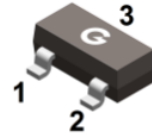
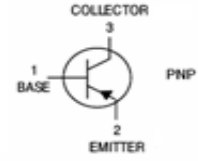


### Features

- Epitaxial planar die construction
- Complementary NPN type: MMBT2222A
- Ultra-small surface mount package
- RoHS compliant with Halogen-free

HF



SOT-23

### Mechanical Data

- Case: SOT-23
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208

### Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| MMBT2907A   | SOT-23  | 3000 pcs / Tape & Reel | 2F           |

### Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter                           | Symbol           | Value | Unit |
|-------------------------------------|------------------|-------|------|
| Collector-Base Breakdown Voltage    | V <sub>CBO</sub> | -60   | V    |
| Collector-Emitter Breakdown Voltage | V <sub>CEO</sub> | -60   | V    |
| Emitter-Base Breakdown Voltage      | V <sub>EBO</sub> | -5    | V    |
| Collector Current (Continuous)      | I <sub>C</sub>   | -0.6  | A    |
| Collector Current (Peak)            | I <sub>CM</sub>  | -1.2  | A    |

### Thermal Characteristics

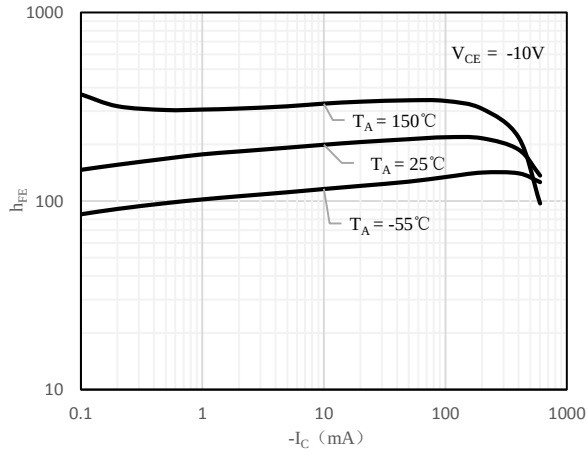
| Parameter                                              | Symbol           | Value      | Unit |
|--------------------------------------------------------|------------------|------------|------|
| Power Dissipation                                      | P <sub>D</sub>   | 300        | mW   |
| Thermal Resistance (Junction-to-Ambient) <sup>*1</sup> | R <sub>θJA</sub> | 417        | °C/W |
| Thermal Resistance (Junction-to-Case) <sup>*1</sup>    | R <sub>θJC</sub> | 380        | °C/W |
| Thermal Resistance (Junction-to-Lead) <sup>*1</sup>    | R <sub>θJL</sub> | 350        | °C/W |
| Ambient Temperature                                    | T <sub>A</sub>   | -55 ~ +150 | °C   |
| Operating junction Temperature                         | T <sub>J</sub>   | -55 ~ +150 | °C   |
| Storage Temperature Range                              | T <sub>STG</sub> | -55 ~ +150 | °C   |

Note 1: The data tested by surface mounted on a 15mm \* 15mm \* 1mm FR4-epoxy P.C.B

