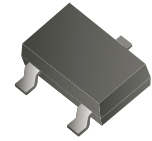


MMBTA56-HF (PNP)

RoHS Device
Halogen Free

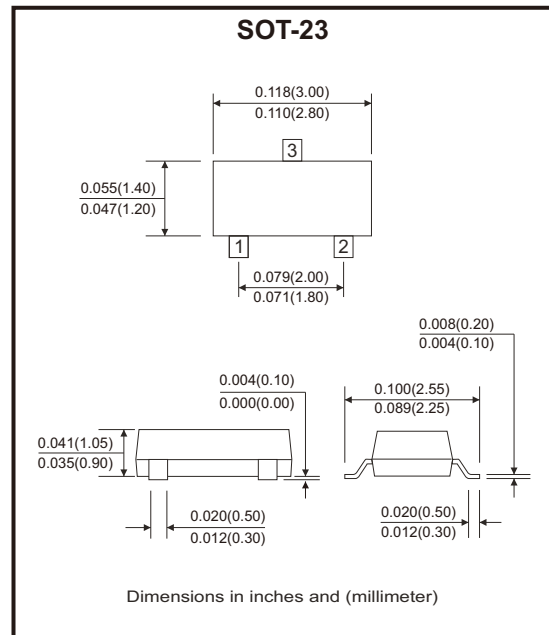


Features

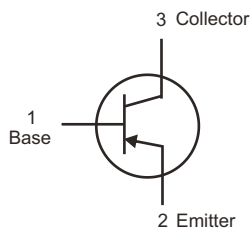
- Epoxy meets UL-94 V-0 flammability rating.
- Moisture sensitivity Level 1.
- High conductance.
- Surface mount package ideally suited for automatic insertion.

Mechanical data

- Case: SOT-23, molded plastic.
- Terminals: Tin plated leads, solderable per J-STD-002 and JESD22-B102.



Circuit Diagram



Maximum Ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------------|-------------|--------------------|
| Collector-base voltage | V_{CB0} | -80 | V |
| Collector-emitter voltage | V_{CE0} | -80 | V |
| Emitter-base voltage | V_{EB0} | -4 | V |
| Collector current | I_c | -500 | mA |
| Collector power dissipation | P_c | 225 | mW |
| Operation junction temperature range | T_J | -55 to +150 | $^\circ\text{C}$ |
| Storage temperature range | T_{STG} | -55 to +150 | $^\circ\text{C}$ |
| Thermal resistance from junction to ambient | $R_{\theta JA}$ | 556 | $^\circ\text{C/W}$ |

Electrical Characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Conditions | Symbol | Min | Max | Unit |
|--------------------------------------|---|---------------|-----|-------|---------------|
| Collector-emitter breakdown voltage | $I_C = -1\text{mA}, I_B = 0$ | V_{CE0} | -80 | | V |
| Emitter-base breakdown voltage | $I_E = -100\mu\text{A}, I_C = 0$ | V_{EBO} | -4 | | V |
| Collector-base cut-off current | $V_{CB} = -80\text{V}, I_E = 0$ | I_{CBO} | | -0.1 | μA |
| Collector-emitter cut-off current | $V_{CE} = -60\text{V}, I_B = 0\text{V}$ | I_{CES} | | -0.1 | μA |
| DC current gain | $V_{CE} = -1\text{V}, I_C = -10\text{mA}$ | $h_{FE(1)}$ | 100 | 400 | |
| | $V_{CE} = -1\text{V}, I_C = -100\text{mA}$ | $h_{FE(2)}$ | 100 | | |
| Collector-emitter saturation voltage | $I_C = -100\text{mA}, I_B = -10\text{mA}$ | $V_{CE(sat)}$ | | -0.25 | V |
| Base-emitter saturation voltage | $I_C = -100\text{mA}, I_B = -10\text{mA}$ | $V_{BE(sat)}$ | | -1.20 | V |
| Transition frequency | $V_{CE} = -1\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$ | f_T | 50 | | MHz |

Rating and Characteristic Curves (MMBTA56-HF)

