

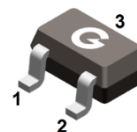
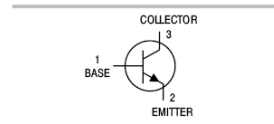
### Features

- Excellent  $h_{FE}$  linearity
- RoHS compliant with Halogen-free

HF

### Mechanical Data

- Case: SOT-323
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208



SOT-323

### Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| 2SC4102-P   | SOT-323 | 3000 pcs / Tape & Reel | TP           |
| 2SC4102-R   | SOT-323 | 3000 pcs / Tape & Reel | TR           |
| 2SC4102-S   | SOT-323 | 3000 pcs / Tape & Reel | TS           |

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

| Parameter                           | Symbol    | Value | Unit |
|-------------------------------------|-----------|-------|------|
| Collector-Base Voltage              | $V_{CBO}$ | 120   | V    |
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | 120   | V    |
| Emitter-Base Breakdown Voltage      | $V_{EBO}$ | 5     | V    |
| Collector Current (Continuous)      | $I_C$     | 50    | mA   |
| Collector Current (Peak)            | $I_{CM}$  | 100   | mA   |

### Thermal Characteristics

| Parameter                          | Symbol          | Value      | Unit               |
|------------------------------------|-----------------|------------|--------------------|
| Power Dissipation                  | $P_D$           | 0.2        | W                  |
| Thermal Resistance Junction-to-Air | $R_{\theta JA}$ | 625        | $^\circ\text{C/W}$ |
| Junction Temperature Range         | $T_J$           | -55 ~ +150 | $^\circ\text{C}$   |
| Storage Temperature Range          | $T_{STG}$       | -55 ~ +150 | $^\circ\text{C}$   |

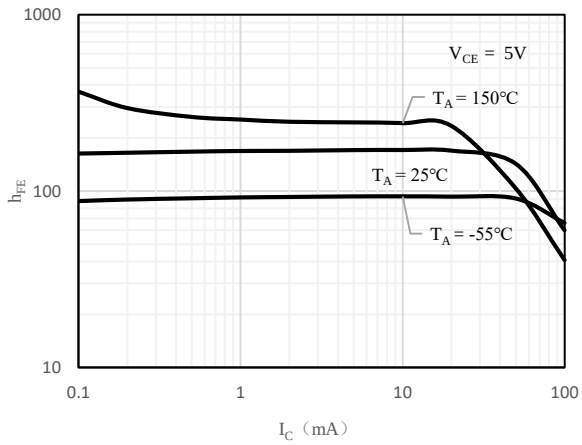
### Electrical Characteristics (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                            | Symbol        | Test Condition                                                    | Min. | Typ. | Max. | Unit          |
|--------------------------------------|---------------|-------------------------------------------------------------------|------|------|------|---------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = 50\mu\text{A}$ , $I_E = 0$                                 | 120  | -    | -    | V             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = 1\text{mA}$ , $I_B = 0$                                    | 120  | -    | -    | V             |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = 50\mu\text{A}$ , $I_C = 0$                                 | 5    | -    | -    | V             |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = 100\text{V}$ , $I_E = 0$                                | -    | -    | 0.5  | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = 4\text{V}$ , $I_C = 0$                                  | -    | -    | 0.5  | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = 6\text{V}$ , $I_C = 2\text{mA}$                         | 120  | -    | 560  | -             |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 10\text{mA}$ , $I_B = 1\text{mA}$                          | -    | -    | 0.5  | V             |
| Base-emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = 10\text{mA}$ , $I_B = 1\text{mA}$                          | -    | -    | 1    | V             |
| Collector-base Output Capacitance    | $C_{OBO}$     | $V_{CB} = 12\text{V}$ , $f = 1\text{MHz}$ , $I_E = 0$             | -    | 2.5  | -    | pF            |
| Current-Gain— Bandwidth Product      | $f_T$         | $I_C = 2\text{mA}$ , $V_{CE} = 12\text{V}$<br>$f = 100\text{MHz}$ | -    | 140  | -    | MHz           |

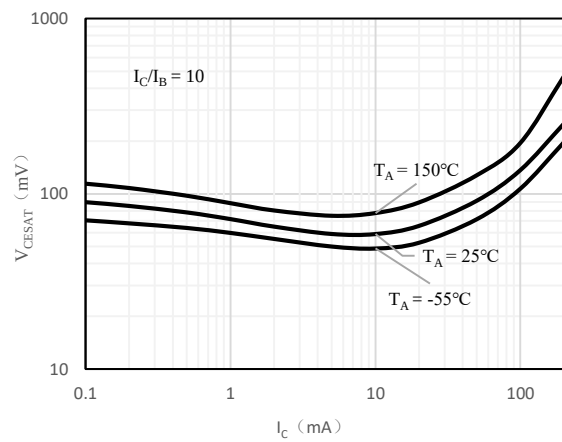
### Classification of $h_{FE}$

| Rank    | P       | R       | S       |
|---------|---------|---------|---------|
| Range   | 120-270 | 180-390 | 270-560 |
| Marking | TP      | TR      | TS      |

