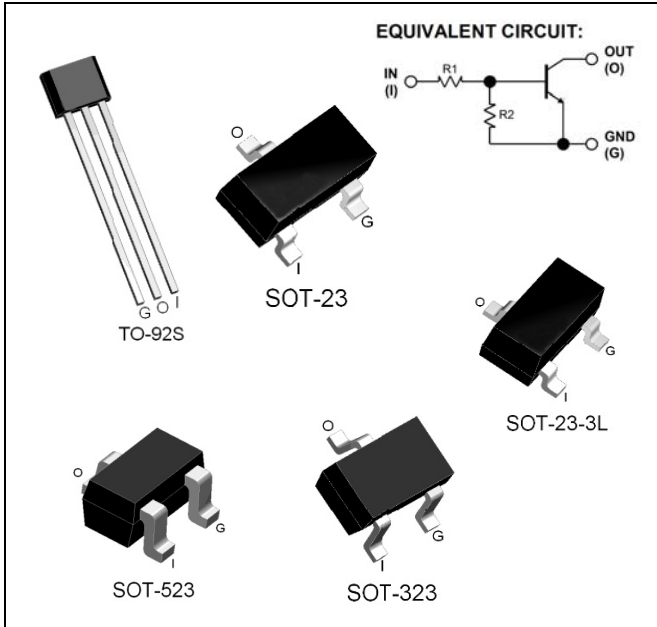


## DIGITAL TRANSISTORS NPN Silicon with Built-in Resistors



### FEATURES

- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see the equivalent circuit).
- 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.
- Only the on/off conditions need to be set for operation, marking the device design easy.

### MECHANICAL DATA

- Available in SOT-523, SOT-323, SOT-23, SOT-23-3L and TO-92S Package
- Solderability : MIL-STD-202, Method 208
- Full RoHS Compliance

### ORDERING INFORMATION

PART NUMBER	PACKAGE	SHIPPING	MARKING CODE
DTC143E□-5T3R	SOT-523	Tape Reel	23
DTC143E□-3T3R	SOT-323	Tape Reel	
DTC143E□-T3R	SOT-23	Tape Reel	
DTC143E□-T3LR	SOT-23-3L	Tape Reel	
DTC143E□-T92SB	TO-92S	Tape Box	DTC143E LS yww

**Notes:**

1. □: none is for Lead Free package;  
"G" is for Halogen Free package.
2. Marking Code: yww: y: Year code; ww: Week code.

### THERMAL DATA

PARAMETER	SYMBOL	VALUES	UNIT
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	833	$^{\circ}\text{C}/\text{W}$
		625	
		625	
		625	
		417	

**Notes:**

3.  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Measured with device mounted on 1 in<sup>2</sup> FR-4 board with 2 oz copper.

### ABSOLUTE MAXIMUM RATINGS

$T_A = 25^\circ\text{C}$ , unless otherwise specified. (Note 4)

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		$V_{CC}$	50	V
Input Voltage		$V_{IN}$	-10 ~ +30	V
Output Current		$I_O$	100	mA
		$I_{C(MAX)}$	100	
Power Dissipation	SOT-523	$P_D$	150	mW
	SOT-323		200	
	SOT-23		200	
	SOT-23-3L		200	
	TO-92S		300	
Maximum Junction Temperature		$T_J$	150	$^\circ\text{C}$
Storage Temperature Range		$T_{stg}$	- 55 ~ +150	$^\circ\text{C}$

#### Notes:

4. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### ELECTRICAL CHARACTERISTICS

$T_A = 25^\circ\text{C}$ , unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage	$V_{I(off)}$	$V_{CC} = 5V, I_O = 100\mu\text{A}$			0.5	V
	$V_{I(on)}$	$V_O = 0.3V, I_O = 20\text{mA}$	3			
Output Voltage	$V_{O(on)}$	$I_O/I_I = 10\text{mA}/0.5\text{mA}$			0.3	V
Input Current	$I_I$	$V_I = 5V$			1.8	mA
Output Current	$I_{O(off)}$	$V_{CC} = 50V, V_I = 0V$			0.5	$\mu\text{A}$
DC Current Gain	$G_I$	$V_O = 5V, I_O = 10\text{mA}$	20			-
Input Resistance	R1		3.29	4.7	6.11	k $\Omega$
Resistance Ratio	R2/R1		0.8	1	1.2	-
Transition Frequency <sup>(Note 3)</sup>	$f_T$	$V_{CE} = 10V, I_E = 5\text{mA}, f = 100\text{MHz}$		250		MHz

