

# PZT2907AT1, SPZT2907AT1G

Preferred Device

## PNP Silicon Epitaxial Transistor

This PNP 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

- NPN Complement is PZT2222AT1
- 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.
- AEC-Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- Pb-Free Packages are Available\*

### MAXIMUM RATINGS

| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector – Emitter Voltage    | $V_{CEO}$ | -60   | Vdc  |
| Collector – Base Voltage       | $V_{CBO}$ | -60   | Vdc  |
| Emitter – Base Voltage         | $V_{EBO}$ | -5.0  | Vdc  |
| Collector Current – Continuous | $I_C$     | -600  | mAdc |

### THERMAL CHARACTERISTICS

| Characteristic                                                              | Symbol          | Max            | Unit       |
|-----------------------------------------------------------------------------|-----------------|----------------|------------|
| Total Device Dissipation (Note 1)<br>$T_A = 25^\circ\text{C}$               | $P_D$           | 1.5<br>12      | W<br>mW/°C |
| Thermal Resistance Junction-to-Ambient<br>(Note 1)                          | $R_{\theta JA}$ | 83.3           | °C/W       |
| Lead Temperature for Soldering,<br>0.0625" from case<br>Time in Solder Bath | $T_L$           | 260<br>10      | °C<br>Sec  |
| Operating and Storage Temperature Range                                     | $T_J, T_{stg}$  | -65 to<br>+150 | °C         |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-4 with 1 oz and 713 mm<sup>2</sup> of copper area.

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

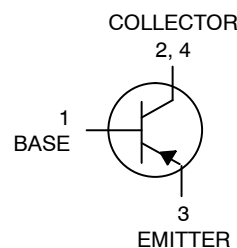


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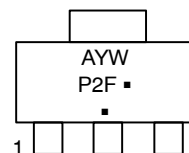
<http://onsemi.com>



SOT-223  
CASE 318E  
STYLE 1



### MARKING DIAGRAM



P2F = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device       | Package              | Shipping†           |
|--------------|----------------------|---------------------|
| PZT2907AT1   | SOT-223              | 1,000 / Tape & Reel |
| PZT2907AT1G  | SOT-223<br>(Pb-Free) | 1,000 / Tape & Reel |
| SPZT2907AT1G | SOT-223<br>(Pb-Free) | 1,000 / Tape & Reel |
| PZT2907AT3   | SOT-223              | 4,000 / Tape & Reel |
| PZT2907AT3G  | SOT-223<br>(Pb-Free) | 4,000 / 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.

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                                 |               |      |   |     |      |
|-------------------------------------------------------------------------------------------------|---------------|------|---|-----|------|
| Collector-Base Breakdown Voltage<br>( $I_C = -10\ \mu\text{Adc}$ , $I_E = 0$ )                  | $V_{(BR)CBO}$ | -60  | - | -   | Vdc  |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 10\ \text{mAdc}$ , $I_B = 0$ )                  | $V_{(BR)CEO}$ | -60  | - | -   | Vdc  |
| Emitter-Base Breakdown Voltage<br>( $I_E = -10\ \mu\text{Adc}$ , $I_C = 0$ )                    | $V_{(BR)EBO}$ | -5.0 | - | -   | Vdc  |
| Collector-Base Cutoff Current<br>( $V_{CB} = -50\ \text{Vdc}$ , $I_E = 0$ )                     | $I_{CBO}$     | -    | - | -10 | nAdc |
| Collector-Emitter Cutoff Current<br>( $V_{CE} = -30\ \text{Vdc}$ , $V_{BE} = 0.5\ \text{Vdc}$ ) | $I_{CEX}$     | -    | - | -50 | nAdc |
| Base-Emitter Cutoff Current<br>( $V_{CE} = -30\ \text{Vdc}$ , $V_{BE} = -0.5\ \text{Vdc}$ )     | $I_{BEX}$     | -    | - | -50 | nAdc |

