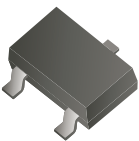


# MMBT5551-HF (NPN)

RoHS Device  
Halogen Free



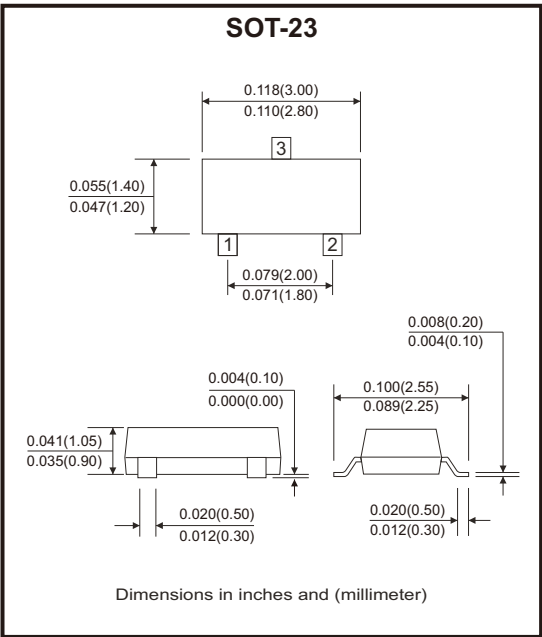
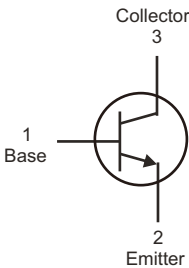
## Features

- Epoxy meets UL-94 V-0 flammability rating.
- Moisture sensitivity Level 1.

## Mechanical data

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

## Circuit Diagram



## Maximum Ratings (at TA=25°C unless otherwise noted)

| Parameter                                   | Conditions                   | Symbol          | Value       | Unit |
|---------------------------------------------|------------------------------|-----------------|-------------|------|
| Collector-base voltage                      | $I_C = 100\mu A$ , $I_E = 0$ | $V_{CBO}$       | 180         | V    |
| Collector-emitter voltage                   | $I_C = 1mA$ , $I_B = 0$      | $V_{CEO}$       | 160         | V    |
| Emitter-base voltage                        | $I_E = 10\mu A$ , $I_C = 0$  | $V_{EBO}$       | 6           | V    |
| Collector current                           |                              | $I_C$           | 600         | mA   |
| Collector power dissipation                 |                              | $P_C$           | 300         | mW   |
| Operation junction temperature range        |                              | $T_J$           | -55 to +150 | °C   |
| Storage temperature range                   |                              | $T_{STG}$       | -55 to +150 | °C   |
| Thermal resistance from junction to ambient |                              | $R_{\theta JA}$ | 417         | °C/W |

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

| Parameter                            | Symbol        | Conditions                                                           | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|----------------------------------------------------------------------|------|------|------|------|
| Collector-base breakdown voltage     | $V_{CBO}$     | $I_C = 100\mu\text{A}$ , $I_E = 0$                                   | 180  |      |      | V    |
| Collector-emitter breakdown voltage  | $V_{CEO}$     | $I_C = 1\text{mA}$ , $I_B = 0$                                       | 160  |      |      | V    |
| Emitter-base breakdown voltage       | $V_{EBO}$     | $I_E = 10\mu\text{A}$ , $I_C = 0$                                    | 6    |      |      | V    |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB} = 120\text{Vdc}$                                             |      |      | 50   | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB} = 4\text{Vdc}$                                               |      |      | 50   | nA   |
| DC current gain                      | $h_{FE(1)}$   | $V_{CE} = 5\text{Vdc}$ , $I_C = 1\text{mA}$                          | 80   |      |      |      |
|                                      | $h_{FE(2)}$   | $V_{CE} = 5\text{Vdc}$ , $I_C = 10\text{mA}$                         | 100  |      | 300  |      |
|                                      | $h_{FE(3)}$   | $V_{CE} = 5\text{Vdc}$ , $I_C = 50\text{mA}$                         | 30   |      |      |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 10\text{mA}$ , $I_B = 1\text{mA}$                             |      |      | 0.15 | V    |
|                                      |               | $I_C = 50\text{mA}$ , $I_B = 5\text{mA}$                             |      |      | 0.20 | V    |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C = 10\text{mA}$ , $I_B = 1\text{mA}$                             |      |      | 1    | V    |
|                                      |               | $I_C = 50\text{mA}$ , $I_B = 5\text{mA}$                             |      |      | 1    | V    |
| Transition frequency                 | $f_T$         | $I_C = 10\text{mA}$ , $V_{CE} = 5\text{Vdc}$ ,<br>$f = 30\text{MHz}$ | 100  |      | 300  | MHz  |

