

# PNP Silicon Epitaxial Transistor

## PZT2907A

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
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant\*

### 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 |

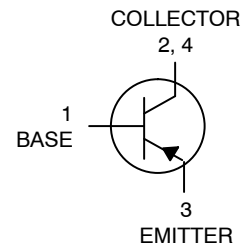
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

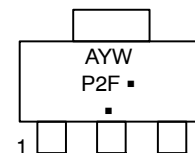
| Characteristic                                                              | Symbol          | Max            | Unit       |
|-----------------------------------------------------------------------------|-----------------|----------------|------------|
| Total Device Dissipation (Note 1)<br>$T_A = 25^\circ\text{C}$               | $P_D$           | 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         |

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 onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



### 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 <sup>†</sup> |
|--------------|----------------------|-----------------------|
| PZT2907AT1G  | SOT-223<br>(Pb-Free) | 1,000 / Tape & Reel   |
| SPZT2907AT1G | SOT-223<br>(Pb-Free) | 1,000 / Tape & Reel   |
| PZT2907AT3G  | SOT-223<br>(Pb-Free) | 4,000 / Tape & Reel   |

<sup>†</sup>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.

# PZT2907A

## 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  $\leq 2.0\%$ .

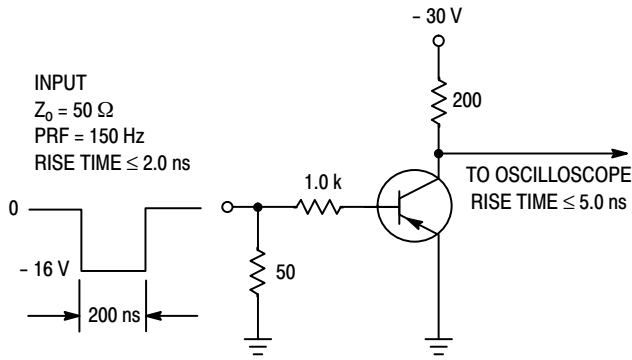


Figure 1. Delay and Rise Time Test Circuit

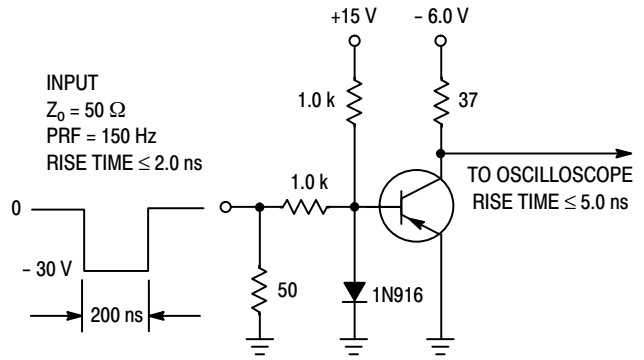


Figure 2. Storage and Fall Time Test Circuit

### TYPICAL ELECTRICAL CHARACTERISTICS

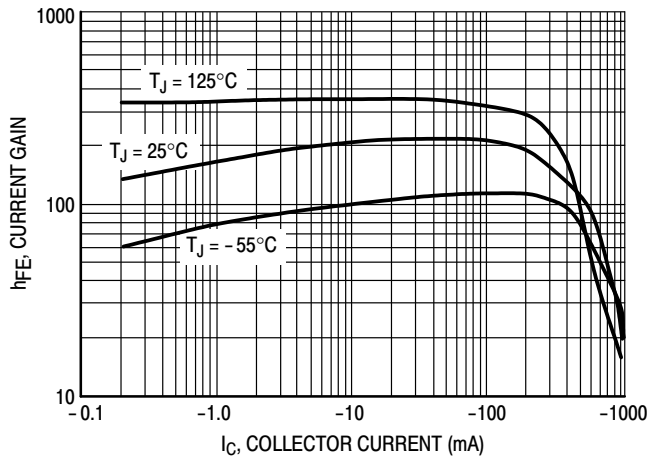


Figure 3. DC Current Gain

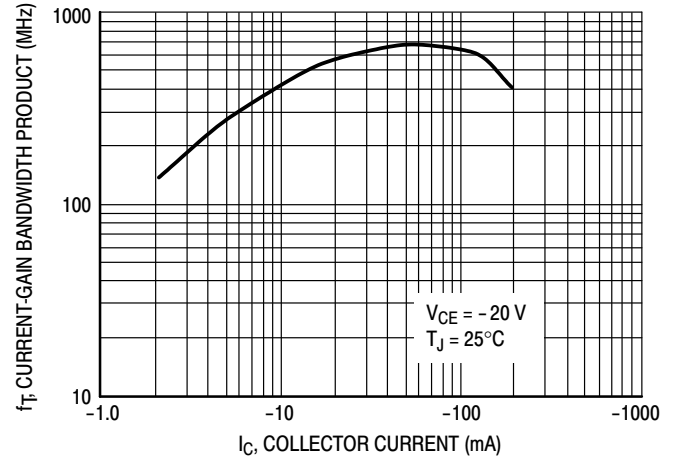


Figure 4. Current Gain Bandwidth Product

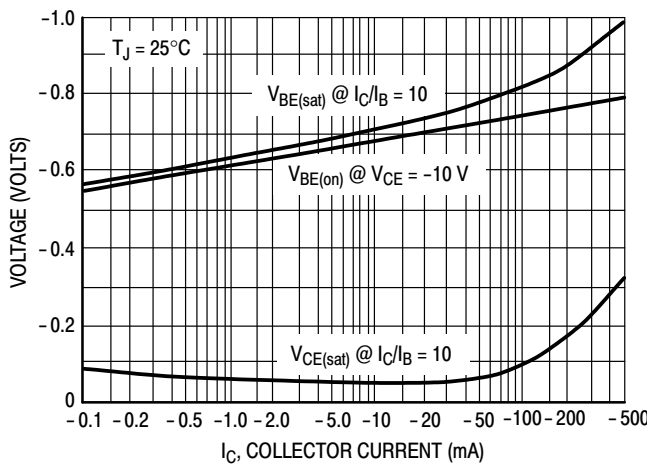


Figure 5. "ON" Voltage

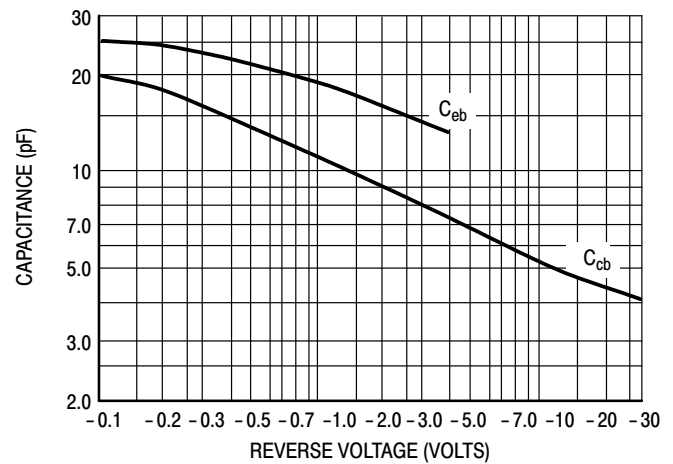


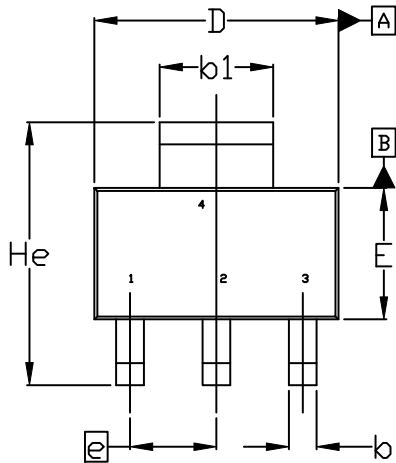
Figure 6. Capacitances



SCALE 1:1

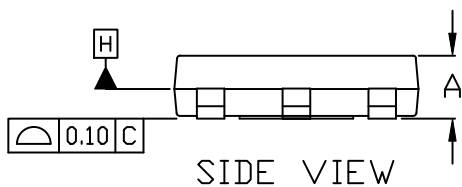
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CASE 318E-04  
ISSUE R

