ETL SEMICONDUCTOR

Digital transistors (built-in resistors)

DTC144EKA

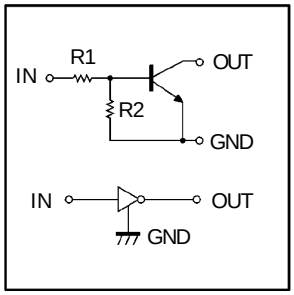
- **Features**

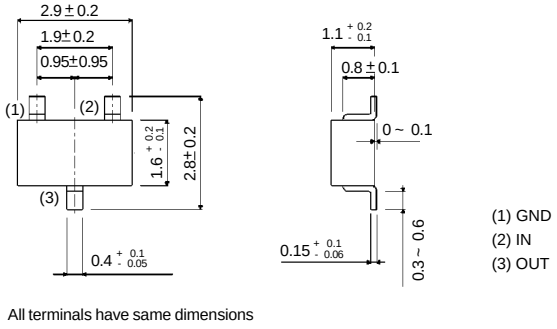
1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
2) The bias resistors consist of thinfilm resistors with complete isolation to allow positive biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
3) Only the on/ off conditions need to be set for operation, making device design easy.

- **Structure**

PNP digital transistor (with built-in resistors)

- **Equivalent circuit**





All terminals have same dimensions

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● Absolute maximum ratings(T_a=25 °C)

Parameter	symbol	limits			unit
Supply voltage	V_{cc}	50			V
Input voltage	V_{IN}	–10~+40			V
Output current	I_O	30			mA
	$I_{C(Max.)}$	100			
Power dissipation	P_d	150	200	300	mW
Junction temperature	T_j	150			℃
Storage temperature	T_{stg}	–55~+150			℃

● Elecrical characteristics(T_a=25°C)

Parameter	symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	—	—	0.5	V	V_{CC}= 5V,I_O= 100μA
	$V_{I(on)}$	3	—	—		V_O= 0.3V,I_O=2mA
Output Voltage	$V_{O(on)}$	—	—	0.3	V	I_O/I_I=10mA/0.5mA
Input current	I_I	—	—	0.18	mA	V_I= 5V
Output current	$I_{O(off)}$	—	—	0.5	μA	V_{CC}= 50V,V_I= 0 V
DC current gain	G_I	68	—	—	—	V_O= 5V,I_O= 5mA
Input resistance	R_1	32.9	47	61.1	KΩ	—
Resistance ratio	R_2 / R_1	0.8	1	1.2	—	—
Transition frequency	f_T	—	250	—	MHz	V_{CE}= 10V,I_E= – 5 mA,f=100MHz*

*Transition frequency of the device

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ELECTRICAL CHARACTERISTIC CURVES

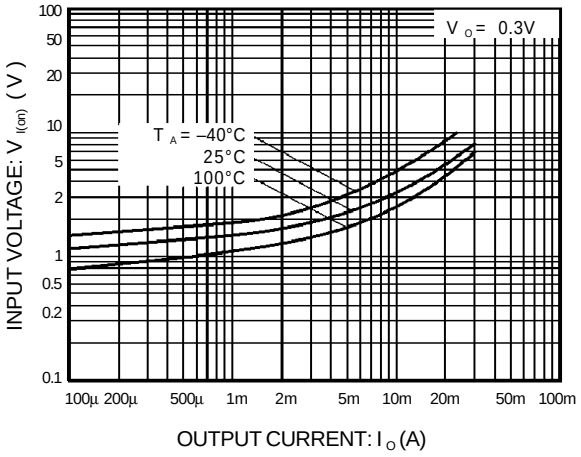

Figure 1. Input voltage vs.output current (ON characteristics)

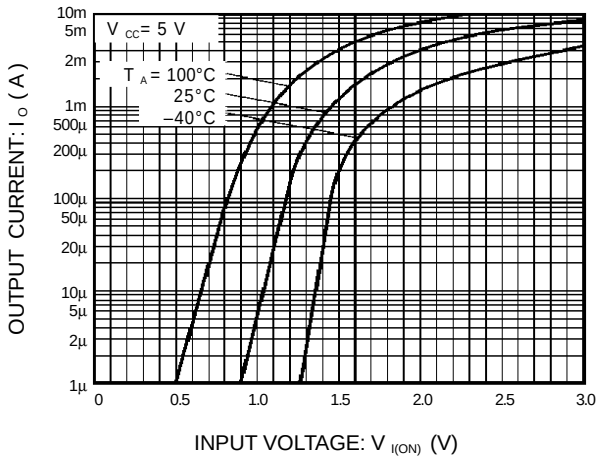

Figure 2. Output current vs.input voltage (OFF characteristics)

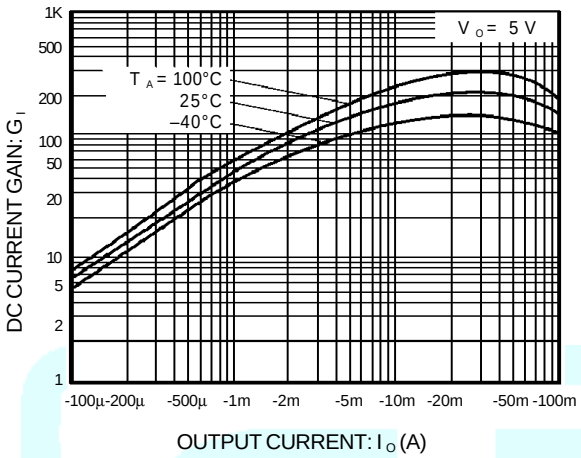

Figure 3. DC current gain vs.output current

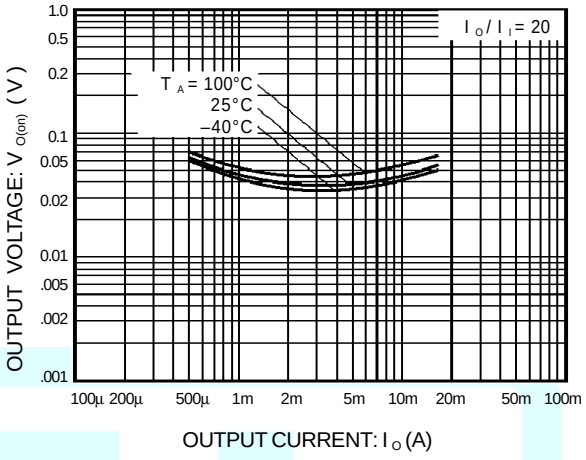

Figure 4. Output voltage vs.output current