

# PZTA42T1G

## High Voltage Transistor Surface Mount

### NPN Silicon

#### Features

- PZTA42T1G is Complement to PZTA92T1G
- 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 (Open Base)                       | $V_{CEO}$ | 300         | Vdc              |
| Collector-Base Voltage (Open Emitter)                       | $V_{CBO}$ | 300         | Vdc              |
| Emitter-Base Voltage (Open Collector)                       | $V_{EBO}$ | 6.0         | Vdc              |
| Collector Current (DC)                                      | $I_C$     | 500         | mAdc             |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1) | $P_D$     | 1.5         | W                |
| Storage Temperature Range                                   | $T_{stg}$ | -65 to +150 | $^\circ\text{C}$ |
| Junction Temperature                                        | $T_J$     | 150         | $^\circ\text{C}$ |

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  
1.575 in x 1.575 in x 0.0625 in; mounting pad for the collector lead = 0.93 sq in.

#### THERMAL CHARACTERISTICS

| Characteristic                                   | Symbol          | Max  | Unit               |
|--------------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 83.3 | $^\circ\text{C/W}$ |

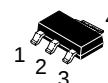
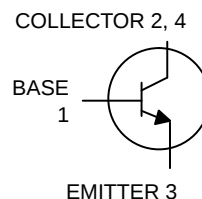
2. Device mounted on a FR-4 glass epoxy printed circuit board  
1.575 in x 1.575 in x 0.0625 in; mounting pad for the collector lead = 0.93 sq in.



ON Semiconductor®

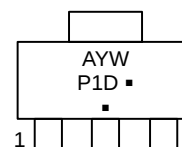
[www.onsemi.com](http://www.onsemi.com)

### SOT-223 PACKAGE NPN SILICON HIGH VOLTAGE TRANSISTOR SURFACE MOUNT



SOT-223  
CASE 318E  
STYLE 1

#### MARKING DIAGRAM



P1D = 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†           |
|------------|-------------------|---------------------|
| PZTA42T1G  | SOT-223 (Pb-Free) | 1,000 / Tape & Reel |
| SPZTA42T1G | 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.

# PZTA42T1G

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

| Characteristics | Symbol | Min | Max | Unit |
|-----------------|--------|-----|-----|------|
|-----------------|--------|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                       |               |     |     |               |
|---------------------------------------------------------------------------------------|---------------|-----|-----|---------------|
| Collector-Emitter Breakdown Voltage (Note 3)<br>( $I_C = 1.0\text{ mA}$ , $I_B = 0$ ) | $V_{(BR)CEO}$ | 300 | –   | Vdc           |
| Collector-Base Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ )    | $V_{(BR)CBO}$ | 300 | –   | Vdc           |
| Emitter-Base Breakdown Voltage<br>( $I_E = 100\text{ }\mu\text{A}$ , $I_C = 0$ )      | $V_{(BR)EBO}$ | 6.0 | –   | Vdc           |
| Collector-Base Cutoff Current<br>( $V_{CB} = 200\text{ Vdc}$ , $I_E = 0$ )            | $I_{CBO}$     | –   | 0.1 | $\mu\text{A}$ |
| Emitter-Base Cutoff Current<br>( $V_{BE} = 6.0\text{ Vdc}$ , $I_C = 0$ )              | $I_{EBO}$     | –   | 0.1 | $\mu\text{A}$ |

### ON CHARACTERISTICS

|                                                                                                                                                                                       |          |                |             |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|-------------|---|
| DC Current Gain<br>( $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 30\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ ) | $h_{FE}$ | 25<br>40<br>40 | –<br>–<br>– | – |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|-------------|---|

### DYNAMIC CHARACTERISTICS

|                                                                                                                |               |    |     |     |
|----------------------------------------------------------------------------------------------------------------|---------------|----|-----|-----|
| Current-Gain – Bandwidth Product<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 20\text{ Vdc}$ , $f = 100\text{ MHz}$ ) | $f_T$         | 50 | –   | MHz |
| Feedback Capacitance<br>( $V_{CB} = 20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                        | $C_{re}$      | –  | 3.0 | pF  |
| Collector-Emitter Saturation Voltage<br>( $I_C = 20\text{ mA}$ , $I_B = 2.0\text{ mA}$ )                       | $V_{CE(sat)}$ | –  | 0.5 | Vdc |
| Base-Emitter Saturation Voltage<br>( $I_C = 20\text{ mA}$ , $I_B = 2.0\text{ mA}$ )                            | $V_{BE(sat)}$ | –  | 0.9 | Vdc |

