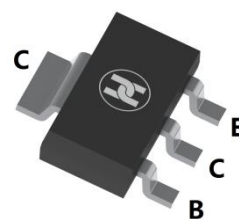
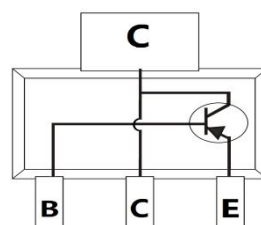


**BIPOLAR TRANSISTOR (PNP)**
**FEATURES**

- Complementary to PZT3904
- Low Voltage and Low Current
- General Purpose Amplifier and Switch Application
- Surface Mount device


**SOT-223**

**MECHANICAL DATA**

- Case: SOT-223
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.04 grams (approximate)

**MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

| Parameter                                   | Symbol          | Value      | Unit               |
|---------------------------------------------|-----------------|------------|--------------------|
| Collector-Base Voltage                      | $V_{CBO}$       | -40        | V                  |
| Collector-Emitter Voltage                   | $V_{CEO}$       | -40        | V                  |
| Emitter-Base Voltage                        | $V_{EBO}$       | -5         | V                  |
| Collector Current                           | $I_C$           | -200       | mA                 |
| Collector Power Dissipation                 | $P_C$           | 1          | W                  |
| Thermal Resistance From Junction To Ambient | $R_{\theta JA}$ | 125        | $^\circ\text{C/W}$ |
| Junction Temperature                        | $T_J$           | 150        | $^\circ\text{C}$   |
| Storage Temperature                         | $T_{STG}$       | -55 ~ +150 | $^\circ\text{C}$   |

