

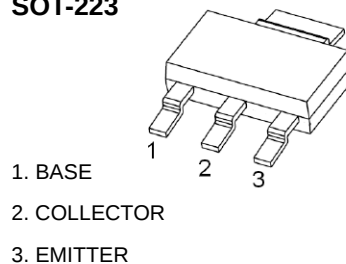
## SOT-223 Plastic-Encapsulate Transistors

TRANSISTOR (PNP)

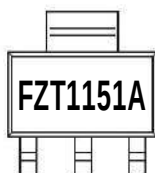
### ■ Features

- Collector Current Capability  $I_C = -3A$
- Collector Emitter Voltage  $V_{CE0} = -40V$
- Low Saturation voltage

### SOT-223



MARKING:



### ■ Absolute Maximum Ratings $T_a = 25^\circ C$

| Parameter                      | Symbol    | Rating     | Unit       |
|--------------------------------|-----------|------------|------------|
| Collector - Base Voltage       | $V_{CB0}$ | -45        | V          |
| Collector - Emitter Voltage    | $V_{CE0}$ | -40        |            |
| Emitter - Base Voltage         | $V_{EB0}$ | -5         |            |
| Collector Current - Continuous | $I_C$     | -3         | A          |
| Collector Current - Pulse      | $I_{CP}$  | -5         |            |
| Base Current                   | $I_B$     | -500       | mA         |
| Collector Power Dissipation    | $P_C$     | 2.5        | W          |
| Junction Temperature           | $T_J$     | 150        | $^\circ C$ |
| Storage Temperature range      | $T_{stg}$ | -55 to 150 |            |

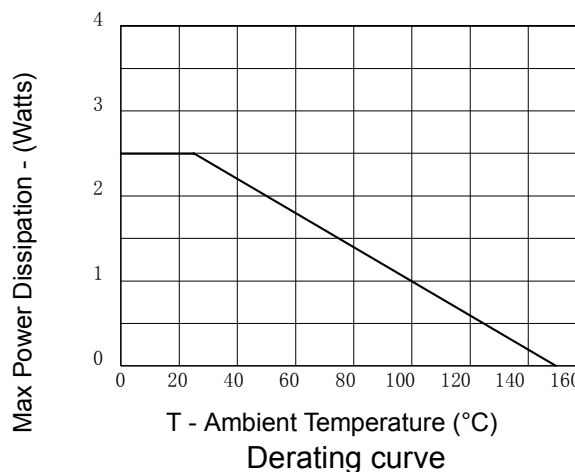
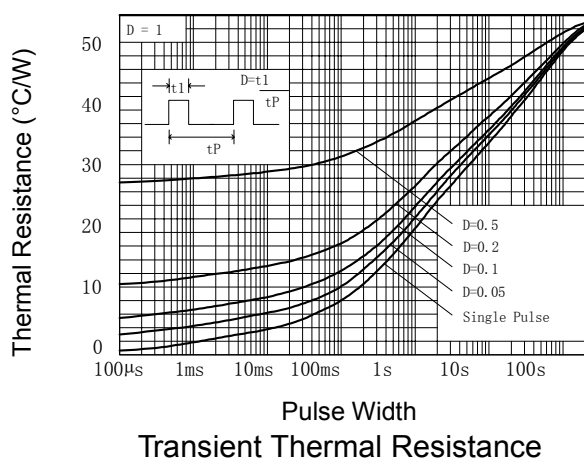
## Typical Characteristics

