

500mA / 50V Digital transistors (with built-in resistors)

DTD113ZK / DTD113ZU / DTD113ZS

●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 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.

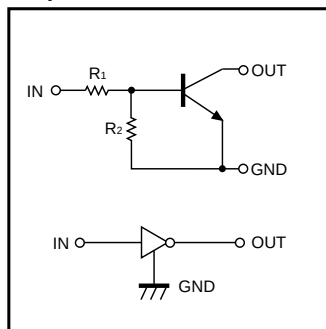
●Structure

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

●Packaging specifications

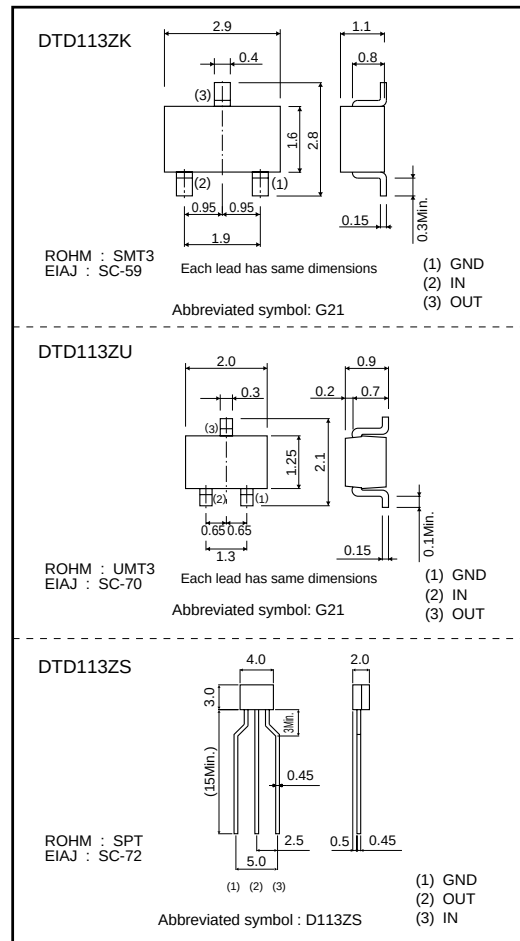
Part No.	Package	SMT3	UMT3	SPT
	Packaging type	Taping	Taping	Taping
	Code	T146	T106	TP
	Basic ordering unit (pieces)	3000	3000	5000
DTD113ZK		○	—	—
DTD113ZU		—	○	—
DTD113ZS		—	—	○

●Equivalent circuit



$R_1=1.0k\Omega$, $R_2=10k\Omega$

●External dimensions (Unit : mm)



DTD113ZK / DTD113ZU / DTD113ZS

Transistors

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits			Unit
		DTD113ZU	DTD113ZK	DTD113ZS	
Supply voltage	V _{CC}	50			V
Input voltage	V _{IN}	-5 to +10			V
Output current	I _C	500			mA
Power dissipation	P _D	200		300	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)}	—	—	0.3	V	V _{CC} =5V, I _O =100μA
	V _{I(on)}	1.5	—	—		V _O =0.3V, I _O =20mA
Output voltage	V _{O(on)}	—	0.1	0.3	V	I _O /I _I =50mA/2.5mA
Input current	I _I	—	—	7.2	mA	V _I =5V
Output current	I _{O(off)}	—	—	0.5	μA	V _{CC} =50V, V _I =0V
DC current gain	G _I	82	—	—	—	V _O =5V, I _O =50mA
Input resistance	R _I	0.7	1	1.3	kΩ	—
Resistance ratio	R ₂ /R ₁	8	10	12	—	—
Transition frequency	f _T *	—	200	—	MHz	V _{CE} =10V, I _E =-50mA, f=100MHz

* Characteristics of built-in transistor

Transistors

●Electrical characteristic curves

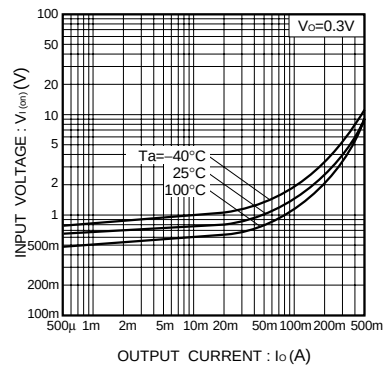


Fig.1 Input voltage vs. output current
(ON characteristics)

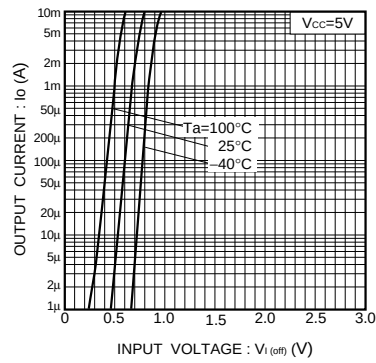


Fig.2 Output current vs. input voltage
(OFF characteristics)

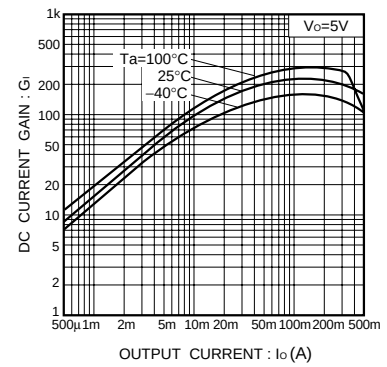


Fig.3 DC current gain vs. output current

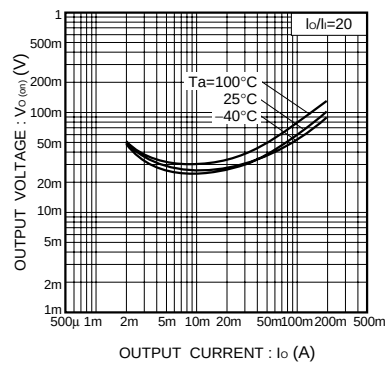


Fig.4 Output voltage vs. output current

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