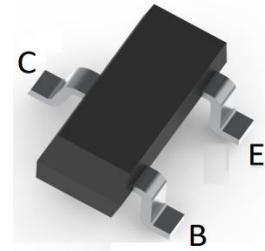
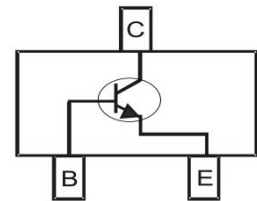


BIPOLAR TRANSISTOR (NPN)
FEATURES

- High DC current gain : $h_{FE}=200$ (Typ) $V_{CE}=6V, I_C=1mA$
- High voltage: $V_{CEO}=50V$
- Surface Mount device
- Complementary to 2SA812


SOT-23

MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)

MAXIMUM RATINGS ($T_A = 25^{\circ}C$ 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} | 5 | V |
| Collector Current | I_C | 100 | mA |
| Collector Power Dissipation | P_C | 200 | mW |
| Thermal Resistance From Junction To Ambient | $R_{\theta JA}$ | 625 | $^{\circ}C/W$ |
| Junction Temperature | T_J | 150 | $^{\circ}C$ |
| Storage Temperature | T_{STG} | -55 ~+150 | $^{\circ}C$ |

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

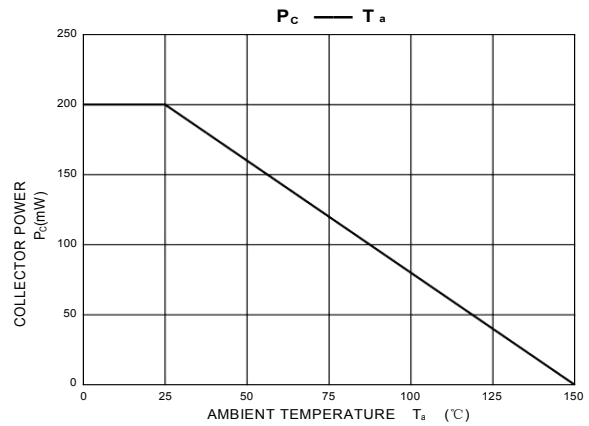
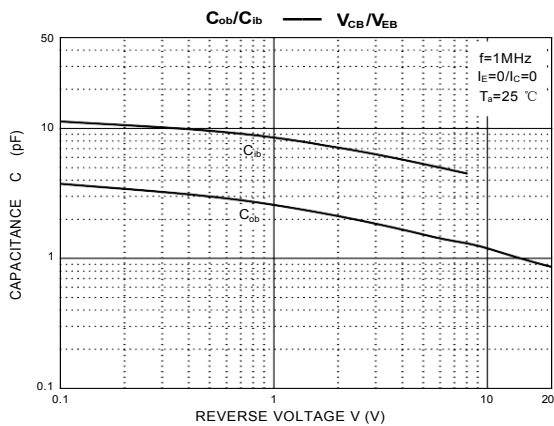
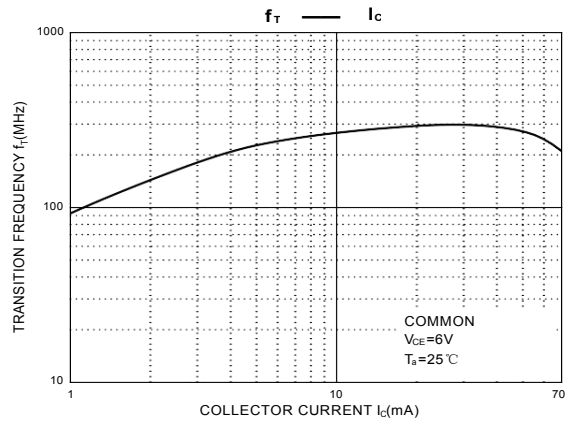
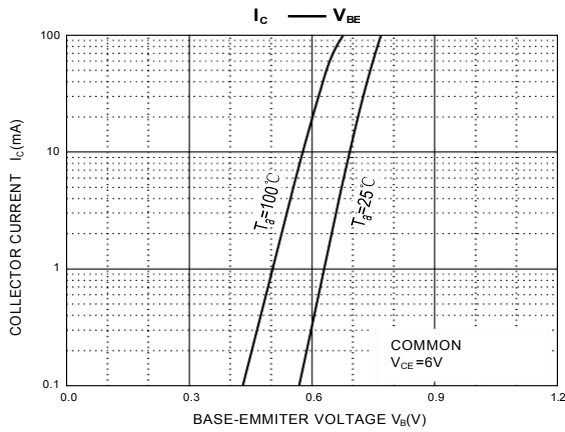
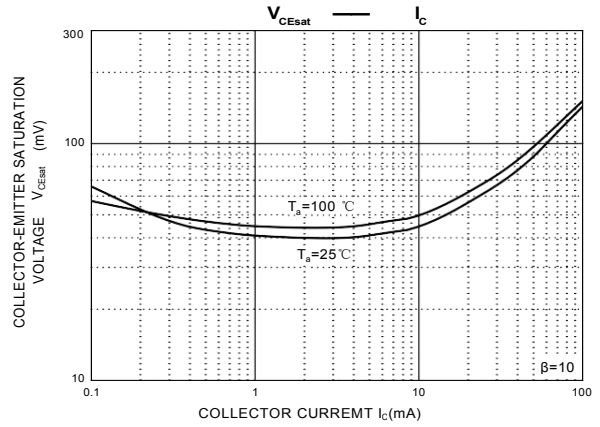
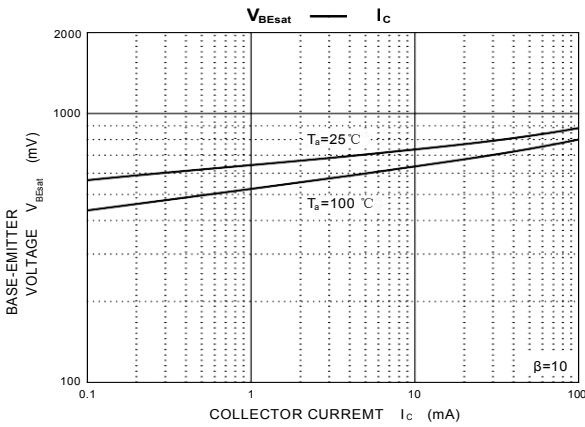
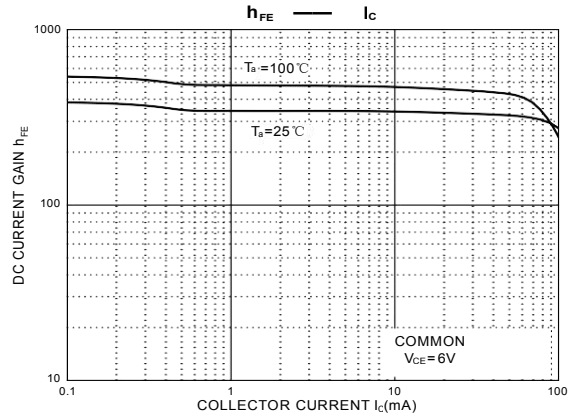
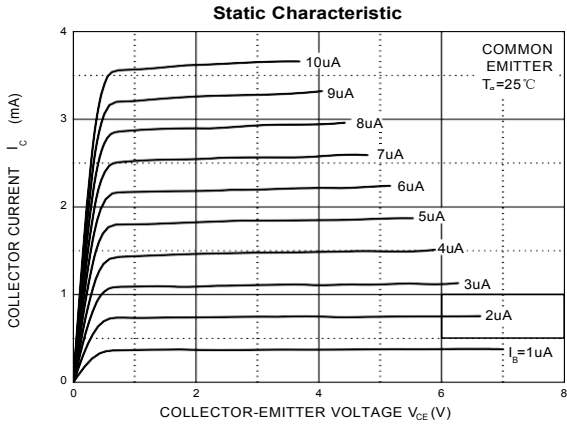
