

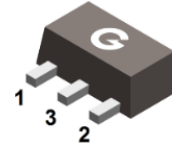
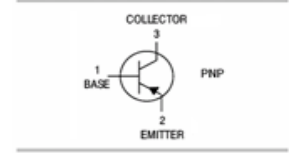
### Features

- Low speed switching
- Low saturation voltage
- Excellent  $h_{FE}$  linearity and high  $h_{FE}$
- 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 |
|-------------|---------|------------------------|--------------|
| GSS6040-R   | SOT-89  | 1000 pcs / Tape & Reel | 6040         |
| GSS6040-O   | SOT-89  | 1000 pcs / Tape & Reel | 6040         |
| GSS6040-Y   | SOT-89  | 1000 pcs / Tape & Reel | 6040         |
| GSS6040-G   | SOT-89  | 1000 pcs / Tape & Reel | 6040         |

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

| Parameter                           | Symbol    | Value | Unit |
|-------------------------------------|-----------|-------|------|
| Collector-Base Breakdown Voltage    | $V_{CBO}$ | -60   | V    |
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | -40   | V    |
| Emitter-Base Breakdown Voltage      | $V_{EBO}$ | -5    | V    |
| Collector Current (Continuous)      | $I_C$     | -3    | A    |

### Thermal Characteristics

| Parameter                                         | Symbol          | Value      | Unit               |
|---------------------------------------------------|-----------------|------------|--------------------|
| Power Dissipation ( $T_A = 25^\circ\text{C}$ )    | $P_D$           | 0.5        | W                  |
| Thermal Resistance Junction-to-Air <sup>*1</sup>  | $R_{\theta JA}$ | 110        | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Case <sup>*1</sup> | $R_{\theta JC}$ | 70         | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-to-Lead <sup>*1</sup> | $R_{\theta JL}$ | 80         | $^\circ\text{C/W}$ |
| Operating 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     | $V_{(BR)CBO}$ | $I_C = -100\mu\text{A}, I_E = 0$                 | -60  | -    | -    | V             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -10\text{mA}, I_B = 0$                    | -40  | -    | -    | V             |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = -100\mu\text{A}, I_C = 0$                 | -6   | -    | -    | V             |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = -40\text{V}, I_E = 0$                  | -    | -    | -1   | $\mu\text{A}$ |
| Collector Cut-off Current            | $I_{CEO}$     | $V_{CE} = -30\text{V}, I_B = 0$                  | -    | -    | -1   | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = -6\text{V}, I_C = 0$                   | -    | -    | -1   | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = -2\text{V}, I_C = -1\text{A}$          | 60   | -    | 400  | -             |
|                                      |               | $V_{CE} = -2\text{V}, I_C = -0.02\text{A}$       | 30   | -    | -    | -             |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -2\text{A}, I_B = -0.2\text{A}$           | -    | -0.3 | -0.5 | V             |
| Base-emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = -2\text{A}, I_B = -0.2\text{A}$           | -    | -1.0 | -2.0 | V             |
| Transition Frequency                 | $f_T$         | $I_C = -0.1\text{A}, V_{CE} = -5\text{V}$        | -    | 80   | -    | MHz           |
| Collector Output Capacitance         | $C_{OB}$      | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$ | -    | 44   | -    | pF            |

### Classification of $h_{FE}$

| Rank  | R      | O       | Y       | G       |
|-------|--------|---------|---------|---------|
| Range | 60-120 | 100-200 | 160-320 | 200-400 |

