

PZT651

NPN Silicon Planar Epitaxial Transistor

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

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.

Features

- High Current
- The SOT-223 Package can be Soldered Using Wave or Reflow
- Available in 12 mm Tape and Reel
 - ◆ Use PZT651T1G to Order the 7 inch/1000 Unit Reel
 - ◆ Use PZT651T3G to Order the 13 inch/4000 Unit Reel
- PNP Complement is PZT751T1G
- 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 ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|-----------|------------|------------|
| Collector-Emitter Voltage | V_{CEO} | 60 | Vdc |
| Collector-Base Voltage | V_{CBO} | 80 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current | I_C | 2.0 | Adc |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1) Derate above 25°C | P_D | 0.8 6.4 | W mW/°C |
| Storage Temperature Range | T_{stg} | -65 to 150 | °C |
| Junction Temperature | T_J | 150 | °C |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|-----------------|-----------|-----------|
| Thermal Resistance from Junction-to-Ambient in Free Air | $R_{\theta JA}$ | 156 | °C/W |
| Maximum Temperature for Soldering Purposes Time in Solder Bath | T_L | 260 10 | °C Sec |

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.

1. Device mounted on a FR-4 glass epoxy printed circuit board using minimum recommended footprint.

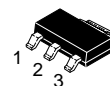
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



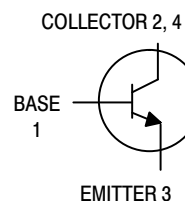
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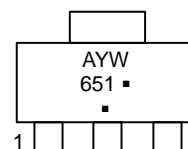
SOT-223 PACKAGE HIGH CURRENT NPN SILICON TRANSISTOR SURFACE MOUNT



SOT-223
CASE 318E-04
STYLE 1



MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
■ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|------------|-------------------|---------------------|
| PZT651T1G | SOT-223 (Pb-Free) | 1,000 / Tape & Reel |
| SPZT651T1G | SOT-223 (Pb-Free) | 1,000 / 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.

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

| Characteristics | Symbol | Min | Max | Unit |
|--|----------------------|----------------------|------------------|------|
| OFF CHARACTERISTICS | | | | |
| Collector–Emitter Breakdown Voltage (I _C = 10 mAdc, I _B = 0) | V _{(BR)CEO} | 60 | – | Vdc |
| Collector–Emitter Breakdown Voltage (I _C = 100 μAdc, I _E = 0) | V _{(BR)CBO} | 80 | – | Vdc |
| Emitter–Base Breakdown Voltage (I _E = 10 μAdc, I _C = 0) | V _{(BR)EBO} | 5.0 | – | Vdc |
| Base–Emitter Cutoff Current (V _{EB} = 4.0 Vdc) | I _{EBO} | – | 0.1 | μAdc |
| Collector–Base Cutoff Current (V _{CB} = 80 Vdc, I _E = 0) | I _{CBO} | – | 100 | nAdc |
| ON CHARACTERISTICS (Note 2) | | | | |
| DC Current Gain (I _C = 50 mAdc, V _{CE} = 2.0 Vdc) (I _C = 500 mAdc, V _{CE} = 2.0 Vdc) (I _C = 1.0 Adc, V _{CE} = 2.0 Vdc) (I _C = 2.0 Adc, V _{CE} = 2.0 Vdc) | h _{FE} | 75 75 75 40 | – – – – | – |
| Collector–Emitter Saturation Voltages (I _C = 2.0 Adc, I _B = 200 mAdc) (I _C = 1.0 Adc, I _B = 100 mAdc) | V _{CE(sat)} | – – | 0.5 0.3 | Vdc |
| Base–Emitter Voltages (I _C = 1.0 Adc, V _{CE} = 2.0 Vdc) | V _{BE(on)} | – | 1.0 | Vdc |
| Base–Emitter Saturation Voltage (I _C = 1.0 Adc, I _B = 100 mAdc) | V _{BE(sat)} | – | 1.2 | Vdc |
| Current–Gain — Bandwidth (I _C = 50 mAdc, V _{CE} = 5.0 Vdc, f = 100 MHz) | f _T | 75 | – | MHz |