### ■ Electrical Characteristics Ta = 25°C

| Parameter                            | Symbol               | Test Conditions                                                           | Min | Typ | Max  | Unit |
|--------------------------------------|----------------------|---------------------------------------------------------------------------|-----|-----|------|------|
| Collector- base breakdown voltage    | V <sub>CB0</sub>     | I <sub>C</sub> = -100 $\mu$ A, I <sub>E</sub> = 0                         | -45 |     |      | V    |
| Collector- emitter breakdown voltage | V <sub>CES</sub>     | I <sub>C</sub> = -100 $\mu$ A, I <sub>B</sub> = 0                         | -45 |     |      |      |
| Collector- emitter breakdown voltage | V <sub>CEO</sub>     | I <sub>C</sub> = -10 mA, I <sub>B</sub> = 0                               | -40 |     |      |      |
| Collector- emitter breakdown voltage | V <sub>CEV</sub>     | I <sub>C</sub> = -100 $\mu$ A, V <sub>EB</sub> = 1V                       | -40 |     |      |      |
| Emitter - base breakdown voltage     | V <sub>EB0</sub>     | I <sub>E</sub> = -100 $\mu$ A, I <sub>C</sub> = 0                         | -5  |     |      |      |
| Collector-base cut-off current       | I <sub>CB0</sub>     | V <sub>CB</sub> = -36 V, I <sub>E</sub> = 0                               |     |     | -100 | nA   |
| Collector-emitter cut-off current    | I <sub>CES</sub>     | V <sub>CE</sub> = -32 V, I <sub>B</sub> = 0                               |     |     | -100 |      |
| Emitter cut-off current              | I <sub>EB0</sub>     | V <sub>EB</sub> = -4V, I <sub>C</sub> = 0                                 |     |     | -100 |      |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> = -100mA, I <sub>B</sub> = -10mA (Note.1)                  |     |     | -90  | mV   |
|                                      |                      | I <sub>C</sub> = -0.5 A, I <sub>B</sub> = -3mA (Note.1)                   |     |     | -180 |      |
|                                      |                      | I <sub>C</sub> = -1 A, I <sub>B</sub> = -20mA (Note.1)                    |     |     | -220 |      |
|                                      |                      | I <sub>C</sub> = -1.8 A, I <sub>B</sub> = -70mA (Note.1)                  |     |     | -260 |      |
|                                      |                      | I <sub>C</sub> = -3 A, I <sub>B</sub> = -250mA (Note.1)                   |     |     | -300 |      |
| Base - emitter saturation voltage    | V <sub>BE(sat)</sub> | I <sub>C</sub> = -3 A, I <sub>B</sub> = -250mA (Note.1)                   |     |     | -1.1 | V    |
| Base-Emitter Turn-On Voltage         | V <sub>BE(on)</sub>  | V <sub>CE</sub> = -2V, I <sub>C</sub> = -3A (Note.1)                      |     |     | -1   |      |
| DC current gain (Note.1)             | h <sub>FE(1)</sub>   | V <sub>CE</sub> = -2V, I <sub>C</sub> = -10mA                             | 270 |     |      |      |
|                                      | h <sub>FE(2)</sub>   | V <sub>CE</sub> = -2V, I <sub>C</sub> = -500mA                            | 250 |     | 800  |      |
|                                      | h <sub>FE(3)</sub>   | V <sub>CE</sub> = -2V, I <sub>C</sub> = -2 A                              | 180 |     |      |      |
|                                      | h <sub>FE(4)</sub>   | V <sub>CE</sub> = -2V, I <sub>C</sub> = -3 A                              | 100 |     |      |      |
|                                      | h <sub>FE(5)</sub>   | V <sub>CE</sub> = -2V, I <sub>C</sub> = -5 A                              |     | 45  |      |      |
| Switching Times                      | t <sub>on</sub>      | I <sub>C</sub> = -2A, I <sub>B</sub> = -20mA, V <sub>CC</sub> = -30V      |     | 170 |      | ns   |
|                                      | t <sub>off</sub>     | I <sub>C</sub> = -2A, I <sub>B</sub> = $\pm$ 20mA, V <sub>CC</sub> = -30V |     | 460 |      |      |
| Collector output capacitance         | C <sub>ob</sub>      | V <sub>CB</sub> = -10V, f = 1MHz                                          |     | 40  |      | pF   |
| Transition frequency                 | f <sub>T</sub>       | V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 50MHz                 |     | 145 |      | MHz  |