| Parameter | Symbol | Min | Typ | Max | Unit | Conditions |
|--------------------------------------|---------------|-----|-----|-----|---------|-----------------------|
| Collector-base breakdown voltage | $V_{(BR)CBO}$ | 60 | | | V | $I_C=100\mu A, I_E=0$ |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | 50 | | | V | $I_C=1mA, I_B=0$ |
| Emitter-base breakdown voltage | $V_{(BR)EBO}$ | 5 | | | V | $I_E=100\mu A, I_C=0$ |
| Collector cut-off current | I_{CBO} | | | 0.1 | μA | $V_{CB}=60V, I_E=0$ |
| Emitter cut-off current | I_{EBO} | | | 0.1 | μA | $V_{EB}=5V, I_C=0$ |
| DC current gain | h_{FE} | 90 | 200 | 600 | | $V_{CE}=6V, I_C=1mA$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | | 0.3 | V | $I_C=100mA, I_B=10mA$ |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | | | 1 | V | $I_C=100mA, I_B=10mA$ |
| Transition frequency | f_T | | 250 | | MHz | $V_{CE}=6V, I_C=10mA$ |

CLASSIFICATION OF h_{FE}

| Rank | L4 | L5 | L6 | L7 |
|---------|--------|---------|---------|---------|
| Range | 90-180 | 135-270 | 200-400 | 300-600 |
| Marking | L4 | L5 | L6 | L7 |

