Digital transistors (built-in resistors)

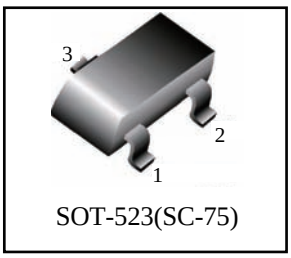
- Features

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 thinfilm resistors with complete isolation to allow positive 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.

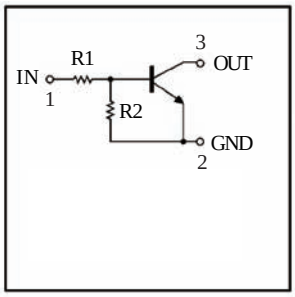
- Structure

NPN digital transistor (with built-in resistors)

- Equivalent circuit
- We declare that the material of productcompliance with RoHS requirements.



SOT-523(SC-75)



- Device Marking

Device	Marking	Shipping
DTC504E	26	3000/Tape&Reel

- Absolute maximum ratings(T_a = 25 °C)

Parameter	symbol	limit			unit
Supply voltage	V_{CC}	50			V
Input voltage	V_{IN}	–10~+40			V
Output current	I_O	30			mA
	$I_{C(Max)}$	100			
Power dissipation	P_d	150	200	300	mW
Junction temperature	T_j	150			℃
Storage temperature	T_{stg}	–55~+150			℃

- Elecrical characteristics(T_a = 25°C)

Parameter	symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_{I(off)}$	-	-	0.5	V	V_{CC} = 5V,I_O = 100μA
	$V_{I(on)}$	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	-	-	0.18	mA	V_I = 5V
Output current	$I_{O(off)}$	-	-	0.5	μA	V_{CC}= 50V,V_I = 0 V
DC current gain	G_I	68	-	-	-	V_O= 5V,I_O = 5mA
Input resistance	R_1	32.9	47	61.1	KΩ	-
Resistance ratio	R_2 / R_1	0.8	1	1.2	-	-
Transition frequency	f_T	-	250	-	MHz	V_{CE}= 10V,I_E = – 5 mA,f=100MHz*

*Transition frequency of the device

ELECTRICAL CHARACTERISTIC CURVES

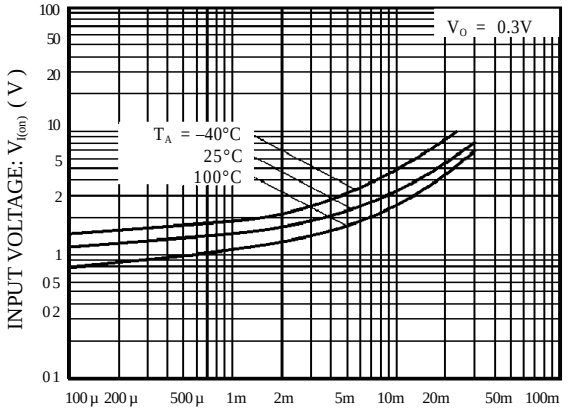


Figure 1. Input voltage vs.output current
(ON characteristics)

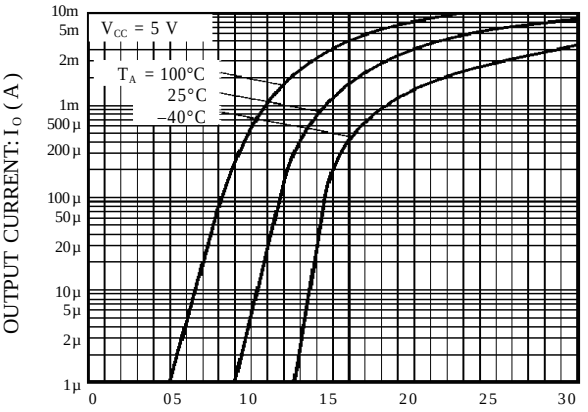


Figure 2. Output current vs.input voltage
(OFF characteristics)

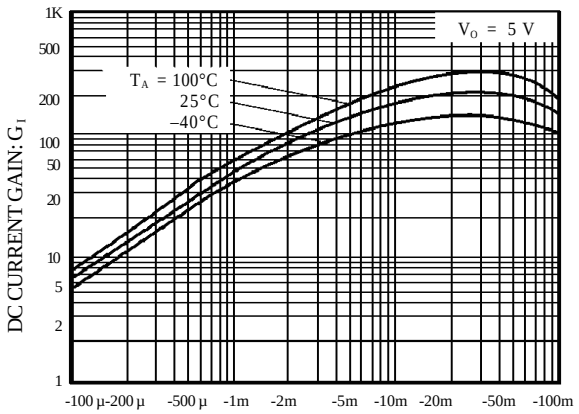


Figure 3. DC current gain vs.output current

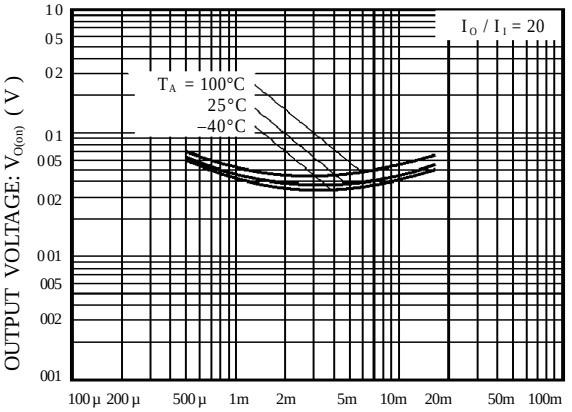
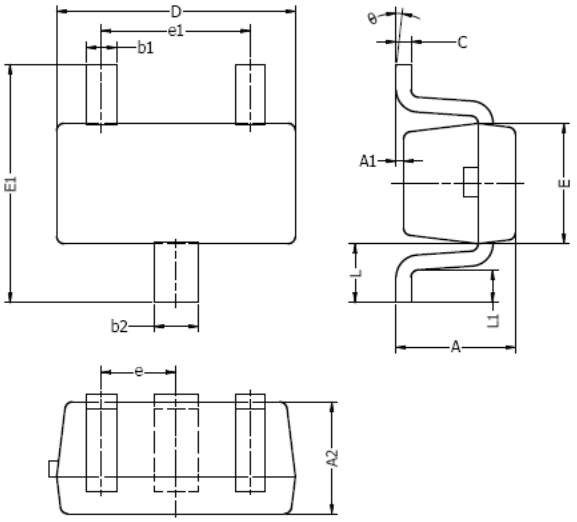


Figure 4. Output voltage vs.output current

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	0^0	8^0	0^0	8^0

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

Typical Soldering Pattern: