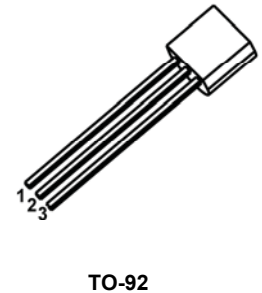
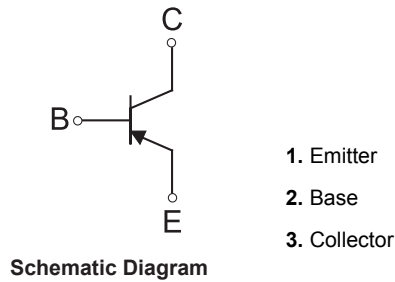


## Features

- General purpose switching and amplification.



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

| Parameter                              | Symbol          | Max.        | Unit                 |
|----------------------------------------|-----------------|-------------|----------------------|
| Collector-Base Voltage                 | $V_{CB0}$       | -80         | V                    |
| Collector-Emitter Voltage              | $V_{CE0}$       | -80         | V                    |
| Emitter-Base Voltage                   | $V_{EB0}$       | -4          | V                    |
| Collector Current-Continuous           | $I_C$           | -0.5        | A                    |
| Collector Power Dissipation            | $P_D$           | 625         | mW                   |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 200         | $^{\circ}\text{C/W}$ |
| Operation Junction Temperature Range   | $T_J$           | -55 To +150 | $^{\circ}\text{C}$   |
| Storage Temperature Range              | $T_{STG}$       | -55 To +150 | $^{\circ}\text{C}$   |

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

| Parameter                            | Symbol        | Conditions                                                    | Min. | Max.  | Unit          |
|--------------------------------------|---------------|---------------------------------------------------------------|------|-------|---------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CB0}$ | $I_C=-0.1\text{mA}$ , $I_E=0$                                 | -80  | -     | V             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CE0}$ | $I_C=-1\text{mA}$ , $I_B=0$                                   | -80  | -     | V             |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EB0}$ | $I_E=-100\mu\text{A}$ , $I_C=0$                               | -4   | -     | V             |
| Collector Cut-Off Current            | $I_{CB0}$     | $V_{CB}=-80\text{V}$ , $I_E=0$                                | -    | -0.1  | $\mu\text{A}$ |
|                                      | $I_{CE0}$     | $V_{CE}=-60\text{V}$ , $I_B=0$                                | -    | -0.1  | $\mu\text{A}$ |
| Emitter Cut-Off Current              | $I_{EB0}$     | $V_{EB}=-4\text{V}$ , $I_C=0$                                 | -    | -0.1  | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE1}$     | $V_{CE}=-1\text{V}$ , $I_C=-10\text{mA}$                      | 100  | -     | -             |
|                                      | $h_{FE2}$     | $V_{CE}=-1\text{V}$ , $I_C=-100\text{mA}$                     | 100  | -     | -             |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-100\text{mA}$ , $I_B=-10\text{mA}$                      | -    | -0.25 | V             |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=-100\text{mA}$ , $V_{CE}=-1\text{V}$                     | -    | -1.2  | V             |
| Transition Frequency                 | $f_T$         | $V_{CE}=-1\text{V}$ , $I_C=-100\text{mA}$ , $f=100\text{MHz}$ | 50   | -     | MHz           |

