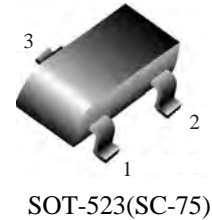


Digital transistors (built-in resistors)

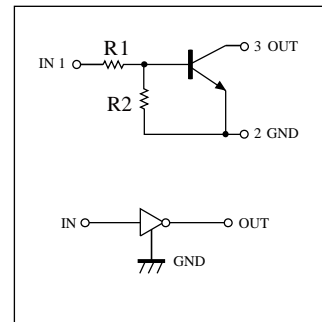
• **Features**

- 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.



• **Device Marking and Ordering Information**

Device	Marking	Shipping
DTC502E	24	3000/Tape&Reel



• **Absolute maximum ratings** ($T_A = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Supply voltage	V_{CC}	50	V
Input voltage	V_{IN}	-10~+40	V
Output current	I_O	50	mA
	$I_{C(Max)}$	100	
Power dissipation	P_d	150	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55~+150	$^\circ\text{C}$

• **Electrical characteristics** ($T_A = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	–	–	0.5	V	$V_{CC} = 5V, I_O = 100\mu A$
	$V_{I(on)}$	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	–	–	0.88	mA	$V_I = 5V$
Output current	$I_{O(off)}$	–	–	0.5	μA	$V_{CC} = 50V, V_I = 0V$
DC current gain	G_I	30	–	–	–	$V_O = 5V, I_O = 5mA$
Input resistance	R_1	7	10	13	k Ω	–
Resistance ratio	R_2/R_1	0.8	1	1.2	–	–
Transition frequency	f_T	–	250	–	MHz	$V_{CE} = 10V, I_E = -5mA, f = 100MHz$ *

* Transition frequency of the device

• **Electrical characteristic curves**

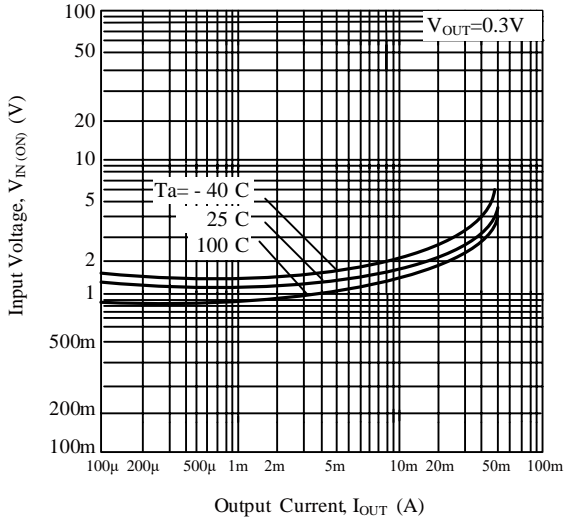


Fig.1 Input Voltage vs. Output Current (ON Characteristics)

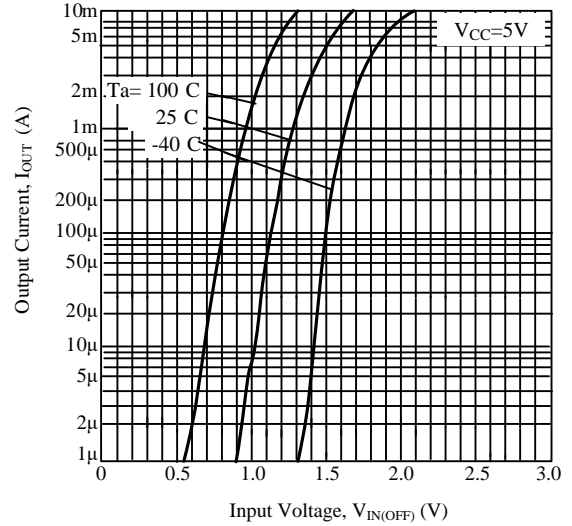


Fig.2 Output Current vs. Input Voltage (OFF Characteristics)

