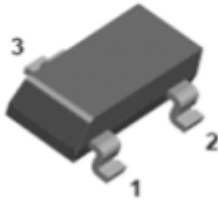
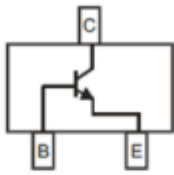


NPN Transistor



SOT-23

Features

- Moisture sensitivity level 1
- Halogen free and RoHS compliant
- Surface mount package ideally suited for automatic insertion

Application

- Signal amplification
- Switching circuit

Mechanical data

- **Package:** SOT-23
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102

■ Maximum Ratings (T_a=25°C Unless otherwise specified)

| Item | Symbol | Unit | Conditions | Value |
|---------------------------|------------------|------|--|-------------|
| Device marking code | | | | 3D |
| Collector-base voltage | V _{CB0} | V | I _C =100μA, I _E =0 | 400 |
| Collector-emitter voltage | V _{CE0} | V | I _C = 1mA, I _B =0 | 400 |
| Emitter-base voltage | V _{EB0} | V | I _E =10μA, I _C =0 | 6 |
| Collector current | I _C | mA | | 200 |
| Power dissipation | P _D | mW | | 350 |
| Junction temperature | T _J | °C | | -55 to +150 |
| Storage temperature | T _{STG} | °C | | -55 to +150 |



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■ Electrical Characteristics (T_a=25°C Unless otherwise specified)

| Item | Symbol | Unit | Conditions | Min | Typ | Max |
|--------------------------------------|-----------------------|------|---|-----|-----|------|
| Collector-base breakdown voltage | V _{(BR)CBO} | V | I _C =100μA, I _E =0 | 400 | | |
| Collector-emitter breakdown voltage | V _{(BR)CEO} | V | I _C =1mA, I _B =0 | 400 | | |
| Emitter-base breakdown voltage | V _{(BR)EBO} | V | I _E =10μA, I _C =0 | 6 | | |
| Collector-base cut-off current | I _{CBO} | nA | V _{CB} =400V | | | 100 |
| Emitter-base cut-off current | I _{EBO} | nA | V _{EB} =4V | | | 100 |
| DC current gain | h _{FE1} | | V _{CE} =10V, I _C =1mA | 40 | | |
| | h _{FE2} | | V _{CE} =10V, I _C =10mA | 50 | | 200 |
| | h _{FE3} | | V _{CE} =10V, I _C =50mA | 45 | | |
| | h _{FE4} | | V _{CE} =10V, I _C =100mA | 40 | | |
| Collector-emitter saturation voltage | V _{CE(sat)1} | V | I _C =10mA, I _B =1mA | | | 0.5 |
| | V _{CE(sat)2} | V | I _C =50mA, I _B =5mA | | | 0.75 |
| Base-emitter saturation voltage | V _{BE(sat)} | V | I _C =10mA, I _B =1mA | | | 0.75 |

■ Thermal Characteristics

| Parameter | Symbol | Unit | Value |
|---|----------------------------------|------|-------|
| Thermal resistance, junction-to-ambient | R _{θJ-A} ⁽¹⁾ | °C/W | 357 |
| Thermal resistance, junction-to-case | R _{θJ-C} ⁽¹⁾ | °C/W | 286 |

Note:

(1) Device mounted on PCB, single-sided copper, with standard footprint



MMBTA44

■ Characteristics

Fig 1: Static Characteristics

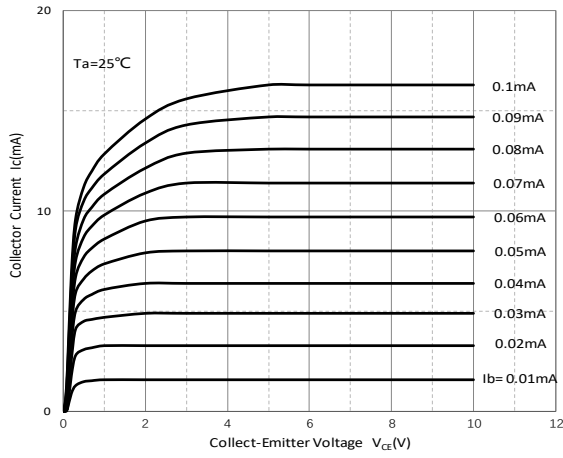


Fig 2: DC Current Gain

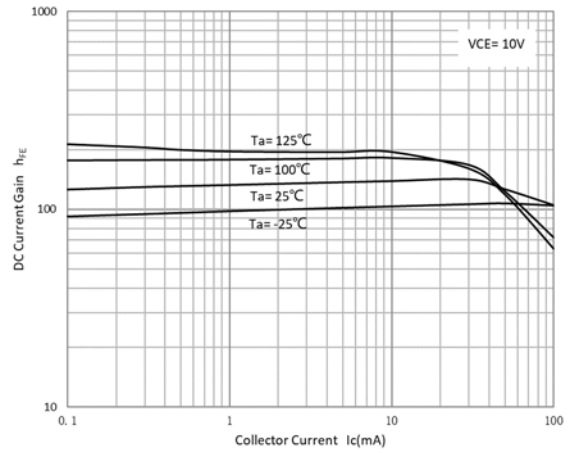


Fig 3: Collector-Emitter Saturation Voltage

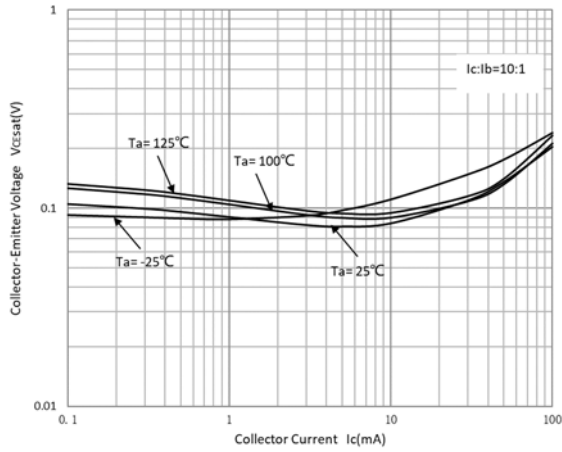


Fig 4: Base-Emitter Saturation Voltage

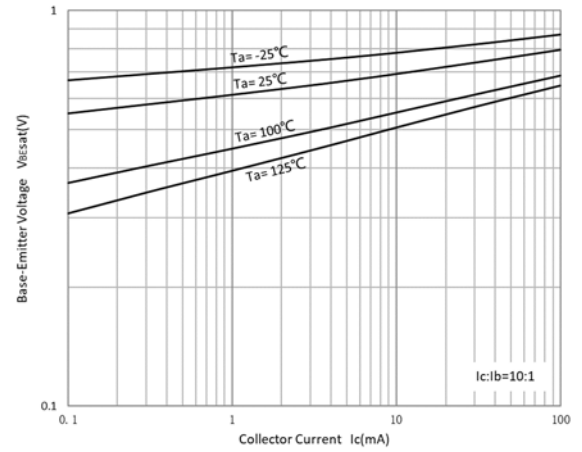


Fig 5: Base-Emitter On Voltage

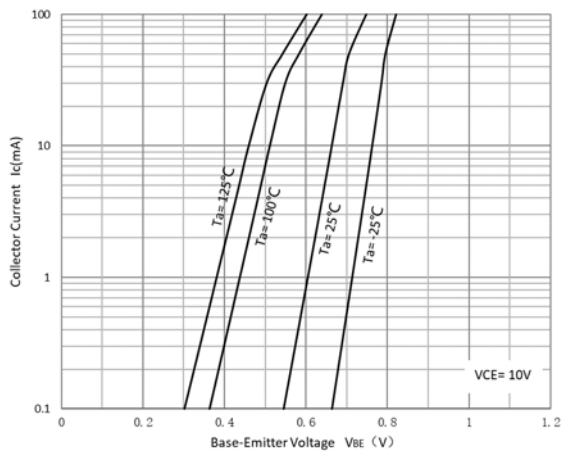


Fig 6: Cob/Cib-V_{CB}/V_{EB}

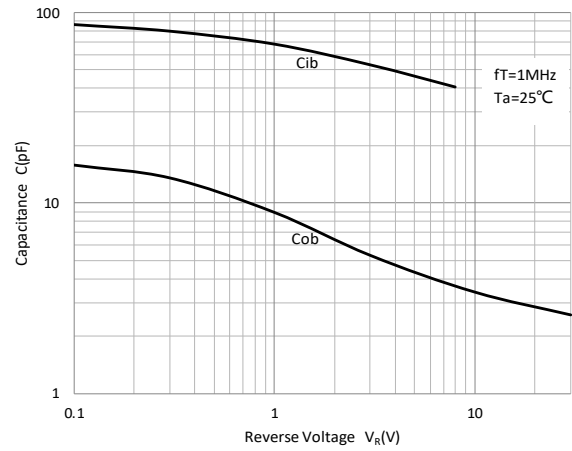
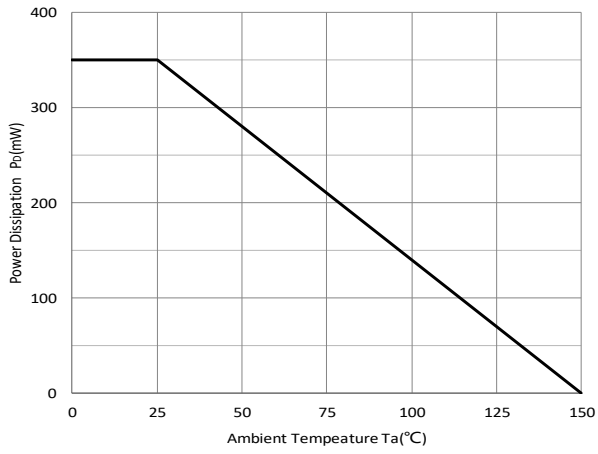