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle = 2.0%

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TYPICAL CHARACTERISTICS

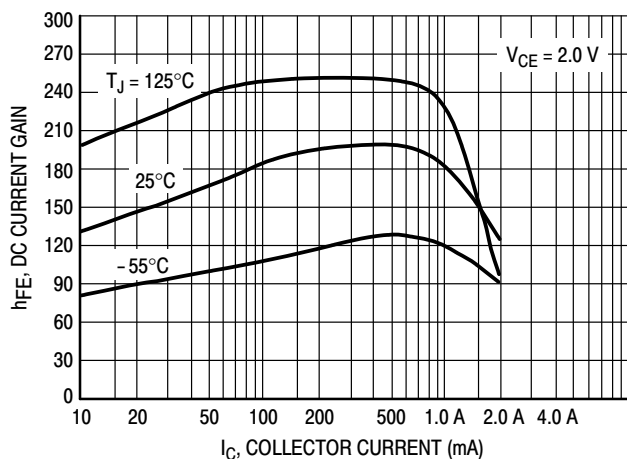


Figure 1. Typical DC Current Gain

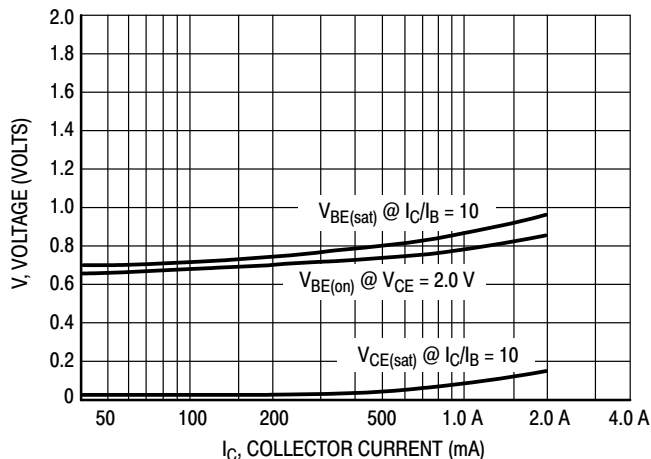


Figure 2. On Voltages

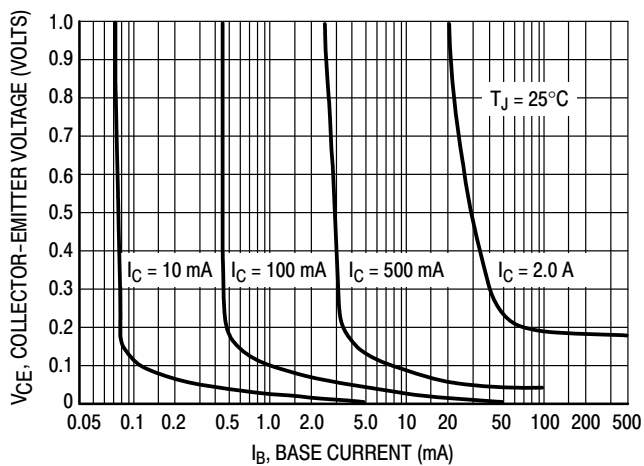
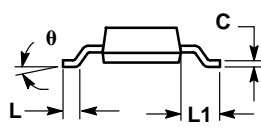
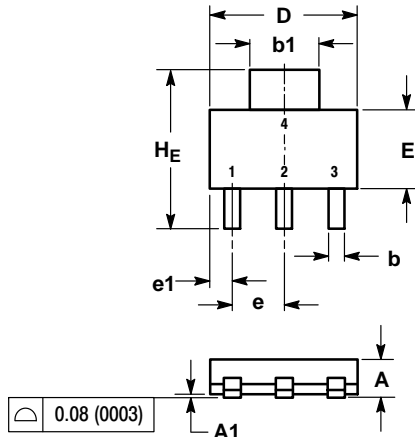


Figure 3. Collector Saturation Region

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PACKAGE DIMENSIONS

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

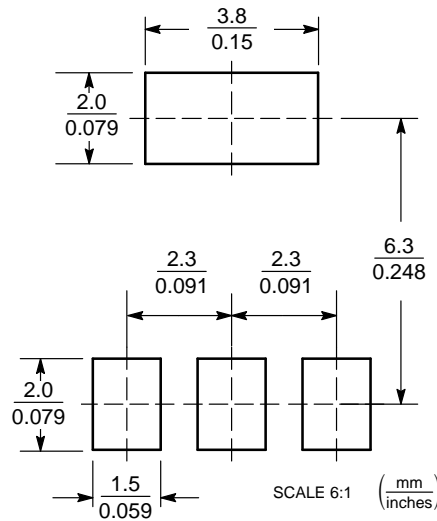


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH

| 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 |
| HE | 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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