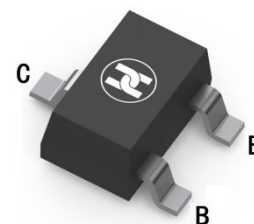
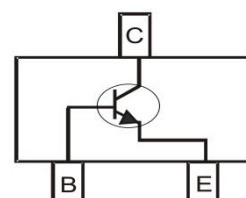


**BIPOLEAR TRANSISTOR (NPN)**
**FEATURES**

- Complementary to 2SA1576A
- Excellent  $h_{FE}$  Linearity
- Surface Mount device


**SOT-323**

**MECHANICAL DATA**

- Case: SOT-323
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)

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

| Parameter                                   | Symbol          | Value      | Unit               |
|---------------------------------------------|-----------------|------------|--------------------|
| Collector-Base Voltage                      | $V_{CBO}$       | 60         | V                  |
| Collector-Emitter Voltage                   | $V_{CEO}$       | 50         | V                  |
| Emitter-Base Voltage                        | $V_{EBO}$       | 7          | V                  |
| Collector Current                           | $I_C$           | 150        | mA                 |
| Collector Power Dissipation                 | $P_C$           | 200        | mW                 |
| Thermal Resistance From Junction To Ambient | $R_{\theta JA}$ | 625        | $^\circ\text{C/W}$ |
| 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)**

