

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

DTC144WE / DTC144WUA / DTC144WKA

● 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.

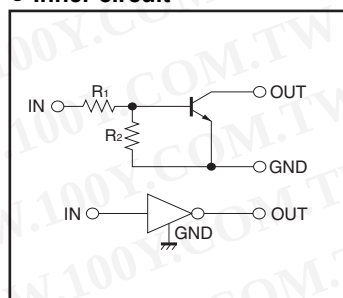
● Structure

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

● Packaging specifications

Package	EMT3	UMT3	SMT3
Packaging type	Taping	Taping	Taping
Code	TL	T106	T146
Part No.	Basic ordering unit (pieces)	3000	3000
DTC144WE	○	—	—
DTC144WUA	—	○	—
DTC144WKA	—	—	○

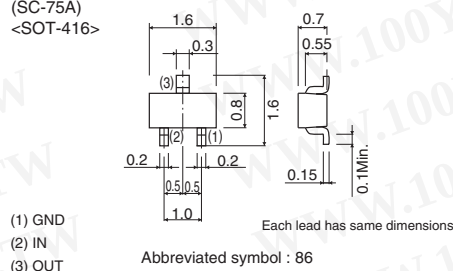
● Inner circuit



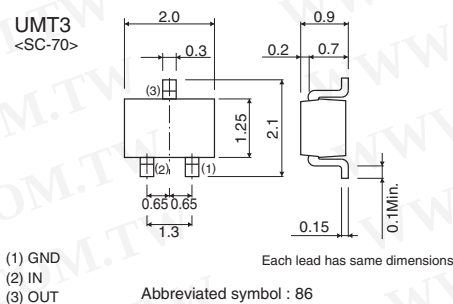
$R_1=47k\Omega$, $R_2=22k\Omega$

● Dimensions (Unit : mm)

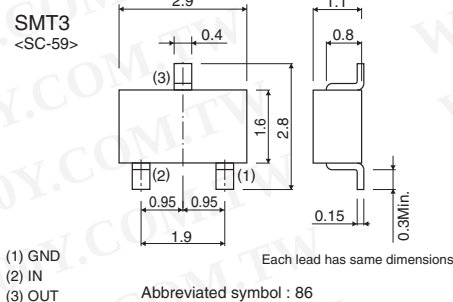
EMT3
(SC-75A)
<SOT-416>



UMT3
<SC-70>



SMT3
<SC-59>



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● Absolute maximum ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Supply voltage		V _{CC}	50	V
Input voltage		V _I	-10 to +40	V
Output current		I _O	30	mA
		I _{C(Max.)}	100	
Power dissipation	DTC144WE	P _D	150	mW
	DTC144WUA / DTC144WKA		200	
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)}	—	—	0.8	V	V _{CC} =5V, I _O =100μA
	V _{I(on)}	4	—	—		V _O =0.3V, I _O =2mA
Output voltage	V _{O(on)}	—	0.1	0.3	V	I _O =10mA, I _I =0.5mA
Input current	I _I	—	—	0.16	mA	V _I =5V
Output current	I _{O(off)}	—	—	0.5	μA	V _{CC} =50V, V _I =0V
DC current gain	G _I	56	—	—	—	I _O =5mA, V _O =5V
Input resistance	R _I	32.9	47	61.1	kΩ	—
Resistance ratio	R ₂ /R ₁	0.37	0.47	0.57	—	—
Transition frequency	f _T *	—	250	—	MHz	V _{CE} =10V, I _E =-5mA, f=100MHz

* Characteristics of built-in transistor

● Electrical characteristic curves

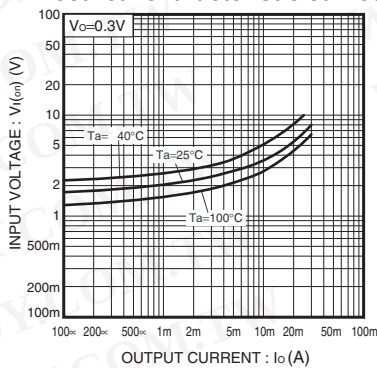


Fig.1 Input voltage vs. Output current (ON characteristics)

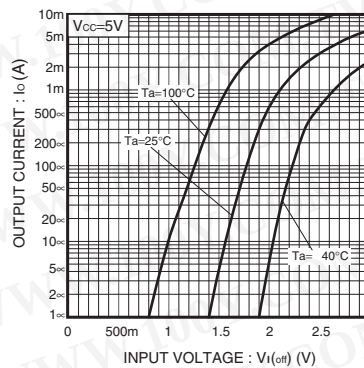


Fig.2 Output current vs. Input voltage (OFF characteristics)

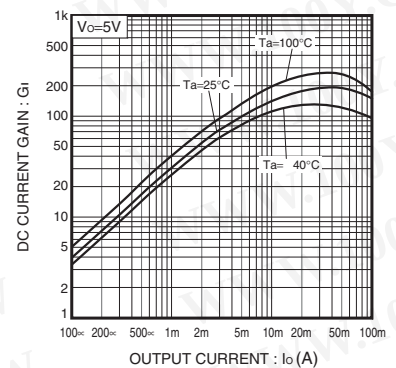


Fig.3 DC current gain vs. Output current

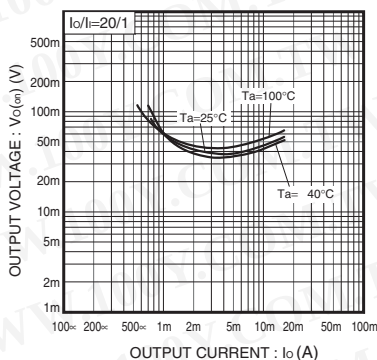


Fig.4 Output voltage vs. Output current

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