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

DTC144VUA / DTC144VKA

●**Applications**

Inverter, Interface, Driver

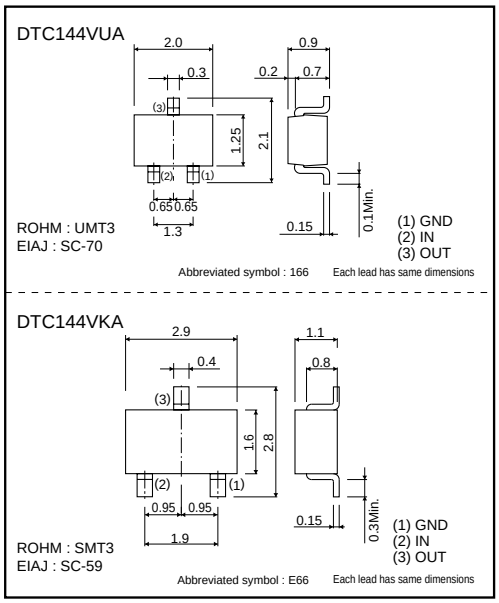
●**Features**

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)

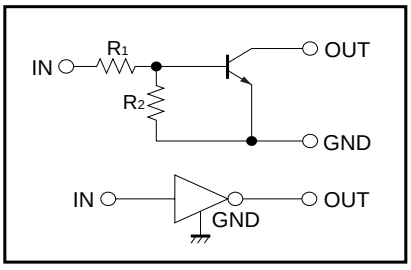
●**External dimensions** (Unit : mm)



●**Packaging specifications**

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

●**Equivalent circuit**



R_1=47kΩ, R_2=10kΩ

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

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	50	V
Input voltage	V_{IN}	−10 to +40	V
Output curren	I_O	30	mA
	$I_{C(Max.)}$	100	
Power dissipation	P_D	200	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	−55 to +150	°C

●**Electrical characteristics** (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	–	–	1	V	V_{CC}=5V , I_O=100μA
	$V_{I(on)}$	6	–	–		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	33	–	–	–	I_O=5mA , V_O=5V
Input resistance	R_1	32.9	47	61.1	kΩ	–
Resistance ratio	R_2/R_1	0.17	0.21	0.26	–	–
Transition frequency	f_T *	–	250	–	MHz	V_{CE}=10V , I_E= −5mA , f=100MHz

* Characteristics of built-in transistor

●**Electrical characteristic curves**

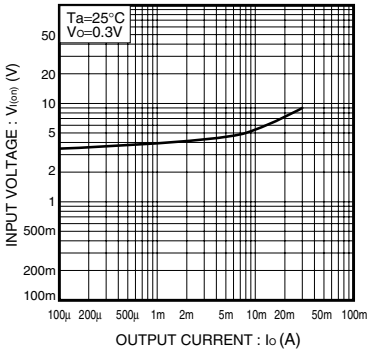


Fig.1 Input voltage vs. Output current (ON characteristics)

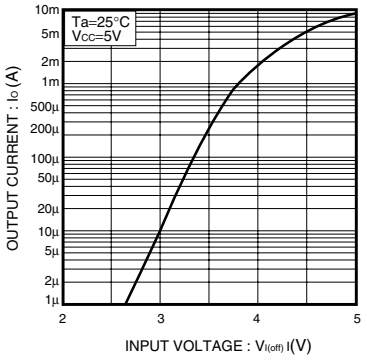


Fig.2 Output current vs. Input voltage (OFF characteristics)

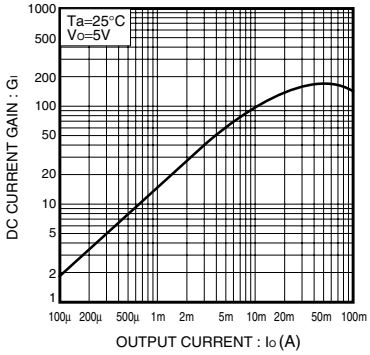


Fig.3 DC current gain vs. Output current

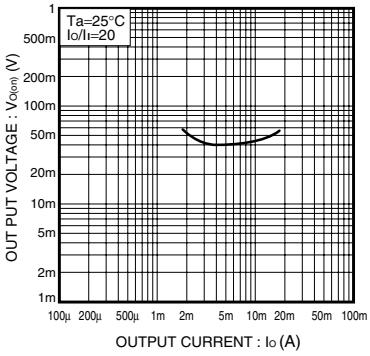


Fig.4 Output voltage vs. Output current

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