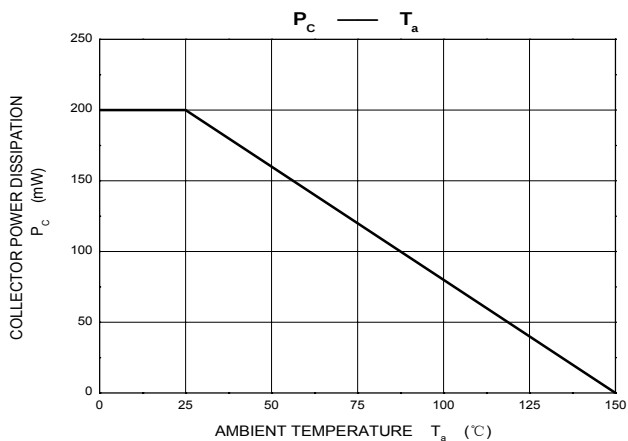
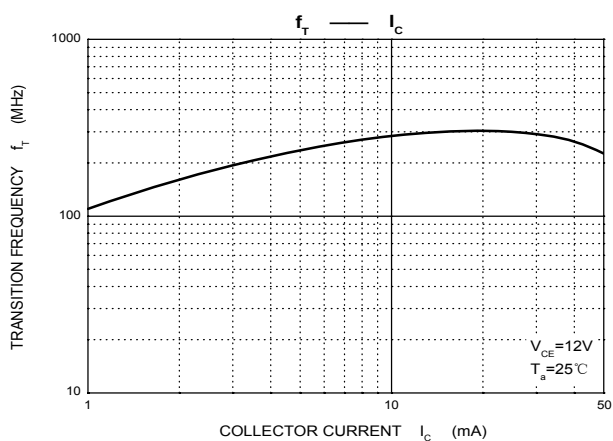
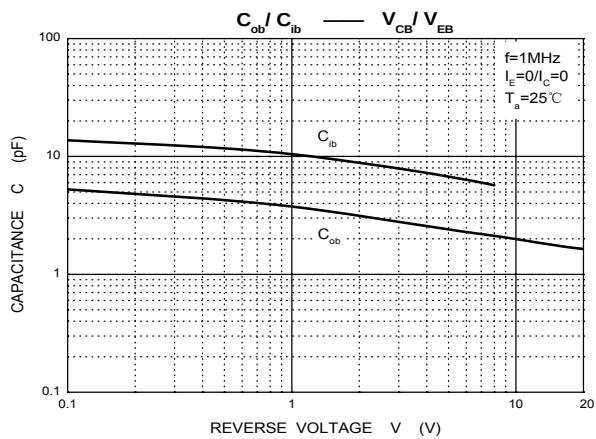
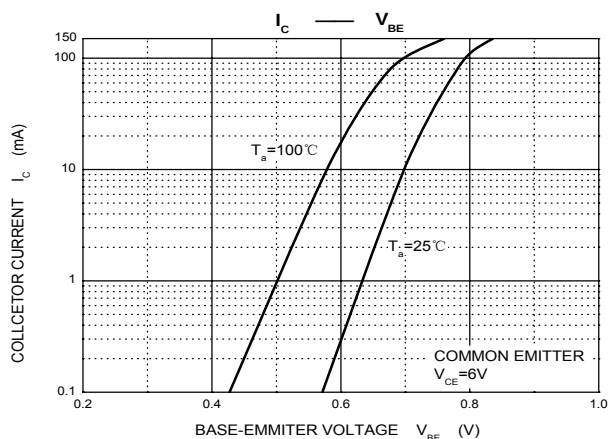
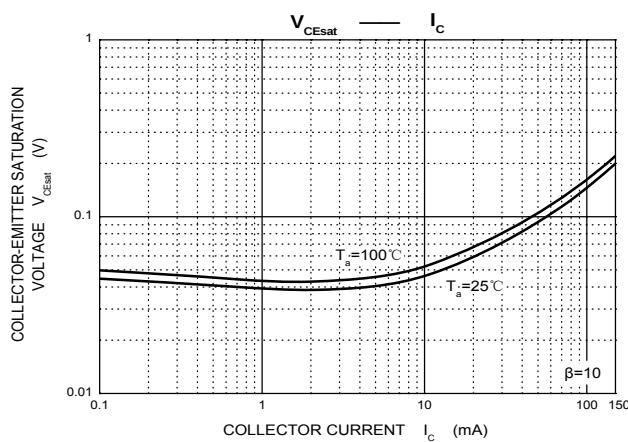
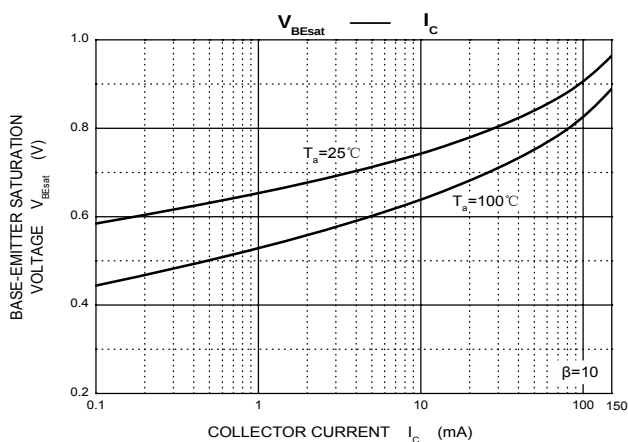
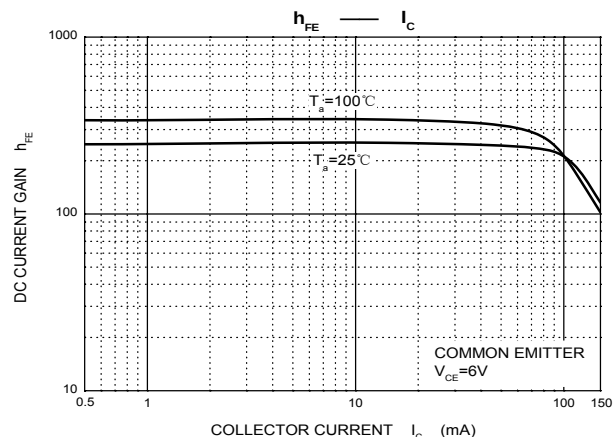
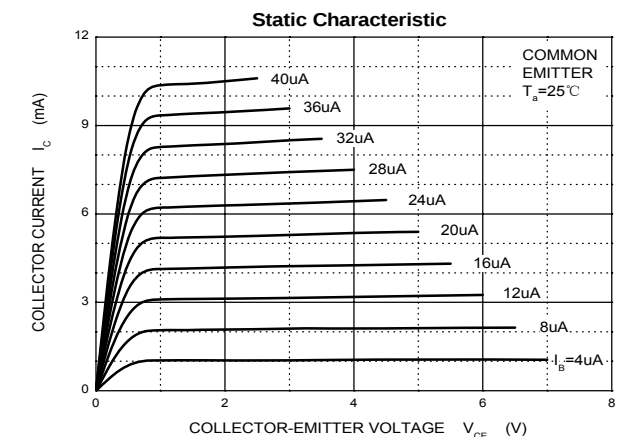
| Parameter                            | Symbol        | Min | Typ | Max | Unit          | Conditions                                                |
|--------------------------------------|---------------|-----|-----|-----|---------------|-----------------------------------------------------------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | 60  |     |     | V             | $I_C=50\mu\text{A}$ , $I_E=0$                             |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | 50  |     |     | V             | $I_C=1\text{mA}$ , $I_B=0$                                |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | 7   |     |     | V             | $I_E=50\mu\text{A}$ , $I_C=0$                             |
| Collector cut-off current            | $I_{CBO}$     |     |     | 0.1 | $\mu\text{A}$ | $V_{CB}=60\text{V}$ , $I_E=0$                             |
| Emitter cut-off current              | $I_{EBO}$     |     |     | 0.1 | $\mu\text{A}$ | $V_{EB}=7\text{V}$ , $I_C=0$                              |
| DC current gain                      | $h_{FE}$      | 120 |     | 560 |               | $V_{CE}=6\text{V}$ , $I_C=1\text{mA}$                     |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ |     |     | 0.4 | V             | $I_C=50\text{mA}$ , $I_B=5\text{mA}$                      |
| Transition frequency                 | $f_T$         |     | 180 |     | MHz           | $V_{CE}=12\text{V}$ , $I_C=2\text{mA}$ , $f=30\text{MHz}$ |
| Collector output capacitance         | $C_{ob}$      |     |     | 3.5 | pF            | $V_{CB}=12\text{V}$ , $I_E=0$ , $f=1\text{MHz}$           |