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

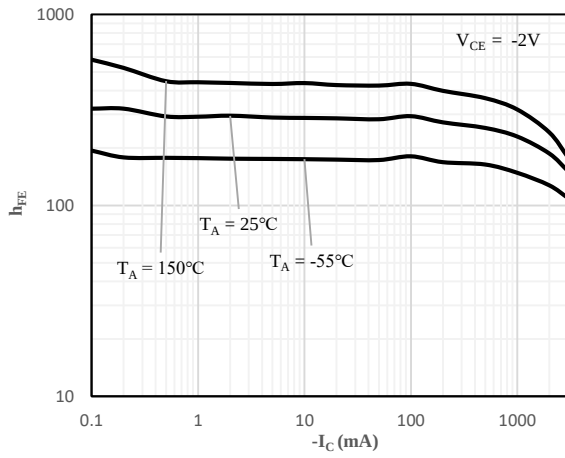


Fig 1  $h_{FE}$  vs.  $I_C$

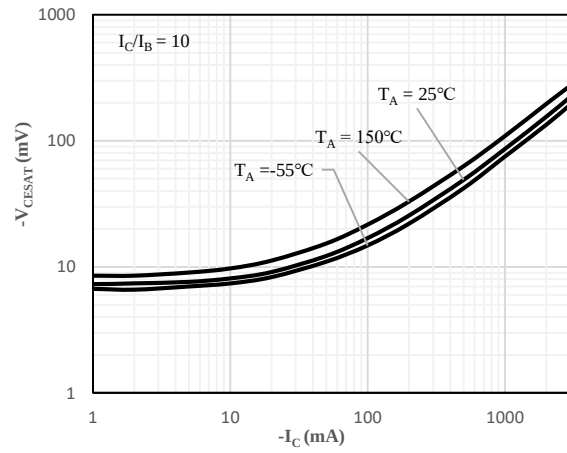


Fig 2  $V_{CE(sat)}$  vs.  $I_C$

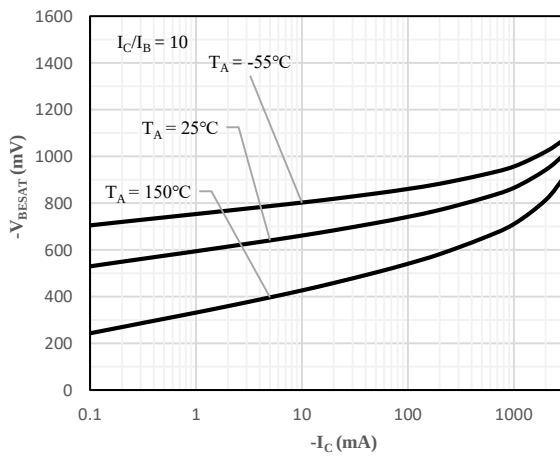


Fig 3  $V_{BE(sat)}$  vs.  $I_C$

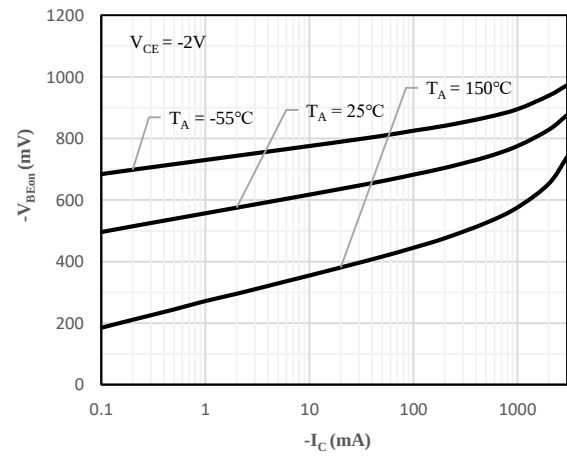


Fig 4  $V_{BE(on)}$  vs.  $I_C$

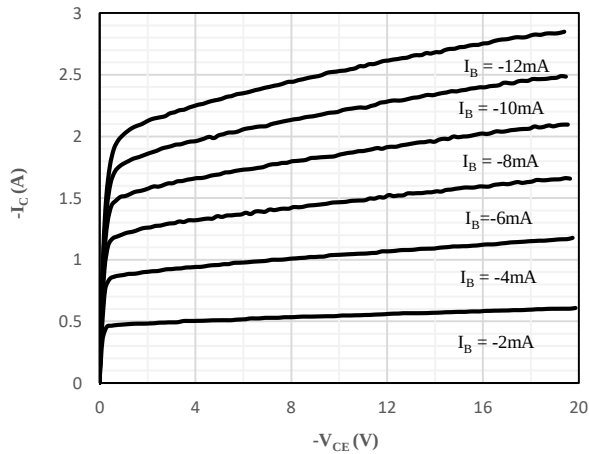


Fig 5  $I_C$  vs.  $V_{CE}$

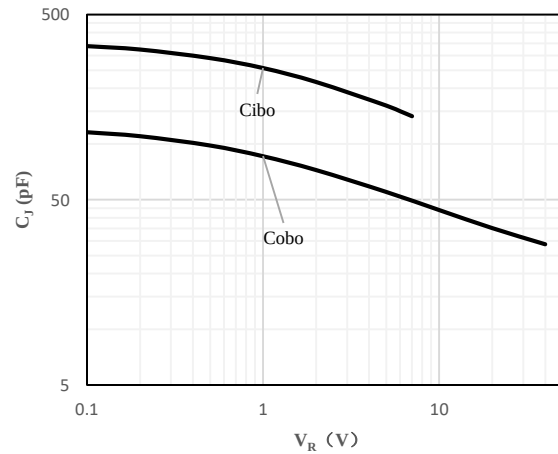
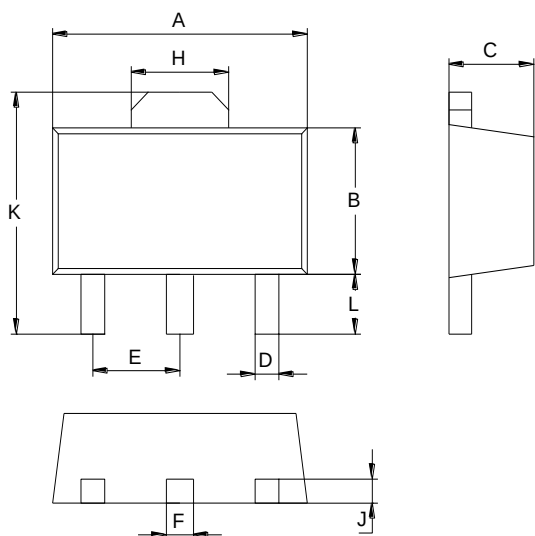


Fig 6  $C_J$  vs.  $V_R$

## 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