Fig.1 - Static Characteristic

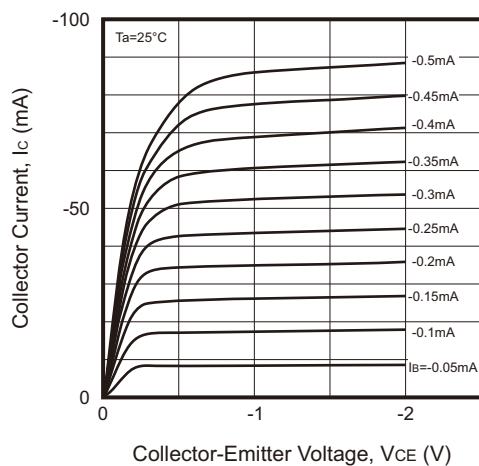


Fig.2 - DC Current Gain

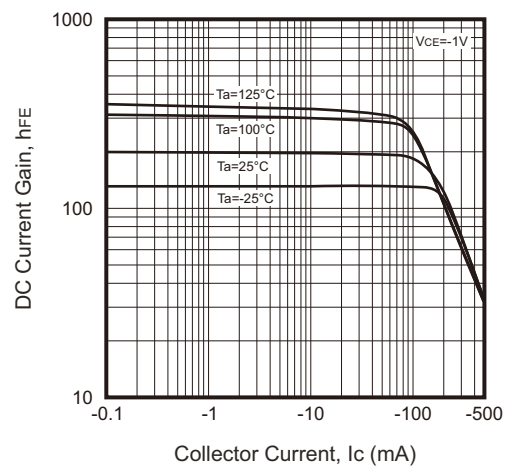


Fig.3 - Collector-Emitter Saturation Voltage

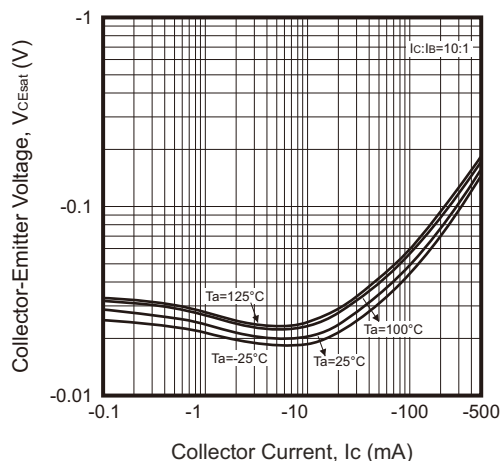
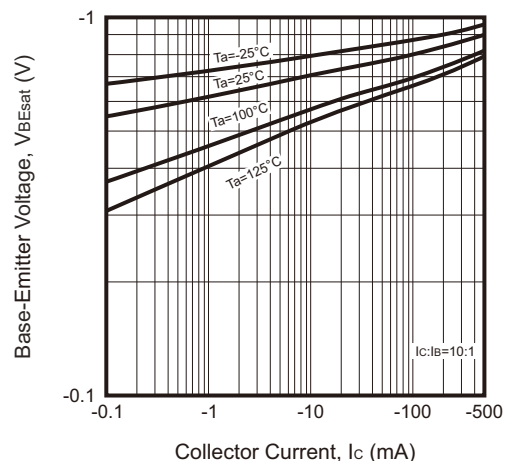


Fig.4 - Base-Emitter Saturation Voltage



Rating and Characteristic Curves (MMBTA56-HF)