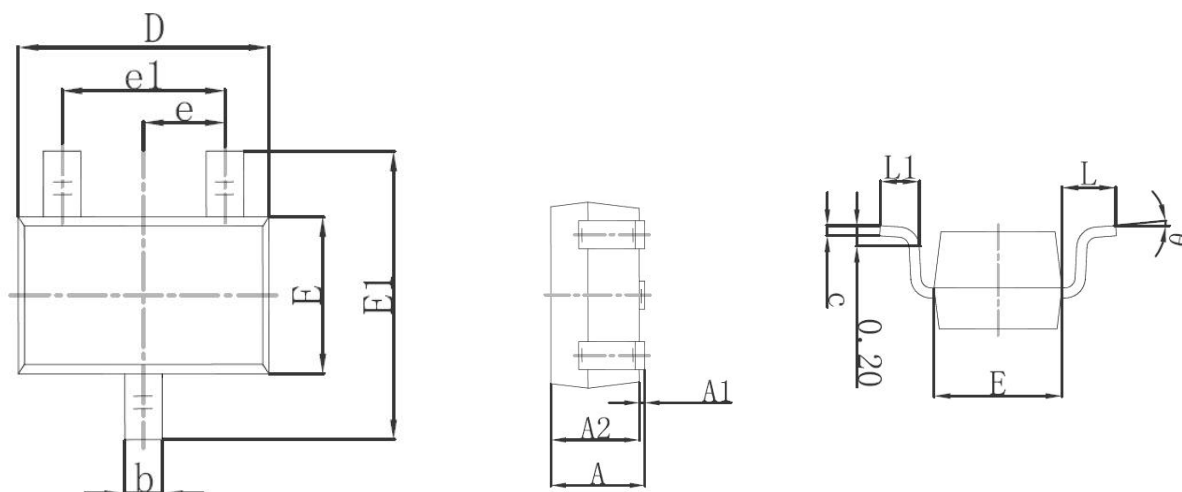
**CLASSIFICATION OF  $h_{FE}$** 

| Rank    | Q       | R       | S       |
|---------|---------|---------|---------|
| Range   | 120-270 | 180-390 | 270-560 |
| Marking | BQ      | BR      | BS      |

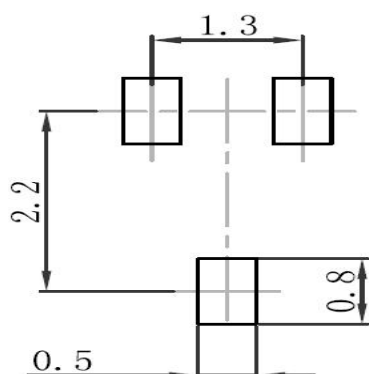
# BIPOLAR TRANSISTOR (NPN)

