

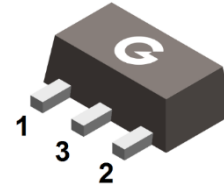
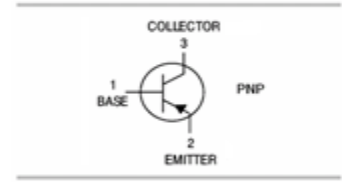
## Features

- Low Collector-Emitter saturation voltage  $V_{CE(sat)}$  and corresponding low  $R_{CE(sat)}$
- High collector current capability
- High collector current gain
- Improved efficiency due to reduced heat generation
- RoHS compliant with Halogen-free

HF

## Mechanical Data

- Case: SOT-89
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208



SOT-89

## Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| GT53100E    | SOT-89  | 1000 pcs / Tape & Reel | T53100       |

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

| Parameter                                        | Symbol    | Value | Unit |
|--------------------------------------------------|-----------|-------|------|
| Collector-Base Breakdown Voltage                 | $V_{CBO}$ | -140  | V    |
| Collector-Emitter Breakdown Voltage              | $V_{CEO}$ | -100  | V    |
| Emitter-Base Breakdown Voltage                   | $V_{EBO}$ | -7    | V    |
| Collector Current (Continuous)                   | $I_C$     | -3    | A    |
| Peak Collector Current ( $t_p \leq 1\text{ms}$ ) | $I_{CM}$  | -5    | A    |

## Thermal Characteristics

| Parameter                                         | Symbol          | Value      | Unit               |
|---------------------------------------------------|-----------------|------------|--------------------|
| Power Dissipation <sup>*1</sup>                   | $P_D$           | 1.5        | W                  |
| Thermal Resistance Junction-to-Air <sup>*1</sup>  | $R_{\theta JA}$ | 83         | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Case <sup>*1</sup> | $R_{\theta JC}$ | 40         | $^\circ\text{C/W}$ |
| Junction Temperature Range                        | $T_J$           | -55 ~ +150 | $^\circ\text{C}$   |
| Storage Temperature Range                         | $T_{STG}$       | -55 ~ +150 | $^\circ\text{C}$   |

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     | $V_{(BR)CBO}$ | $I_C = -0.1\text{mA}, I_E = 0$                                    | -140 | -    | -     | V    |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -1\text{mA}, I_B = 0$                                      | -100 | -    | -     | V    |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = -0.1\text{mA}, I_C = 0$                                    | -7   | -    | -     | V    |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = -140\text{V}, I_E = 0$                                  | -    | -    | -100  | nA   |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = -6\text{V}, I_C = 0$                                    | -    | -    | -50   | nA   |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = -2\text{V}, I_C = -10\text{mA}$                         | 150  | -    | -     | -    |
|                                      |               | $V_{CE} = -2\text{V}, I_C = -500\text{mA}$                        | 120  | -    | 360   | -    |
|                                      |               | $V_{CE} = -2\text{V}, I_C = -1\text{A}$                           | 80   | -    | -     | -    |
|                                      |               | $V_{CE} = -2\text{V}, I_C = -2\text{A}$                           | 50   | -    | -     | -    |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -100\text{mA}, I_B = -10\text{mA}$                         | -    | -    | -40   | mV   |
|                                      |               | $I_C = -500\text{mA}, I_B = -50\text{mA}$                         | -    | -    | -80   |      |
|                                      |               | $I_C = -1\text{A}, I_B = -0.1\text{A}$                            | -    | -    | -115  |      |
|                                      |               | $I_C = -2\text{A}, I_B = -0.2\text{A}$                            | -    | -    | -250  |      |
| Base-emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = -1\text{A}, I_B = -0.1\text{A}$                            | -    | -    | -0.95 | V    |
| Base-emitter Voltage                 | $V_{BE(on)}$  | $I_C = -1\text{A}, V_{CE} = -2\text{V}$                           | -    | -    | -0.85 | V    |
| Transition Frequency                 | $f_T$         | $V_{CE} = -5\text{V}, I_C = -100\text{mA}$<br>$f = 100\text{MHz}$ | -    | 120  | -     | MHz  |
| Output Capacitance                   | $C_{ob}$      | $V_{CB} = -10\text{V}, I_E = I_C = 0$<br>$f = 1\text{MHz}$        | -    | 25   | -     | pF   |

