

Bipolar Transistors Silicon NPN Epitaxial Type

## TDTC123J

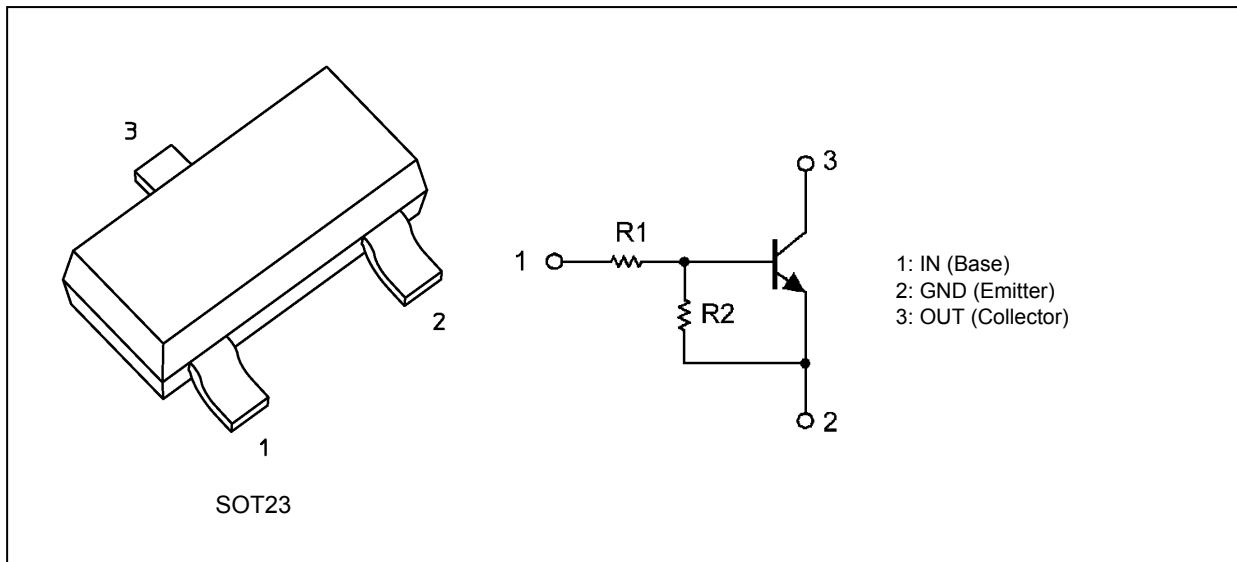
### 1. Applications

- Switching
- Inverter Circuits
- Driver Circuits

### 2. Features

- (1) The integrated bias resistor reduces the number of external parts required, making it possible to reduce system size and assembly time.
- (2) Toshiba offers transistors with a wide range of resistance to accommodate various circuit designs.
- (3) Complementary to TDTA123J

### 3. Packaging and Internal Circuit



### 4. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25\text{ }^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	50	V
Output current	$I_o$	100	mA
Power dissipation	$P_D$	320	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

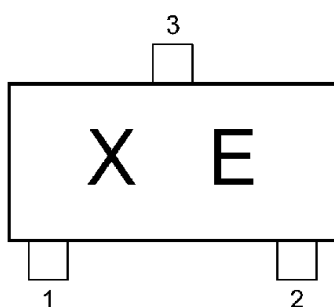
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Start of commercial production  
2016-03

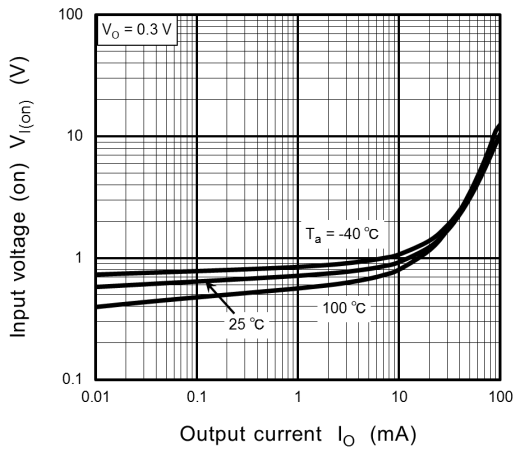
## 5. Electrical Characteristics (Unless otherwise specified, $T_a = 25\text{ }^\circ\text{C}$ )

