

## NPN Silicon Epitaxial Planar Transistor

## S9013

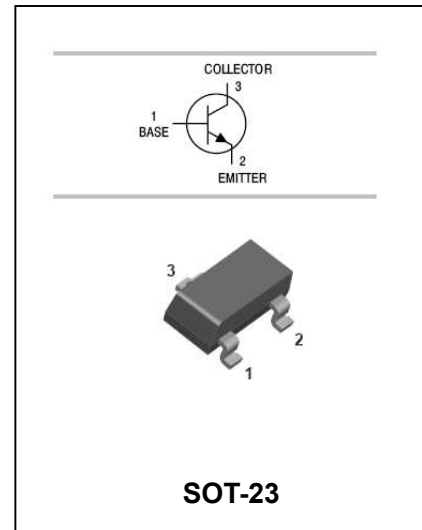
### FEATURES

- High Collector Current.( $I_C=500\text{mA}$ ).
- Complementary To S9012.
- Excellent  $H_{FE}$  Linearity.
- Power dissipation.( $P_C=300\text{mW}$ ).



### APPLICATIONS

- High Collector Current.



### ORDERING INFORMATION

| Type No. | Marking | Package Code |
|----------|---------|--------------|
| S9013□   | J3      | SOT-23       |

□: none is for Lead Free package;  
“G” is for Halogen Free package.

### MAXIMUM RATING @ $T_a=25^\circ\text{C}$ unless otherwise specified

| Symbol         | Parameter                        | Value       | Units            |
|----------------|----------------------------------|-------------|------------------|
| $V_{CBO}$      | Collector-Base Voltage           | 40          | V                |
| $V_{CEO}$      | Collector-Emitter Voltage        | 25          | V                |
| $V_{EBO}$      | Emitter-Base Voltage             | 5           | V                |
| $I_C$          | Collector Current -Continuous    | 500         | mA               |
| $P_C$          | Collector Dissipation            | 300         | mW               |
| $T_j, T_{stg}$ | Junction and Storage Temperature | -55 to +150 | $^\circ\text{C}$ |

**NPN Silicon Epitaxial Planar Transistor**

**S9013**

**ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified**

| Parameter                            | Symbol        | Test conditions                    | MIN | TYP | MAX | UNIT    |
|--------------------------------------|---------------|------------------------------------|-----|-----|-----|---------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C=100\mu A, I_E=0$              | 40  |     |     | V       |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C=0.1mA, I_B=0$                 | 25  |     |     | V       |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E=100\mu A, I_C=0$              | 5   |     |     | V       |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=40V, I_E=0$                |     |     | 0.1 | $\mu A$ |
| Collector cut-off current            | $I_{CEO}$     | $V_{CE}=20V, I_B=0$                |     |     | 0.1 | $\mu A$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=5V, I_C=0$                 |     |     | 0.1 | $\mu A$ |
| DC current gain                      | $h_{FE}$      | $V_{CE}=1V, I_C=50mA$              | 120 |     | 400 |         |
|                                      |               | $V_{CE}=1V, I_C=500mA$             | 40  |     |     |         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=500mA, I_B=50mA$              |     |     | 0.6 | V       |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C=500mA, I_B=50mA$              |     |     | 1.2 | V       |
| Transition frequency                 | $f_T$         | $V_{CE}=6V, I_C=20mA$<br>$f=30MHz$ | 150 |     |     | MHz     |

**CLASSIFICATION OF  $h_{FE(1)}$**

| Rank  | L       | H       | J       |
|-------|---------|---------|---------|
| Range | 120-200 | 200-350 | 300-400 |

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TYPICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

