

# 100mA / 50V Digital transistor (with built-in resistors) DTC144VUA / DTC144VKA

●Applications

Inverter, Interface, Driver

●Features

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors.
- 2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input, and parasitic effects are almost completely eliminated.
- 3) Only the on / off conditions need to be set for operation, making the device design easy.
- 4) Higher mounting densities can be achieved.

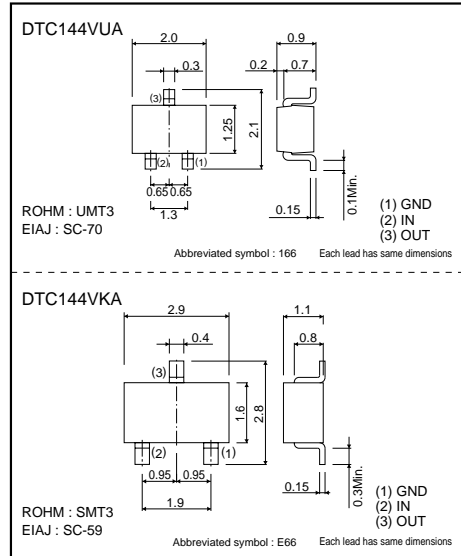
●Structure

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

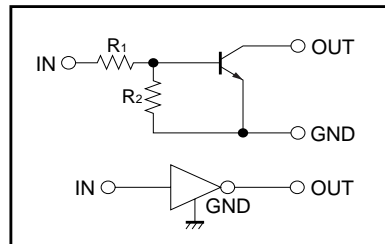
●Packaging specifications

Part No.	Package	UMT3	SMT3
		Packaging type	Taping
	Code	T106	T146
	Basic ordering unit (pieces)	3000	3000
DTC144VUA		○	—
DTC144VKA		—	○

●External dimensions (Unit : mm)



●Equivalent circuit



R<sub>1</sub>=47kΩ, R<sub>2</sub>=10kΩ

Transistors

● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V <sub>CC</sub>	50	V
Input voltage	V <sub>IN</sub>	-10 to +40	V
Output curren	I <sub>o</sub>	30	mA
	I <sub>C(Max.)</sub>	100	
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

● Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	-	-	1	V	V <sub>CC</sub> =5V, I <sub>o</sub> =100μA
	V <sub>I(on)</sub>	6	-	-		V <sub>o</sub> =0.3V, I <sub>o</sub> =2mA
Output voltage	V <sub>O(on)</sub>	-	0.1	0.3	V	I <sub>o</sub> =10mA, I <sub>i</sub> =0.5mA
Input current	I <sub>i</sub>	-	-	0.16	mA	V <sub>I</sub> =5V
Output current	I <sub>O(off)</sub>	-	-	0.5	μA	V <sub>CC</sub> =50V, V <sub>I</sub> =0V
DC current gain	G <sub>I</sub>	33	-	-	-	I <sub>o</sub> =5mA, V <sub>o</sub> =5V
Input resistance	R <sub>1</sub>	32.9	47	61.1	kΩ	-
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	0.17	0.21	0.26	-	-
Transition frequency	f <sub>T</sub> *	-	250	-	MHz	V <sub>CE</sub> =10V, I <sub>E</sub> =-5mA, f=100MHz

\* Characteristics of built-in transistor

● Electrical characteristic curves

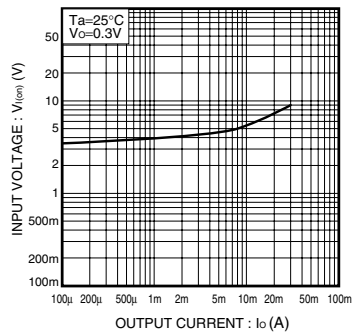


Fig.1 Input voltage vs. Output current (ON characteristics)

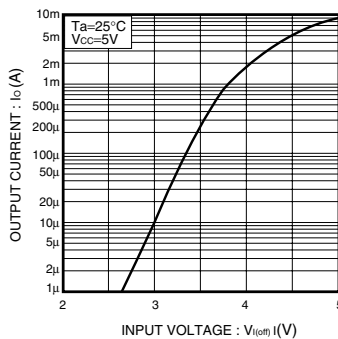


Fig.2 Output current vs. Input voltage (OFF characteristics)

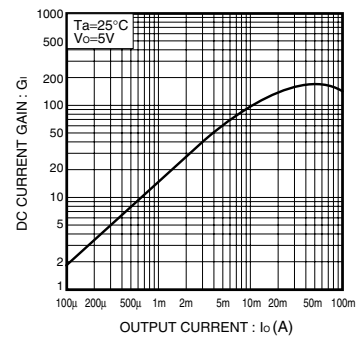


Fig.3 DC current gain vs. Output current

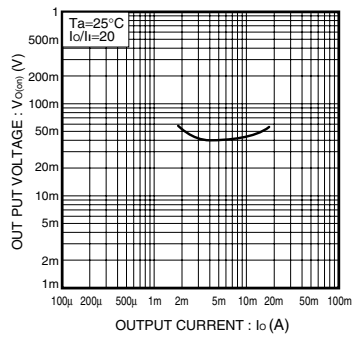


Fig.4 Output voltage vs. Output current

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