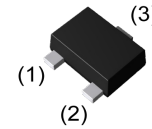
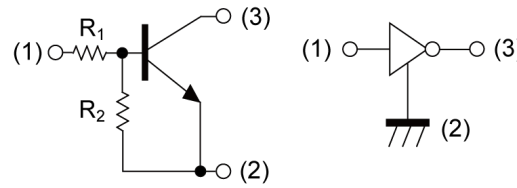
NPN 100mA 50V Digital Transistor (Bias Resistor Built-in Transistor)

●Features

1) Built-In Biasing Resistors,
   R_1 = 1kΩ, R_2 = 10kΩ
2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit) .
3) Only the on/off conditions need to be set for operation, making the circuit design easy.

SOT-723





(1) IN (BASE)
(2) GND (EMITTER)
(3) OUT (COLLECTOR)

●Application

INVERTER, INTERFACE, DRIVER

MARKING: E21

Parameter	Value
V_{CC}	50V
$I_{C(MAX.)}$	100mA
R_1	1.0kΩ
R_2	10kΩ

Absolute maximum ratings (T_a = 25°C)

Parameter	Symbol	Values	Unit
Supply voltage	V_{CC}	50	V
Input voltage	V_{IN}	-5 to 10	V
Output current	I_O	100	mA
Collector current	$I_{C(MAX)}$*1	100	mA
Power dissipation	P_D*2	150	mW
Junction temperature	T_j	150	℃
Range of storage temperature	T_{stg}	-55 to +150	℃

Electrical characteristics (T_a = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Input voltage	$V_{I(off)}$	V_{CC} = 5V, I_O = 100μA	-	-	0.3	V
	$V_{I(on)}$	V_O = 0.3V, I_O = 20mA	3.0	-	-	
Output voltage	$V_{O(on)}$	I_O = 10mA, I_I = 0.5mA	-	100	300	mV
Input current	I_I	V_I = 5V	-	-	7.2	mA
Output current	$I_{O(off)}$	V_{CC} = 50V, V_I = 0V	-	-	500	nA
DC current gain	G_I	V_O = 5V, I_O = 5mA	33	-	-	-
Input resistance	R_1	-	0.7	1.0	1.3	kΩ
Resistance ratio	R_2/R_1	-	8	10	12	-
Transition frequency	f_T*1	V_{CE} = 10V, I_E = -5mA, f = 100MHz	-	250	-	MHz

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference land.

Electrical characteristic curves (T_a =25°C)

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

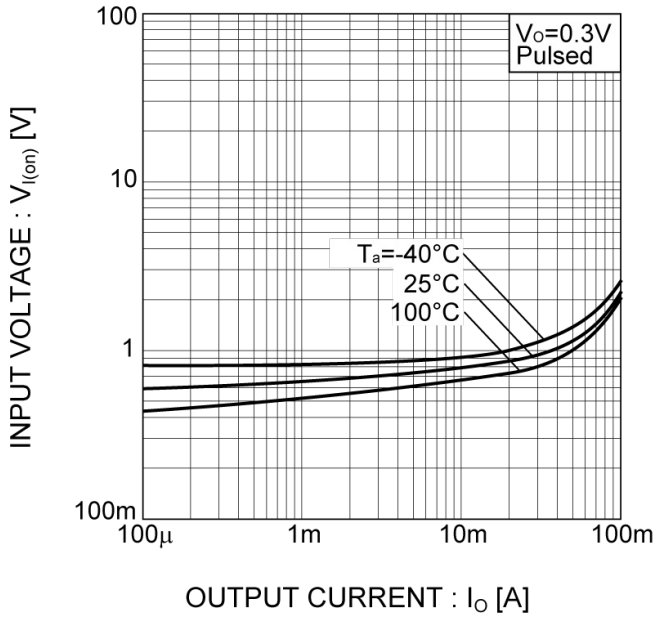


Fig.2 Output current vs. input voltage (OFF characteristics)