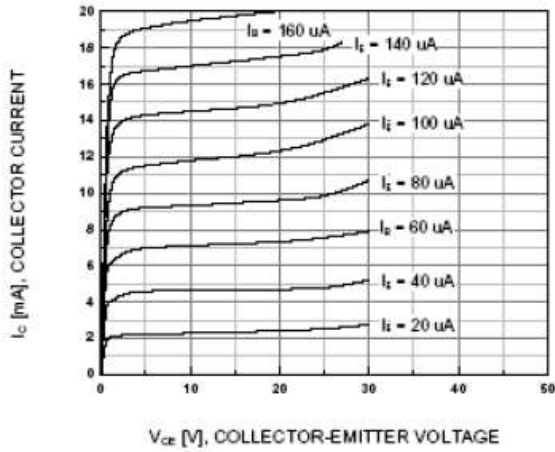


Figure 1. Static Characteristic

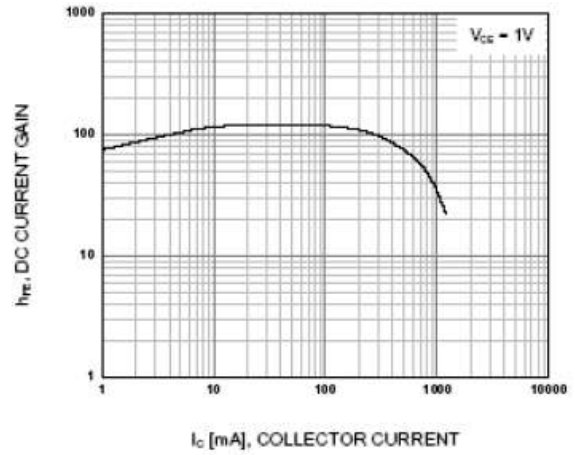


Figure 2. DC current Gain

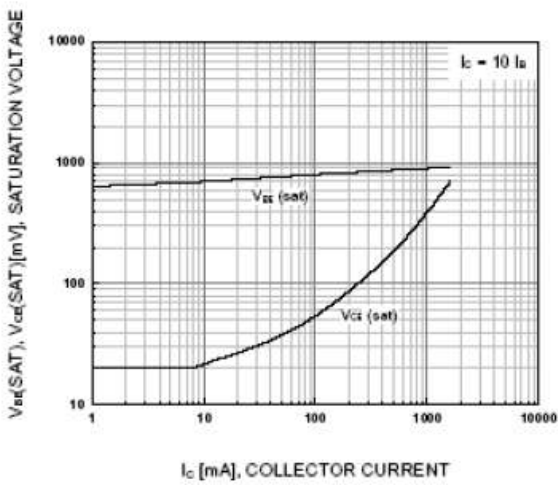


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

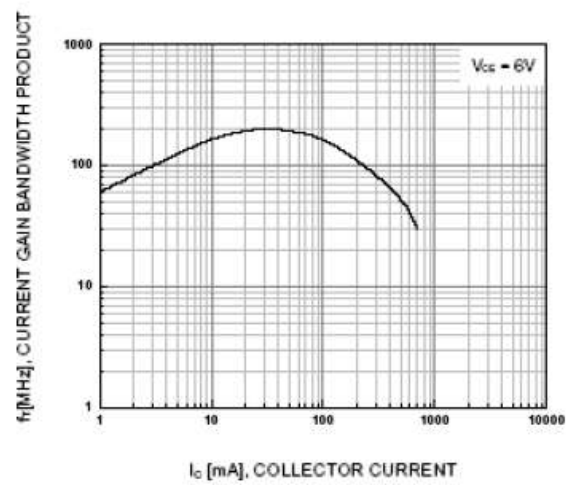


Figure 4. Current Gain Bandwidth Product

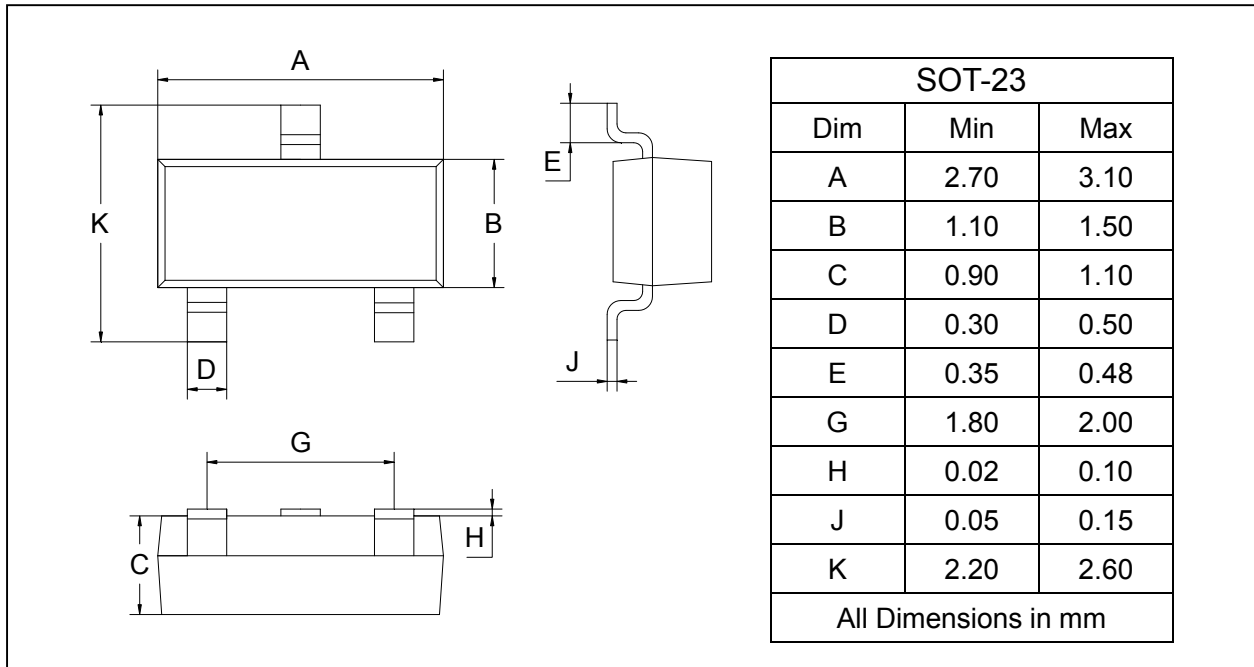
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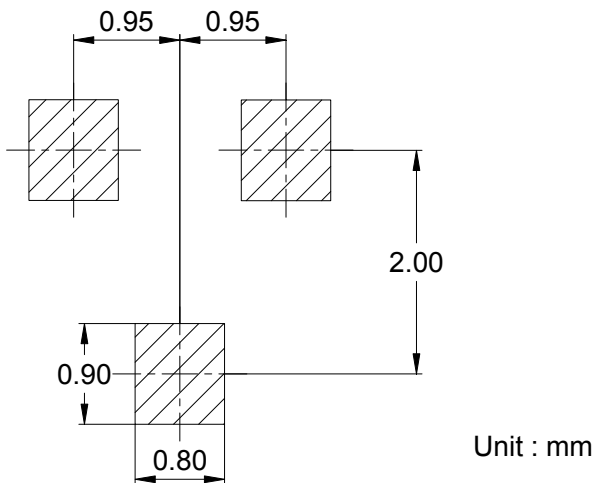
### PACKAGE OUTLINE

Plastic surface mounted package

SOT-23



### SOLDERING FOOTPRINT



### PACKAGE INFORMATION

| Device | Package | Shipping       |
|--------|---------|----------------|
| S9013  | SOT-23  | 3000/Tape&Reel |