Digital transistors (built-in resistors)

DTD113ZK / DTD113ZU / DTD113ZS

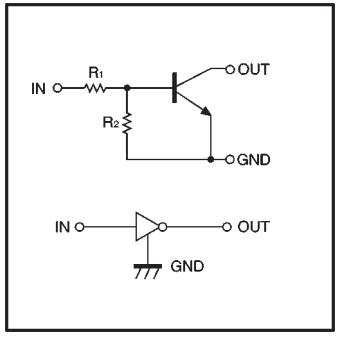
●Features

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 device design easy.

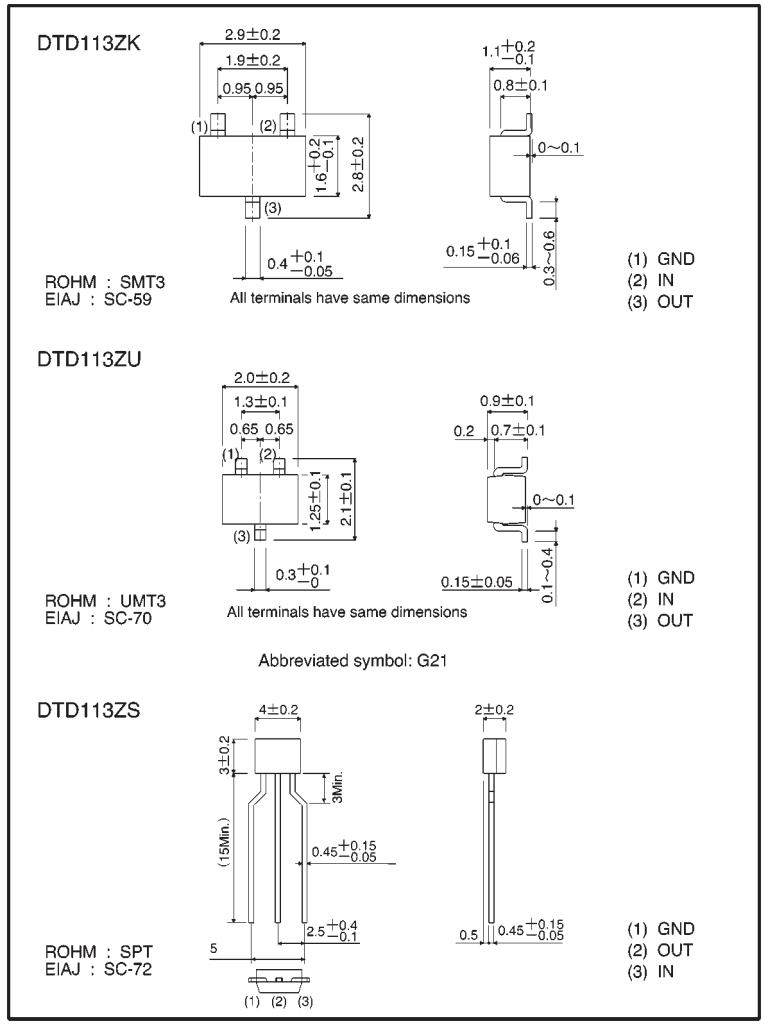
●Structure

NPN digital transistor
(Built-in resistor type)

●Equivalent circuit



●External dimensions (Units: mm)



●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits(DTD113Z□)			Unit
		U	K	S	
Supply voltage	V_{CC}	50			V
Input voltage	V_{IN}	−5～+10			V
Output current	I_C	500			mA
Power dissipation	Pd	200		300	mW
Junction temperature	Tj	150			℃
Storage temperature	Tstg	−55～+150			℃

●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=100 μA
	$V_{I(on)}$	3	—	—		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	56	—	—	—	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=−5mA, f=100MHz ✻

✻ Transition frequency of the device

●Packaging specifications

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

●Electrical characteristic curves

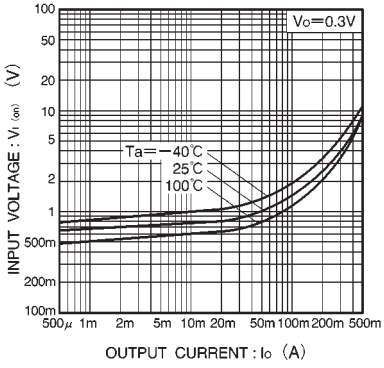


Fig.1 Input voltage vs. output current (ON characteristics)

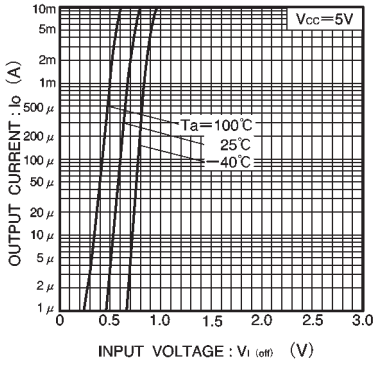


Fig.2 Output current vs. input voltage (OFF characteristics)

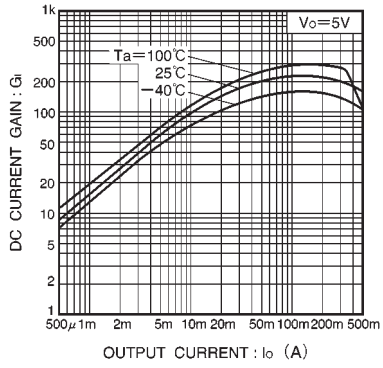


Fig. 3 DC current gain vs. output current

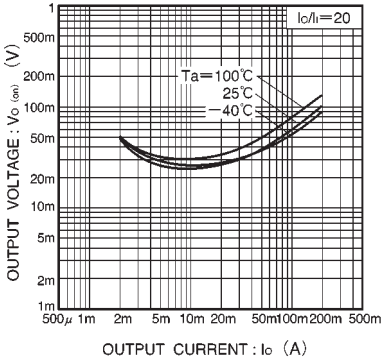


Fig.4 Output voltage vs. output current