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

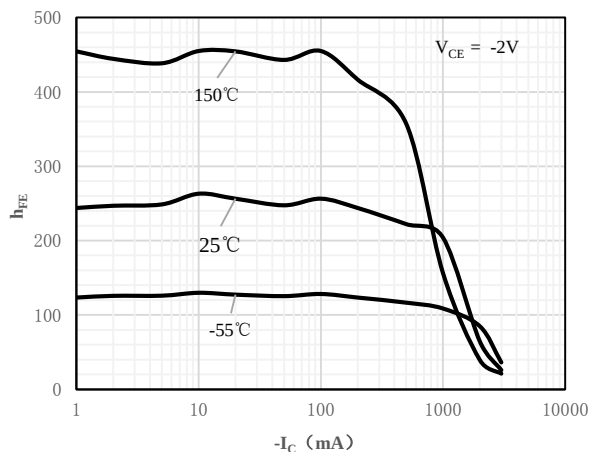


Fig 1  $h_{FE}$  vs.  $I_C$

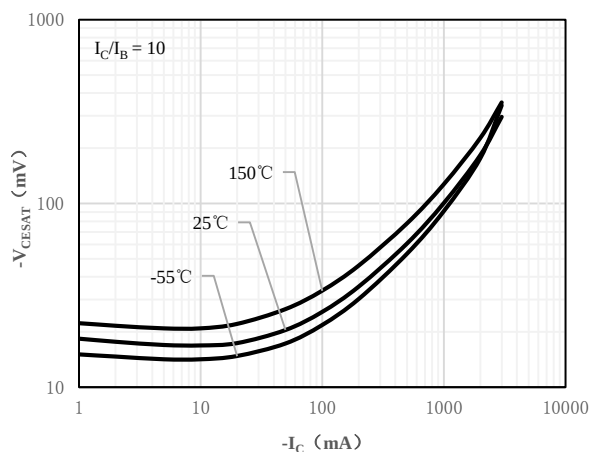


Fig 2  $V_{CE(sat)}$  vs.  $I_C$

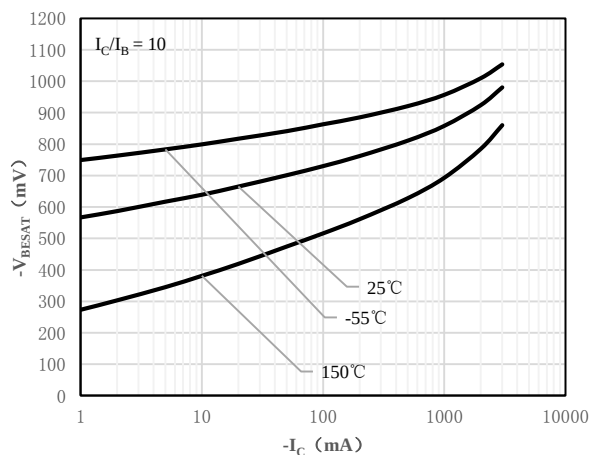


Fig 3  $V_{BE(sat)}$  vs.  $I_C$

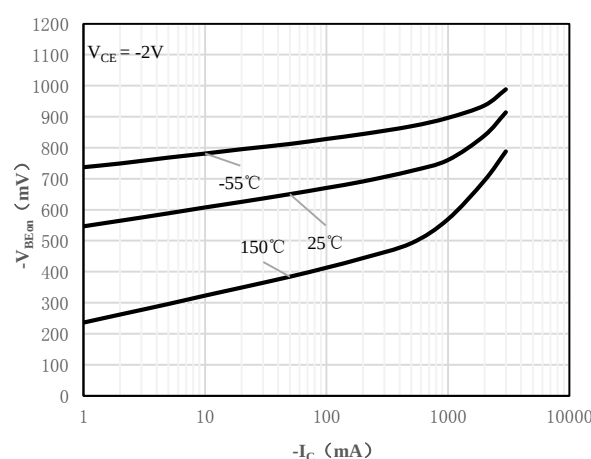


Fig 4  $V_{BE(on)}$  vs.  $I_C$

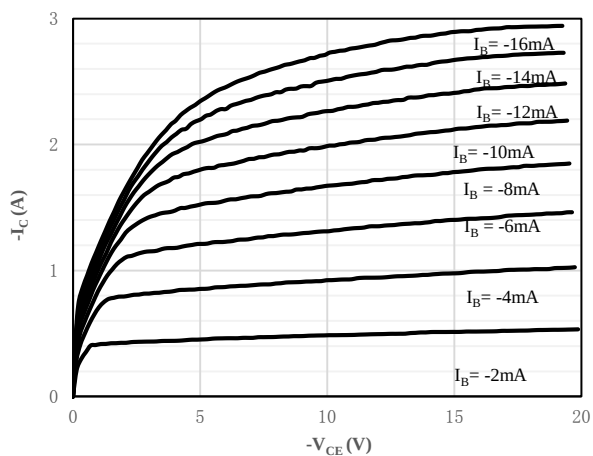


Fig 5  $I_C$  vs.  $V_{CE}$

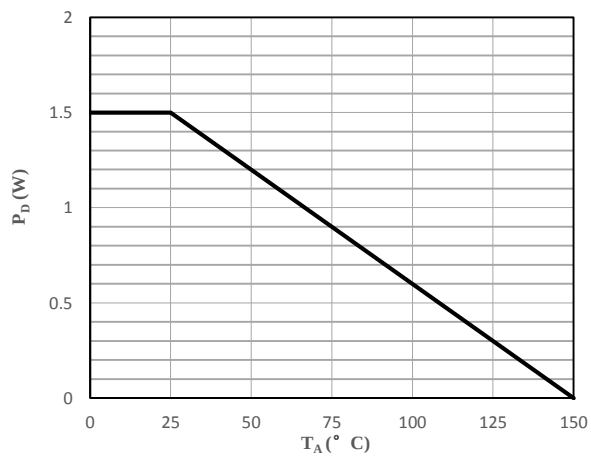


Fig 6  $P_D$  vs.  $T_A$