#### Notes:

5. Characteristics of built-in transistor.

## TYPICAL PERFORMANCE CHARACTERISTICS

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

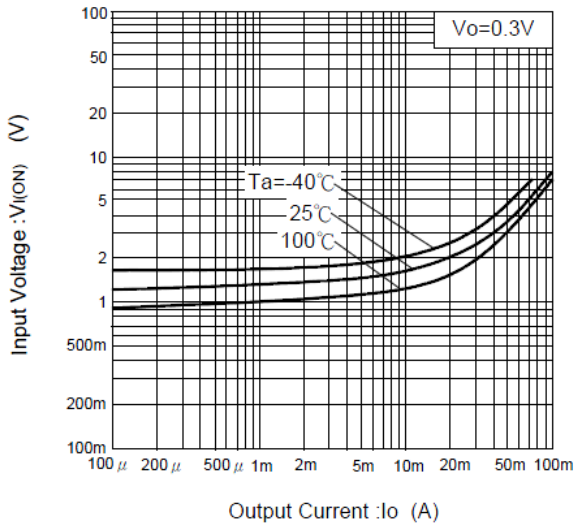


Fig.2 Output current vs Input voltage  
(OFF characteristics)

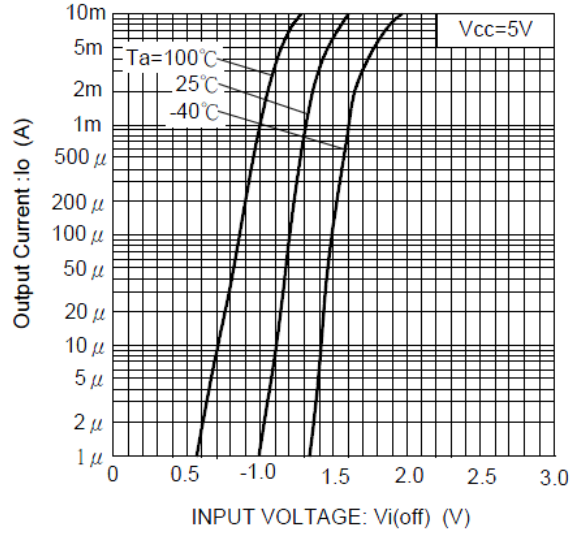


Fig.3 DC current gain vs.output current

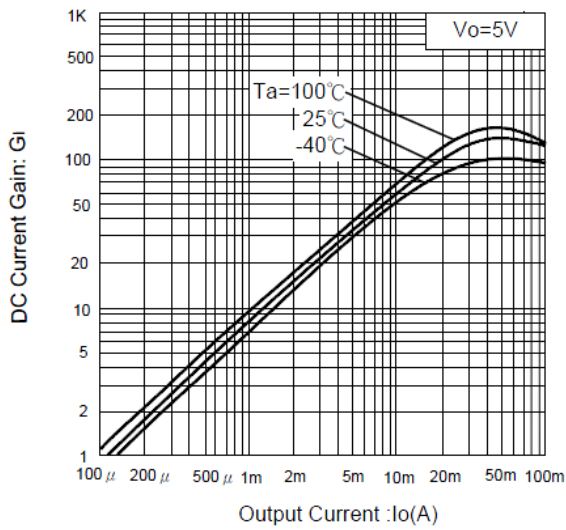
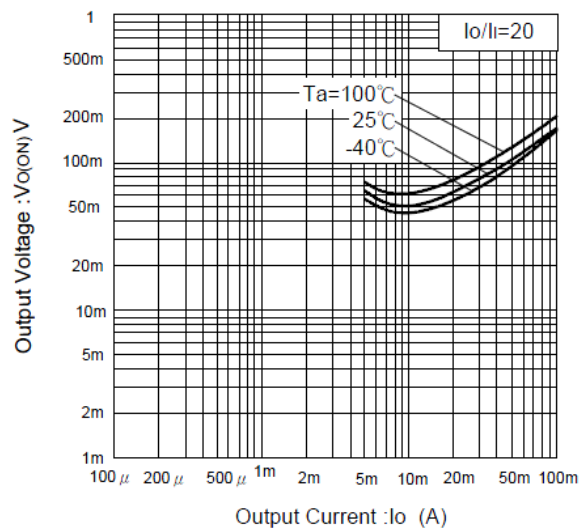


Fig.4 Output voltage vs. output current



PHYSICAL DIMENSION