3. Pulse Test Conditions,  $t_p = 300\text{ }\mu\text{s}$ ,  $\delta = 0.02$ .

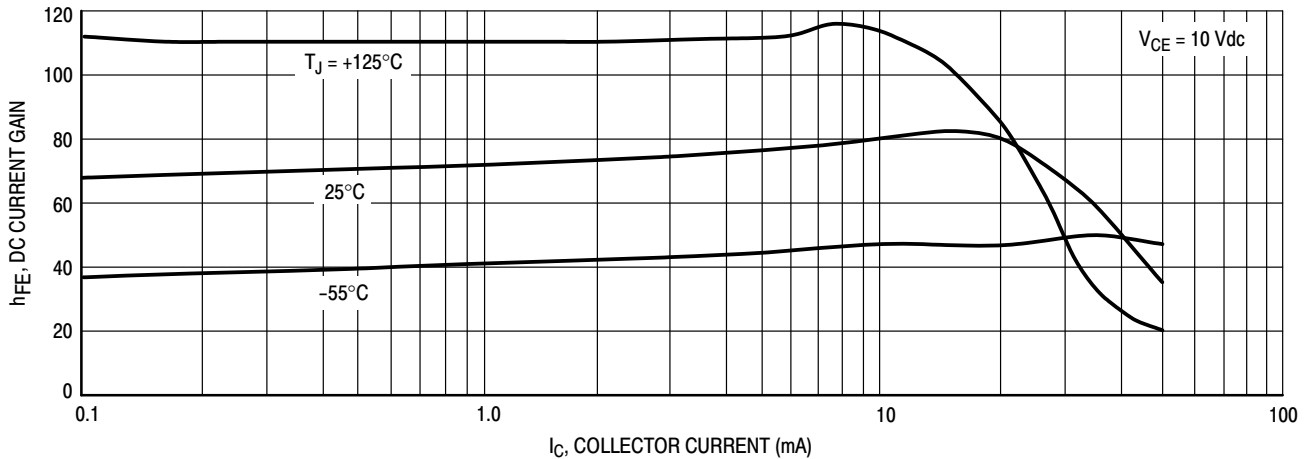


Figure 1. DC Current Gain

# PZTA42T1G

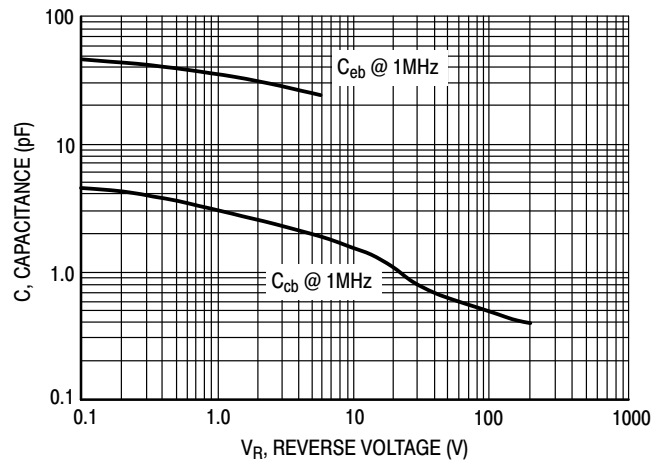


Figure 2. Capacitance

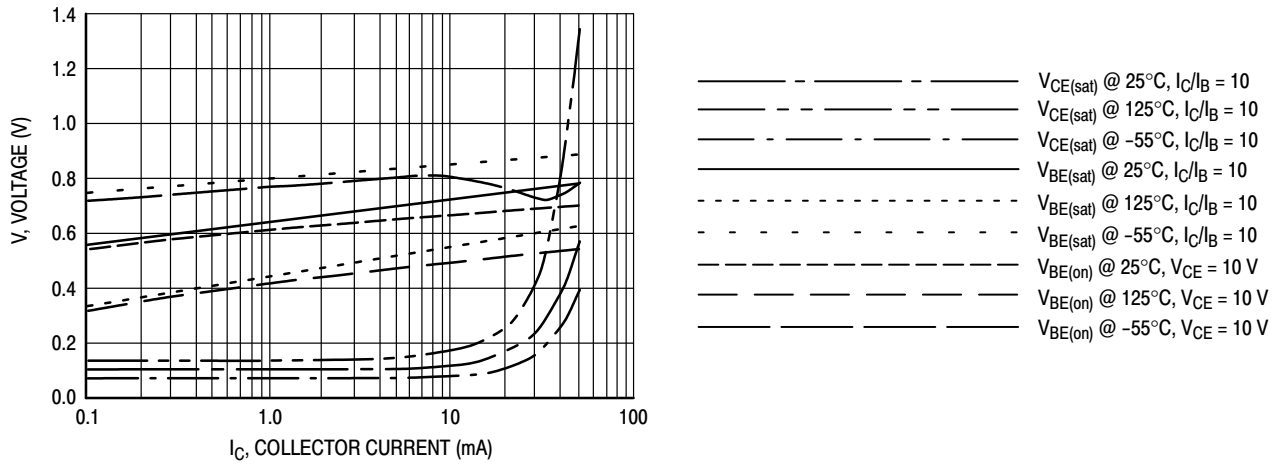


Figure 3. "ON" Voltages

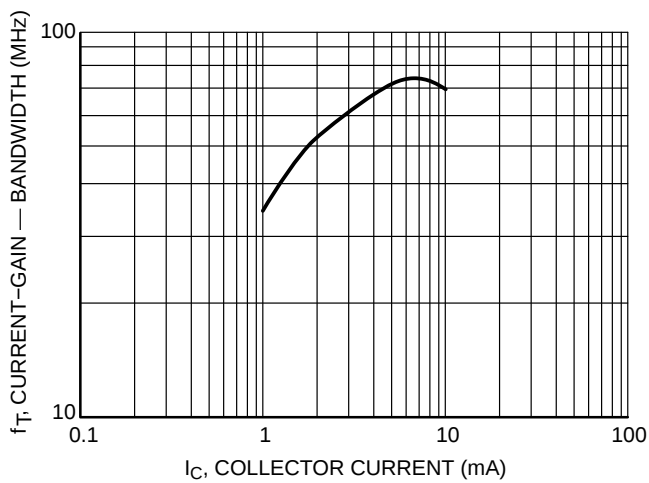


Figure 4. Current Gain Bandwidth Product

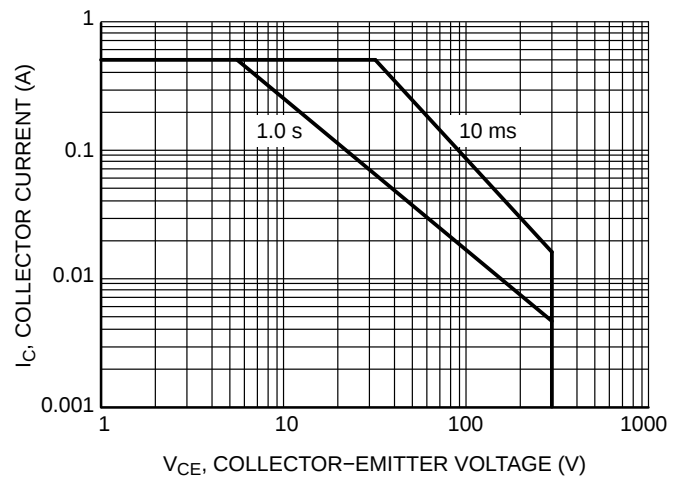
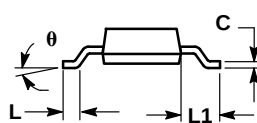