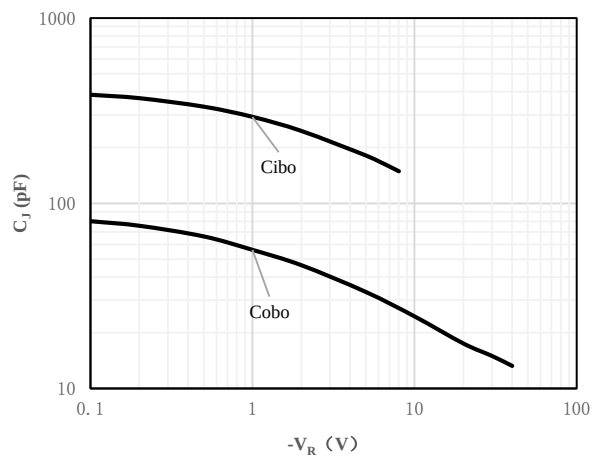
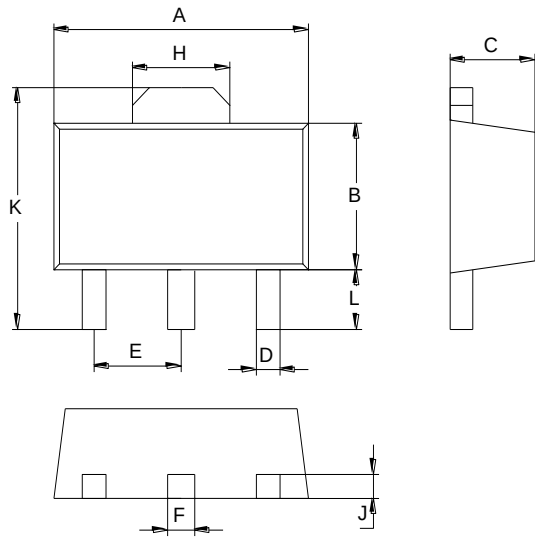


Fig 7  $C_J$  vs.  $V_R$

**Package Outline Dimensions** (Unit: mm)



| SOT-89    |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 4.30 | 4.70 |
| B         | 2.25 | 2.65 |
| C         | 1.30 | 1.70 |
| D         | 0.30 | 0.50 |
| E         | 1.40 | 1.60 |
| F         | 0.38 | 0.58 |
| H         | 1.60 | 1.80 |
| J         | 0.30 | 0.50 |
| L         | 0.90 | 1.10 |
| K         | 3.95 | 4.35 |

**Mounting Pad Layout** (Unit: mm)

**SOT-89**