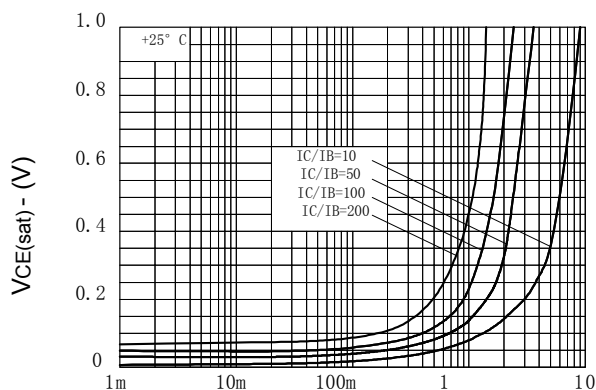
Note.1: Pulse width=300 $\mu$ s. Duty cycle  $\leq$  2%

### ■ Typical Characteristics

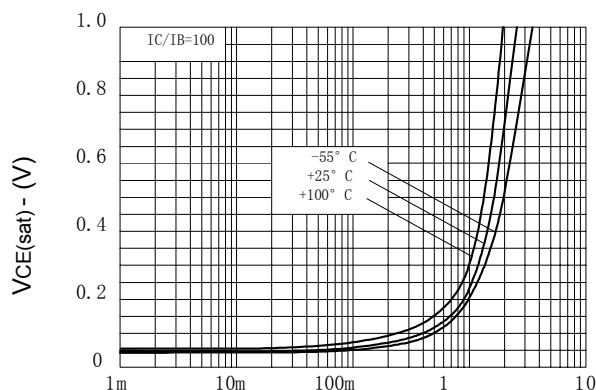


## Typical Characteristics

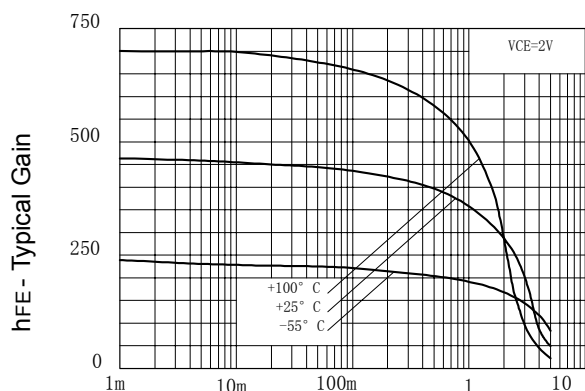
### ■ Typical Characteristics



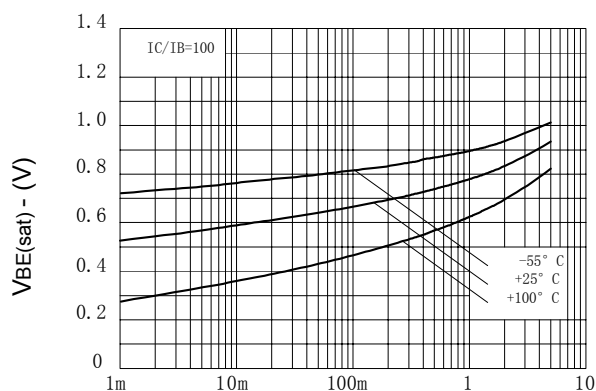
$I_C$  - Collector Current (A)  
 $V_{CE(sat)}$  v  $I_C$



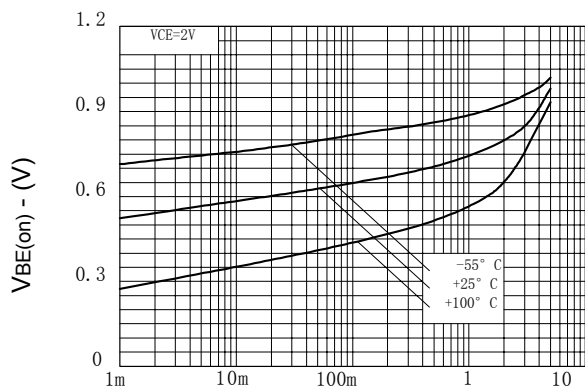
$I_C$  - Collector Current (A)  
 $V_{CE(sat)}$  v  $I_C$