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

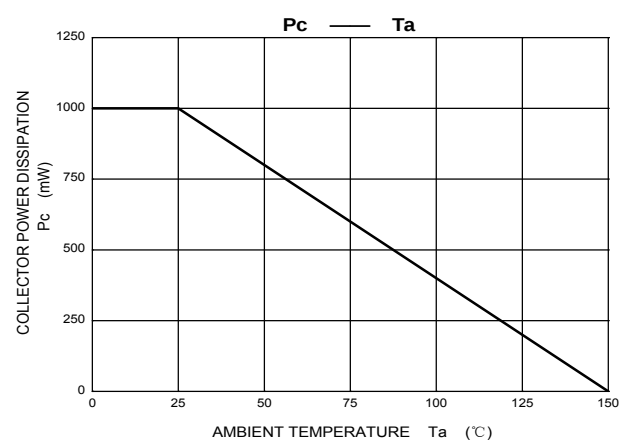
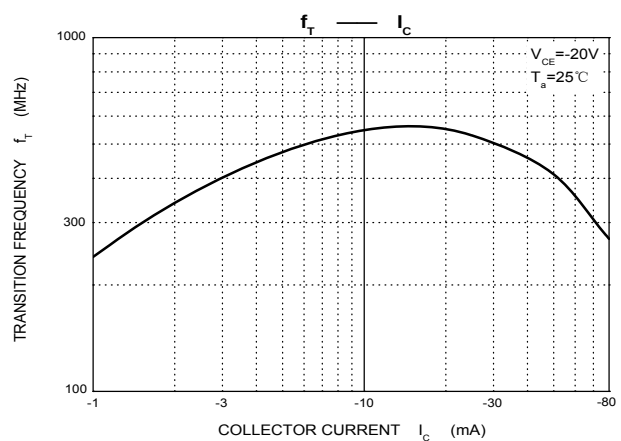
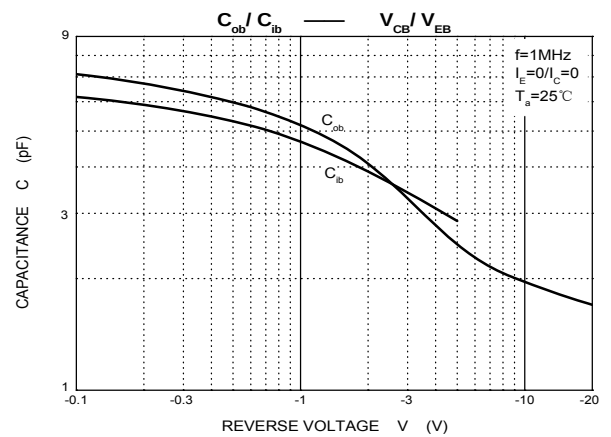
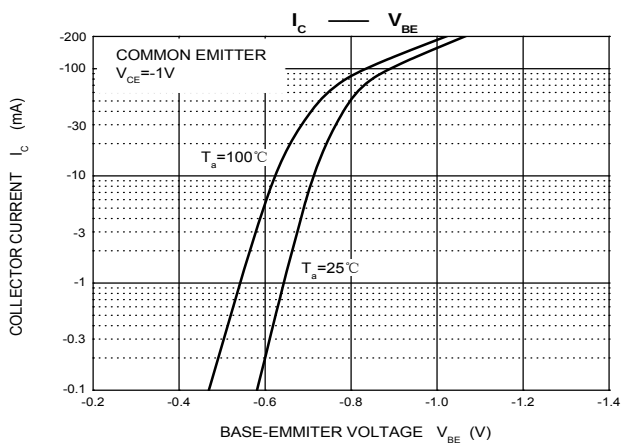
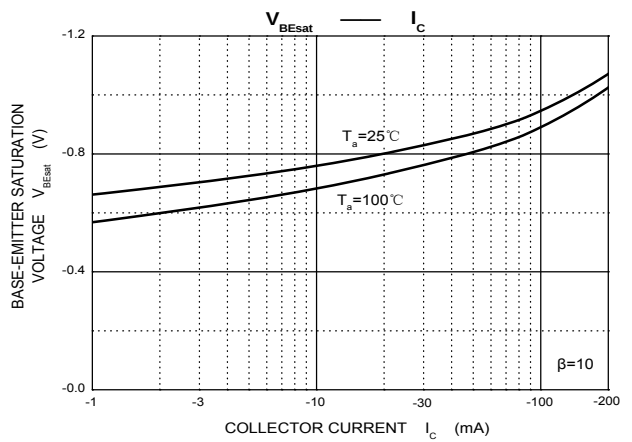
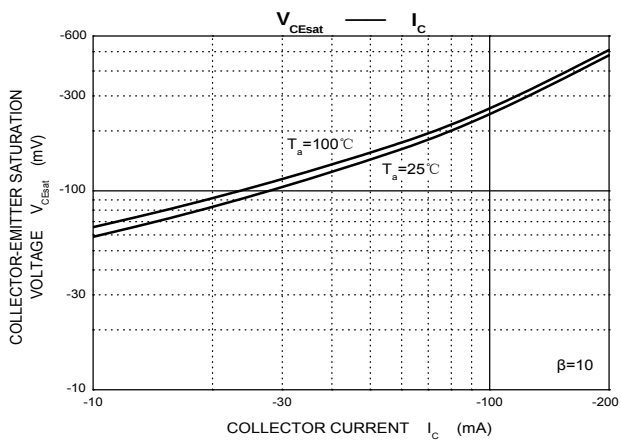
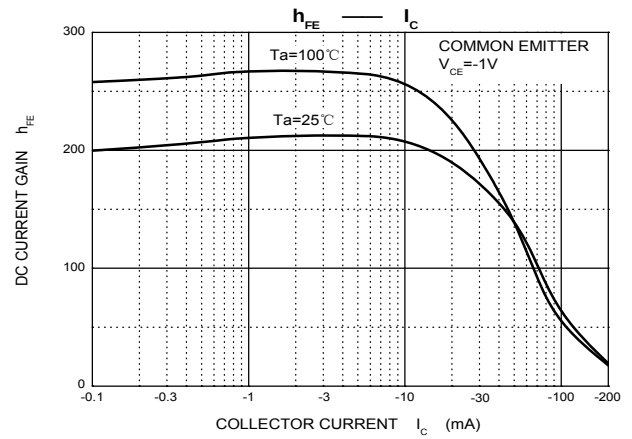
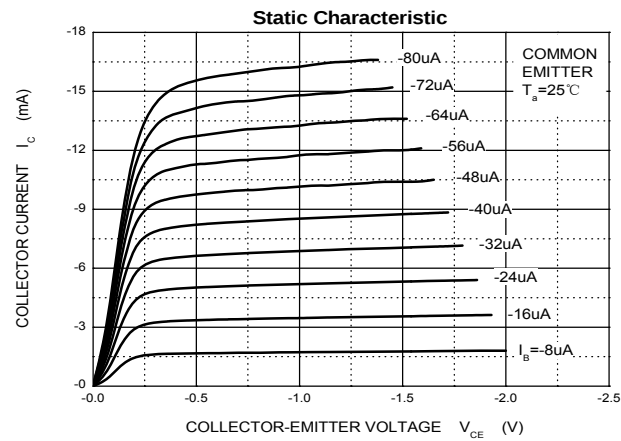
| Parameter                            | Symbol          | Min   | Typ | Max   | Unit | Conditions                                                                                                        |
|--------------------------------------|-----------------|-------|-----|-------|------|-------------------------------------------------------------------------------------------------------------------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}^*$ | -40   |     |       | V    | $I_C = -10\mu\text{A}$ , $I_E = 0$                                                                                |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}^*$ | -40   |     |       | V    | $I_C = -10\text{mA}$ , $I_B = 0$                                                                                  |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}^*$ | -5    |     |       | V    | $I_E = -10\mu\text{A}$ , $I_C = 0$                                                                                |
| Collector cut-off current            | $I_{CBO}$       |       |     | -50   | nA   | $V_{CB} = -30\text{V}$ , $I_E = 0$                                                                                |
| Collector cut-off current            | $I_{CEX}$       |       |     | -50   | nA   | $V_{CE} = -30\text{V}$ , $V_{BE(off)} = -3\text{V}$                                                               |
| DC current gain                      | $h_{FE1}^*$     | 60    |     |       |      | $V_{CE} = -1\text{V}$ , $I_C = -0.1\text{mA}$                                                                     |
|                                      | $h_{FE2}$       | 80    |     |       |      | $V_{CE} = -1\text{V}$ , $I_C = -1\text{mA}$                                                                       |
|                                      | $h_{FE3}$       | 100   | 300 |       |      | $V_{CE} = -1\text{V}$ , $I_C = -10\text{mA}$                                                                      |
|                                      | $h_{FE4}$       | 60    |     |       |      | $V_{CE} = -1\text{V}$ , $I_C = -50\text{mA}$                                                                      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$   |       |     | -0.25 | V    | $I_C = -10\text{mA}$ , $I_B = -1\text{mA}$                                                                        |
|                                      |                 |       |     | -0.4  | V    | $I_C = -50\text{mA}$ , $I_B = -5\text{mA}$                                                                        |
| Base-emitter saturation voltage      | $V_{BE(sat)}$   | -0.65 |     | -0.85 | V    | $I_C = -10\text{mA}$ , $I_B = -1\text{mA}$                                                                        |
|                                      |                 |       |     | -0.95 | V    | $I_C = -50\text{mA}$ , $I_B = -5\text{mA}$                                                                        |
| Transition frequency                 | $f_T$           | 250   |     |       | MHz  | $V_{CE} = -20\text{V}$ , $I_C = -10\text{mA}$ , $f = 100\text{MHz}$                                               |
| Collector output capacitance         | $C_{ob}$        |       |     | 4.5   | pF   | $V_{CB} = -5\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$                                                             |
| Emitter input capacitance            | $C_{ib}$        |       |     | 10    | pF   | $V_{BE} = -0.5\text{V}$ , $I_C = 0$ , $f = 1\text{MHz}$                                                           |
| Delay time                           | $t_d$           |       |     | 35    | nS   | $V_{CC} = -3\text{V}$ , $V_{BE(off)} = -0.5\text{V}$ ,<br>$I_C = -10\text{mA}$ , $I_{B1} = -I_{B2} = -1\text{mA}$ |
| Rise time                            | $t_r$           |       |     | 35    | nS   |                                                                                                                   |
| Storage time                         | $t_s$           |       |     | 225   | nS   | $V_{CC} = -3\text{V}$ , $I_C = -10\text{mA}$ ,<br>$I_{B1} = -I_{B2} = -1\text{mA}$                                |
| Fall time                            | $t_f$           |       |     | 75    | nS   |                                                                                                                   |

