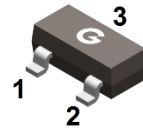
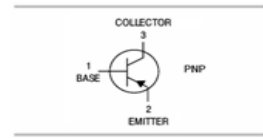


### Features

- Small collector to emitter saturation voltage
- Excellent DC forward current gain
- Halogen free
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF



SOT-23

### Mechanical Data

- Case: SOT-23
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

### Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| T2SA1235A-E | SOT-23  | 3000 pcs / Tape & Reel | ME           |
| T2SA1235A-F | SOT-23  | 3000 pcs / Tape & Reel | MF           |
| T2SA1235A-G | SOT-23  | 3000 pcs / Tape & Reel | MG           |

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

| Parameter                           | Symbol           | Value | Unit |
|-------------------------------------|------------------|-------|------|
| Collector-Base Voltage              | V <sub>CBO</sub> | -50   | V    |
| Collector-Emitter Breakdown Voltage | V <sub>CEO</sub> | -50   | V    |
| Emitter-Base Breakdown Voltage      | V <sub>EBO</sub> | -6    | V    |
| Collector Current (Continuous)      | I <sub>C</sub>   | -0.2  | A    |

### Thermal Characteristics

| Parameter                              | Symbol           | Value      | Unit |
|----------------------------------------|------------------|------------|------|
| Power Dissipation                      | P <sub>D</sub>   | 0.15       | W    |
| Thermal Resistance Junction-to-Air     | R <sub>θJA</sub> | 833        | °C/W |
| Power Dissipation *1                   | P <sub>D</sub>   | 0.45       | W    |
| Thermal Resistance Junction-to-Air *1  | R <sub>θJA</sub> | 280        | °C/W |
| Thermal Resistance Junction-to-Case *1 | R <sub>θJC</sub> | 190        | °C/W |
| Thermal Resistance Junction-to-Lead *1 | R <sub>θJL</sub> | 210        | °C/W |
| 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 1 inch<sup>2</sup> FR-4 board with 2OZ copper

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

| Parameter                            | Symbol        | Test Condition                                                                           | Min. | Typ. | Max. | Unit          |
|--------------------------------------|---------------|------------------------------------------------------------------------------------------|------|------|------|---------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = -100\mu\text{A}, I_E = 0$                                                         | -50  | -    | -    | V             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -1\text{mA}, I_B = 0$                                                             | -50  | -    | -    | V             |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = -100\mu\text{A}, I_C = 0$                                                         | -6   | -    | -    | V             |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = -50\text{V}, I_E = 0$                                                          | -    | -    | -0.1 | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = -6\text{V}, I_C = 0$                                                           | -    | -    | -0.1 | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = -6\text{V}, I_C = -1\text{mA}$                                                 | 150  | -    | 800  | -             |
|                                      |               | $V_{CE} = -6\text{V}, I_C = -0.1\text{mA}$                                               | 90   | -    | -    | -             |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -100\text{mA}, I_B = -10\text{mA}$                                                | -    | -    | -0.3 | V             |
| Current-Gain—Bandwidth Product       | $f_T$         | $V_{CE} = -6\text{V}, I_C = -10\text{mA}$                                                | -    | 200  | -    | MHz           |
| Collector output capacitance         | $C_{ob}$      | $V_{CB} = -6\text{V}, I_E = 0, f = 1\text{MHz}$                                          | -    | 4    | -    | pF            |
| Noise Figure                         | $N_F$         | $V_{CE} = -6\text{V}, I_E = 0.3\text{mA}$<br>$f = 100\text{MHz}, R_G = 10\text{k}\Omega$ | -    | -    | 20   | dB            |

### Classification of $h_{FE}$

| Rank    | E       | F       | G       |
|---------|---------|---------|---------|
| Range   | 150-300 | 250-500 | 400-800 |
| Marking | ME      | MF      | MG      |