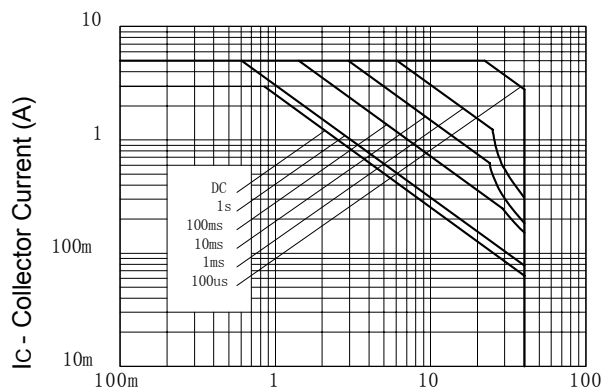
$I_C$  - Collector Current (A)  
 $h_{FE}$  v  $I_C$



$I_C$  - Collector Current (A)  
 $V_{BE(sat)}$  v  $I_C$

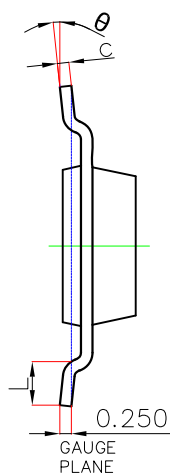
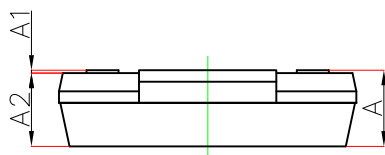
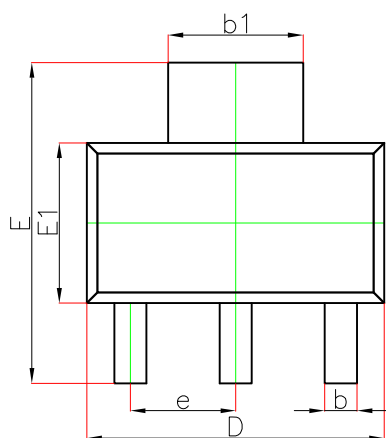


$I_C$  - Collector Current (A)  
 $V_{BE(on)}$  v  $I_C$



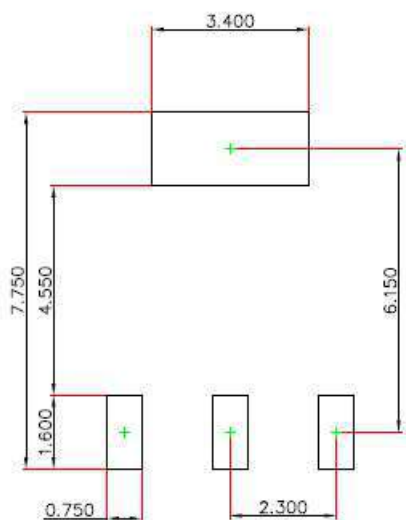
$V_{CE}$  - Collector Emitter Voltage (V)  
 Safe Operating Area

## 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                | —     |
| theta  | 0°                        | 10°   | 0°                   | 10°   |

## SOT-223 Suggested Pad Layout

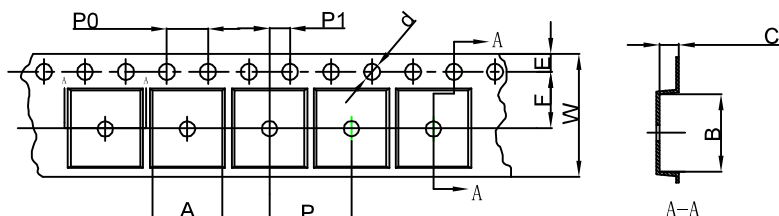


### Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.050$ mm.
3. The pad layout is for reference purposes only.