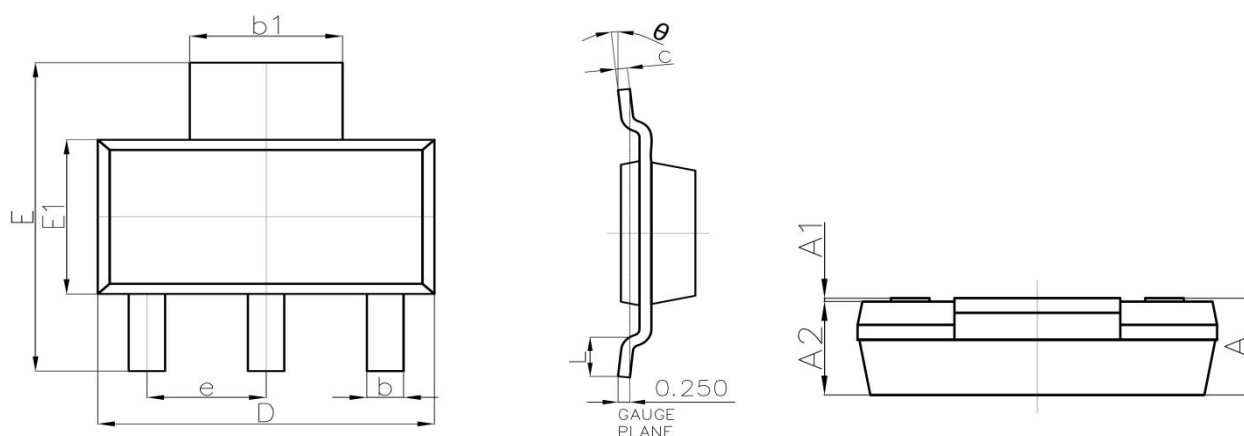
\*Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

