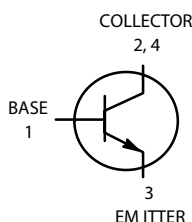


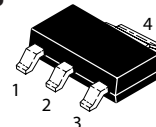
NPN Silicon Planar Epitaxial Transistor

 **Lead(Pb)-Free**



SOT-223

1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR



ABSOLUTE MAXIMUM RATINGS (Ta=25 °C)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	40	Vdc
Collector-Base Voltage	V _{CBO}	75	Vdc
Emitter-Base Voltage	V _{EBO}	6.0	Vdc
Collector Current (DC)	I _C (DC)	600	Adc
Total Device Dissipation T _A =25 °C	P _D	1.5	W
Junction Temperature	T _j	150	°C
Storage, Temperature	T _{stg}	-65 to +150	°C

Device Marking

PZT2222A=GT2222A

ELECTRICAL CHARACTERISTICS

Characteristics	Symbol	Min	Max	Unit
Collector-Emitter Breakdown Voltage (I _C = 10 mAdc, I _B =0)	V _(BR) CEO	40	-	Vdc
Collector-Base Breakdown Voltage (I _C =10 μAdc, I _E =0)	V _(BR) CBO	75	-	Vdc
Emitter-Base Breakdown Voltage (I _E = 10 μAdc, I _C =0)	V _(BR) EBO	6.0	-	Vdc
Base-Emitter Cutoff Current (V _{CE} = 60 Vdc, V _{BE} =-3.0Vdc)	I _{BEX}	-	20	nAdc
Collector-Emitter Cutoff Current (V _{CE} = 60 Vdc, V _{BE} =-3.0Vdc)	I _{CEX}	-	10	nAdc
Emitter-Base Cutoff Current (V _{EB} = 3.0Vdc, I _C =0)	I _{EBO}	-	100	nAdc

NOTE: 1.Device mounted on an epoxy printed circuit board 1.575 inches×1.575 inches×0.059 inches; mounting pad for the collector lead min. 0.93 inches.²

ELECTRICAL CHARACTERISTICS— Continued ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS (continued)

Collector-Base Cutoff Current ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$, $T_A = 125^\circ\text{C}$)	I_{CBO}	- -	10 10	nAdc uAdc
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ON CHARACTERISTICS

DC Current Gain ($I_C = 0.1\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $T_A = -55^\circ\text{C}$) ($I_C = 150\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 150\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 500\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)	h_{FE}	35 50 70 35 100 50 40	- - - - 300 - -	-
Collector-Emitter Saturation Voltages ($I_C = 150\text{ mAdc}$, $I_B = 15\text{ mAdc}$) ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)	$V_{CE(sat)}$	- -	0.3 1.0	Vdc
Base-Emitter Saturation Voltages ($I_C = 150\text{ mAdc}$, $I_B = 15\text{ mAdc}$) ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)	$V_{BE(sat)}$	0.6 -	1.2 2.0	Vdc
Input Impedance ($V_{CE} = 10\text{ Vdc}$, $I_C = 1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$) ($V_{CE} = 10\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{ie}	2.0 0.25	8.0 1.25	k Ω
Voltage Feedback Ratio ($V_{CE} = 10\text{ Vdc}$, $I_C = 1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$) ($V_{CE} = 10\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{re}	- -	8.0×10^{-4} 4.0×10^{-4}	-
Small-Signal Current Gain ($V_{CE} = 10\text{ Vdc}$, $I_C = 1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$) ($V_{CE} = 10\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	50 75	300 375	-
Output Admittance ($V_{CE} = 10\text{ Vdc}$, $I_C = 1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$) ($V_{CE} = 10\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{oe}	5.0 25	35 200	umhos
Noise Figure ($V_{CE} = 10\text{ Vdc}$, $I_C = 100\text{ uAdc}$, $f = 1.0\text{ kHz}$)	F	-	4.0	dB