## Rating and Characteristic Curves (MMBT5551-HF)

Fig.1 - Static Characteristic

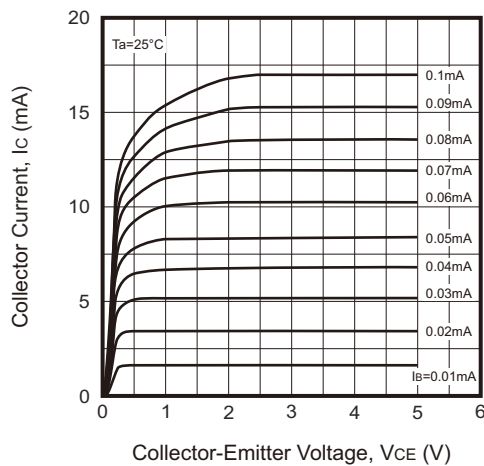
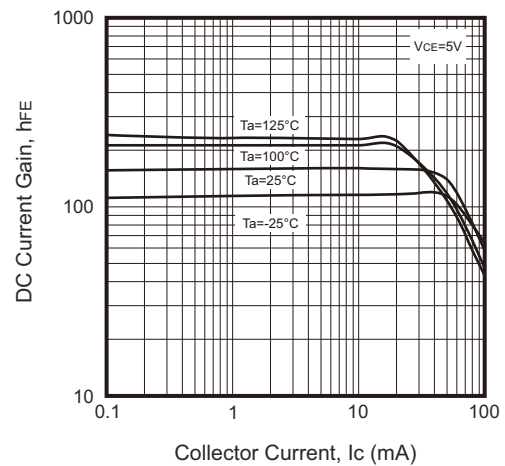