Fig.5 - Base-Emitter on Voltage

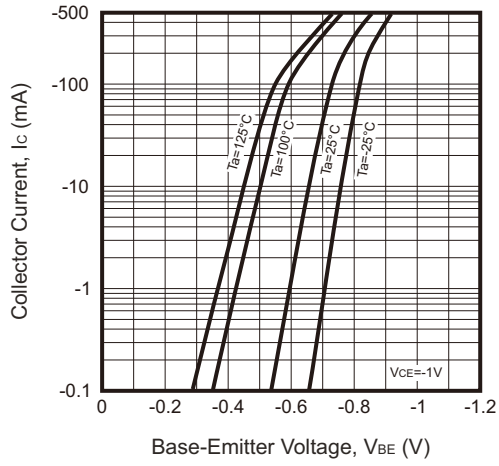


Fig.6 - $C_{ob}/C_{ib} \text{ --- } V_{CB}/V_{EB}$

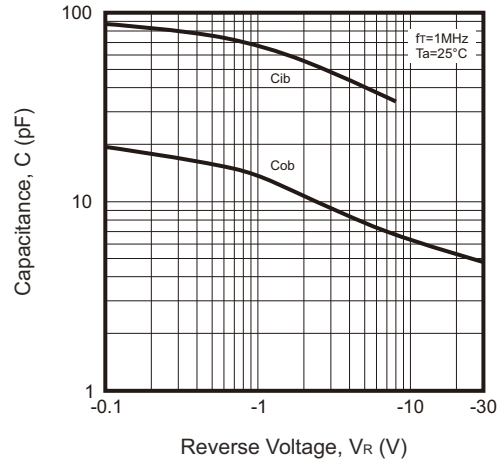
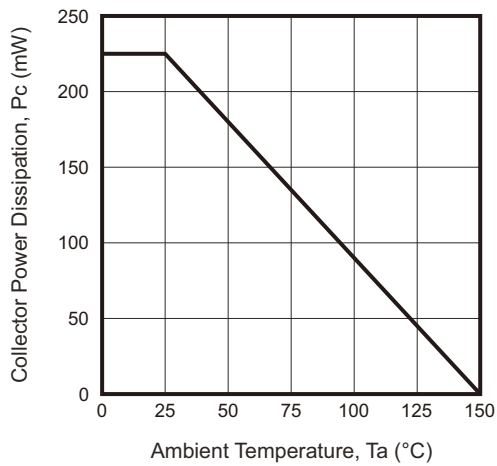
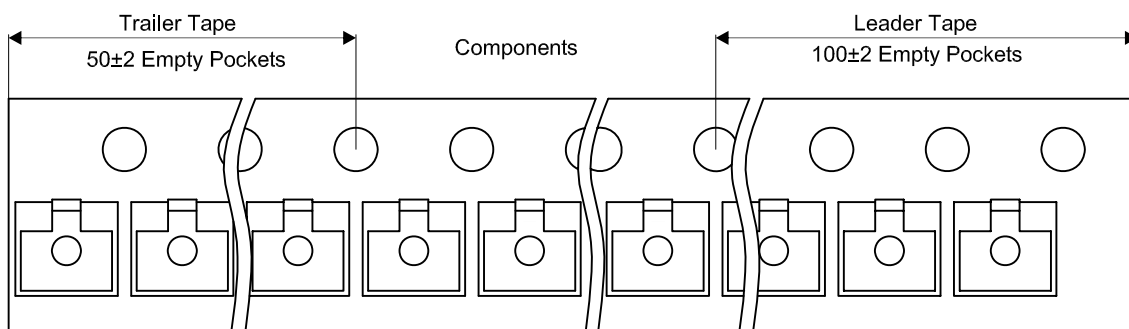
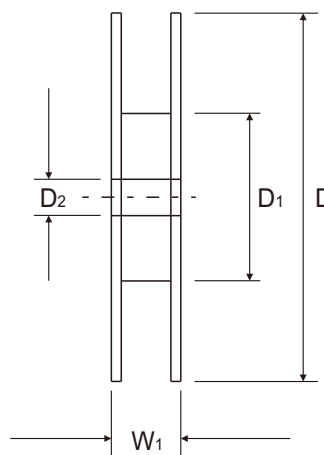
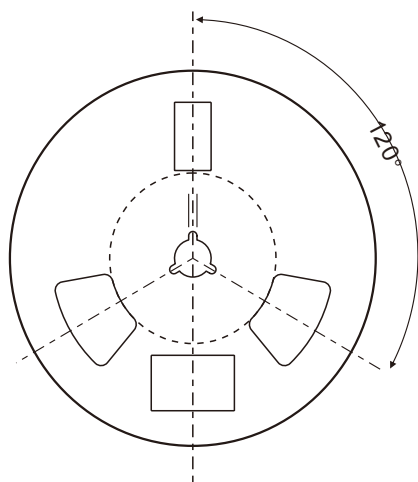
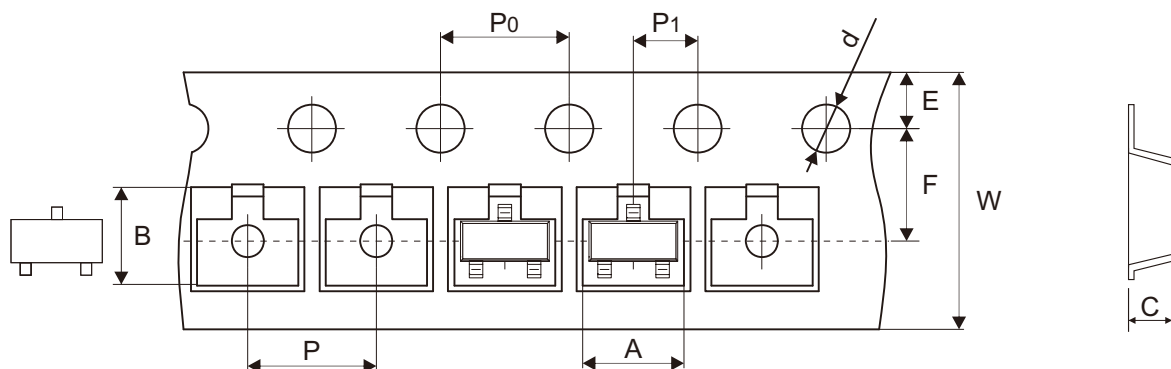


