

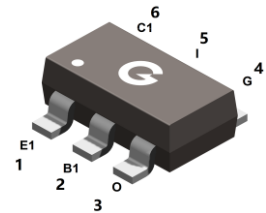
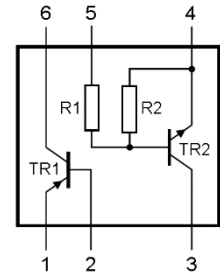
## Features

- Low  $V_{CEsat}$  (BISS) transistor and resistor-equipped transistor in one package
- Low threshold voltage compared to MOSFET
- Low drive power required
- Space-saving solution
- Reduction of component count
- RoHS compliant with Halogen-free
- Qualified to AEC-Q101 Standards

HF

## Mechanical Data

- Case: SOT-23-6L
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208



SOT-23-6L

## Ordering Information

| Part Number | Package   | Shipping Quantity      | Marking Code |
|-------------|-----------|------------------------|--------------|
| TGBLS6003D  | SOT-23-6L | 3000 pcs / Tape & Reel | 6003D        |

## Maximum Ratings-TR1 (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                      | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Base Voltage         | $V_{CBO}$ | -80   | V    |
| Collector-Emitter Voltage      | $V_{CEO}$ | -60   | V    |
| Emitter-Base Voltage           | $V_{EBO}$ | -5    | V    |
| Collector Current (Continuous) | $I_C$     | -1    | A    |
| Collector Current (Pulse)      | $I_{CM}$  | -2    | A    |
| Base Current                   | $I_B$     | -0.3  | A    |
| Base Current (Pulse)           | $I_{BM}$  | -1    | A    |

## Maximum Ratings-TR2 (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter         | Symbol       | Value      | Unit |
|-------------------|--------------|------------|------|
| Supply Voltage    | $V_{CC}$     | 50         | V    |
| Input Voltage     | $V_I$        | -10 to +40 | V    |
| Output Current    | $I_O$        | 50         | mA   |
| Collector Current | $I_{C(Max)}$ | 100        | mA   |

## Thermal Characteristics

| Parameter                                      | Symbol          | Value      | Unit               |
|------------------------------------------------|-----------------|------------|--------------------|
| Power Dissipation ( $T_A = 25^\circ\text{C}$ ) | $P_D$           | 400        | mW                 |
| Thermal Resistance Junction-to-Air             | $R_{\theta JA}$ | 312        | $^\circ\text{C/W}$ |
| Operating Junction Temperature                 | $T_J$           | -55 ~ +150 | $^\circ\text{C}$   |
| Storage Temperature Range                      | $T_{STG}$       | -55 ~ +150 | $^\circ\text{C}$   |