### ON CHARACTERISTICS (Note 2)

|                                                                                                                                                                                                                                                                                                                                      |               |                               |                       |                         |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|-----------------------|-------------------------|-----|
| DC Current Gain<br>( $I_C = -0.1\ \text{mAdc}$ , $V_{CE} = -10\ \text{Vdc}$ )<br>( $I_C = -1.0\ \text{mAdc}$ , $V_{CE} = -10\ \text{Vdc}$ )<br>( $I_C = -10\ \text{mAdc}$ , $V_{CE} = -10\ \text{Vdc}$ )<br>( $I_C = -150\ \text{mAdc}$ , $V_{CE} = -10\ \text{Vdc}$ )<br>( $I_C = -500\ \text{mAdc}$ , $V_{CE} = -10\ \text{Vdc}$ ) | $h_{FE}$      | 75<br>100<br>100<br>100<br>50 | -<br>-<br>-<br>-<br>- | -<br>-<br>-<br>300<br>- | -   |
| Collector-Emitter Saturation Voltages<br>( $I_C = -150\ \text{mAdc}$ , $I_B = -15\ \text{mAdc}$ )<br>( $I_C = -500\ \text{mAdc}$ , $I_B = -50\ \text{mAdc}$ )                                                                                                                                                                        | $V_{CE(sat)}$ | -<br>-                        | -<br>-                | -0.4<br>-1.6            | Vdc |
| Base-Emitter Saturation Voltages<br>( $I_C = -150\ \text{mAdc}$ , $I_B = -15\ \text{mAdc}$ )<br>( $I_C = -500\ \text{mAdc}$ , $I_B = -50\ \text{mAdc}$ )                                                                                                                                                                             | $V_{BE(sat)}$ | -<br>-                        | -<br>-                | -1.3<br>-2.6            | Vdc |

### DYNAMIC CHARACTERISTICS

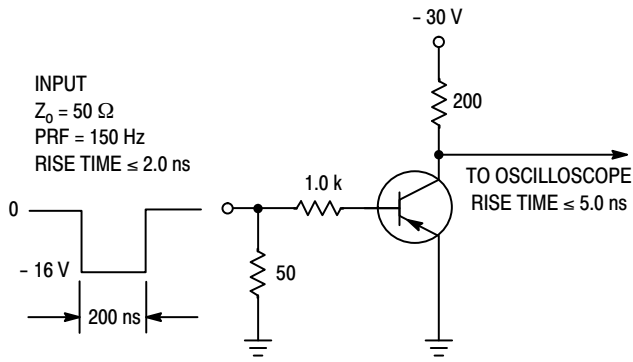
|                                                                                                                       |       |     |   |     |     |
|-----------------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|-----|
| Current-Gain – Bandwidth Product<br>( $I_C = -50\ \text{mAdc}$ , $V_{CE} = -20\ \text{Vdc}$ , $f = 100\ \text{MHz}$ ) | $f_T$ | 200 | - | -   | MHz |
| Output Capacitance<br>( $V_{CB} = -10\ \text{Vdc}$ , $I_E = 0$ , $f = 1.0\ \text{MHz}$ )                              | $C_C$ | -   | - | 8.0 | pF  |
| Input Capacitance<br>( $V_{EB} = -2.0\ \text{Vdc}$ , $I_C = 0$ , $f = 1.0\ \text{MHz}$ )                              | $C_e$ | -   | - | 30  | pF  |

### SWITCHING TIMES

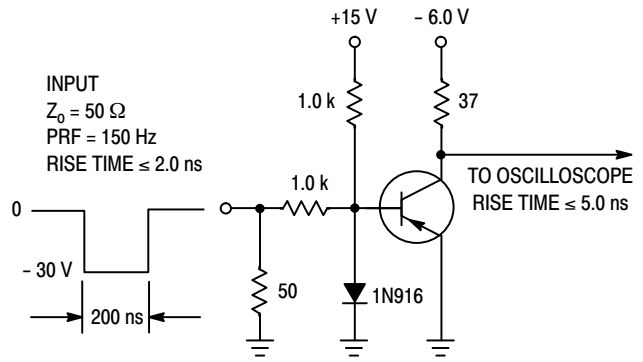
|               |                                                                                                      |           |   |   |     |    |
|---------------|------------------------------------------------------------------------------------------------------|-----------|---|---|-----|----|
| Turn-On Time  | $(V_{CC} = -30\ \text{Vdc}$ , $I_C = -150\ \text{mAdc}$ ,<br>$I_{B1} = -15\ \text{mAdc}$ )           | $t_{on}$  | - | - | 45  | ns |
| Delay Time    |                                                                                                      | $t_d$     | - | - | 10  |    |
| Rise Time     |                                                                                                      | $t_r$     | - | - | 40  |    |
| Turn-Off Time | $(V_{CC} = -6.0\ \text{Vdc}$ , $I_C = -150\ \text{mAdc}$ ,<br>$I_{B1} = I_{B2} = -15\ \text{mAdc}$ ) | $t_{off}$ | - | - | 100 | ns |
| Storage Time  |                                                                                                      | $t_s$     | - | - | 80  |    |
| Fall Time     |                                                                                                      | $t_f$     | - | - | 30  |    |

2. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# PZT2907AT1, SPZT2907AT1G

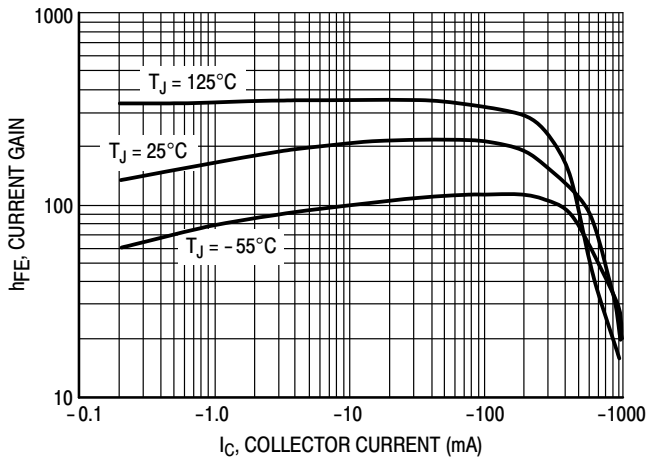


**Figure 1. Delay and Rise Time Test Circuit**

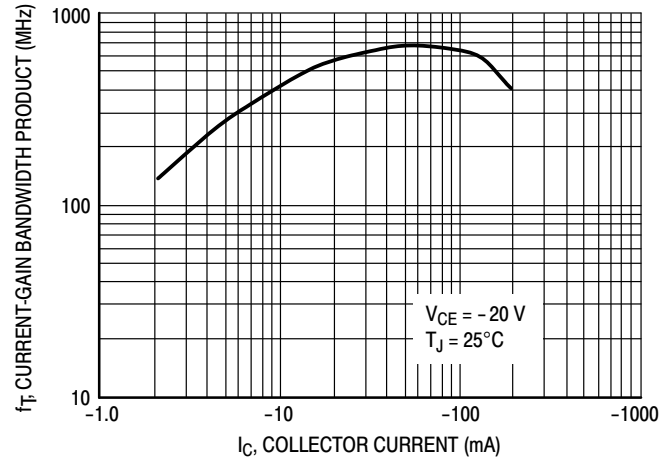


**Figure 2. Storage and Fall Time Test Circuit**

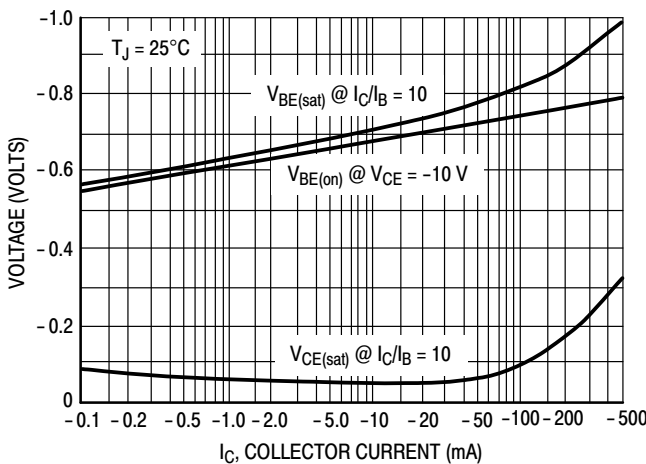
## TYPICAL ELECTRICAL CHARACTERISTICS



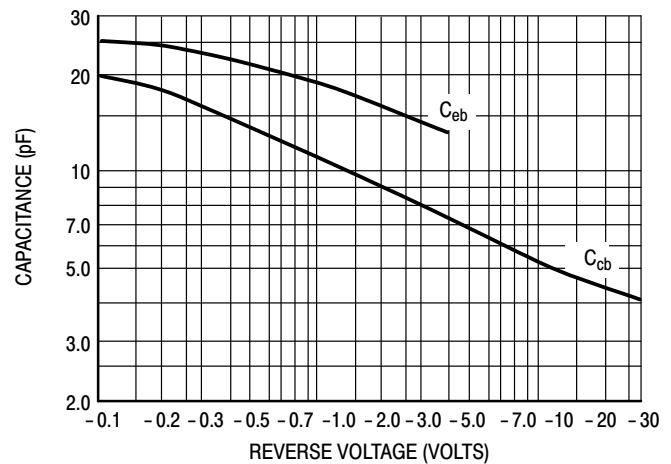
**Figure 3. DC Current Gain**



**Figure 4. Current Gain Bandwidth Product**



**Figure 5. "ON" Voltage**

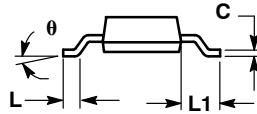
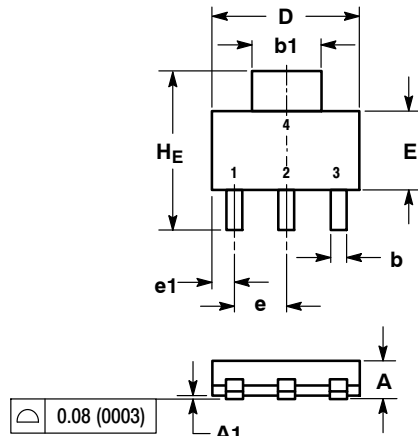


**Figure 6. Capacitances**

# PZT2907AT1, SPZT2907AT1G

## PACKAGE DIMENSIONS

### SOT-223 (TO-261) CASE 318E-04 ISSUE N

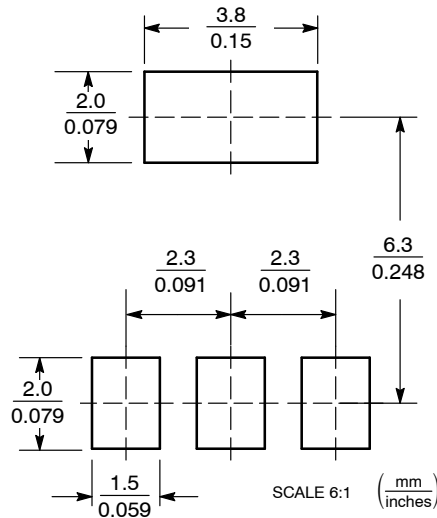


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.  
2. CONTROLLING DIMENSION: INCH.

| DIM   | MILLIMETERS |      |      | INCHES |       |       |
|-------|-------------|------|------|--------|-------|-------|
|       | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A     | 1.50        | 1.63 | 1.75 | 0.060  | 0.064 | 0.068 |
| A1    | 0.02        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b     | 0.60        | 0.75 | 0.89 | 0.024  | 0.030 | 0.035 |
| b1    | 2.90        | 3.06 | 3.20 | 0.115  | 0.121 | 0.126 |
| c     | 0.24        | 0.29 | 0.35 | 0.009  | 0.012 | 0.014 |
| D     | 6.30        | 6.50 | 6.70 | 0.249  | 0.256 | 0.263 |
| E     | 3.30        | 3.50 | 3.70 | 0.130  | 0.138 | 0.145 |
| e     | 2.20        | 2.30 | 2.40 | 0.087  | 0.091 | 0.094 |
| e1    | 0.85        | 0.94 | 1.05 | 0.033  | 0.037 | 0.041 |
| L     | 0.20        | ---  | ---  | 0.008  | ---   | ---   |
| L1    | 1.50        | 1.75 | 2.00 | 0.060  | 0.069 | 0.078 |
| H_E   | 6.70        | 7.00 | 7.30 | 0.264  | 0.276 | 0.287 |
| theta | 0°          | ---  | 10°  | 0°     | ---   | 10°   |

- 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.

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