## Typical Characteristics

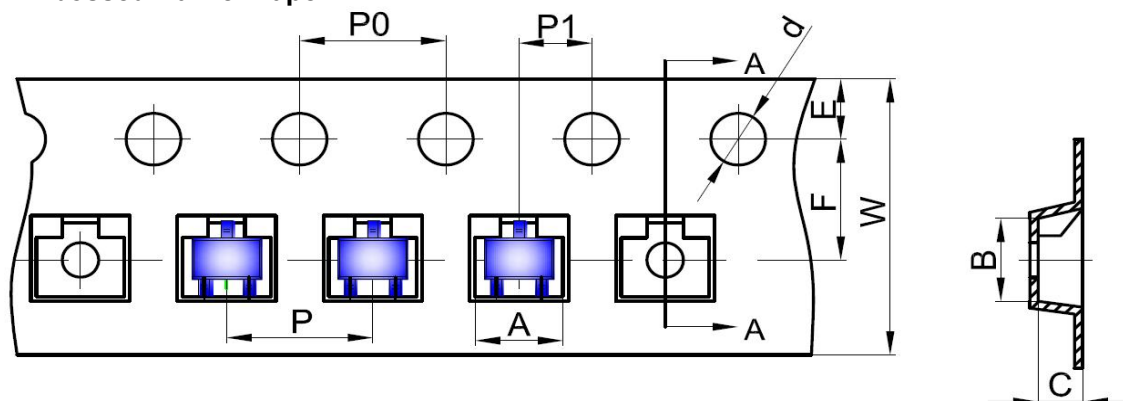


**BIPOLAR TRANSISTOR (NPN)**
**SOT-323 Package Outline Dimensions**


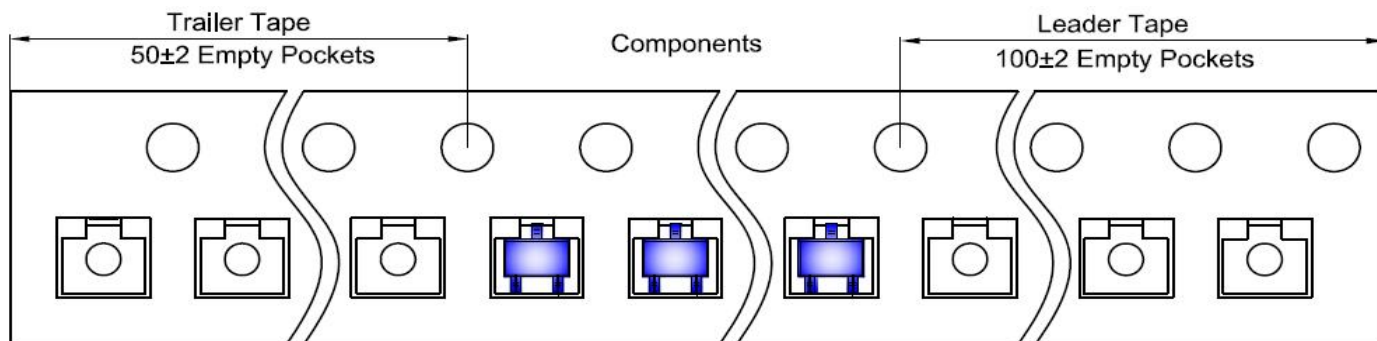
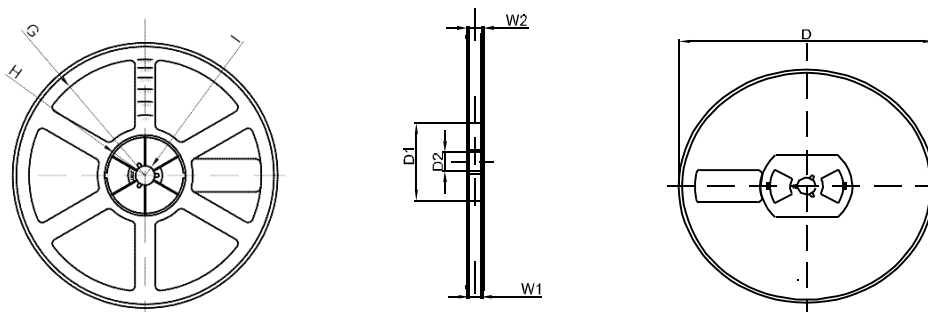
| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.000 | 0.035                | 0.039 |
| b      | 0.200                     | 0.400 | 0.008                | 0.016 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.000                     | 2.200 | 0.079                | 0.087 |
| E      | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1     | 2.150                     | 2.450 | 0.085                | 0.096 |
| e      | 0.650TYP                  |       | 0.026TYP             |       |
| e1     | 1.200                     | 1.400 | 0.047                | 0.055 |
| L      | 0.525REF                  |       | 0.021REF             |       |
| L1     | 0.260                     | 0.460 | 0.010                | 0.018 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

**SOT-323 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 (NPN)**
**SOT-323 Tape and Reel**
**SOT-323 Embossed Carrier Tape**


| DIMENSIONS ARE IN MILLIMETER |      |      |      |       |      |      |      |      |      |      |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| TYPE                         | A    | B    | C    | d     | E    | F    | P0   | P    | P1   | W    |
| SOT-323                      | 2.25 | 2.55 | 1.19 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE                    | ±0.1 | ±0.1 | ±0.1 | ±0.1  | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |

**SOT-323 Tape Leader and Trailer**

**SOT-323 Reel**


| DIMENSIONS ARE IN MILLIMETER |      |       |       |     |        |       |      |       |
|------------------------------|------|-------|-------|-----|--------|-------|------|-------|
| REEL OPTION                  | D    | D1    | D2    | G   | H      | I     | W1   | W2    |
| 7" DIA                       | Ø178 | 54.40 | 13.00 | R78 | R25.60 | R6.50 | 9.50 | 12.30 |
| TOLERANCE                    | ±2   | ±1    | ±1    | ±1  | ±1     | ±1    | ±1   | ±1    |