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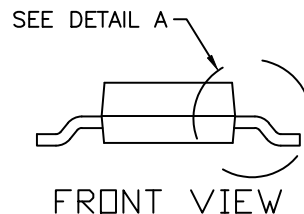


TOP VIEW

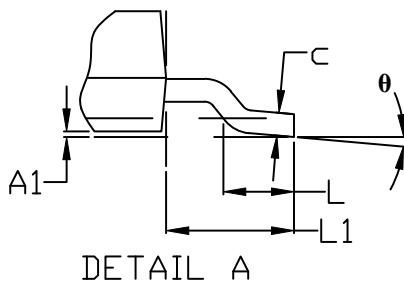
$\oplus 0.10 \text{ (M) C A B}$   
NOTE 5



SIDE VIEW



FRONT VIEW

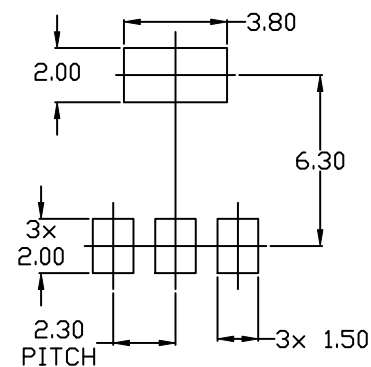


DETAIL A

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.200MM PER SIDE.
4. DATUMS A AND B ARE DETERMINED AT DATUM H.
5. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
6. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

| MILLIMETERS |          |      |      |
|-------------|----------|------|------|
| DIM         | MIN.     | NOM. | MAX. |
| A           | 1.50     | 1.63 | 1.75 |
| A1          | 0.02     | 0.06 | 0.10 |
| b           | 0.60     | 0.75 | 0.89 |
| b1          | 2.90     | 3.06 | 3.20 |
| c           | 0.24     | 0.29 | 0.35 |
| D           | 6.30     | 6.50 | 6.70 |
| E           | 3.30     | 3.50 | 3.70 |
| e           | 2.30 BSC |      |      |
| L           | 0.20     | ---  | ---  |
| L1          | 1.50     | 1.75 | 2.00 |
| He          | 6.70     | 7.00 | 7.30 |
| $\theta$    | 0°       | ---  | 10°  |



RECOMMENDED MOUNTING  
FOOTPRINT

|                  |                  |                                                                                                                                                                                     |
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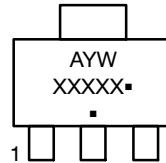
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**ISSUE R**

DATE 02 OCT 2018

|                                                                              |                                                                             |                                                                               |                                                                       |                                                                       |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>STYLE 1:</b><br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 2:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. NC<br>4. CATHODE        | <b>STYLE 3:</b><br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE<br>4. DRAIN           | <b>STYLE 4:</b><br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE<br>4. DRAIN   | <b>STYLE 5:</b><br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE<br>4. GATE    |
| <b>STYLE 6:</b><br>PIN 1. RETURN<br>2. INPUT<br>3. OUTPUT<br>4. INPUT        | <b>STYLE 7:</b><br>PIN 1. ANODE 1<br>2. CATHODE<br>3. ANODE 2<br>4. CATHODE | <b>STYLE 8:</b><br>CANCELLED                                                  | <b>STYLE 9:</b><br>PIN 1. INPUT<br>2. GROUND<br>3. LOGIC<br>4. GROUND | <b>STYLE 10:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE<br>4. ANODE |
| <b>STYLE 11:</b><br>PIN 1. MT 1<br>2. MT 2<br>3. GATE<br>4. MT 2             | <b>STYLE 12:</b><br>PIN 1. INPUT<br>2. OUTPUT<br>3. NC<br>4. OUTPUT         | <b>STYLE 13:</b><br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR |                                                                       |                                                                       |

**GENERIC  
MARKING DIAGRAM\***



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

(Note: Microdot may be in either location)  
 \*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

|                         |                         |                                                                                                                                                                                     |
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