

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

DTB123YU / DTB123YK

● **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)

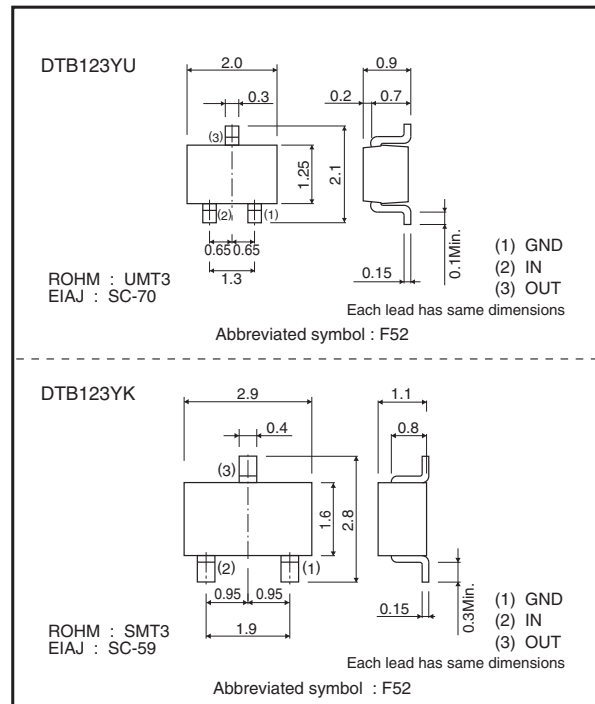
● **Packaging specifications**

Part No.	Package	UMT3	SMT3
	Packaging type	Taping	Taping
	Code	T106	T146
	Basic ordering unit (pieces)	3000	3000
DTB123YU		○	-
DTB123YK		-	○

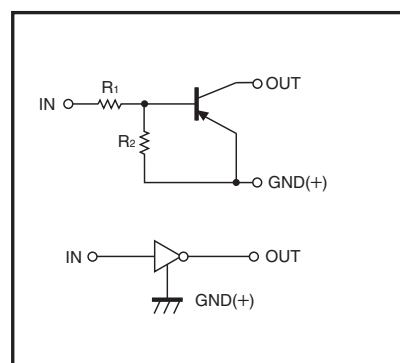
● **Absolute maximum ratings (Ta=25°C)**

Parameter	Symbol	Limits		Unit
		DTB123YU	DTB123YK	
Supply voltage	V <sub>CC</sub>	-50		V
Input voltage	V <sub>IN</sub>	-12 to +5		V
Output current	I <sub>c</sub>	-500		mA
Power dissipation	P <sub>D</sub>	200		mW
Junction temperature	T <sub>J</sub>	150		°C
Storage temperature	T <sub>stg</sub>	-55 to +150		°C

● **Dimensions (Unit : mm)**



● **Inner circuit**



R<sub>1</sub>=2.2kΩ, R<sub>2</sub>=10kΩ

● Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	-0.3	V	$V_{CC} = -5V, I_o = -100\mu A$
	$V_{I(on)}$	-2	-	-		$V_o = -0.3V, I_o = -20mA$
Output voltage	$V_{O(on)}$	-	-0.1	-0.3	V	$I_o/I_i = -50mA/-2.5mA$
Input current	$I_i$	-	-	-3.0	mA	$V_i = -5V$
Output current	$I_{O(off)}$	-	-	-0.5	$\mu A$	$V_{CC} = -50V, V_i = 0V$
DC current gain	$G_i$	56	-	-	-	$V_o = -5V, I_o = -50mA$
Input resistance	$R_1$	1.54	2.2	2.86	$k\Omega$	-
Resistance ratio	$R_2/R_1$	3.6	4.5	5.5	-	-
Transition frequency	$f_t$ *	-	200	-	MHz	$V_{CE} = -10V, I_E = 50mA, f = 100MHz$

\* Characteristics of built-in transistor

● Electrical characteristic curves

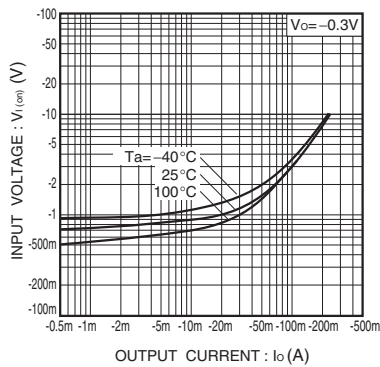


Fig.1 Input voltage vs. output current (ON characteristics)

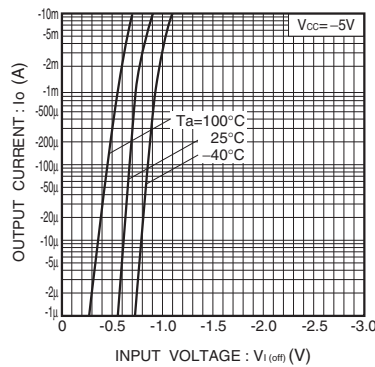


Fig.2 Output current vs. input voltage (OFF characteristics)

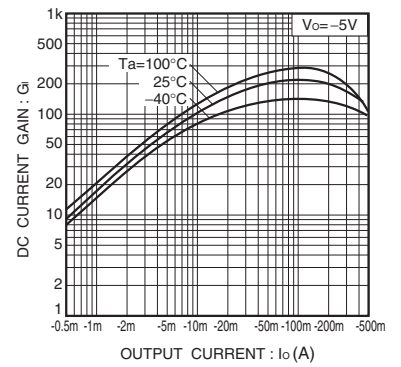


Fig.3 DC current gain vs. output current

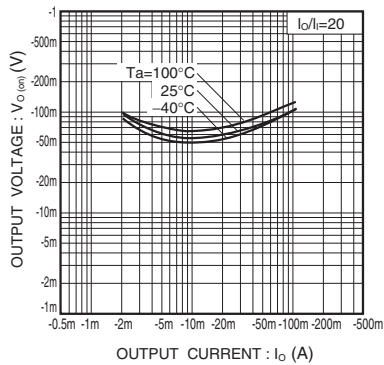


Fig.4 Output voltage vs. output current

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