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Input voltage (off)	$V_{I(off)}$		$V_{CC} = 5\text{ V}, I_O = 0.1\text{ mA}$	—	—	0.5	V
Input voltage (on)	$V_{I(on)}$		$V_O = 0.3\text{ V}, I_O = 5\text{ mA}$	1.1	—	—	V
Output voltage	$V_{O(on)}$		$I_O = 10\text{ mA}, I_I = 0.5\text{ mA}$	—	0.1	0.3	V
Input bias current	$I_I$		$V_I = 5\text{ V}$	—	—	0.145	mA
Output current	$I_{O(off)}$		$V_{CC} = 50\text{ V}, V_I = 0\text{ V}$	—	—	500	nA
DC current gain	$G_I$		$V_O = 5\text{ V}, I_O = 10\text{ mA}$	80	—	—	—
Input resistance	$R_1$		—	1.54	2.2	2.86	k $\Omega$
Resistance ratio	$R_2/R_1$		—	17	21	26	—
Transition frequency	$f_T$		$V_{CE} = 10\text{ V}, I_E = -5\text{ mA}, f = 100\text{ MHz}$	—	250	—	MHz

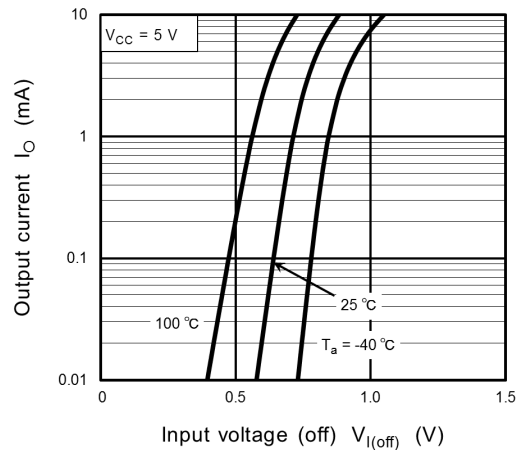
## 6. Marking



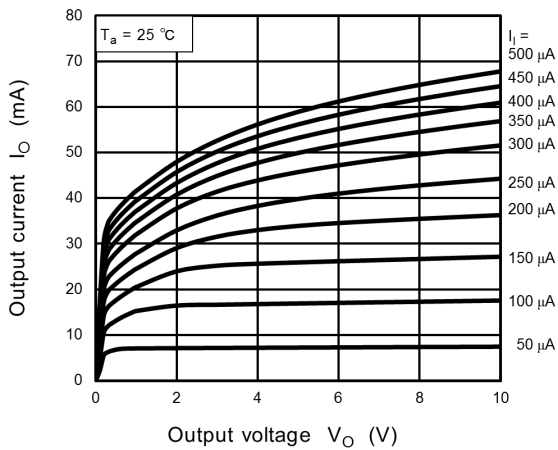
## 7. Characteristics Curves (Note)



