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

DTD113ZK / DTD113ZU / DTD113ZS

●Applications

Inverter, Interface, Driver

●Features

1) Built-in bias resistors enable theconfiguration 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.

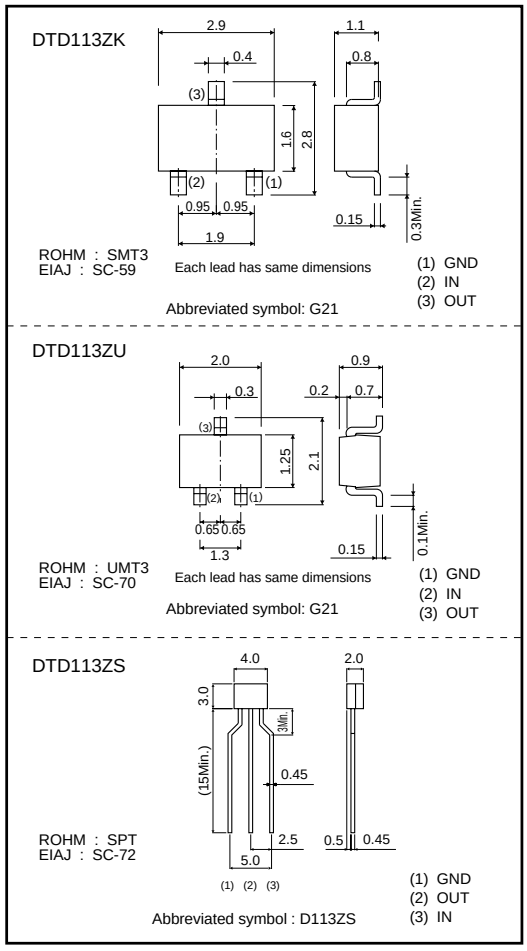
●Structure

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

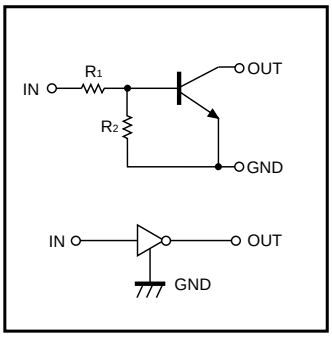
●Packaging specifications

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		–	–	○

●External dimensions (Unit : mm)



●Equivalent circuit



R_1=1.0kΩ, R_2=10kΩ

●**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	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
	$V_{I(on)}$	1.5	–	–		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_1	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

●**Electrical characteristic curves**

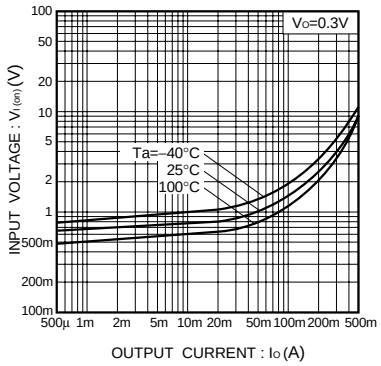


Fig.1 Input voltage vs. output current (ON characteristics)

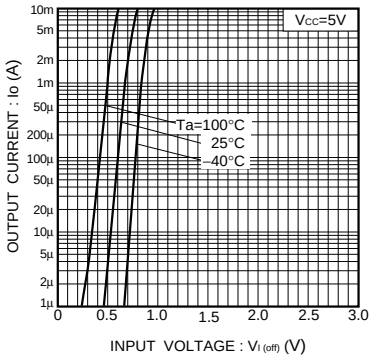


Fig.2 Output current vs. input voltage (OFF characteristics)

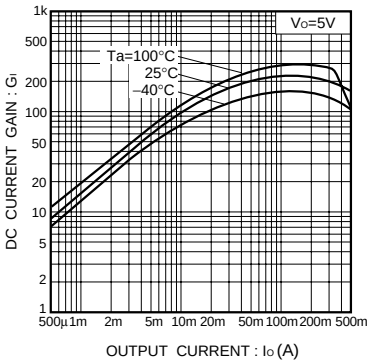


Fig. 3 DC current gain vs. output current

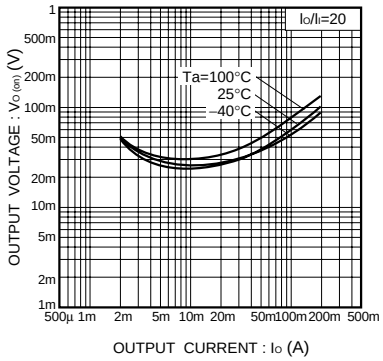


Fig.4 Output voltage vs. output current

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