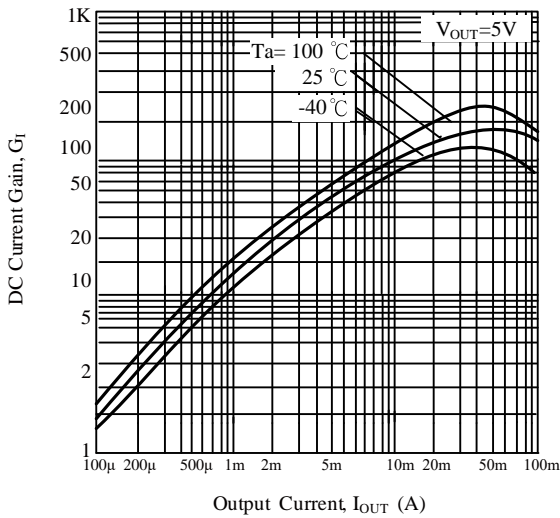


Fig.3 DC Current Gain vs. Output Current

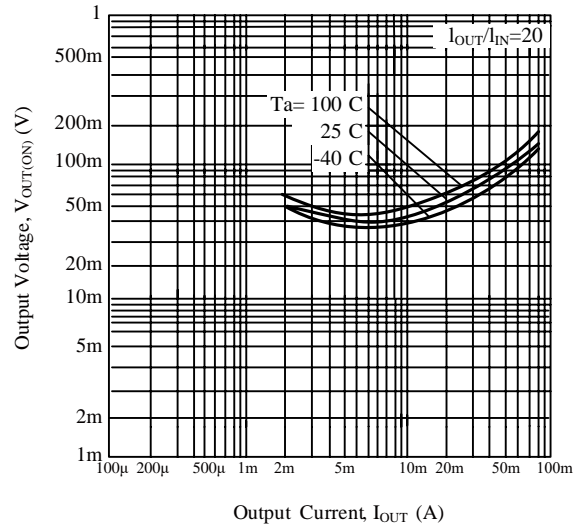
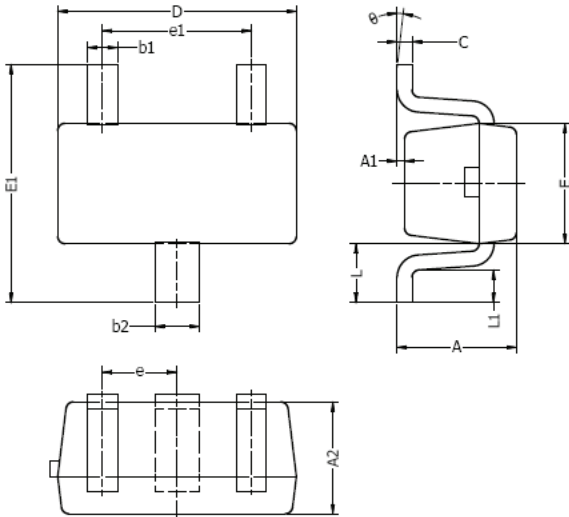


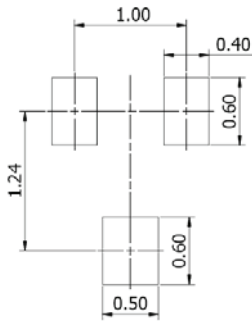
Fig.4 Output Voltage vs. Output Current

SOT-523(SC-75) OUTLINE AND DIMENSIONS



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.70	0.90	0.028	0.035
A1	0.00	0.10	0.000	0.004
A2	0.70	0.80	0.028	0.031
b1	0.15	0.25	0.006	0.010
b2	0.25	0.35	0.010	0.014
c	0.10	0.20	0.004	0.008
D	1.50	1.70	0.059	0.067
E	0.70	0.90	0.028	0.035
E1	1.45	1.75	0.057	0.069
e	0.50 TYP.		0.020 TYP.	
e1	0.90	1.10	0.035	0.043
L	0.40 REF.		0.016 REF.	
L1	0.10	0.30	0.004	0.012
θ	0°	8°	0°	8°

Typical Soldering Pattern:



NOTES:

- Above package outline conforms to JEITA EAIJ ED-7500A SC-75.
- Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.