PZT2222AT1

Preferred Device

NPN Silicon Planar Epitaxial Transistor

This NPN Silicon Epitaxial transistor is designed for use in linear and switching applications. The device is housed in the SOT-223 package which is designed for medium power surface mount applications.

Features

- PNP Complement is PZT2907AT1
- The SOT-223 package can be soldered using wave or reflow
- SOT-223 package ensures level mounting, resulting in improved thermal conduction, and allows visual inspection of soldered joints
- The formed leads absorb thermal stress during soldering, eliminating the possibility of damage to the die
- Available in 12 mm tape and reel
- Pb−Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Collector-Base Voltage	V_{CBO}	75	Vdc
Emitter-Base Voltage (Open Collector)	V_{EBO}	6.0	Vdc
Collector Current	I_C	600	mAdc
Total Power Dissipation up to T_A = 25°C (Note 1)	P_D	1.5	W
Storage Temperature Range	T_{stg}	− 65 to +150	°C
Junction Temperature	T_J	150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	83.3	°C/W
Lead Temperature for Soldering, 0.0625″ from case Time in Solder Bath	T_L	260 10	°C Sec

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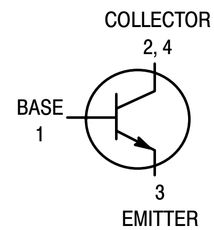
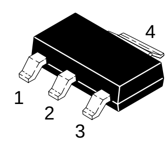
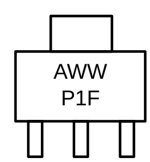
SOT−223 PACKAGE NPN SILICON TRANSISTOR SURFACE MOUNT





SOT−223 (TO−261)
CASE 318E−04
STYLE 1

MARKING DIAGRAM



A = Assembly Location
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping†
PZT2222AT1	SOT−223	3000 Tape & Reel
PZT2222AT1G	SOT−223 (Pb−Free)	3000 Tape & Reel
PZT2222AT3	SOT−223	10,000 Tape & Reel
PZT2222AT3G	SOT−223 (Pb−Free)	10,000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

April, 2005 − Rev. 5

Publication Order Number:
PZT2222AT1/D

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
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} = − 3.0 Vdc)	I_{BEX}	−	20	nAdc
Collector-Emitter Cutoff Current (V_{CE} = 60 Vdc, V_{BE} = − 3.0 Vdc)	I_{CEX}	−	10	nAdc
Emitter-Base Cutoff Current (V_{EB} = 3.0 Vdc, I_C = 0)	I_{EBO}	−	100	nAdc
Collector-Base Cutoff Current (V_{CB} = 60 Vdc, I_E = 0) (V_{CB} = 60 Vdc, I_E = 0, T_A = 125°C)	I_{CBO}	− −	10 10	 nAdc μAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 0.1 mAdc, V_{CE} = 10 Vdc) (I_C = 1.0 mAdc, V_{CE} = 10 Vdc) (I_C = 10 mAdc, V_{CE} = 10 Vdc) (I_C = 10 mAdc, V_{CE} = 10 Vdc, T_A = − 55°C) (I_C = 150 mAdc, V_{CE} = 10 Vdc) (I_C = 150 mAdc, V_{CE} = 1.0 Vdc) (I_C = 500 mAdc, V_{CE} = 10 Vdc)	h_{FE}	 35 50 70 35 100 50 40	 − − − − 300 − −	−
Collector-Emitter Saturation Voltages (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc)	$V_{CE(sat)}$	 − −	 0.3 1.0	Vdc
Base-Emitter Saturation Voltages (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc)	$V_{BE(sat)}$	 0.6 −	 1.2 2.0	Vdc
Input Impedance (V_{CE} = 10 Vdc, I_C = 1.0 mAdc, f = 1.0 kHz) (V_{CE} = 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{ie}	 2.0 0.25	 8.0 1.25	kΩ
Voltage Feedback Ratio (V_{CE} = 10 Vdc, I_C = 1.0 mAdc, f = 1.0 kHz) (V_{CE} = 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{re}	 − −	 $8.0x10^{-4}$ $4.0x10^{-4}$	−
Small-Signal Current Gain (V_{CE} = 10 Vdc, I_C = 1.0 mAdc, f = 1.0 kHz) (V_{CE} = 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	$\|h_{fe}\|$	 50 75	 300 375	−
Output Admittance (V_{CE} = 10 Vdc, I_C = 1.0 mAdc, f = 1.0 kHz) (V_{CE} = 10 Vdc, I_C = 10 mAdc, f = 1.0 kHz)	h_{oe}	 5.0 25	 35 200	μmhos
Noise Figure (V_{CE} = 10 Vdc, I_C = 100 μAdc, f = 1.0 kHz)	F	−	4.0	dB
DYNAMIC CHARACTERISTICS				
Current-Gain − Bandwidth Product (I_C = 20 mAdc, V_{CE} = 20 Vdc, f = 100 MHz)	f_T	300	−	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	C_c	−	8.0	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	C_e	−	25	pF

SWITCHING TIMES (T_A = 25°C)

Characteristic	Conditions	Symbol	Min	Max	Unit
Delay Time	(V_{CC} = 30 Vdc, I_C = 150 mAdc, $I_{B(on)}$ = 15 mAdc, $V_{EB(off)}$ = 0.5 Vdc) Figure 1	t_d	−	10	ns
Rise Time		t_r	−	25	
Storage Time	(V_{CC} = 30 Vdc, I_C = 150 mAdc, $I_{B(on)}$ = $I_{B(off)}$ = 15 mAdc) Figure 2	t_s	−	225	ns
Fall Time		t_f	−	60	