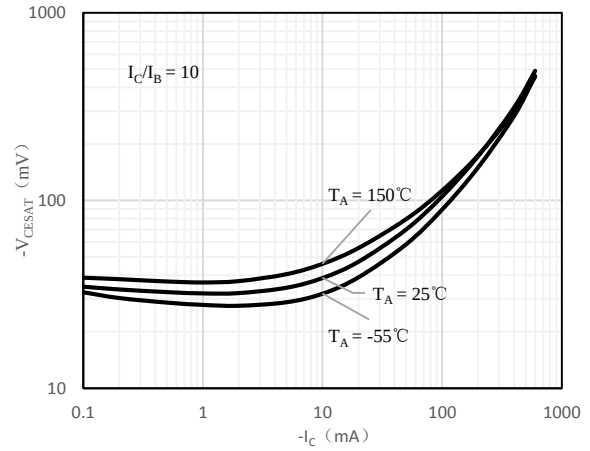
### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                            | Symbol        | Test Condition                                                         | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|------------------------------------------------------------------------|------|------|------|------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = -10\mu\text{A}, I_E = 0$                                        | -60  | -    | -    | V    |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -10\text{mA}, I_B = 0$                                          | -60  | -    | -    | V    |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = -10\mu\text{A}, I_C = 0$                                        | -5   | -    | -    | V    |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = -50\text{V}, I_E = 0$                                        | -    | -    | -10  | nA   |
| Collector Cut-off Current            | $I_{CEX}$     | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$                     | -    | -    | -50  | nA   |
| Base Cut-off Current                 | $I_{BL}$      | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -0.5\text{V}$                     | -    | -    | -50  | nA   |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = -10\text{V}, I_C = -0.1\text{mA}$                            | 75   | -    | -    | -    |
|                                      |               | $V_{CE} = -10\text{V}, I_C = -1\text{mA}$                              | 100  | -    | -    | -    |
|                                      |               | $V_{CE} = -10\text{V}, I_C = -10\text{mA}$                             | 100  | -    | -    | -    |
|                                      |               | $V_{CE} = -10\text{V}, I_C = -150\text{mA}$                            | 100  | -    | 300  | -    |
|                                      |               | $V_{CE} = -10\text{V}, I_C = -500\text{mA}$                            | 50   | -    | -    | -    |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -500\text{mA}, I_B = -50\text{mA}$                              | -    | -    | -1.6 | V    |
|                                      |               | $I_C = -150\text{mA}, I_B = -15\text{mA}$                              | -    | -    | -0.4 | V    |
| Base-emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = -500\text{mA}, I_B = -50\text{mA}$                              | -    | -    | -2.6 | V    |
|                                      |               | $I_C = -150\text{mA}, I_B = -15\text{mA}$                              | -    | -    | -1.3 | V    |
| Transition Frequency                 | $f_T$         | $I_C = -50\text{mA}, V_{CE} = -20\text{V}$<br>$f = 100\text{MHz}$      | 200  | -    | -    | MHz  |
| Collector Output Capacitance         | $C_{OBO}$     | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$                       | -    | -    | 8    | pF   |
| Input Capacitance                    | $C_{IBO}$     | $V_{EB} = -2\text{V}, I_C = 0, f = 1\text{MHz}$                        | -    | -    | 30   | pF   |
| Delay Time                           | $t_d$         | $V_{CC} = -30\text{V}, I_C = -150\text{mA}$<br>$I_{B1} = -15\text{mA}$ | -    | -    | 10   | ns   |
| Rise Time                            | $t_r$         |                                                                        | -    | -    | 40   | ns   |
| Storage Time                         | $t_s$         | $V_{CC} = -6\text{V}, I_C = -150\text{mA}$                             | -    | -    | 80   | ns   |
| Fall Time                            | $t_f$         | $I_{B1} = I_{B2} = -15\text{mA}$                                       | -    | -    | 30   | ns   |

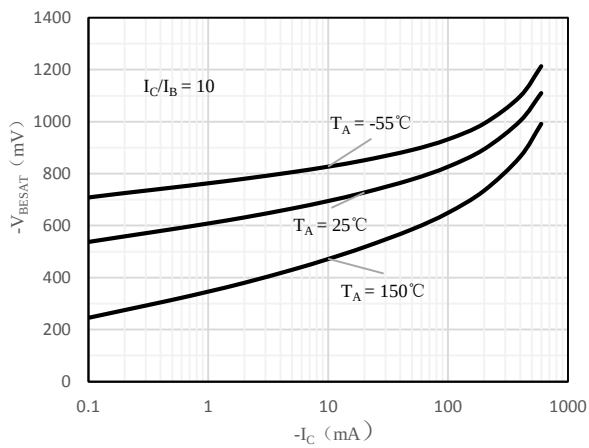
**Ratings and Characteristics Curves** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)



