

# 100mA / 50V Digital transistors (with built-in resistors)

DTC123YE / DTC123YUA / DTC123YKA

● **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)

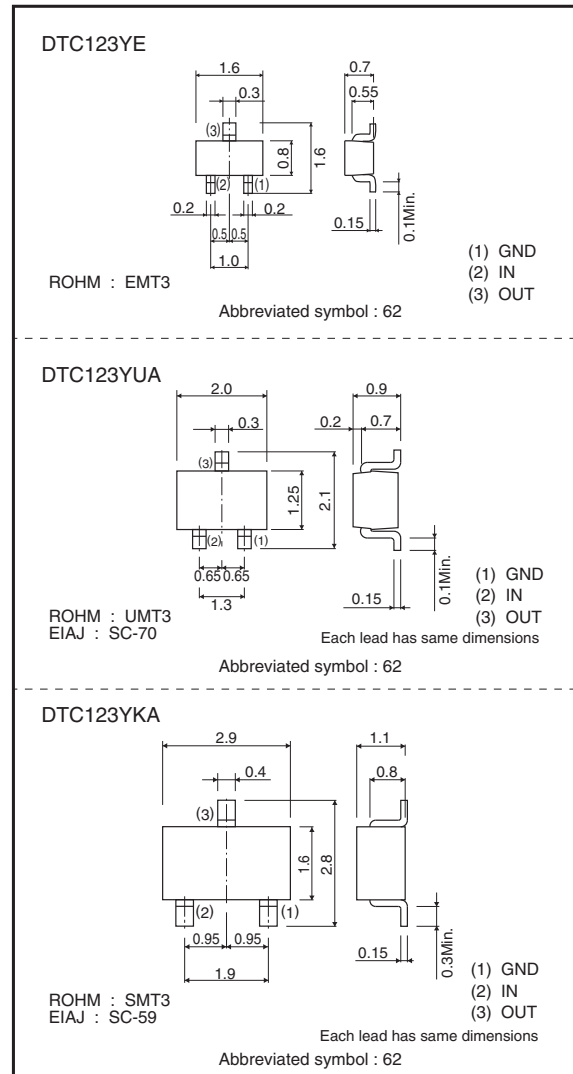
● **Packaging specifications**

Part No.	Package	EMT3	UMT3	SMT3
		Packaging type	Taping	Taping
	Code	TL	T106	T146
	Basic ordering unit (pieces)	3000	3000	3000
DTC123YE		○	-	-
DTC123YUA		-	○	-
DTC123YKA		-	-	○

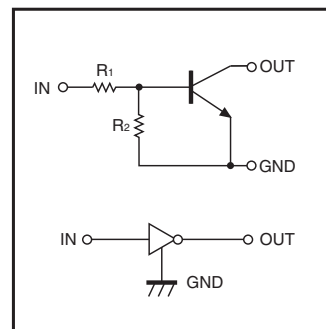
● **Absolute maximum ratings (Ta=25°C)**

Parameter	Symbol	Limits			Unit
		DTC123YE	DTC123YUA	DTC123YKA	
Supply voltage	V <sub>CC</sub>	50			V
Input voltage	V <sub>IN</sub>	-5 to +12			V
Output current	I <sub>o</sub>	100			mA
	I <sub>c(Max.)</sub>	100			
Power dissipation	P <sub>d</sub>	150	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**



R1=2.2kΩ, R2=10kΩ

● Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	0.3	V	$V_{CC}=5V, I_o=100\mu A$
	$V_{I(on)}$	3	-	-		$V_o=0.3V, I_o=20mA$
Output voltage	$V_{O(on)}$	-	0.1	0.3	V	$I_o/I_i=10mA/0.5mA$
Input current	$I_i$	-	-	3.8	mA	$V_i=5V$
Output current	$I_{O(off)}$	-	-	0.5	$\mu A$	$V_{CC}=50V, V_i=0V$
DC current gain	$G_i$	33	-	-	-	$V_o=5V, I_o=10mA$
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	$f_t$ *	-	250	-	MHz	$V_{CE}=10V, I_E=-5mA, f=100MHz$

\* Characteristics of built-in transistor

● Electrical characteristic curves

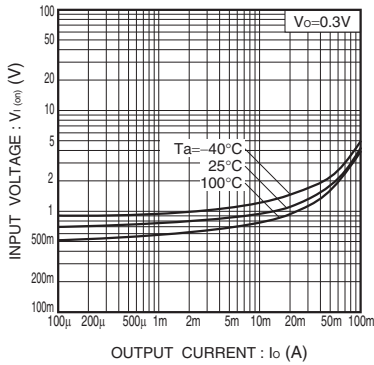


Fig.1 Input voltage vs. output current (ON characteristics)

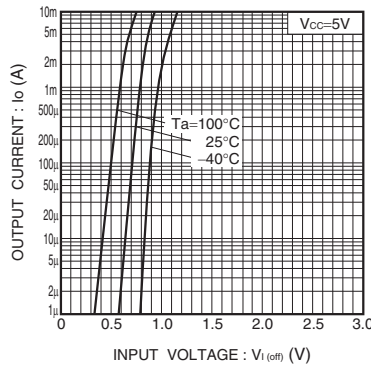


Fig.2 Output current vs. input voltage (OFF characteristics)

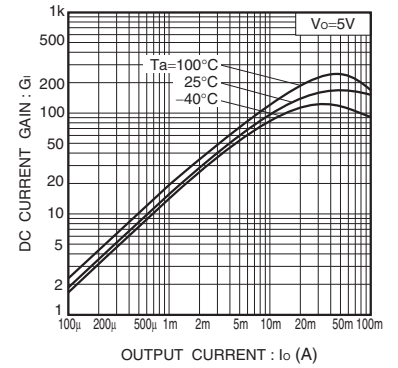


Fig.3 DC current gain vs. output current

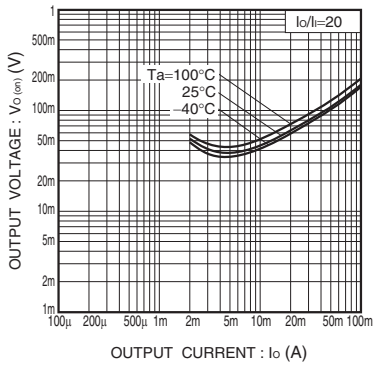


Fig.4 Output voltage vs. output current

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