**MARKING: ZT3906**

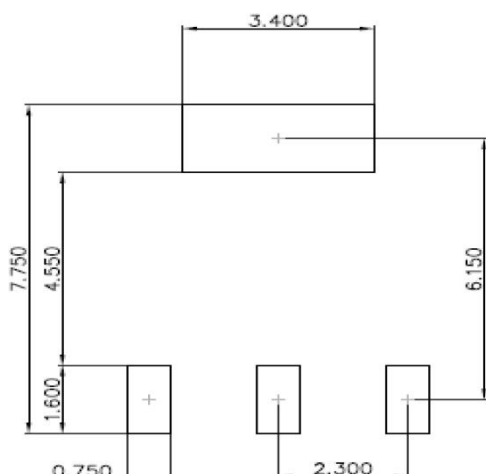
# BIPOLAR TRANSISTOR (PNP)

## Typical Characteristics



**BIPOLAR TRANSISTOR (PNP)**
**SOT-223 Package Outline Dimensions**


| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | —                         | 1.800 | -----                | 0.071 |
| A1     | 0.020                     | 0.100 | 0.001                | 0.004 |
| A2     | 1.500                     | 1.700 | 0.059                | 0.067 |
| b      | 0.660                     | 0.840 | 0.026                | 0.033 |
| b1     | 2.900                     | 3.100 | 0.114                | 0.122 |
| c      | 0.230                     | 0.350 | 0.009                | 0.014 |
| D      | 6.300                     | 6.700 | 0.248                | 0.264 |
| E      | 6.700                     | 7.300 | 0.264                | 0.287 |
| E1     | 3.300                     | 3.700 | 0.130                | 0.146 |
| e      | 2.300(BSC)                |       | 0.091(BSC)           |       |
| L      | 0.750                     | ----- | 0.030                | ----- |
| θ      | 0°                        | 10°   | 0°                   | 10°   |