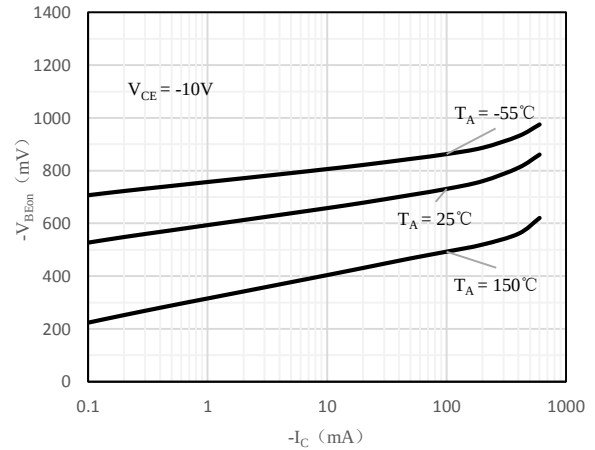
**Fig 1  $h_{FE}$  vs.  $I_C$**



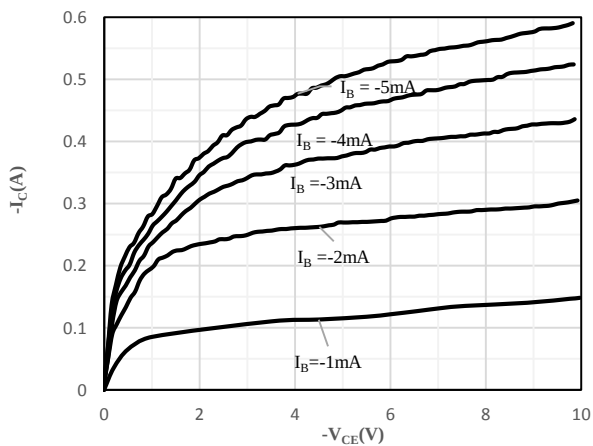
**Fig 2  $V_{CE(sat)}$  vs.  $I_C$**



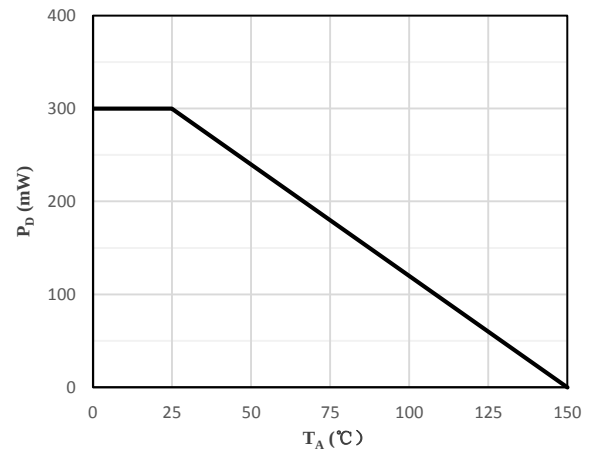
**Fig 3  $V_{BE(sat)}$  vs.  $I_C$**



**Fig 4  $V_{BE(on)}$  vs.  $I_C$**



**Fig 5  $I_C$  vs.  $V_{CE}$**



**Fig 6  $P_D$  vs.  $T_A$**

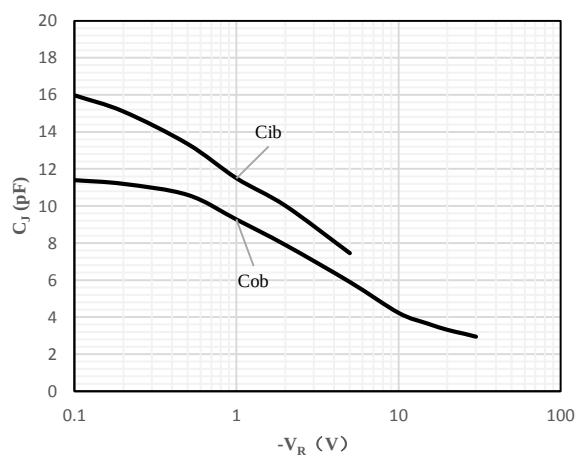
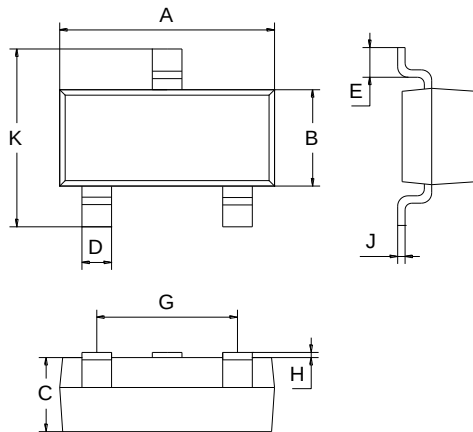


Fig 7  $C_J$  vs.  $V_R$

Package Outline Dimensions (Unit: mm)



| SOT-23    |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 2.70 | 3.10 |
| B         | 1.10 | 1.50 |
| C         | 0.9  | 1.1  |
| D         | 0.3  | 0.5  |
| E         | 0.35 | 0.48 |
| G         | 1.80 | 2.00 |
| H         | 0.02 | 0.1  |
| J         | 0.05 | 0.15 |
| K         | 2.20 | 2.60 |

Package Outline Dimensions (Unit: mm)

SOT-23