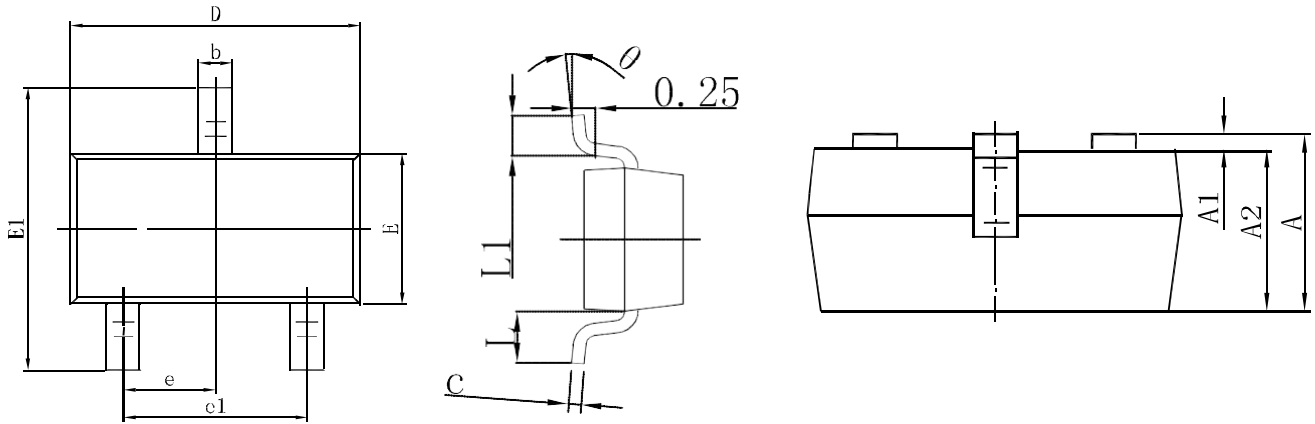
BIPOLAR TRANSISTOR (NPN)

Typical Characteristics



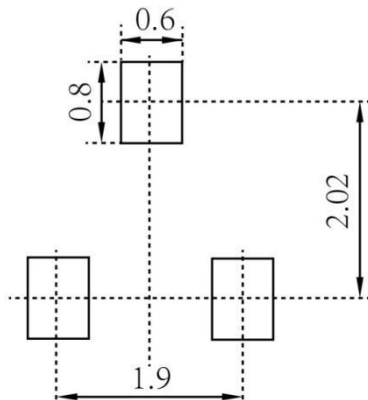
BIPOLAR TRANSISTOR (NPN)

SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

SOT-23 Suggested Pad Layout



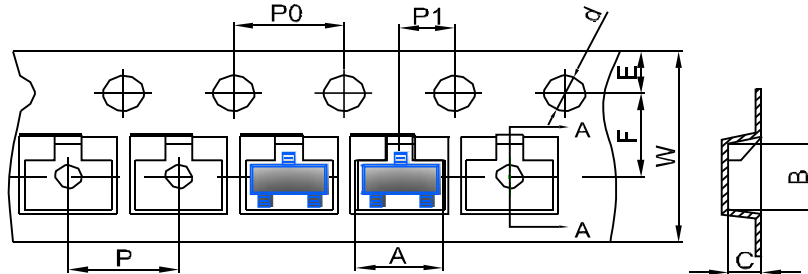
Note:

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)

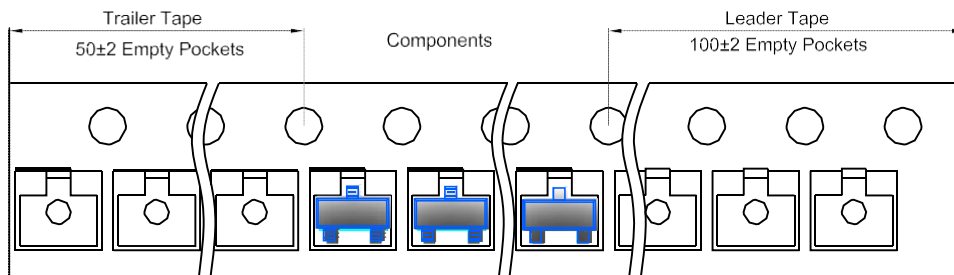
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

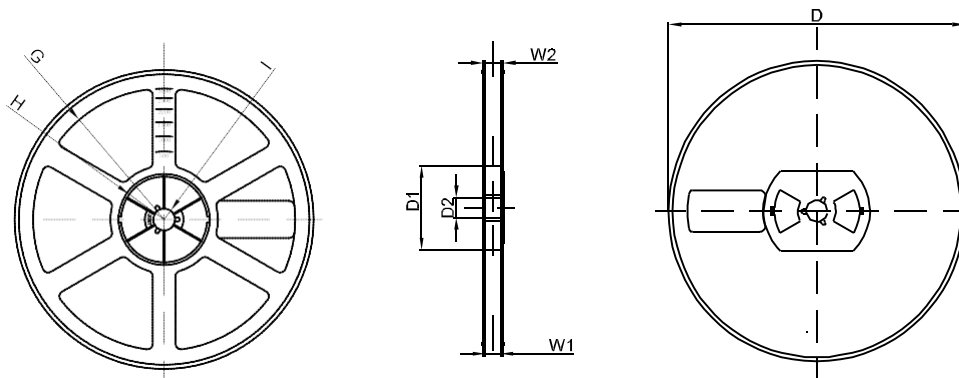


| DIMENSIONS ARE IN MILLIMETER | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| TYPE | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |

SOT-23 Tape Leader and Trailer



SOT-23 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 |