

Transistors

# 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.

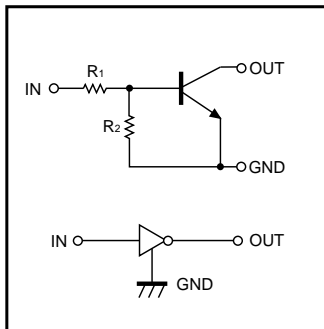
●Structure

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

●Packaging specifications

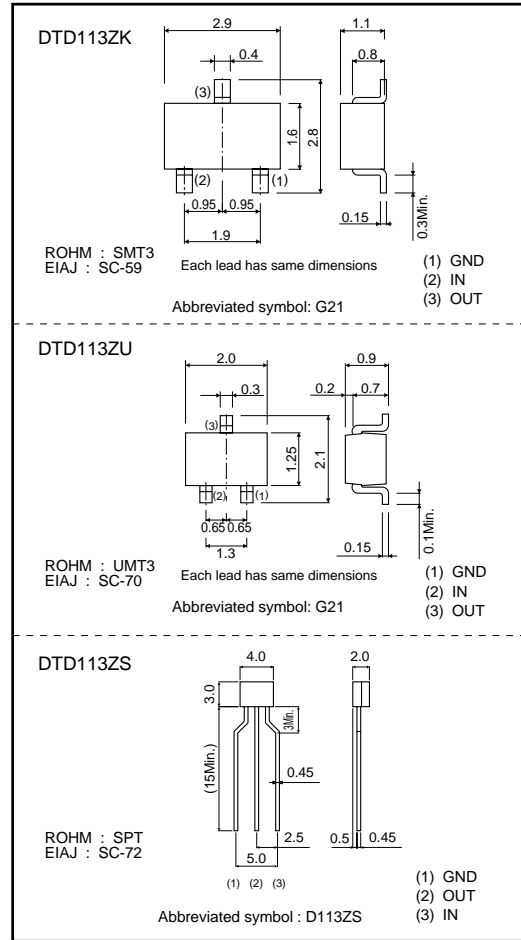
Package	SMT3	UMT3	SPT
Package type	Taping	Taping	Taping
Code	T146	T106	TP
Part No.	Basic ordering unit (pieces)		
DTD113ZK	3000	3000	5000
DTD113ZU	—	—	—
DTD113ZS	—	—	—

●Equivalent circuit



R<sub>1</sub>=1.0kΩ, R<sub>2</sub>=10kΩ

●External dimensions (Unit : mm)



# DTD113ZK / DTD113ZU / DTD113ZS

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

Parameter	Symbol	Limits			Unit
		DTD113ZU	DTD113ZK	DTD113ZS	
Supply voltage	V <sub>CC</sub>	50			V
Input voltage	V <sub>IN</sub>	-5 to +10			V
Output current	I <sub>C</sub>	500			mA
Power dissipation	P <sub>D</sub>	200		300	mW
Junction temperature	T <sub>J</sub>	150			°C
Storage temperature	T <sub>stg</sub>	-55 to +150			°C

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V <sub>I(off)</sub>	-	-	0.3	V	V <sub>CC</sub> =5V, I <sub>O</sub> =100μA
	V <sub>I(on)</sub>	1.5	-	-		V <sub>O</sub> =0.3V, I <sub>O</sub> =20mA
Output voltage	V <sub>O(on)</sub>	-	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> =50mA/2.5mA
Input current	I <sub>I</sub>	-	-	7.2	mA	V <sub>I</sub> =5V
Output current	I <sub>O(off)</sub>	-	-	0.5	μA	V <sub>CC</sub> =50V, V <sub>I</sub> =0V
DC current gain	G <sub>I</sub>	82	-	-	-	V <sub>O</sub> =5V, I <sub>O</sub> =50mA
Input resistance	R <sub>I</sub>	0.7	1	1.3	kΩ	-
Resistance ratio	R <sub>2</sub> /R <sub>1</sub>	8	10	12	-	-
Transition frequency	f <sub>T</sub> *	-	200	-	MHz	V <sub>CE</sub> =10V, I <sub>E</sub> =-50mA, f=100MHz

\* Characteristics of built-in transistor

Transistors

●Electrical characteristic curves

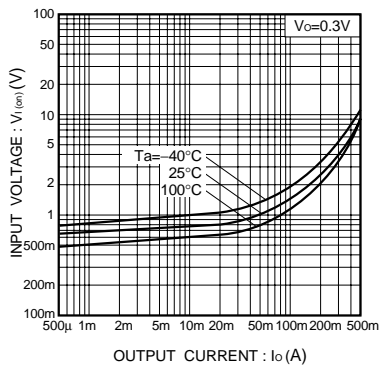


Fig.1 Input voltage vs. output current (ON characteristics)

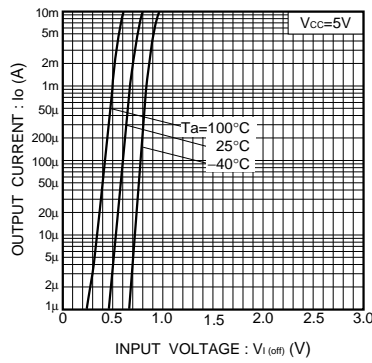


Fig.2 Output current vs. input voltage (OFF characteristics)

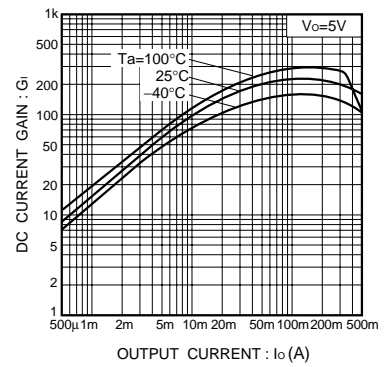


Fig. 3 DC current gain vs. output current

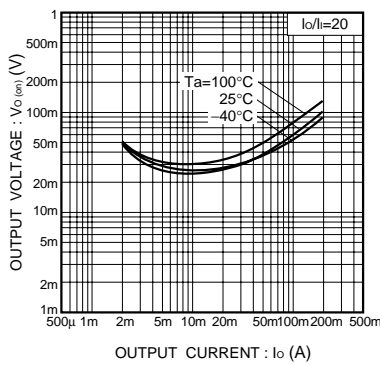


Fig.4 Output voltage vs. output current

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