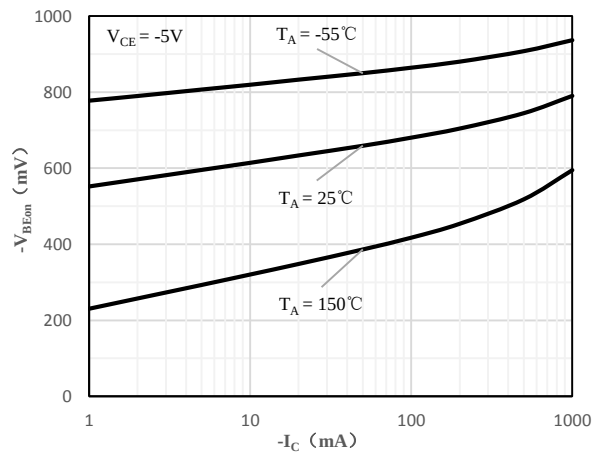
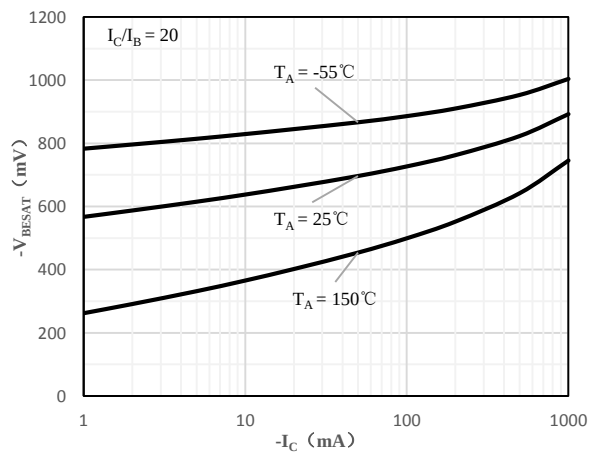
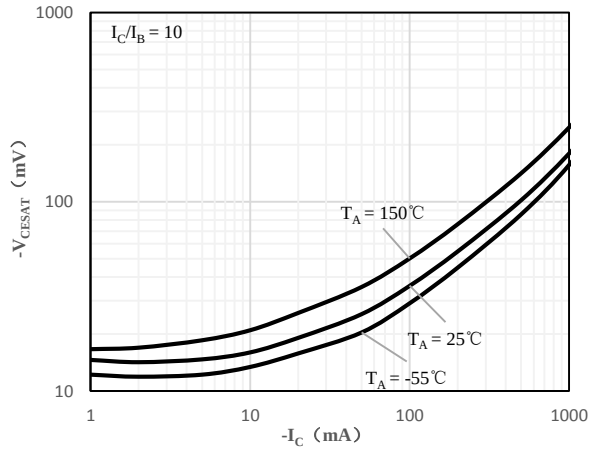
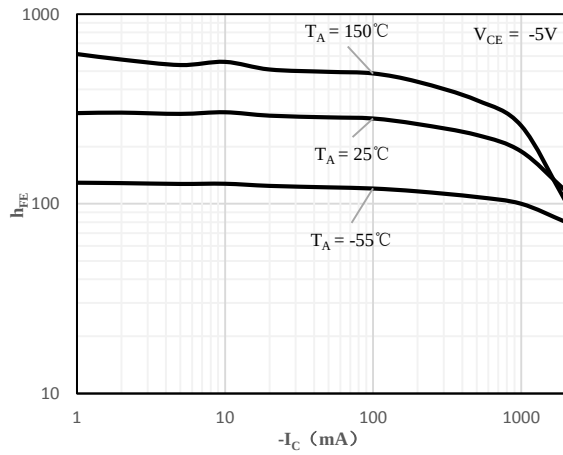
## Electrical Characteristics of TR1 (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter                            | Symbol        | Test Condition                                                    | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|-------------------------------------------------------------------|------|------|------|------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = -100\mu\text{A}, I_E = 0$                                  | -80  | -    | -    | V    |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -10\text{mA}, I_B = 0$                                     | -60  | -    | -    | V    |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = -100\mu\text{A}, I_C = 0$                                  | -5   | -    | -    | V    |
| Collector Cut-off Current            | $I_{CBO}$     | $V_{CB} = -60\text{V}, I_E = 0$                                   | -    | -    | -100 | nA   |
| Collector Cut-off Current            | $I_{CES}$     | $V_{CE} = -60\text{V}, V_{BE} = 0\text{V}$                        | -    | -    | -100 | nA   |
| Emitter Cut-off Current              | $I_{EBO}$     | $V_{EB} = -5\text{V}, I_C = 0$                                    | -    | -    | -100 | nA   |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = -5\text{V}, I_C = -1\text{mA}$                          | 100  | -    | -    | -    |
|                                      |               | $V_{CE} = -5\text{V}, I_C = -500\text{mA}$                        | 100  | -    | 300  | -    |
|                                      |               | $V_{CE} = -5\text{V}, I_C = -1000\text{mA}$                       | 80   | -    | -    | -    |
| Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -100\text{mA}, I_B = -10\text{mA}$                         | -    | -35  | -175 | mV   |
|                                      |               | $I_C = -500\text{mA}, I_B = -50\text{mA}$                         | -    | -105 | -300 | mV   |
|                                      |               | $I_C = -1000\text{mA}, I_B = -100\text{mA}$                       | -    | -190 | -340 | mV   |
| Base-emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = -1000\text{mA}, I_B = -50\text{mA}$                        | -    | -0.9 | -1.2 | V    |
| Base-emitter Voltage                 | $V_{BE(on)}$  | $V_{CE} = -5\text{V}, I_C = -1\text{A}$                           | -    | -0.8 | -1   | V    |
| Transition Frequency                 | $f_T$         | $V_{CE} = -10\text{V}, I_C = -50\text{mA}$<br>$f = 100\text{MHz}$ | 150  | -    | -    | MHz  |
| Collector Output Capacitance         | $C_{ob}$      | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$                  | -    | -    | 15   | pF   |