DYNAMIC CHARACTERISTICS

Current-Gain—Bandwidth Product ($I_C = 20\text{ mAdc}$, $V_{CE} = 20\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	300	-	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_c	-	8.0	pF
Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_e	-	25	pF

SWITCHING TIMES ($T_A = 25^\circ\text{C}$)

Delay Time	($V_{CC} = 30\text{ Vdc}$, $I_C = 150\text{ mAdc}$, $I_{B(on)} = 15\text{ mAdc}$, $V_{EB(off)} = 0.5\text{ Vdc}$) Figure 1	t_d	-	10	ns
Rise Time		t_r	-	25	
Storage Time	($V_{CC} = 30\text{ Vdc}$, $I_C = 150\text{ mAdc}$, $I_{B(on)} = I_{B(off)} = 15\text{ mAdc}$) Figure 2	t_s	-	225	ns
Fall Time		t_f	-	60	

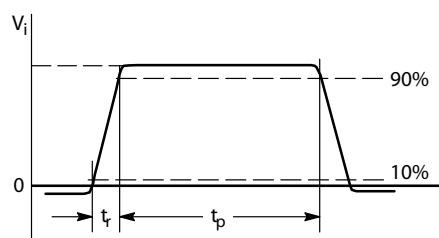


FIG.1 Input Waveform and Test Circuit for Determining Delay Time and Rise Time

$V_i = -0.5 \text{ V to } +9.9 \text{ V}$, $V_{CC} = +30 \text{ V}$, $R_1 = 619 \Omega$, $R_2 = 200 \Omega$.

PULSE GENERATOR:

PULSE DURATION

$t_p \leq 200 \text{ ns}$

RISE TIME

$t_r \leq 2 \text{ ns}$

DUTY FACTOR

$\delta = 0.02$

OSCILLOSCOPE:

INPUT IMPEDANCE

$Z_i > 100 \text{ k}\Omega$

INPUT CAPACITANCE

$C_i < 12 \text{ pF}$

RISE TIME

$t_r < 5 \text{ ns}$

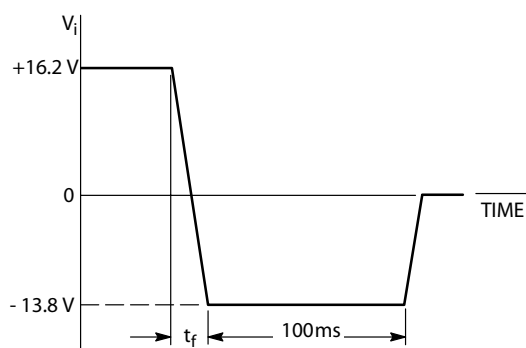
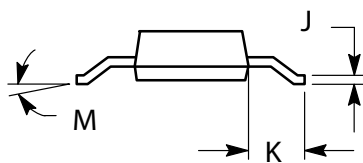
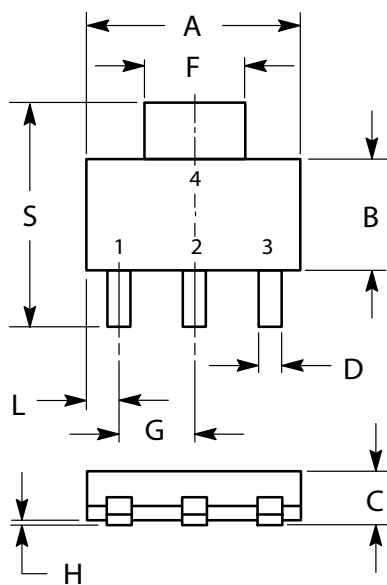


FIG.2 Input Waveform and Test Circuit for Determining Storage Time and Fall Time

SOT-223 Outline Dimensions

unit:mm



DIM	MILLIMETERS	
	MIN	MAX
A	6.30	6.70
B	3.30	3.70
C	1.50	1.75
D	0.60	0.89
F	2.90	3.20
G	2.20	2.40
H	0.020	0.100
J	0.24	0.35
K	1.50	2.00
L	0.85	1.05
M	0°	10°
S	6.70	7.30