

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

DTC144EB / DTC144EM / DTC144EE / DTC144EUA / DTC144EKA

●Applications

Inverter, Interface, Driver

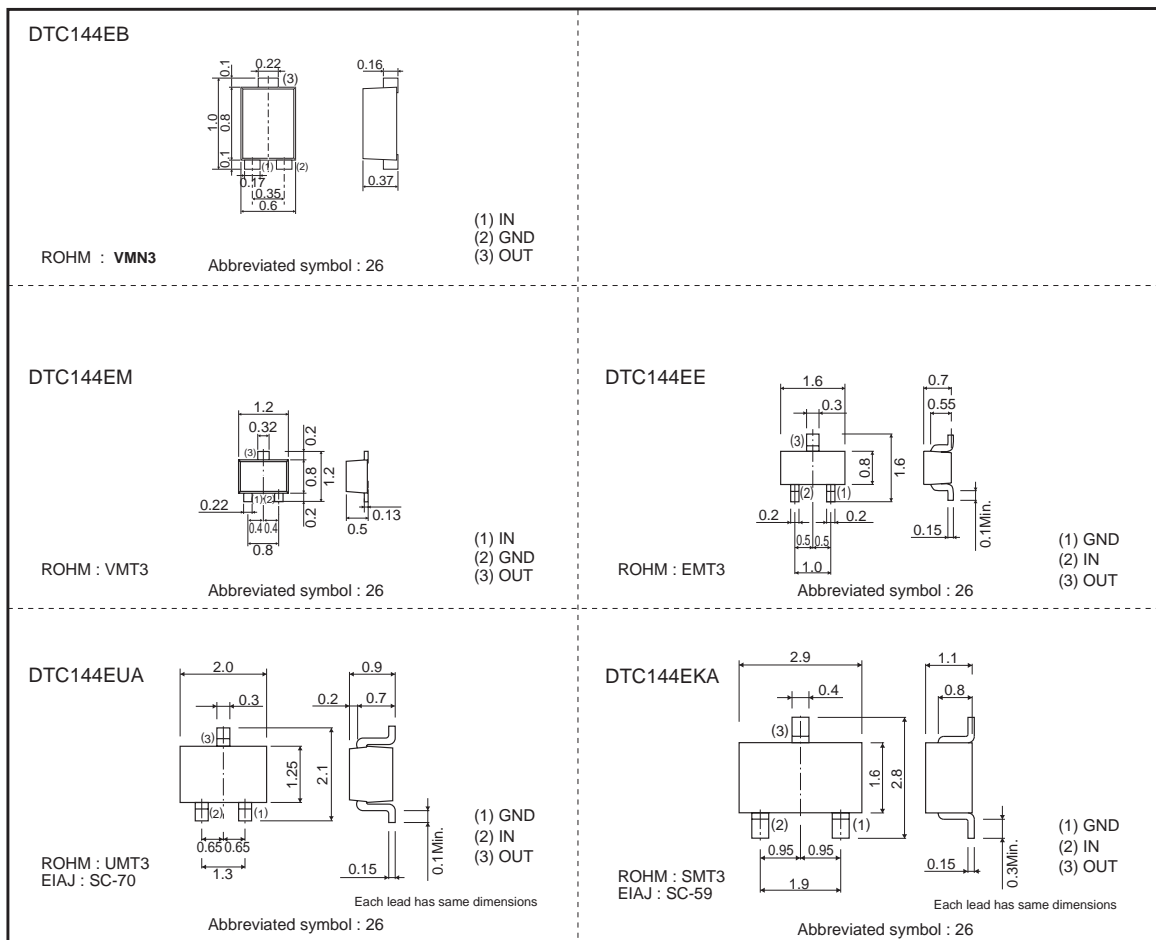
●Features

- 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)