## SOT-223 Tape and Reel

### SOT-223 Embossed Carrier Tape

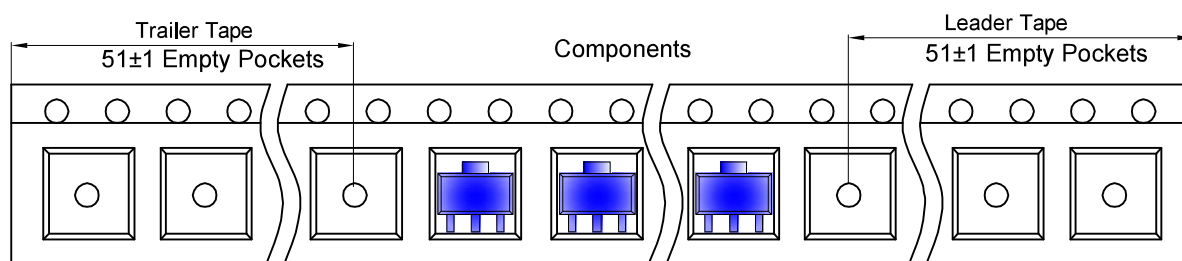


#### Packaging Description:

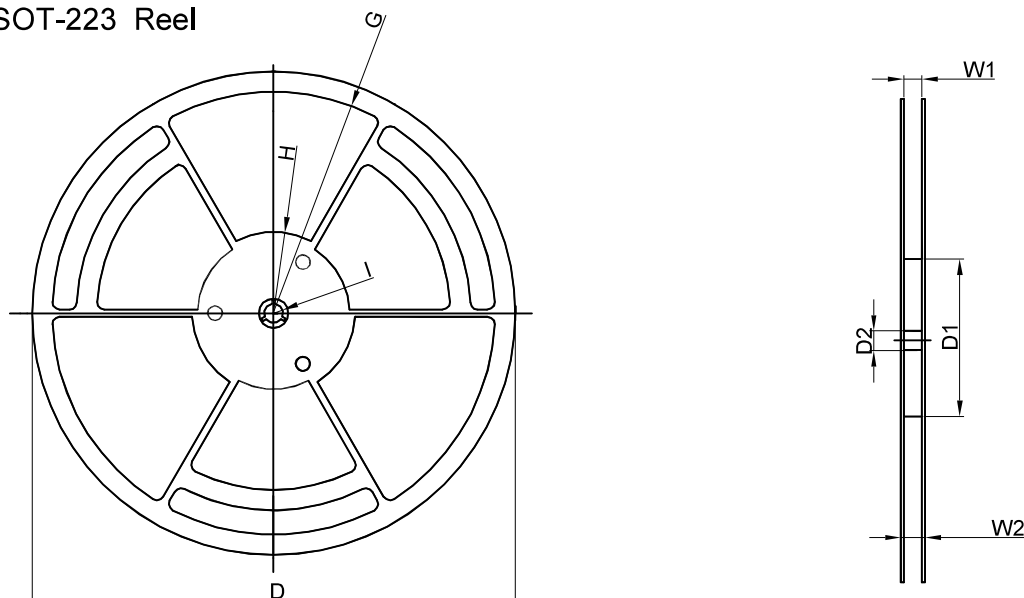
SOT-223 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 33.0cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter |       |       |      |       |      |      |      |      |      |       |
|------------------------------|-------|-------|------|-------|------|------|------|------|------|-------|
| Pkg 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 | 8.00 | 2.00 | 12.00 |

### 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 |

| REEL      | Reel Size | Box       | Box Size(mm) | Carton     | Carton Size(mm) | G.W.(kg) |
|-----------|-----------|-----------|--------------|------------|-----------------|----------|
| 2,500 pcs | 13 inch   | 2,500 pcs | 336×336×48   | 20,000 pcs | 445×355×365     |          |