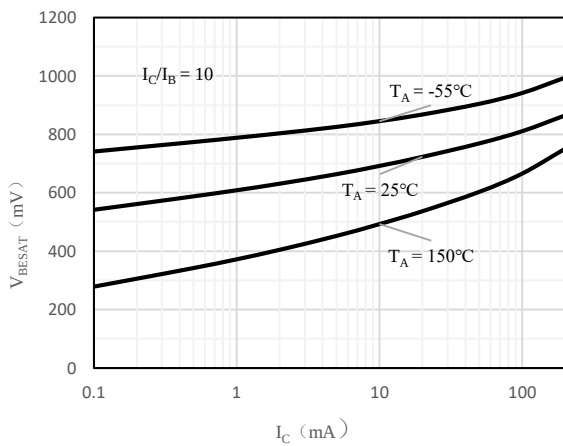
**Ratings and Characteristics Curves** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)



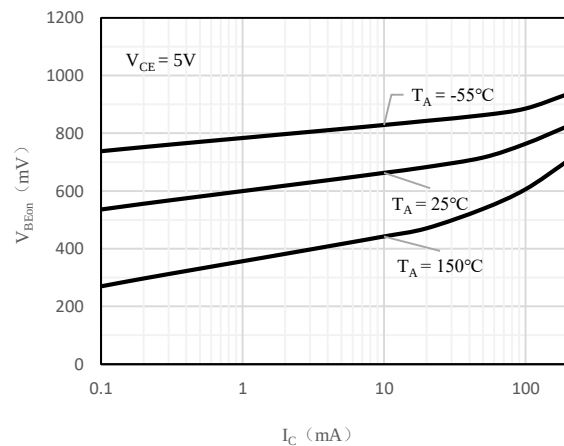
**Fig 1  $h_{FE}$  vs.  $I_C$**



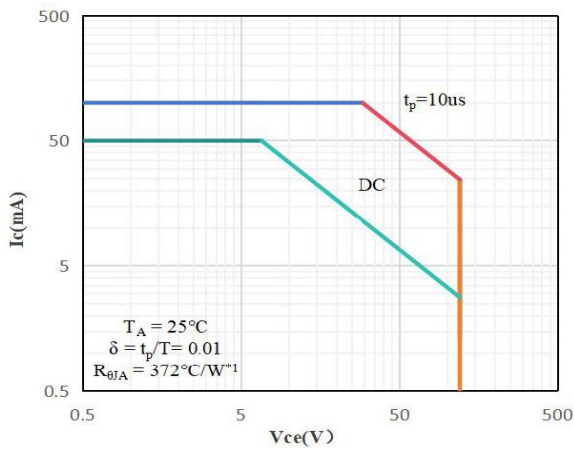
**Fig 2  $V_{CE(sat)}$  vs.  $I_C$**



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



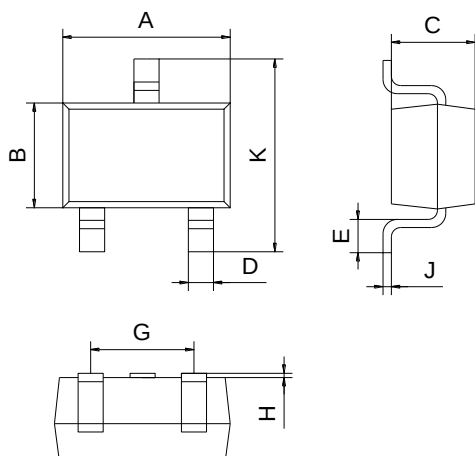
**Fig 4  $V_{BE(on)}$  vs.  $I_C$**



**Fig 5 Safe Operating Area**

Note 1: The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper

## Package Outline Dimensions (Unit: mm)



| SOT-323   |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 2.00 | 2.20 |
| B         | 1.15 | 1.35 |
| C         | 0.90 | 1.10 |
| D         | 0.15 | 0.35 |
| E         | 0.25 | 0.40 |
| G         | 1.20 | 1.40 |
| H         | 0.02 | 0.10 |
| J         | 0.05 | 0.15 |
| K         | 2.20 | 2.40 |

## Mounting Pad Layout (Unit: mm)

### SOT-323