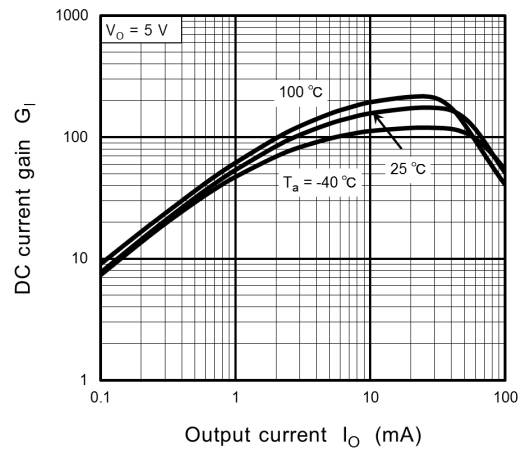
**Fig. 7.1  $V_{I(on)}$  -  $I_O$**



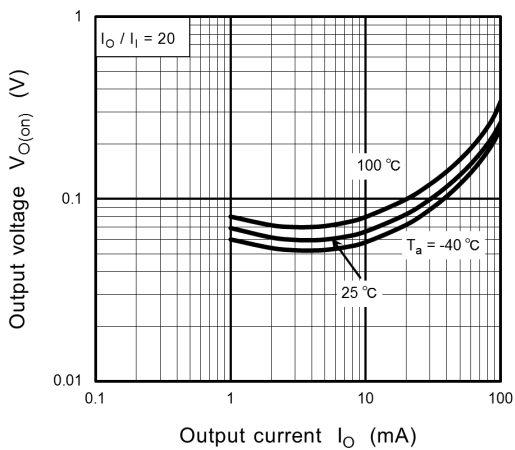
**Fig. 7.2  $I_O$  -  $V_{I(off)}$**



**Fig. 7.3  $I_O$  -  $V_O$**



**Fig. 7.4  $G_I$  -  $I_O$**

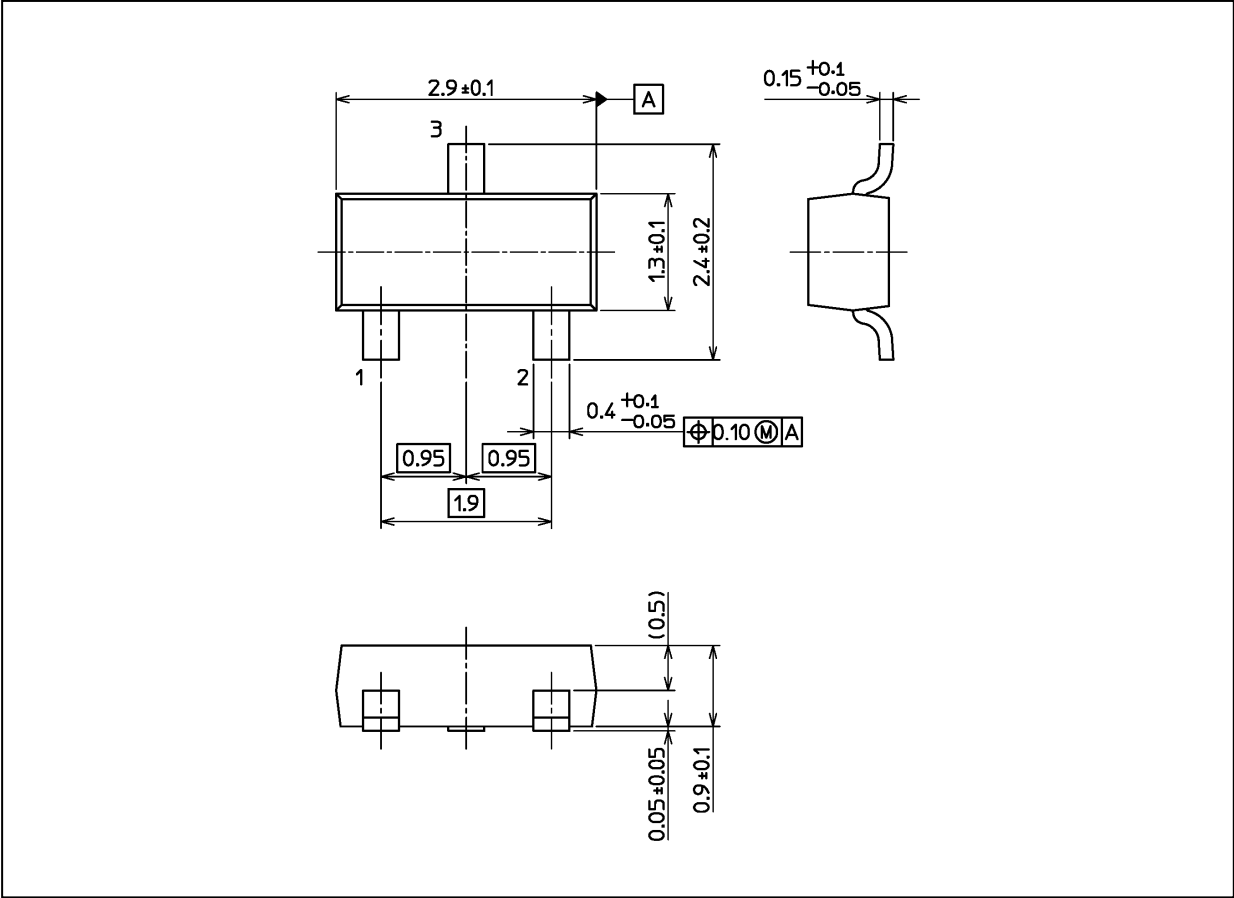


**Fig. 7.5  $V_{O(on)}$  -  $I_O$**

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 9 mg (typ.)

Package Name(s)
Nickname: SOT23

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