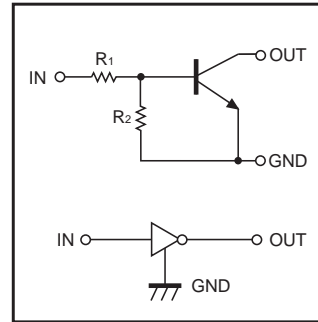
●Dimensions (Unit : mm)



●Packaging specifications

Part No.	Package	VMN3	VMT3	EMT3	UMT3	SMT3
	Packaging type	Taping	Taping	Taping	Taping	Taping
	Code	T2L	T2L	TL	T106	T146
	Basic ordering unit (pieces)	8000	8000	3000	3000	3000
DTC144EB		○	-	-	-	-
DTC144EM		-	○	-	-	-
DTC144EE		-	-	○	-	-
DTC144EUA		-	-	-	○	-
DTC144EKA		-	-	-	-	○

●Equivalent circuit



R1=R2=47kΩ

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits					Unit
		DTC144EB	DTC144EM	DTC144EE	DTC144EUA	DTC144EKA	
Supply voltage	V <sub>CC</sub>	50					V
Input voltage	V <sub>IN</sub>	-10 to +40					V
Output current	I <sub>O</sub>	30					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

●Electrical characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	-	-	0.5	V	V <sub>CC</sub> =5V, I <sub>O</sub> =100μA
	V <sub>I(on)</sub>	3	-	-		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> /I <sub>I</sub> =10mA/0.5mA
Input current	I <sub>I</sub>	-	-	0.18	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>	68	-	-	-	V <sub>O</sub> =5V, I <sub>O</sub> =5mA
Input resistance	R <sub>1</sub>	32.9	47	61.1	kΩ	-
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	-	-
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

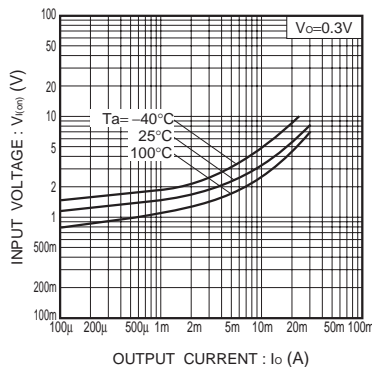


Fig.1 Input voltage vs. output current (ON characteristics)

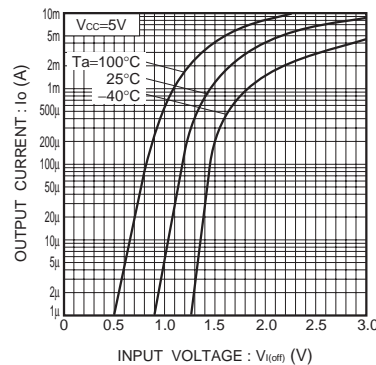


Fig.2 Output current vs. input voltage (OFF characteristics)

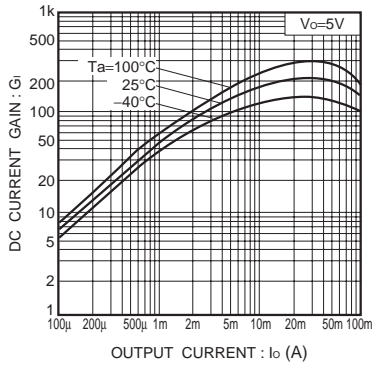


Fig.3 DC current gain vs. output current

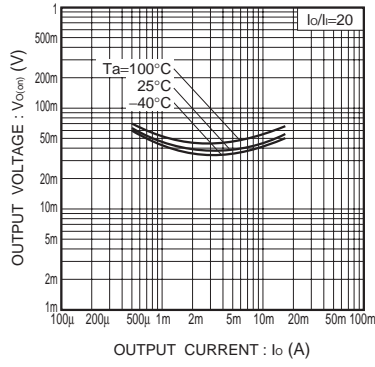


Fig.4 Output voltage vs. output current

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