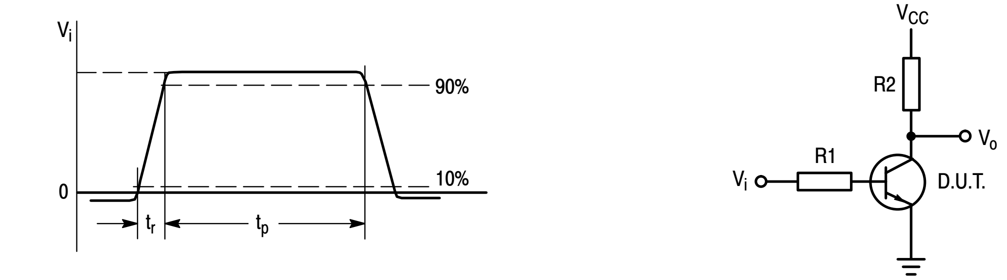


Figure 1. Input Waveform and Test Circuit for Determining Delay Time and Rise Time

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	3	200 ns	INPUT IMPEDANCE	Z_i	>	100 kΩ
RISE TIME	t_r	3	2 ns	INPUT CAPACITANCE	C_i	<	12 pF
DUTY FACTOR	δ	=	0.02	RISE TIME	t_r	<	5 ns

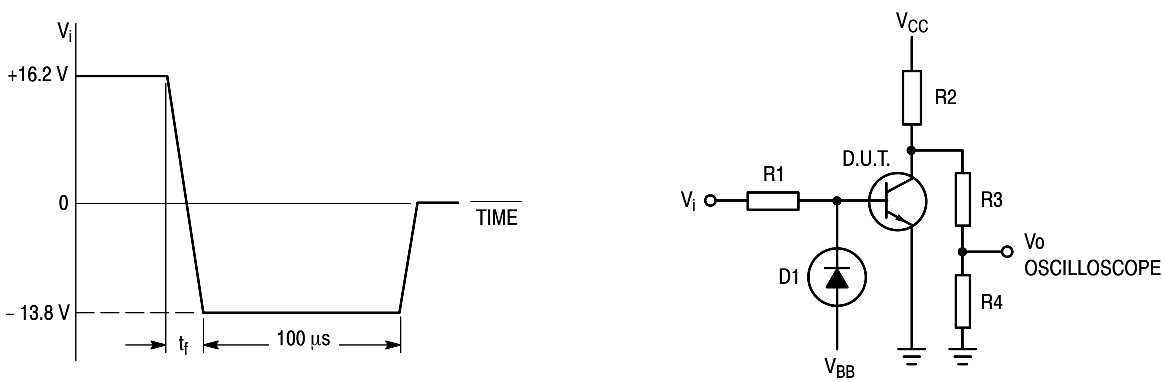
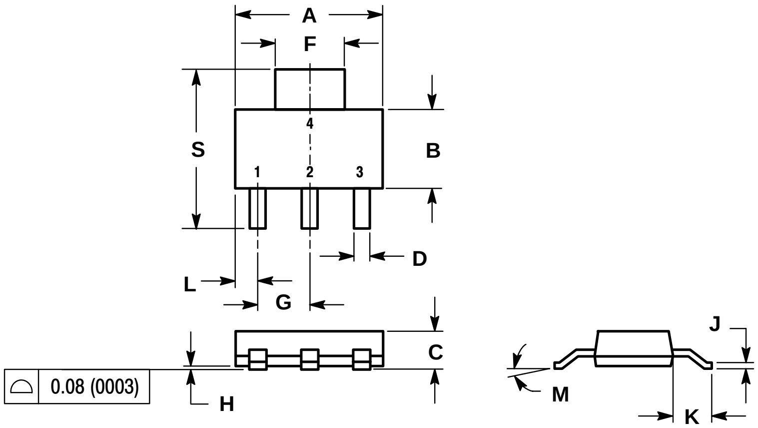


Figure 2. Input Waveform and Test Circuit for Determining Storage Time and Fall Time

PACKAGE DIMENSIONS

SOT−223 (TO−261)
CASE 318E−04
ISSUE K

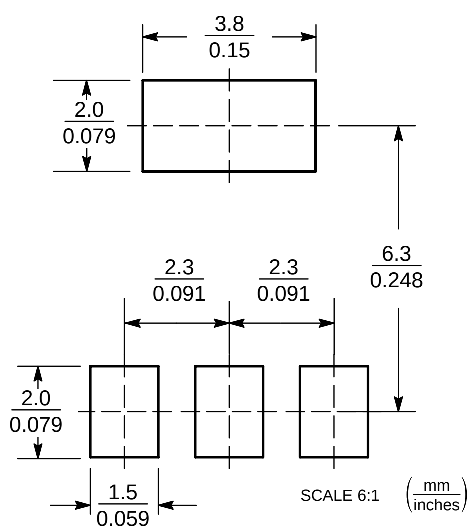


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.249	0.263	6.30	6.70
B	0.130	0.145	3.30	3.70
C	0.060	0.068	1.50	1.75
D	0.024	0.035	0.60	0.89
F	0.115	0.126	2.90	3.20
G	0.087	0.094	2.20	2.40
H	0.0008	0.0040	0.020	0.100
J	0.009	0.014	0.24	0.35
K	0.060	0.078	1.50	2.00
L	0.033	0.041	0.85	1.05
M	0°	10°	0°	10°
S	0.264	0.287	6.70	7.30

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

SOLDERING FOOTPRINT*



*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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