SILICON PLANAR EPITAXIAL TRANSISTORS

NPN silicon planar epitaxial transistors in a miniature SMD package (SOT-223), primarily intended for linear and switching applications.

PNP complements are PZT2907/2907A.

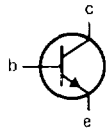
QUICK REFERENCE DATA

			PZT2222	PZT2222A	
Collector-emitter voltage (open base)	V_{CEO}	max.	30	40	V
Collector-base voltage (open emitter)	V_{CBO}	max.	60	75	V
Collector current (DC)	I_C	max.	600		mA
Total power dissipation up to T_{amb} = 25 °C *	P_{tot}	max.	1,5		W
Collector-emitter saturation voltage I_C = 150 mA; I_B = 15 mA	V_{CEsat}	max.	0,4	0,3	V
DC current gain I_C = 150 mA; V_{CE} = 10 V	h_{FE}	min. max.	100 300		

MECHANICAL DATA

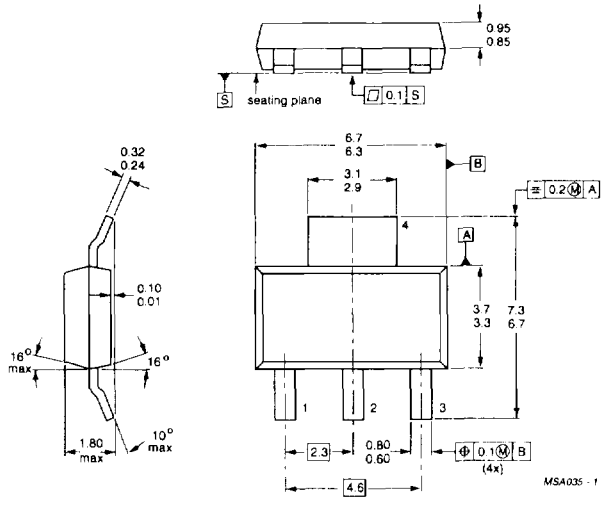
Dimensions in mm

Fig. 1 SOT-223



Pinning:

1 = base
2 = collector
3 = emitter
4 = collector



RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

			PZT2222	PZT2222A	
Collector-emitter voltage (open base)	V_{CEO}	max.	30	40	V
Collector-base voltage (open emitter)	V_{CBO}	max.	60	75	V
Emitter-base voltage (open collector)	V_{EBO}	max.	5,0	6,0	V
Collector current (DC)	I_C	max.	600		mA
Total power dissipation up to T_{amb} = 25 °C *	P_{tot}	max.	1,5		W
Storage temperature range	T_{stg}		−55 to +150		°C
Junction temperature	T_j	max.	150		°C

THERMAL RESISTANCE

From junction to ambient in free air *	$R_{th\ j\text{-}a}$	=	83,3	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified			PZT2222	PZT2222A	
Collector-emitter breakdown voltage I_B = 0; I_C = 10 mA	$V_{(BR)CEO}$	min.	30	40	V
Collector-base breakdown voltage I_E = 0; I_C = 10 μA	$V_{(BR)CBO}$	min.	60	75	V
Emitter-base breakdown voltage I_E = 10 μA; I_C = 0	$V_{(BR)EBO}$	min.	5,0	6,0	V
Base cut-off current V_{CE} = 60 V; $-V_{BE}$ = 3 V	I_{BEX}	max.	–	20	nA
Collector cut-off current V_{CE} = 60 V; $-V_{BE}$ = 3 V	I_{CEX}	r ax.	–	10	nA
Emitter cut-off current I_C = 0; V_{EB} = 3 V	I_{EBO}	max.	–	10	nA
Collector cut-off current					
I_E = 0; V_{CB} = 50 V	I_{CBO}	max.	10	–	nA
I_E = 0; V_{CB} = 60 V	I_{CBO}	max.	–	10	nA
I_E = 0; V_{CB} = 50 V; T_{amb} = 125 °C	I_{CBO}	max.	10	–	μA
I_E = 0; V_{CB} = 60 V; T_{amb} = 125 °C	I_{CBO}	max.	–	10	μA

* Device mounted on an epoxy printed circuit board 40 mm x 40 mm x 1,5 mm; mounting pad for the collector lead min. 6 cm².