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

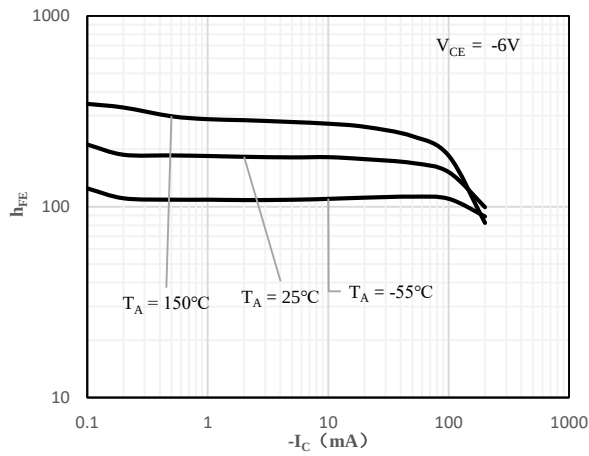


Fig 1  $h_{FE}$  vs.  $I_C$

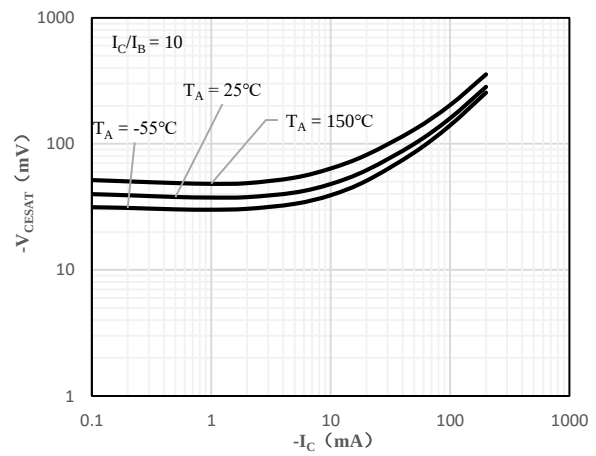


Fig 2  $V_{CE(sat)}$  vs.  $I_C$

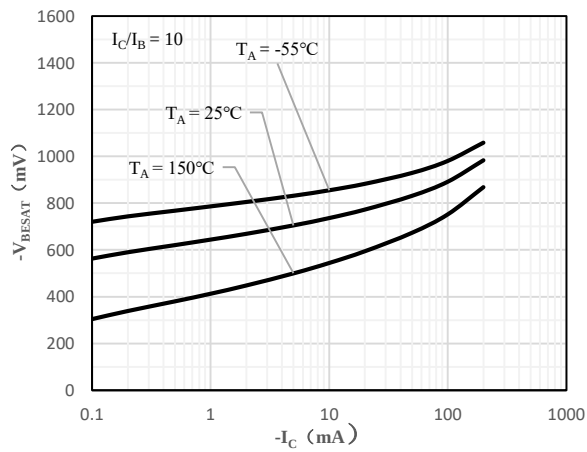


Fig 3  $V_{BE(sat)}$  vs.  $I_C$

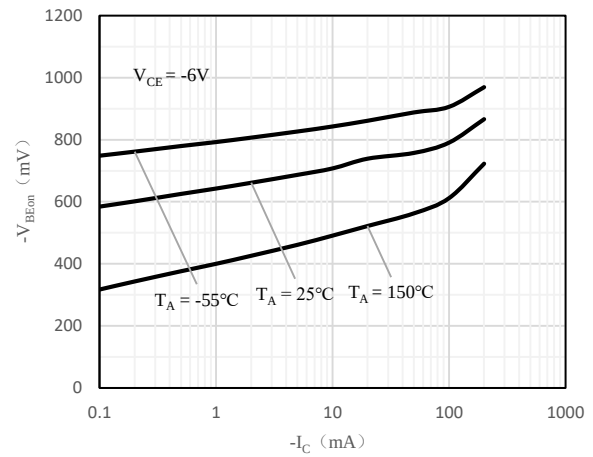


Fig 4  $V_{BE(on)}$  vs.  $I_C$

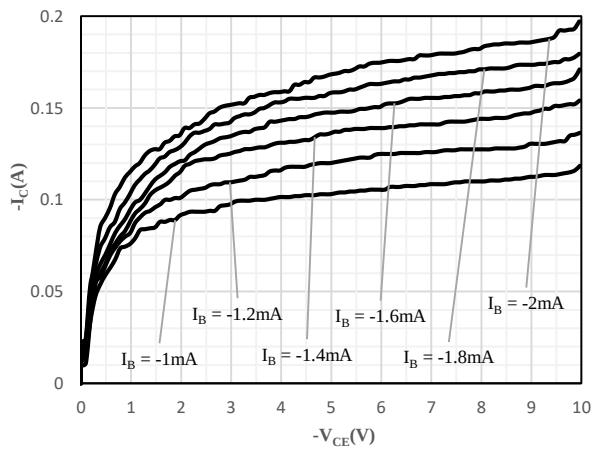


Fig 5  $I_C$  vs.  $V_{CE}$

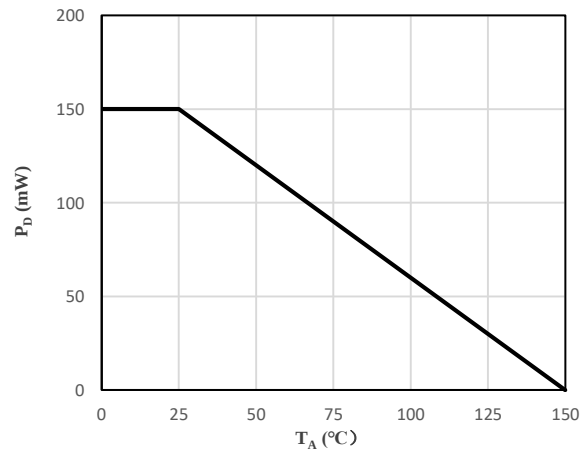


Fig 6  $P_D$  vs.  $T_A$

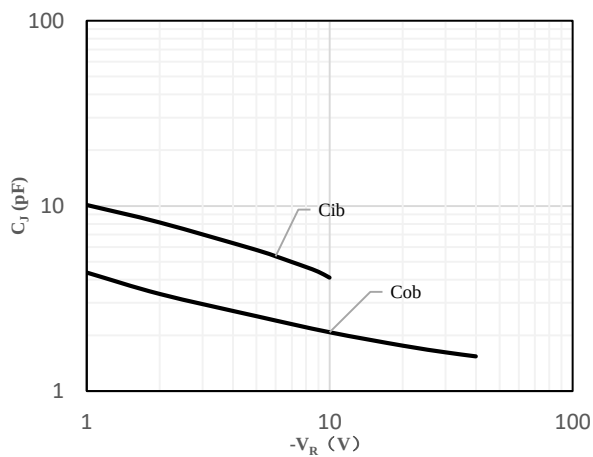
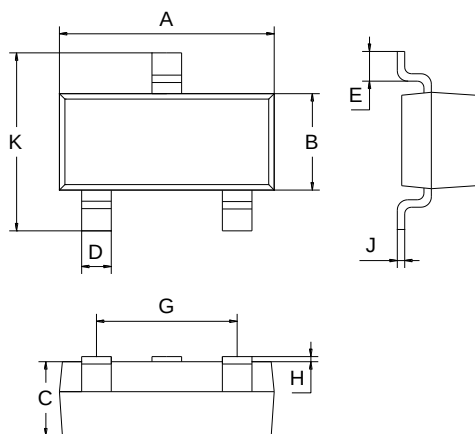


Fig 7  $C_J$  vs.  $V_R$

## 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

