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

DTC114YM / DTC114YE / DTC114YUA / DTC114YKA

● Applications

Inverter, Interface, Driver

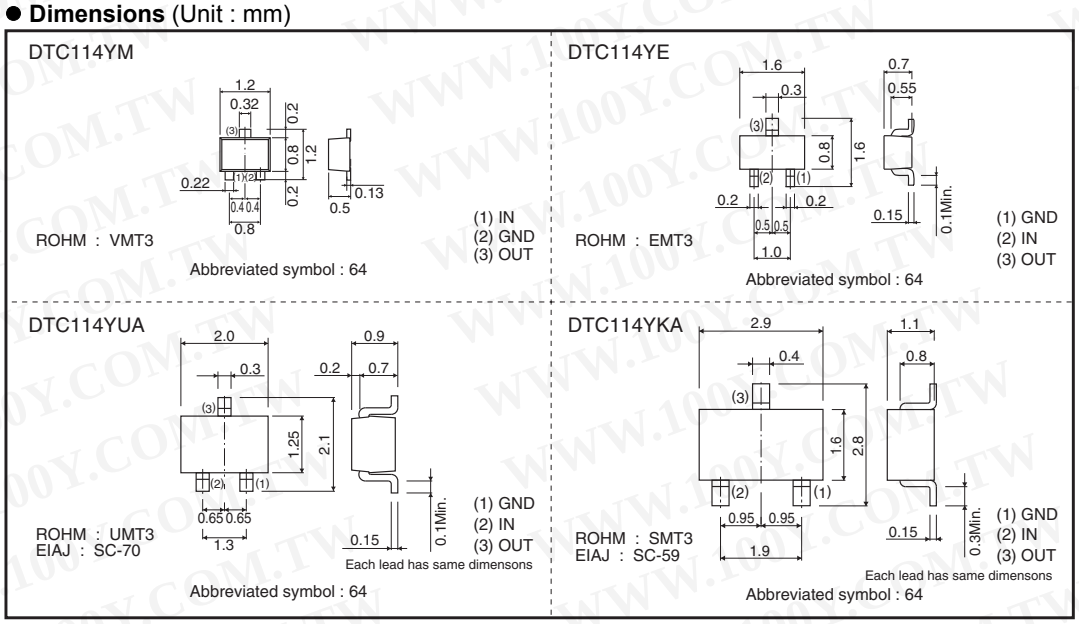
● Features

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 types)

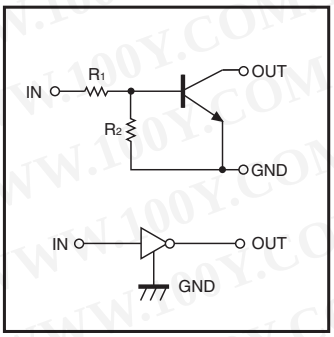
● Dimensions (Unit : mm)



● 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
DTC114YM		○	–	–	–
DTC114YE		–	○	–	–
DTC114YUA		–	–	○	–
DTC114YKA		–	–	–	○

● Inner circuit



R1=10kΩ R2=47kΩ

● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits				Unit
		DTC114YM	DTC114YE	DTC114YUA	DTC114YKA	
Supply voltage	V_{CC}	50				V
Input voltage	V_{IN}	−6 to +40				V
Output current	I_O	70				mA
	$I_{C(Max.)}$	100				
Power dissipation	P_D	150		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	$V_{I(off)}$	−	−	0.3	V	V_{CC}=5V, I_O=100μA
	$V_{I(on)}$	1.4	−	−		V_O=0.3V, I_O=1mA
Output voltage	$V_{O(on)}$	−	0.1	0.3	V	I_O/I_I=5mA/0.25mA
Input current	I_I	−	−	0.88	mA	V_I=5V
Output current	$I_{O(off)}$	−	−	0.5	μA	V_{CC}=50V, V_I=0V
DC current gain	G_I	68	−	−	−	V_O=5V, I_O=5mA
Input resistance	R_1	7	10	13	kΩ	−
Resistance ratio	R_2/R_1	3.7	4.7	5.7	−	−
Transition frequency	f_T *	−	250	−	MHz	V_{CE}=10V, I_E=−5mA, f=100MHz

* Characteristics of built-in transistor

● Electrical characteristic curves

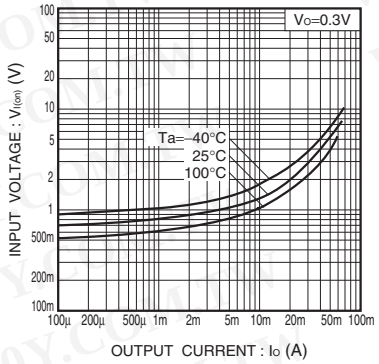


Fig.1 Input voltage vs. output current (ON characteristics)

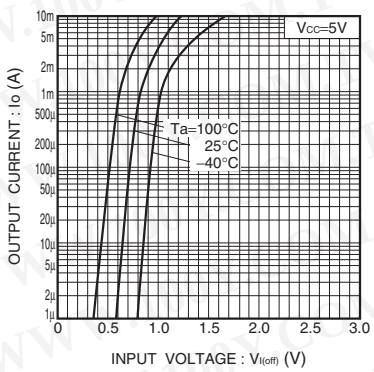


Fig.2 Output current vs. input voltage (OFF characteristics)

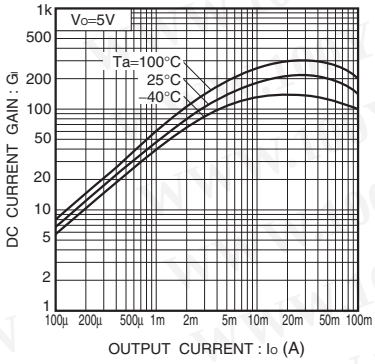


Fig.3 DC current gain vs. output current

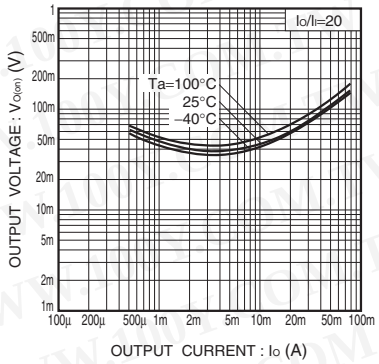


Fig.4 Output voltage vs. output current

Notes

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