**Electrical Characteristics of TR2** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

| Parameter              | Symbol       | Test Condition                            | Min. | Typ. | Max. | Unit      |
|------------------------|--------------|-------------------------------------------|------|------|------|-----------|
| Input Voltage          | $V_{I(OFF)}$ | $V_{CC} = 5V, I_O = 100\mu A$             | 0.5  | -    | -    | V         |
| Input Voltage          | $V_{I(ON)}$  | $V_O = 0.3V, I_O = 10mA$                  | -    | -    | 3    | V         |
| Output Voltage         | $V_{O(on)}$  | $I_O = 10mA, I_I = 0.5mA$                 | -    | -    | 0.3  | V         |
| Input Current          | $I_I$        | $V_I = 5V$                                | -    | -    | 0.88 | mA        |
| Output Current         | $I_{O(off)}$ | $V_{CC} = 50V, V_I = 0V$                  | -    | -    | 0.5  | $\mu A$   |
| DC Current Gain        | $G_I$        | $V_O = 5V, I_O = 5mA$                     | 30   | -    | -    | -         |
| Input Resistor         | $R_1$        |                                           | 7    | 10   | 13   | $k\Omega$ |
| Resistance ratio       | $R_2/R_1$    |                                           | 0.8  | 1.0  | 1.2  | -         |
| Gain-Bandwidth Product | $f_T$        | $V_{CE} = 10V, I_E = 5mA$<br>$f = 100MHz$ | -    | 250  | -    | MHz       |

Ratings and Characteristic Curves-TR1 (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)



Ratings and Characteristic Curves-TR2 (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