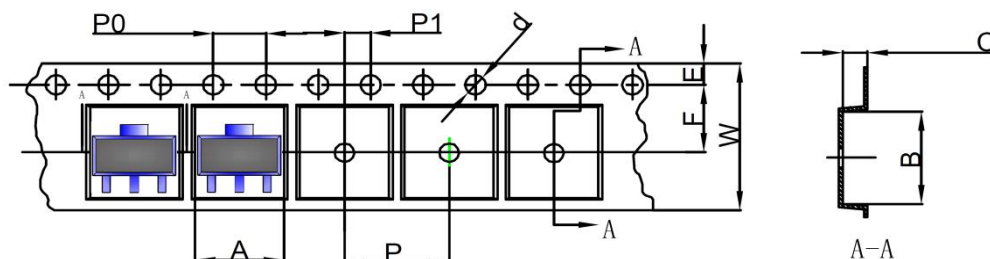
**SOT-223 Suggested Pad Layout**

**Note:**

1. Controlling dimension: in millimeters
2. General tolerance:  $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

## BIPOLAR TRANSISTOR (PNP)

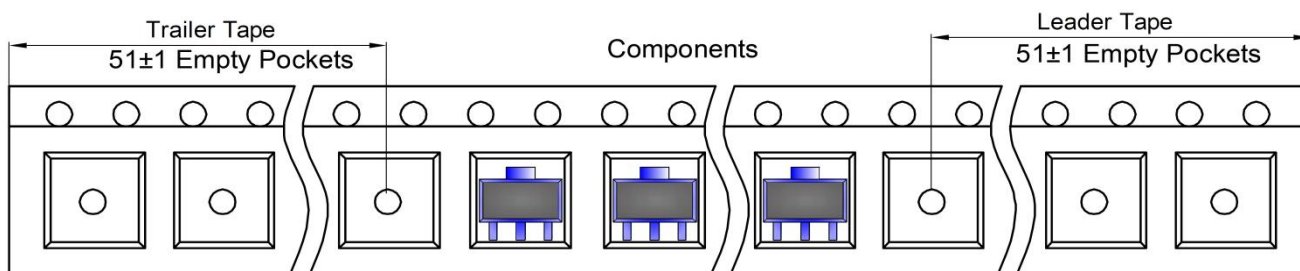
### SOT-223 Tape and Reel

#### SOT-223 Embossed Carrier Tape

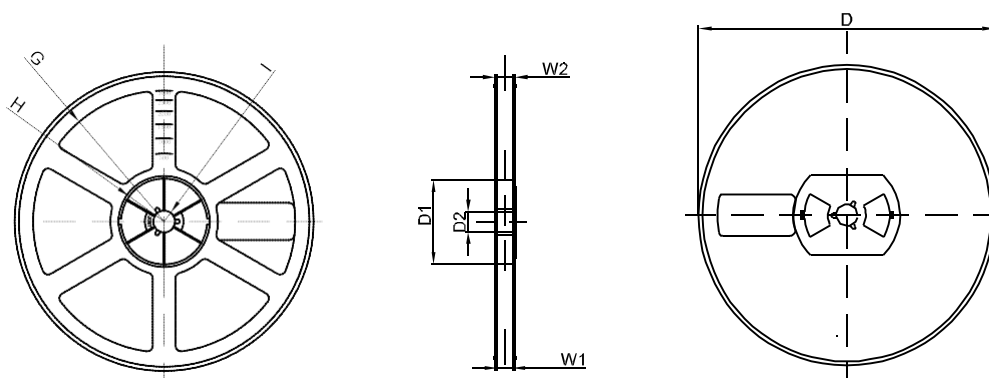


| DIMENSIONS ARE IN MILLIMETER |       |       |      |       |      |      |      |      |      |       |
|------------------------------|-------|-------|------|-------|------|------|------|------|------|-------|
| TYPE                         | A     | B     | C    | d     | E    | F    | P0   | P    | P1   | W     |
| SOT-223                      | 6.765 | 7.335 | 1.88 | Ø1.50 | 1.75 | 5.50 | 4.00 | 4.00 | 2.00 | 12.00 |
| TOLERANCE                    | ±0.1  | ±0.1  | ±0.1 | ±0.1  | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1  |

#### SOT-223 Tape Leader and Trailer



#### SOT-223 Reel



| DIMENSIONS ARE IN MILLIMETER |         |        |       |         |        |       |       |       |
|------------------------------|---------|--------|-------|---------|--------|-------|-------|-------|
| REEL OPTION                  | D       | D1     | D2    | G       | H      | I     | W1    | W2    |
| 13" DIA                      | Ø330.00 | 100.00 | 13.00 | R151.00 | R56.00 | R6.50 | 12.40 | 17.60 |
| TOLERANCE                    | ±2      | ±1     | ±1    | ±1      | ±1     | ±1    | ±1    | ±1    |