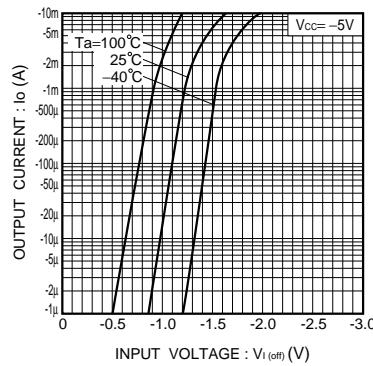


Fig.2 Output current vs. input voltage (OFF characteristics)

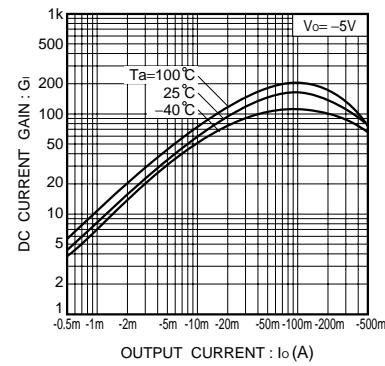


Fig.3 DC current gain vs. output current

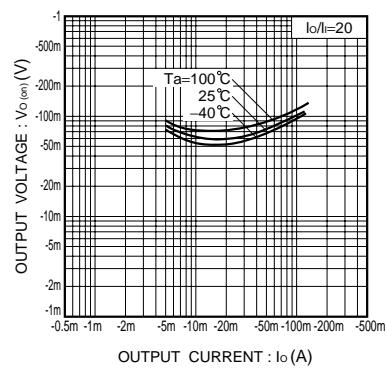


Fig.4 Output voltage vs. output current

Appendix

Notes

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