

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

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DTC143EM / DTC143EE / DTC143EUA / DTC143EKA

● Applications

Inverter, Interface, Driver

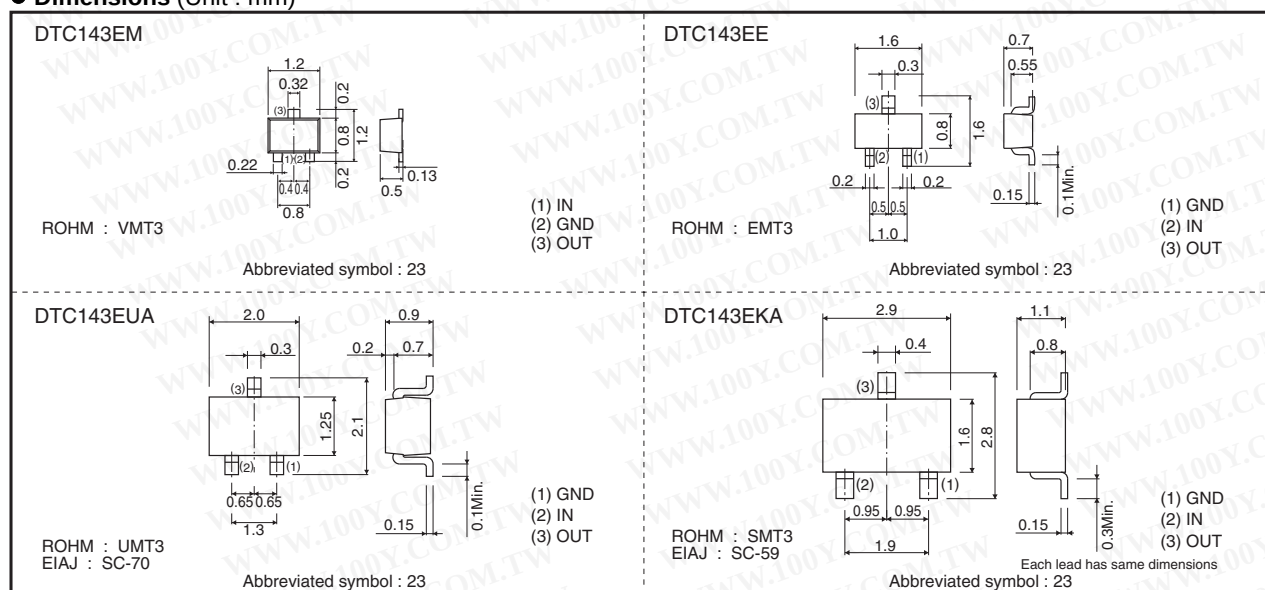
● Features

- 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)

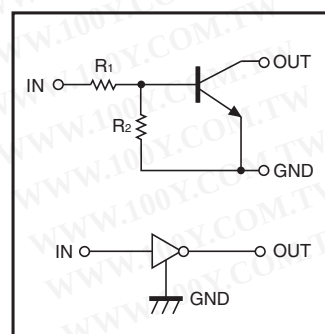
● Dimensions (Unit : mm)



● Packaging specifications

Part No.	Package	VMT3	EMT3	UMT3	SMT3
	Packaging type	Taping	Taping	Taping	Taping
	Code	T2L	TL	T106	T146
	Basic ordering unit (pieces)	8000	3000	3000	3000
DTC143EM		○	-	-	-
DTC143EE		-	○	-	-
DTC143EUA		-	-	○	-
DTC143EKA		-	-	-	○

● Inner circuit



$R_1 = R_2 = 4.7k\Omega$

● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits				Unit
		DTC143EM	DTC143EE	DTC143EUA	DTC143EKA	
Supply voltage	V _{CC}	50				V
Input voltage	V _{IN}	−10 to +30				V
Output current	I _O	100				mA
	I _{C(Max.)}	100				
Power dissipation	P _D	150	200			mW
Junction temperature	T _J	150				°C
Storage temperature	T _{stg}	−55 to +150				°C

● 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 =100μA
	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	—	—	1.8	mA	V _I =5V
Output current	I _{O(off)}	—	—	0.5	μA	V _{CC} =50V, V _I =0V
DC current gain	G _I	30	—	—	—	V _O =5V, I _O =10mA
Input resistance	R _I	3.29	4.7	6.11	kΩ	—
Resistance ratio	R ₂ /R ₁	0.8	1	1.2	—	—
Transition frequency	f _T *	—	250	—	MHz	V _{CE} =10V, I _E =-5mA, f=100MHz

* Characteristics of built-in transistor

● Electrical characteristic curves

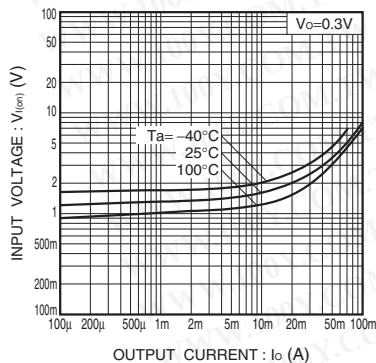


Fig.1 Input voltage vs. output current (ON characteristics)

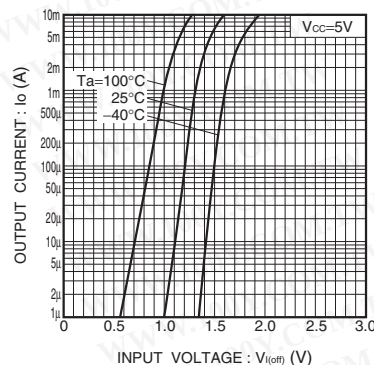


Fig.2 Output current vs. input voltage (OFF characteristics)

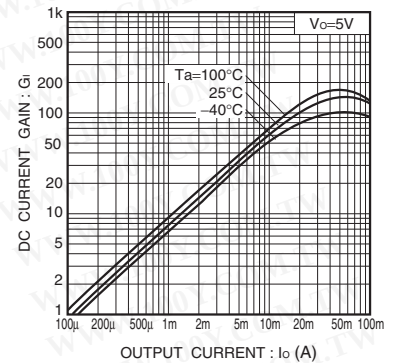


Fig.3 DC current gain vs. output current

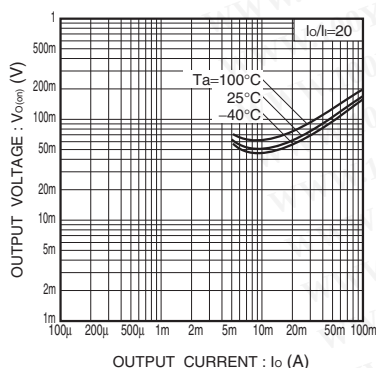


Fig.4 Output voltage vs. output current

Notes

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