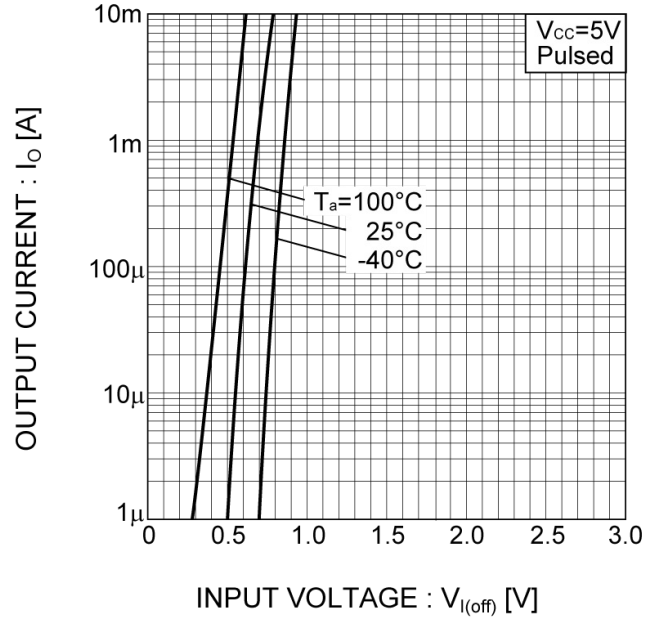


Fig.3 Output current vs. output voltage

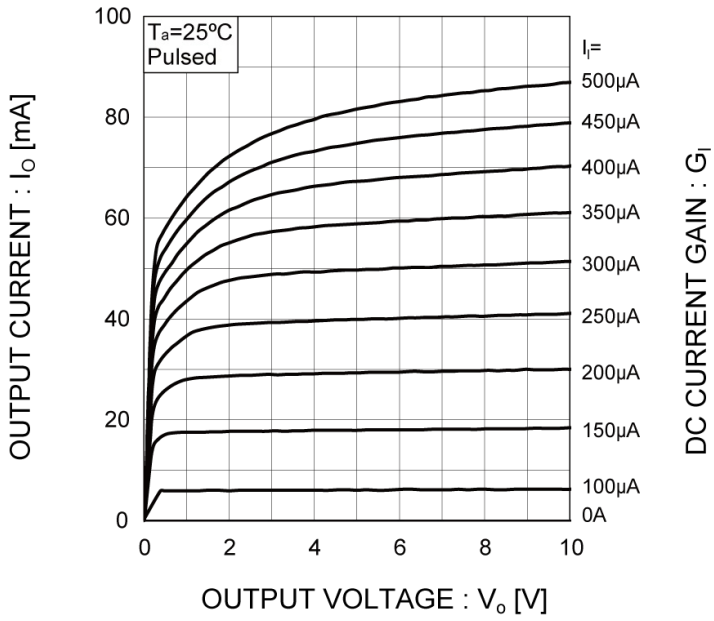


Fig.4 DC current gain vs. output current

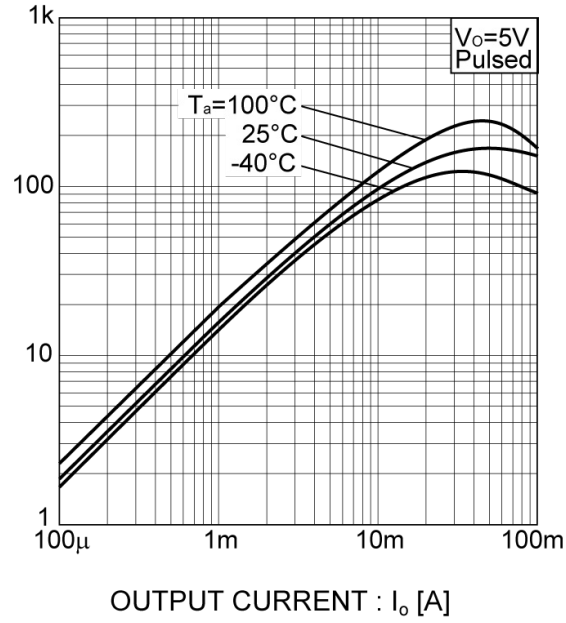
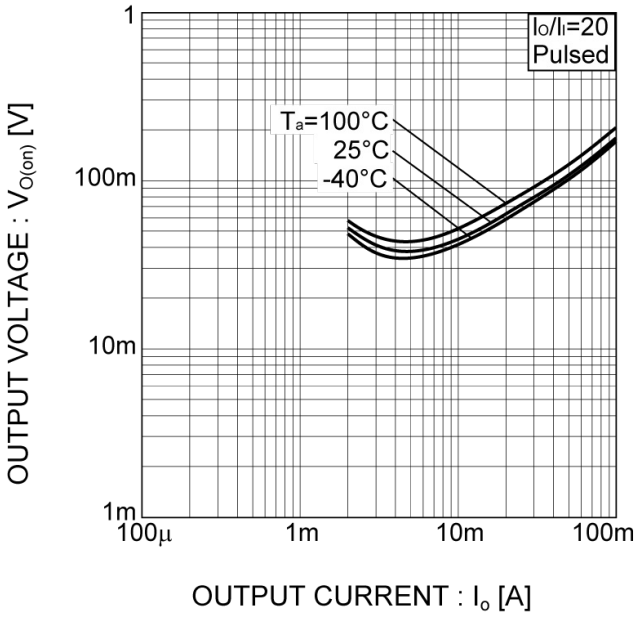
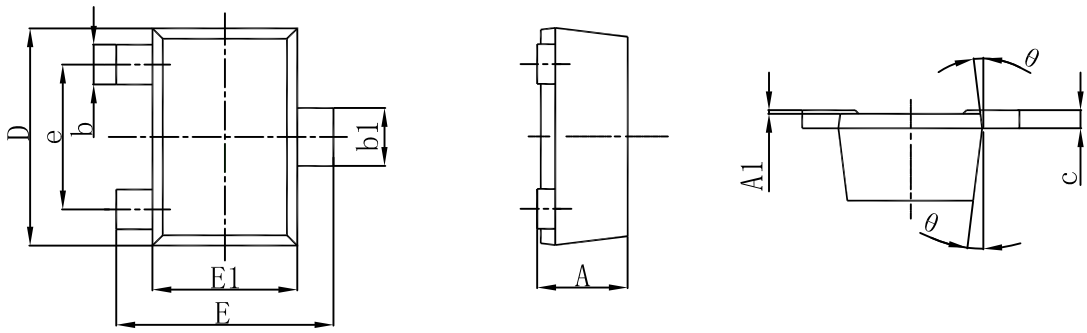


Fig.5 Output voltage vs. output current

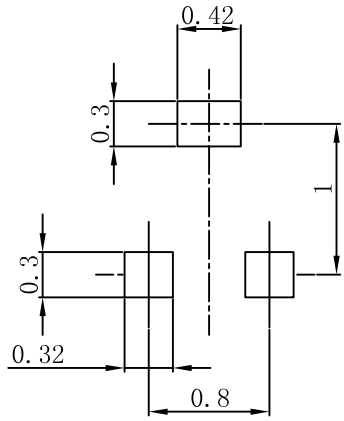


SOT-723 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450	0.550	0.018	0.022
A1	0.000	0.050	0.000	0.002
b	0.170	0.270	0.007	0.011
b1	0.270	0.370	0.011	0.015
c	0.080	0.150	0.003	0.006
D	1.150	1.250	0.045	0.049
E	1.150	1.250	0.045	0.049
E1	0.750	0.850	0.030	0.033
e	0.800TYP.		0.031TYP.	
θ	7° REF.		7° REF.	

SOT-723 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.