



## Digital transistors (built-in resistors)

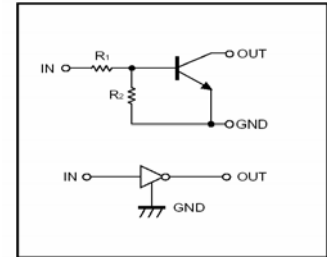
### DTC143XM/DTC143XE/DTC143XUA /DTC143XCA/DTC143XKA/DTC143XSA

DIGITAL TRANSISTOR (NPN)

#### 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.

#### ●Equivalent circuit



#### PIN CONNENCTIONS AND MARKING

<p>DTC143XE</p> <p>1.IN 2.GND 3.OUT</p> <p>SOT-523      Abbreviated symbol: 43</p>	<p>DTC143XUA</p> <p>1.IN 2.GND 3.OUT</p> <p>SOT-323      Abbreviated symbol: 43</p>
<p>DTC143XKA</p> <p>1.IN 2.GND 3.OUT</p> <p>SOT-23-3L      Abbreviated symbol: 43</p>	<p>DTC143XCA</p> <p>1.IN 2.GND 3.OUT</p> <p>SOT-23      Abbreviated symbol: 43</p>
<p>DTC143XSA</p> <p>1.GND 2.OUT 3.IN</p> <p>TO-92S</p>	<p>DTC143XM</p> <p>1.IN 2.GND 3.OUT</p> <p>SOT-723      Abbreviated symbol: 43</p>

### Absolute maximum ratings(Ta=25°C)

Parameter	Symbol	Limits (DTC143X)						Unit
		M	E	UA	CA	KA	SA	
Supply voltage	$V_{CC}$	50						V
Input voltage	$V_{IN}$	-7~20						V
Output current	$I_O$	100						mA
	$I_{C(MAX)}$	100						
Power dissipation	$P_d$	100	150	200		300		mW
Junction temperature	$T_j$	150						°C
Storage temperature	$T_{stg}$	-55~150						°C

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

Parameter	Symbol	Min.	Typ	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$			0.3	V	$V_{CC}=5V, I_O=100\mu A$
	$V_{I(on)}$	2.5				$V_O=0.3V, I_O=20\text{ mA}$
Output voltage	$V_{O(on)}$		0.1	0.3	V	$I_O/I_I=10\text{mA}/0.5\text{mA}$
Input current	$I_I$			1.8	mA	$V_I=5V$
Output current	$I_{O(off)}$			0.5	$\mu A$	$V_{CC}=50V, V_I=0$
DC current gain	$G_I$	30				$V_O=5V, I_O=10\text{mA}$
Input resistance	$R_1$	3.29	4.7	6.11	K $\Omega$	
Resistance ratio	$R_2/R_1$	1.7	2.1	2.6		
Transition frequency	$f_T$		250		MHz	$V_O=10V, I_O=5\text{mA}, f=100\text{MHz}$

## Typical Characteristics

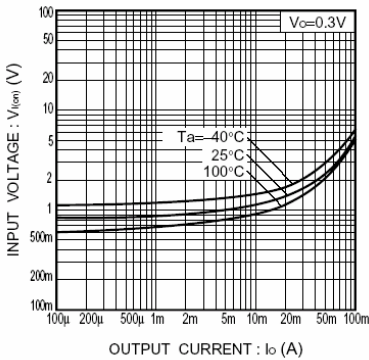


Fig.1 Input voltage vs. output current (ON characteristics)

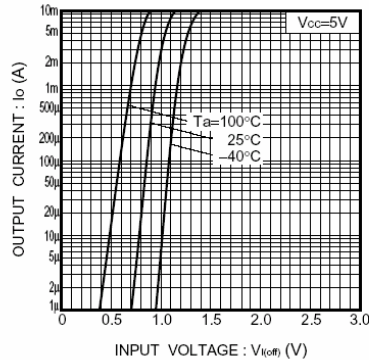


Fig.2 Output current vs. input voltage (OFF characteristics)

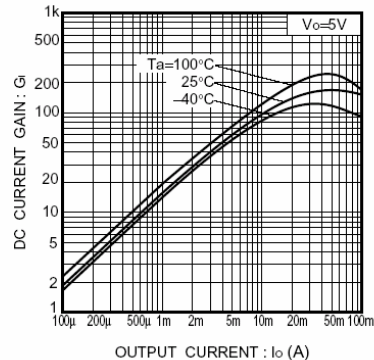


Fig.3 DC current gain vs. output current

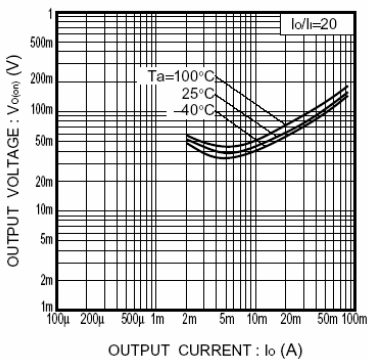


Fig.4 Output voltage vs. output current