Fig 7: P_D-T_a Curve



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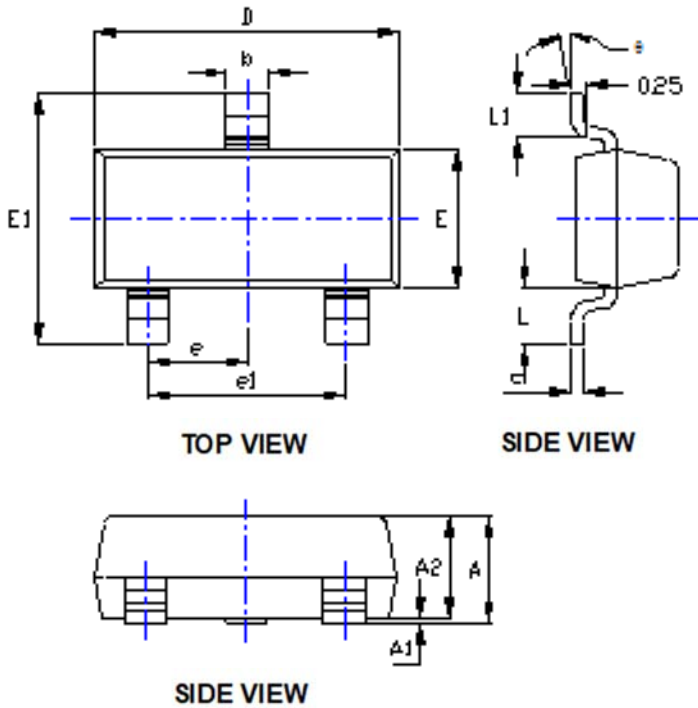


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■ Ordering Information

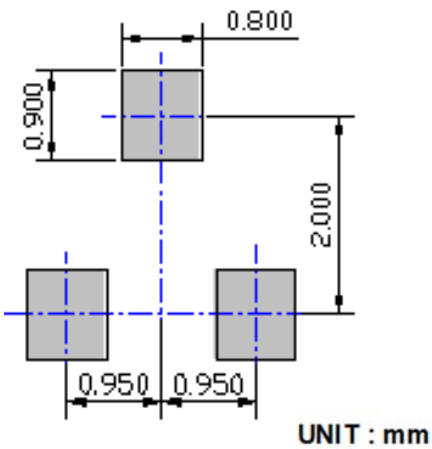
| Preferred P/N | Packing code | Unit weight(g) | Minimum package(pcs) | Inner box quantity(pcs) | Outer carton quantity(pcs) | Delivery mode |
|---------------|--------------|-------------------|----------------------|-------------------------|----------------------------|---------------|
| MMBTA44 | F2 | Approximate 0.008 | 3000 | 30000 | 120000 | 7" reel |
| MMBTA44 | F4 | Approximate 0.008 | 10000 | / | 210000 | 13" reel |

■ Outline Dimensions



| SYMBOL | DIMENSIONS | | | |
|--------|------------|-------|------------|-------|
| | INCHES | | Millimeter | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.035 | 0.045 | 0.900 | 1.150 |
| A1 | 0.000 | 0.004 | 0.000 | 0.100 |
| A2 | 0.035 | 0.041 | 0.900 | 1.050 |
| b | 0.012 | 0.020 | 0.300 | 0.500 |
| c | 0.004 | 0.008 | 0.100 | 0.200 |
| D | 0.110 | 0.118 | 2.800 | 3.000 |
| E | 0.047 | 0.055 | 1.200 | 1.400 |
| E1 | 0.089 | 0.100 | 2.250 | 2.550 |
| e | 0.037 TYP | | 0.950 TYP | |
| e1 | 0.071 | 0.079 | 1.800 | 2.000 |
| L | 0.022 REF | | 0.550 REF | |
| L1 | 0.012 | 0.020 | 0.300 | 0.500 |
| θ | 0° | 8° | 0° | 8° |

■ Suggested Pad Layout





MMBTA44

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