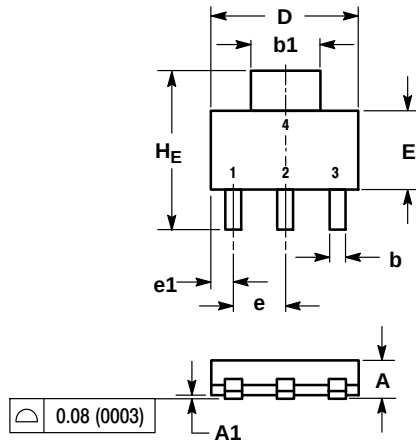


Figure 5. Safe Operating Area

# PZTA42T1G

## PACKAGE DIMENSIONS

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

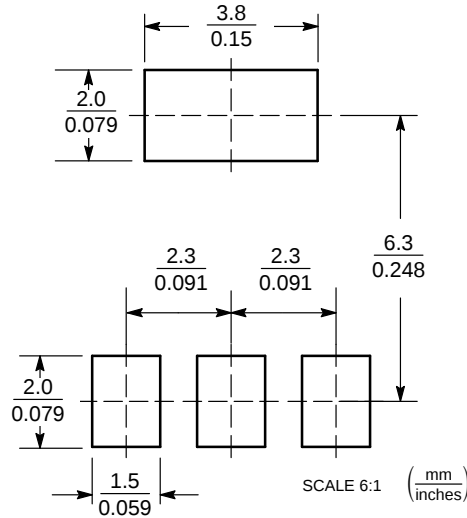


NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.  
2. CONTROLLING DIMENSION: INCH.

| 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 |
| θ   | 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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