			PZT2222	PZT2222A	
DC current gain					
I_C = 0,1 mA; V_{CE} = 10 V	h_{FE}	min.		35	
I_C = 1 mA; V_{CE} = 10 V	h_{FE}	min.		50	
I_C = 10 mA; V_{CE} = 10 V	h_{FE}	min.		75	
I_C = 10 mA; V_{CE} = 10 V; T_{amb} = −55 °C	h_{FE}	min.	–		35
I_C = 150 mA; V_{CE} = 10 V	h_{FE}	min. max.		100 300	
I_C = 150 mA; V_{CE} = 1 V	h_{FE}	min.		50	
I_C = 500 mA; V_{CE} = 10 V	h_{FE}	min.	30		40
Saturation voltages					
I_C = 150 mA; I_B = 15 mA	V_{CEsat}	max.	0,4		0,3 V
I_C = 500 mA; I_B = 50 mA	V_{CEsat}	min.	1,6		1,0 V
I_C = 150 mA; I_B = 15 mA	V_{BEsat}	max.	1,3		– V
I_C = 150 mA; I_B = 15 mA	V_{BEsat}	min. max.			0,6 V 1,2 V
I_C = 500 mA; I_B = 50 mA	V_{BEsat}	max.	2,6		2,0 V
Transition frequency at f = 100 MHz					
I_C = 20 mA; V_{CE} = 20 V; T_{amb} = 25 °C	f_T	min.	250		300 MHz
Output capacitance at f = 1 MHz					
I_E = 0; V_{CB} = 10 V	C_c	max.		8,0	pF
Input capacitance at f = 1 MHz					
I_C = 0; V_{EB} = 0,5 V	C_e	max.	30		25 pF

			PZT2222A
Noise figure at R_S = 1 kΩ I_C = 100 μA; V_{CE} = 10 V; f = 1 kHz; T_{amb} = 25 °C	F	max.	4,0 dB
Switching times at T_{amb} = 25 °C			
Turn-on time (see Fig. 2) I_C = 150 mA; I_{Bon} = 15 mA V_{CC} = 30 V; $V_{EB(off)}$ = 0,5 V			
delay time	t_d	max.	10 ns
rise time	t_r	max.	25 ns
Turn-off time (see Fig. 3) I_C = 150 mA; I_{Bon} = I_{Boff} = 15 mA V_{CC} = 30 V			
storage time	t_s	max.	225 ns
fall time	t_f	max.	60 ns

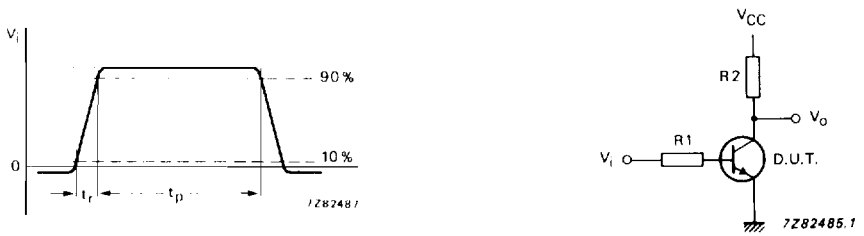


Fig. 2 Input waveform and test circuit for determining delay time and rise time.

V_i = −0,5 V to + 9,9 V; V_{CC} = + 30 V; R1 = 619 Ω; R2 = 200 Ω.

Pulse generator:				Oscilloscope:			
pulse duration	t_p	≤	200 ns	input impedance	Z_i	>	100 kΩ
rise time	t_r	≤	2 ns	input capacitance	C_i	<	12 pF
duty factor	δ	=	0,02	rise time	t_r	<	5 ns

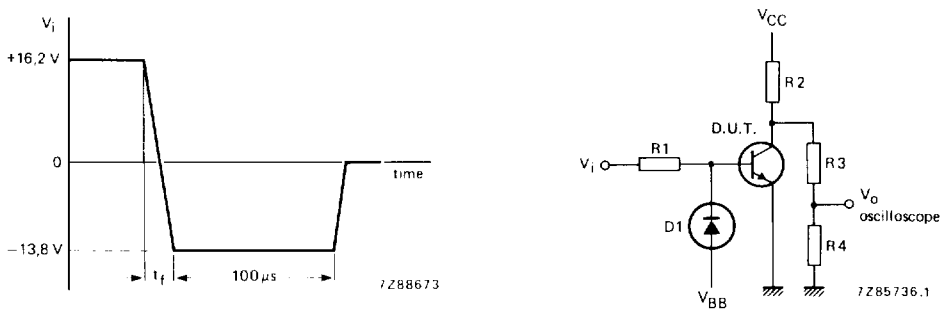


Fig. 3 Input waveform and test circuit for determining storage time and fall time.