

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

DTB113EK / DTB113ES

●Applications

Inverter, Interface, Driver

●Feature

- 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)

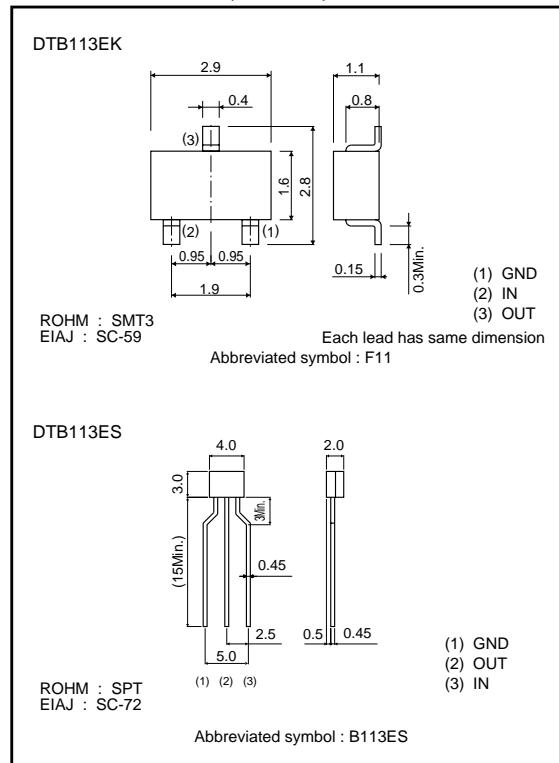
●Packaging specifications

Part No.	Package	SMT3	SPT
	DTB113EK	○	—
DTB113ES	—	—	○

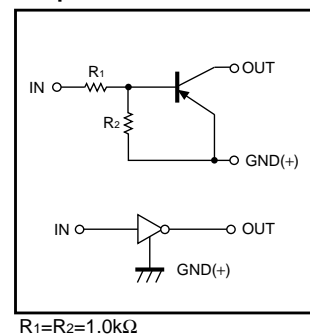
Package	SMT3	SPT	Limits		Unit
			DTB113EK	DTB113ES	
Supply voltage	V _{CC}	-50		V	
Input voltage	V _{IN}	-10 to +10		V	
Output current	I _c	-500		mA	
Power dissipation	P _D	200	300	mW	
Junction temperature	T _j	150		°C	
Storage temperature	T _{stg}	-55 to +150		°C	

●Absolute maximum ratings (Ta=25°C)

●External dimensions (Unit : mm)



●Equivalent circuit



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	$V_o = -0.3V, I_o = -20mA$
Output voltage	$V_{O(on)}$	-	-0.1	-0.3	V	$I_o/I_i = -50mA/-2.5mA$
Input current	I_i	-	-	-7.2	mA	$V_i = -5V$
Output current	$I_{o(off)}$	-	-	-0.5	μA	$V_{CC} = -50V, V_i = 0V$
DC current gain	G_i	33	-	-	-	$V_o = -5V, I_o = -50mA$
Input resistance	R_i	0.7	1	1.3	$k\Omega$	-
Resistance ratio	R_z/R_i	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

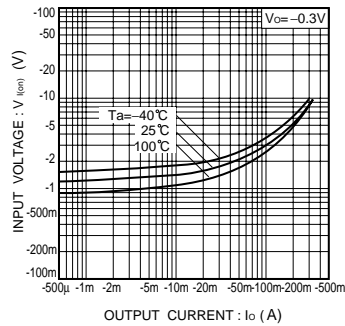


Fig.1 Input voltage vs. output current (ON characteristics)

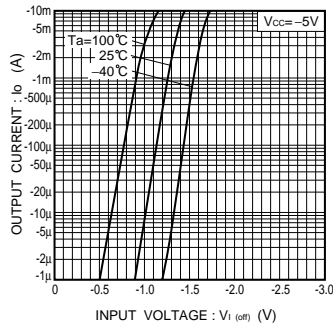


Fig.2 Output current vs. input voltage (OFF characteristics)

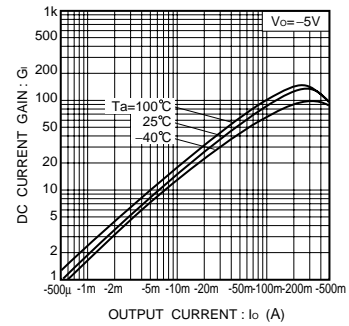


Fig.3 DC current gain vs. output current

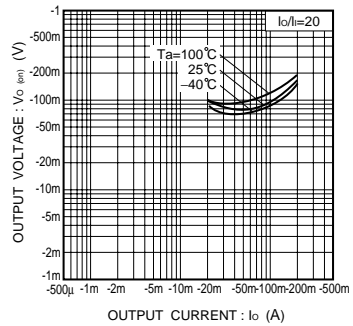


Fig.4 Output voltage vs. output current

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