Fig.2 - DC Current Gain



## Rating and Characteristic Curves (MMBT5551-HF)

Fig.3 - Collector-Emitter Saturation Voltage

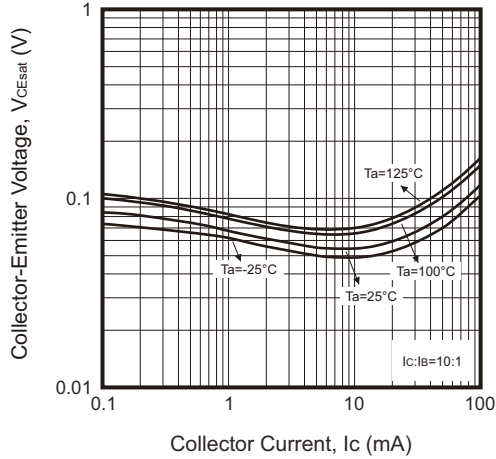


Fig.4 - Base-Emitter Saturation Voltage

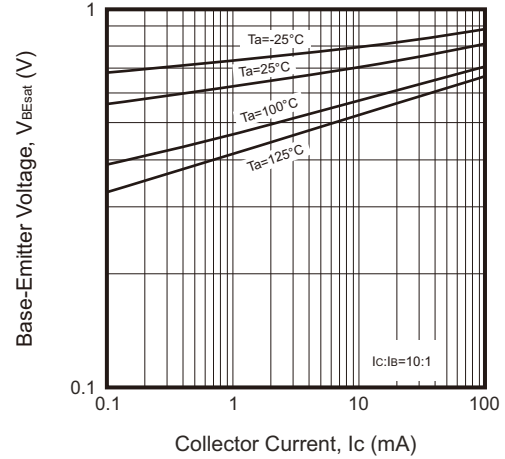


Fig.5 - Base-Emitter on Voltage

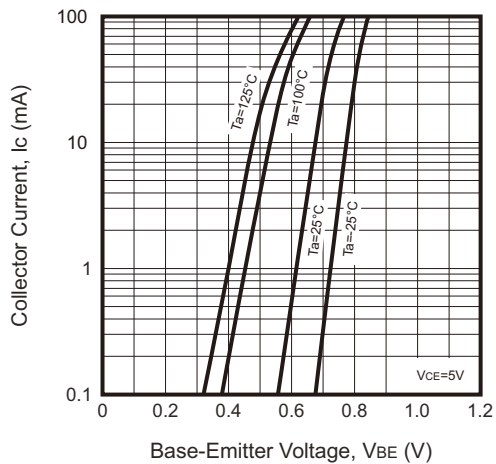


Fig.6 -  $C_{ob}/C_{ib}$  —  $V_{CB}/V_{EB}$

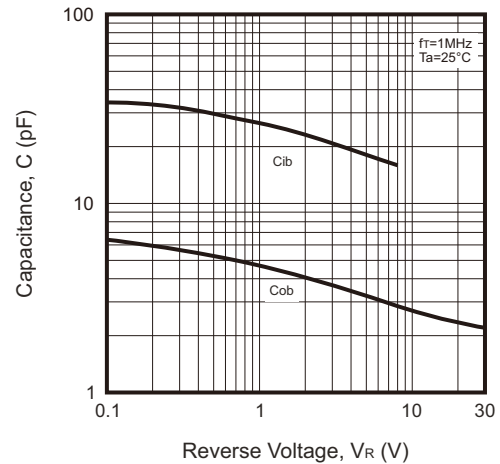
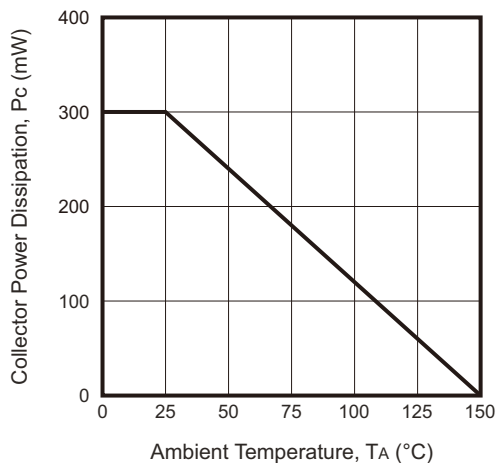
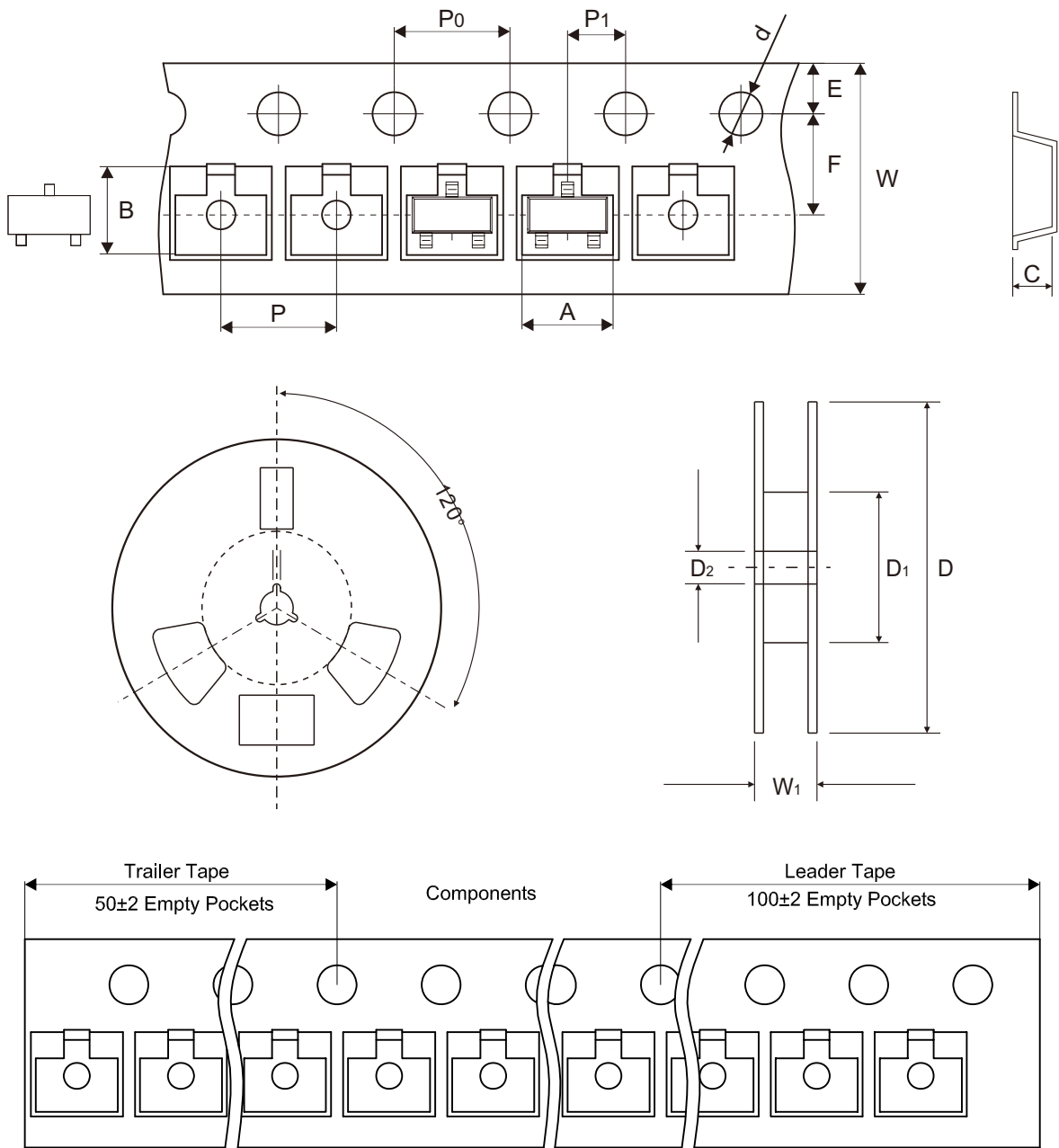