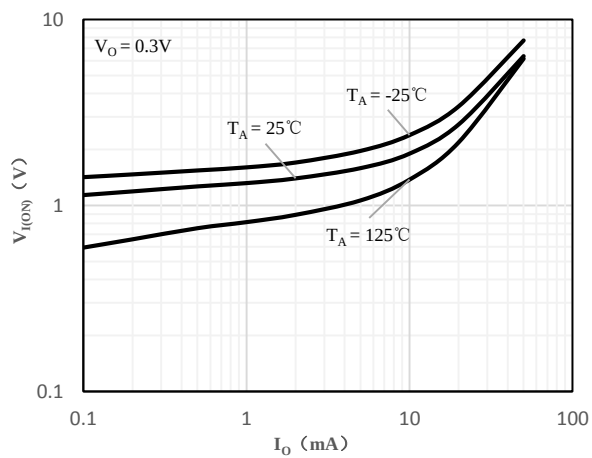


Fig 1 Input Voltage vs Output Current

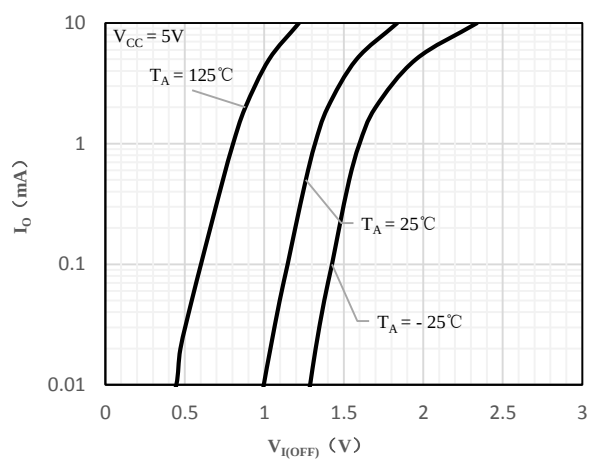


Fig 2 Output Current vs Input Voltage

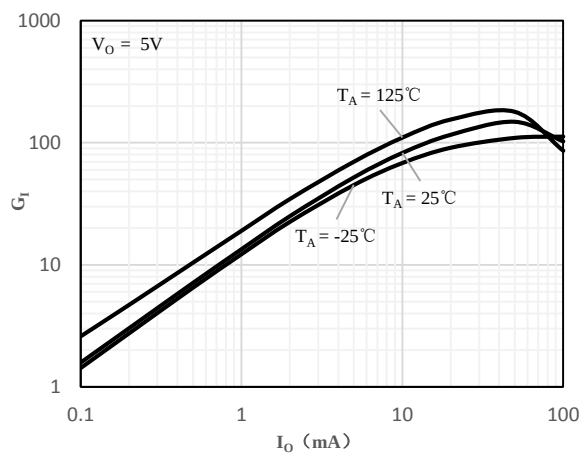


Fig 3 DC Current Gain vs Output Current

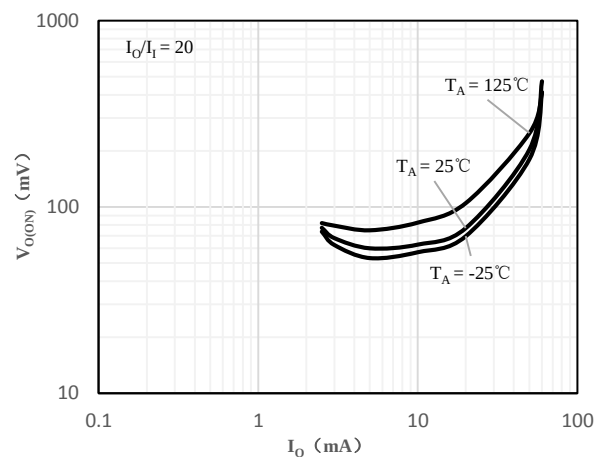
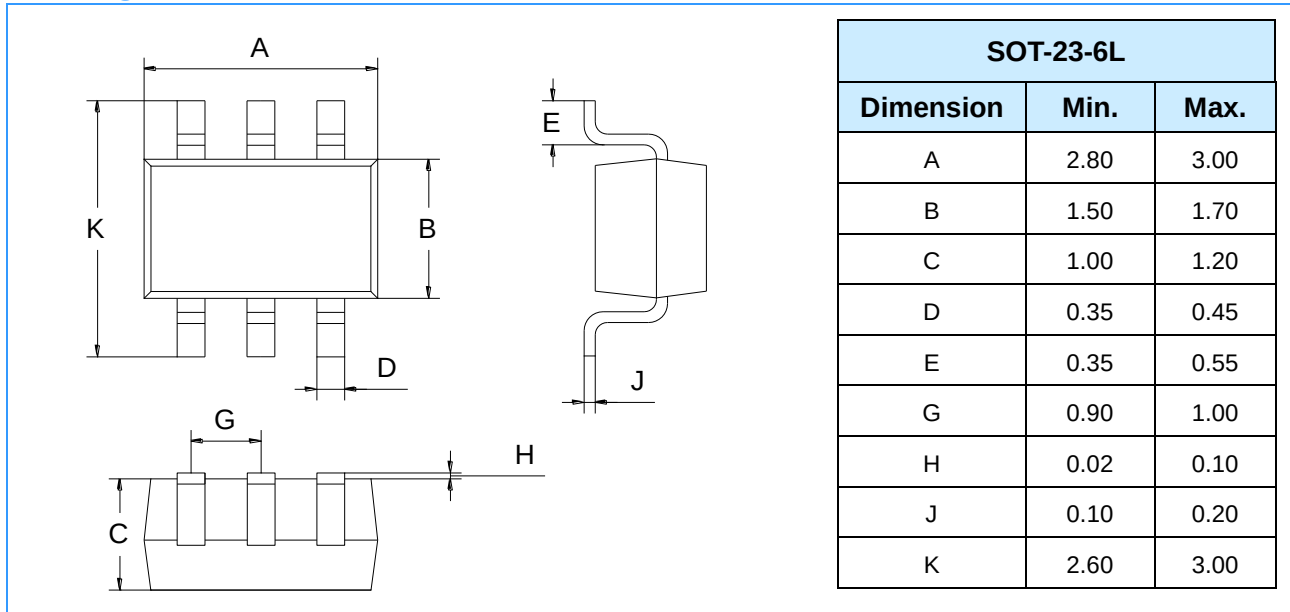


Fig 4 Output Voltage vs Output Current

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



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

