

Digital transistors (built-in resistors)

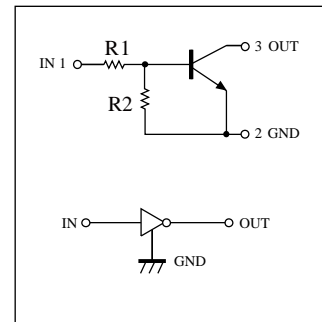
• **Features**

- 1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see the 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
DTC505E	E42	3000/Tape&Reel



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

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	50	V
Input voltage	V_{IN}	-5~+12	V
Output current	I_O	100	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	$V_{CC} = 5V, I_O = 100\mu A$
	$V_{I(on)}$	1.1	-	-		$V_O = 0.3V, I_O = 5mA$
Output voltage	$V_{O(on)}$	-	0.1	0.3	V	$I_O/I_I = 5mA/0.25mA$
Input current	I_I	-	-	3.6	mA	$V_I = 5V$
Output current	$I_{O(off)}$	-	-	0.5	μA	$V_{CC} = 50V, V_I = 0V$
DC current gain	G_I	80	-	-	-	$V_O = 5V, I_O = 10mA$
Input resistance	R_1	1.54	2.2	2.86	k Ω	-
Resistance ratio	R_2/R_1	17	21	26	-	-
Transition frequency	f_T	-	250	-	MHz	$V_{CE} = 10V, I_E = -5mA, f = 100MHz$ *

* Transition frequency of the device

• Electrical characteristic curves

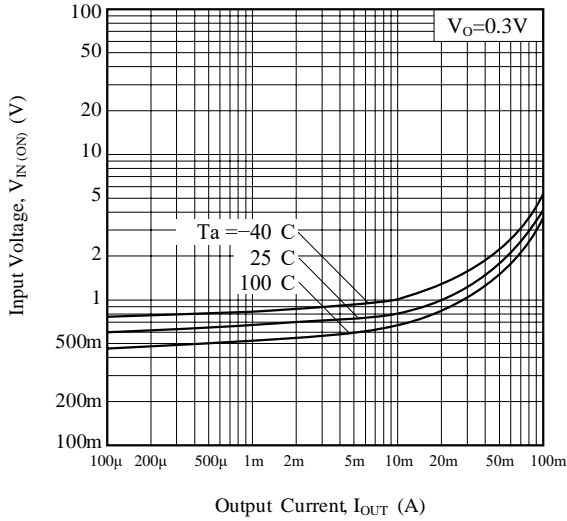


Fig.1 Input Voltage vs. Output Current (ON Characteristics)

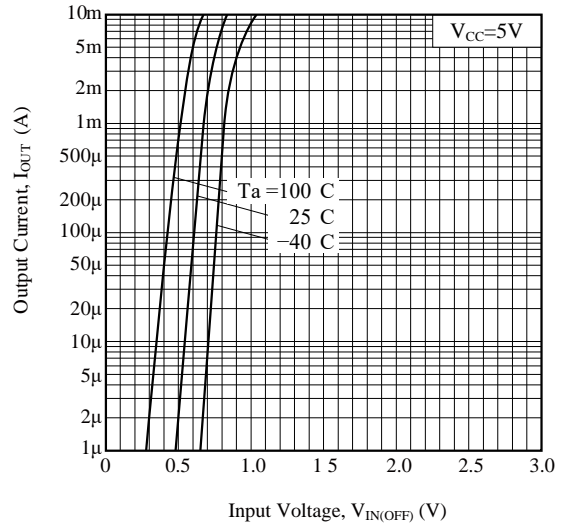


Fig.2 Output Current vs. Input Voltage (OFF Characteristics)

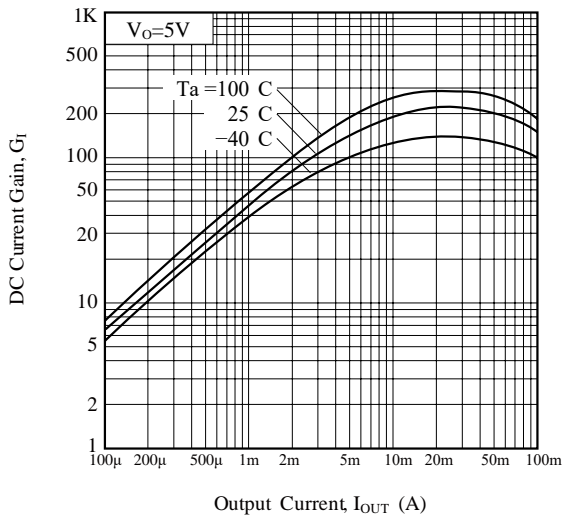


Fig.3 DC Current Gain vs. Output Current

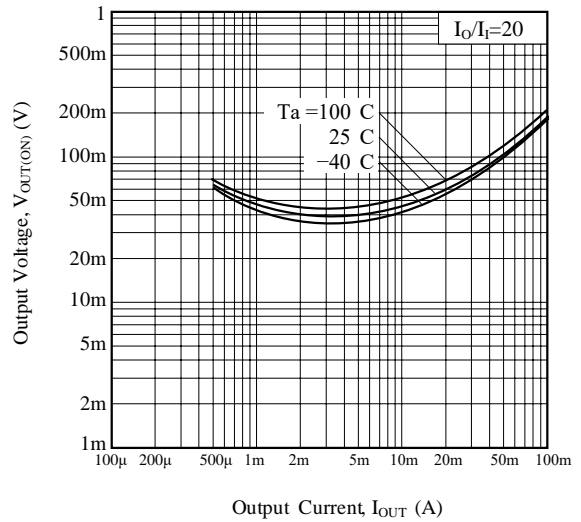
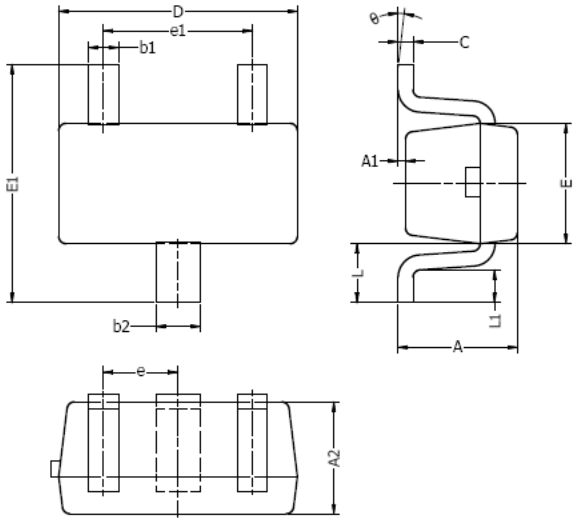


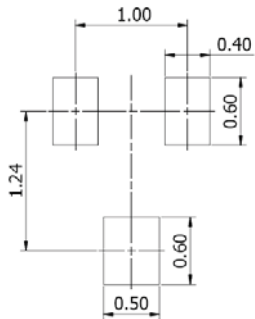
Fig.4 Output Voltage vs. Output Current

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
theta	0°	8°	0°	8°

Typical Soldering Pattern:



NOTES:

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