Fig.7 - Collector Power Derating Curve



Reel Taping Specification



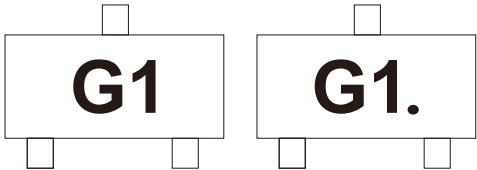
| SOT-23 | SYMBOL | A             | B             | C             | d                        | D             | D1            | D2            |
|--------|--------|---------------|---------------|---------------|--------------------------|---------------|---------------|---------------|
|        | (mm)   | 3.15 ± 0.10   | 2.77 ± 0.10   | 1.22 ± 0.10   | 1.50 + 0.10<br>- 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<br>- 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<br>- 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<br>- 0.004 | 0.437 ± 0.008 |

Marking Code

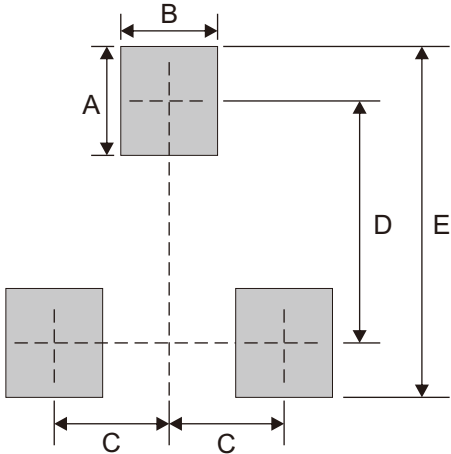
| Part Number | Marking Code |
|-------------|--------------|
| MMBT5551-HF | G1           |



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                |