Fig.7 - Collector Power Derating Curve



Reel Taping Specification

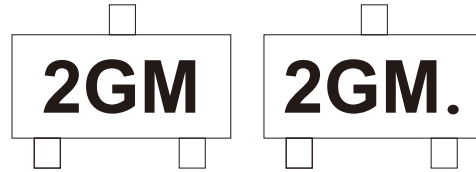


| SOT-23 | SYMBOL | A | B | C | d | D | D1 | D2 |
|--------|--------|---------------|---------------|---------------|--------------------------|---------------|---------------|---------------|
| | (mm) | 3.15 ± 0.10 | 2.77 ± 0.10 | 1.22 ± 0.10 | 1.50 + 0.10 - 0.00 | 178.00 ± 1.00 | 54.60 ± 1.00 | 13.30 ± 1.00 |
| | (inch) | 0.124 ± 0.004 | 0.109 ± 0.004 | 0.048 ± 0.004 | 0.059 + 0.004 - 0.000 | 7.008 ± 0.039 | 2.150 ± 0.039 | 0.524 ± 0.039 |

| SOT-23 | SYMBOL | E | F | P | P0 | P1 | W | W1 |
|--------|--------|---------------|---------------|---------------|---------------|---------------|--------------------------|---------------|
| | (mm) | 1.75 ± 0.10 | 3.50 ± 0.05 | 4.00 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 | 8.00 + 0.30 - 0.10 | 11.10 ± 0.20 |
| | (inch) | 0.069 ± 0.004 | 0.138 ± 0.002 | 0.157 ± 0.004 | 0.157 ± 0.004 | 0.079 ± 0.002 | 0.315 + 0.012 - 0.004 | 0.437 ± 0.008 |

Marking Code

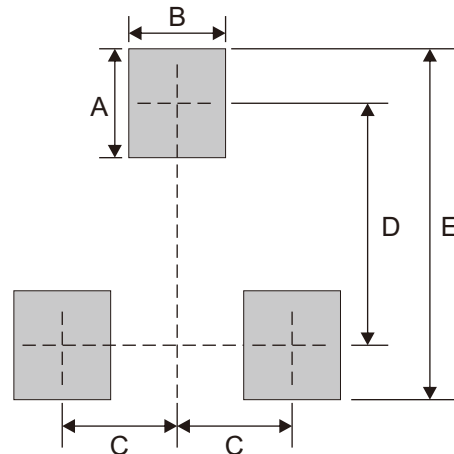
| Part Number | Marking Code |
|-------------|--------------|
| MMBTA56-HF | 2GM |



Solid dot = Control code

Suggested P.C.B. PAD Layout

| SIZE | SOT-23 | |
|------|--------|--------|
| | (mm) | (inch) |
| A | 0.90 | 0.035 |
| B | 0.80 | 0.031 |
| C | 0.95 | 0.037 |
| D | 2.00 | 0.079 |
| E | 2.90 | 0.114 |



Note: 1. The pad layout is for reference purposes only.

Standard Packaging

| Case Type | REEL PACK | |
|-----------|------------|------------------|
| | REEL (pcs) | Reel Size (inch) |
| SOT-23 | 3,000 | 7 |