## Typical Characteristic Curves

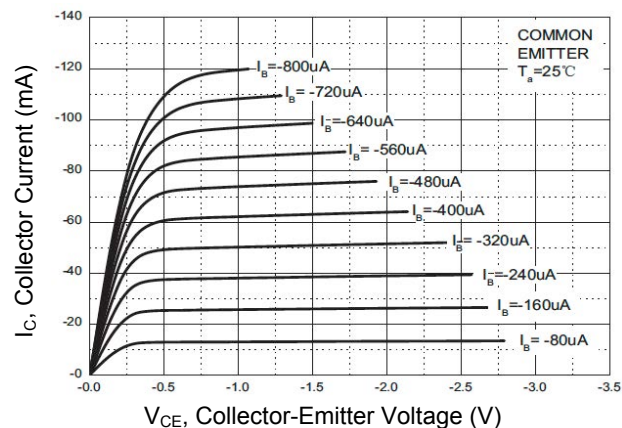


Figure 1. Static Characteristic

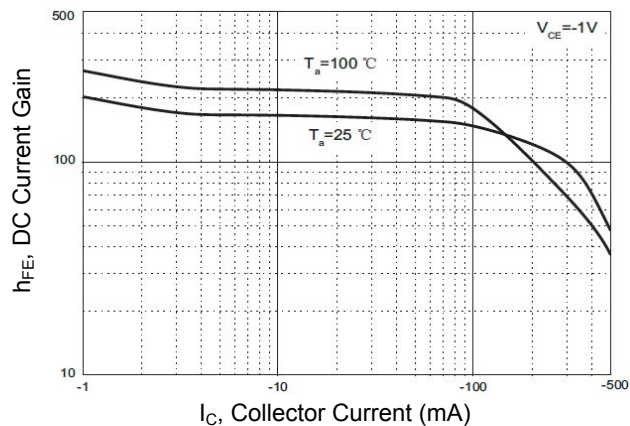


Figure 2. DC Current Gain vs. Collector Current

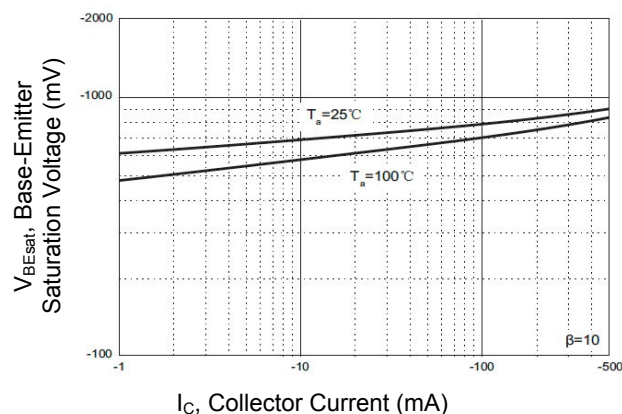


Figure 3. Base Emitter Saturation Voltage vs.  $I_C$

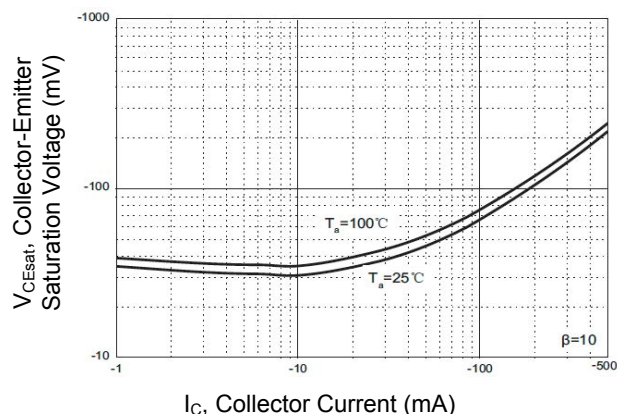


Figure 4. Collector Emitter Saturation Voltage vs.  $I_C$

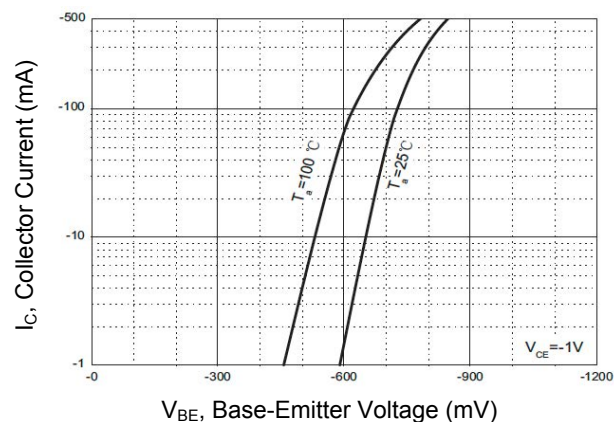


Figure 5.  $I_C$  vs. Base Emitter Voltage

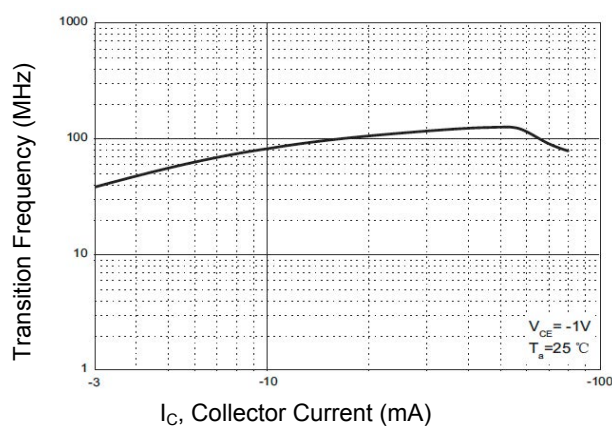


Figure 6. Transition Frequency vs.  $I_C$

## Typical Characteristic Curves

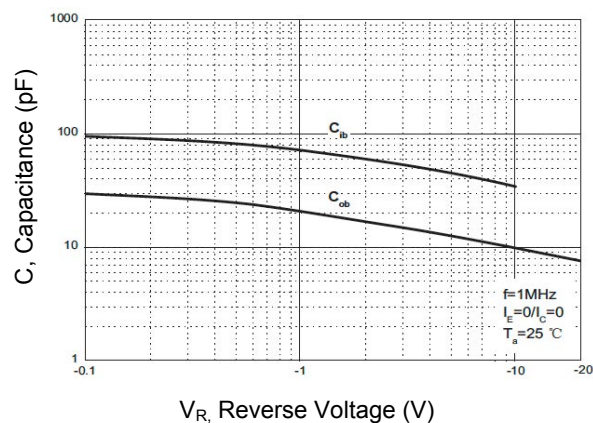


Figure 7. Capacitance Characteristics

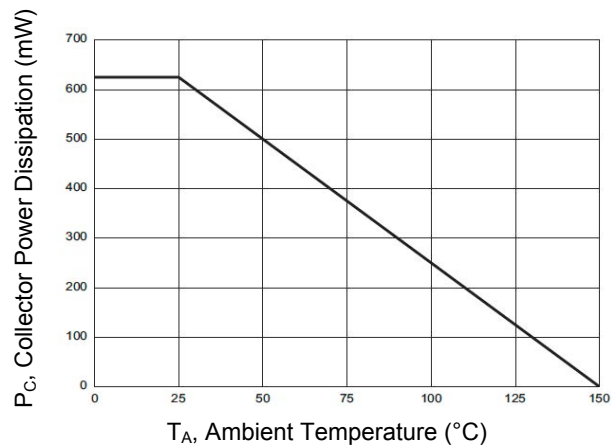
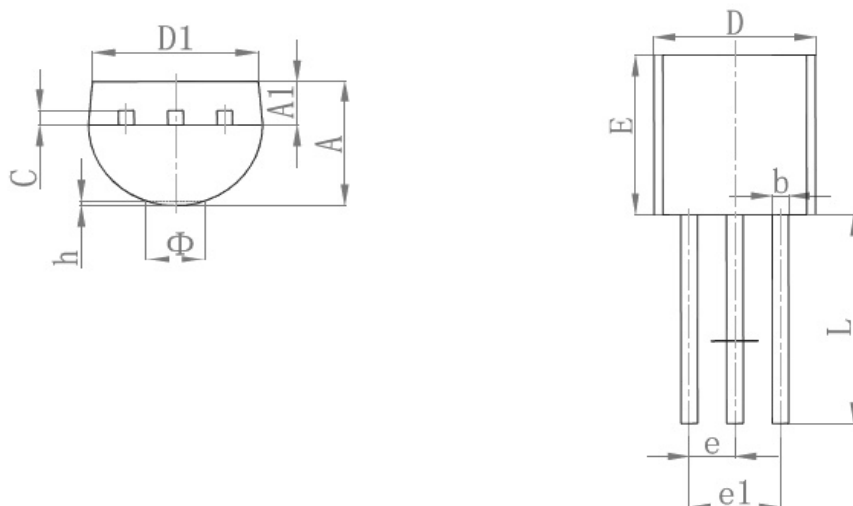


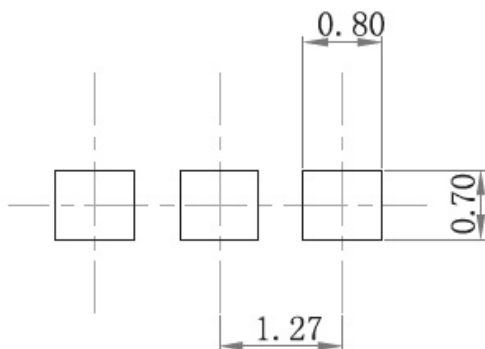
Figure 8. Power Derating

## Package Outline Dimensions (TO-92)



| Symbol | Dimensions in Millimeters |        | Dimensions in Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 3.300                     | 3.700  | 0.130                | 0.146 |
| A1     | 1.100                     | 1.400  | 0.043                | 0.055 |
| b      | 0.380                     | 0.550  | 0.015                | 0.022 |
| c      | 0.360                     | 0.510  | 0.014                | 0.020 |
| D      | 4.300                     | 4.700  | 0.169                | 0.185 |
| D1     | 3.430                     | -      | 0.135                | -     |
| E      | 4.300                     | 4.700  | 0.169                | 0.185 |
| e      | 1.270 TYP                 |        | 0.050 TYP            |       |
| e1     | 2.440                     | 2.640  | 0.096                | 0.104 |
| L      | 14.100                    | 14.500 | 0.555                | 0.571 |
| Φ      | -                         | 1.600  | -                    | 0.063 |
| h      | 0.000                     | 0.380  | 0.000                | 0.015 |

## Recommended Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

## Order Information

| Device   | Package | Packing Method | Quantity        |
|----------|---------|----------------|-----------------|
| GSMPSA56 | TO-92   | Tape           | 2,000 pcs / Box |