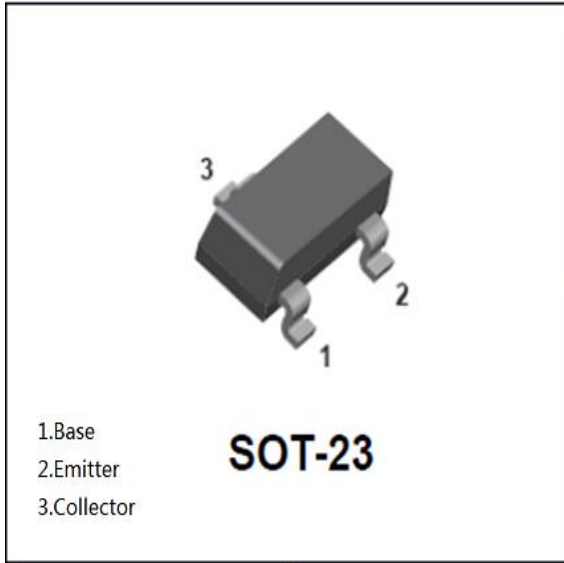


## PNP Transistor



### Features

- Epoxy meets UL-94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Halogen free available upon request by adding suffix "HF"
- Surface mount package ideally Suited for Automatic Insertion
- PNP

### Mechanical Data

- **Package:** SOT-23
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:**

|           |    |
|-----------|----|
| 2SA812-M4 | M4 |
| 2SA812-M5 | M5 |
| 2SA812-M6 | M6 |
| 2SA812-M7 | M7 |

### ■ Maximum Ratings (Ta=25°C unless otherwise noted)

| Item                        | Symbol    | Unit | Conditions                 | Value       |
|-----------------------------|-----------|------|----------------------------|-------------|
| Collector-Base Voltage      | $V_{CBO}$ | V    | $I_C = -100\mu A, I_E = 0$ | -60         |
| Collector-Emitter Voltage   | $V_{CEO}$ | V    | $I_C = -1mA, I_B = 0$      | -50         |
| Emitter-Base Voltage        | $V_{EBO}$ | V    | $I_E = -100\mu A, I_C = 0$ | -5          |
| Collector Current           | $I_C$     | A    |                            | -0.1        |
| Collector Power Dissipation | $P_C$     | mW   |                            | 200         |
| Junction Temperature        | $T_j$     | °C   |                            | 150         |
| Storage Temperature         | $T_{stg}$ | °C   |                            | -55 to +150 |

### ■ Electrical Characteristics (Ta=25°C unless otherwise noted)

| Item                                 | Symbol        | Unit    | Conditions                         | Min | Type | Max   |
|--------------------------------------|---------------|---------|------------------------------------|-----|------|-------|
| Collector-base breakdown voltage     | $V_{CBO}$     | V       | $I_C = -100\mu A, I_E = 0$         | -60 |      |       |
| Collector-emitter breakdown voltage  | $V_{CEO}$     | V       | $I_C = -1mA, I_B = 0$              | -50 |      |       |
| Emitter-base breakdown voltage       | $V_{EBO}$     | V       | $I_E = -100\mu A, I_C = 0$         | -5  |      |       |
| Collector-base cut-off current       | $I_{CBO}$     | $\mu A$ | $V_{CB} = -60V, I_E = 0$           |     |      | -0.1  |
| Emitter-base cut-off current         | $I_{EBO}$     | $\mu A$ | $V_{EB} = -5V, I_C = 0$            |     |      | -0.1  |
| DC current gain                      | $h_{FE}$      |         | $V_{CE} = -6V, I_C = -1mA$         | 90  |      | 600   |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | V       | $I_C = -100mA, I_B = -10mA$        |     |      | -0.3  |
| Base-emitter voltage                 | $V_{BE}$      | V       | $V_{CE} = -6V, I_C = -1mA$         |     |      | -0.68 |
| Transition frequency                 | $f_T$         | MHz     | $V_{CE} = -6V, I_C = -10mA$        |     | 180  |       |
| Collector-base output capacitance    | $C_{ob}$      | pF      | $V_{CB} = -10V, I_E = 0, f = 1MHz$ |     | 4.5  |       |



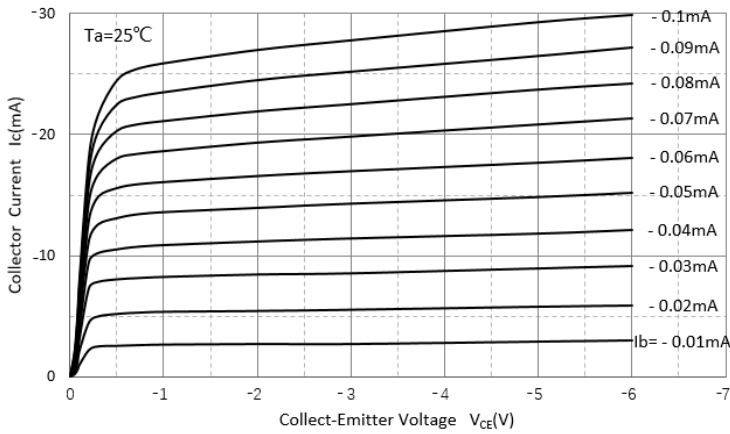
■ CLASSIFICATION OF HFE

| Rank  | M4     | M5      | M6      | M7      |
|-------|--------|---------|---------|---------|
| Range | 90-180 | 135-270 | 200-400 | 300-600 |

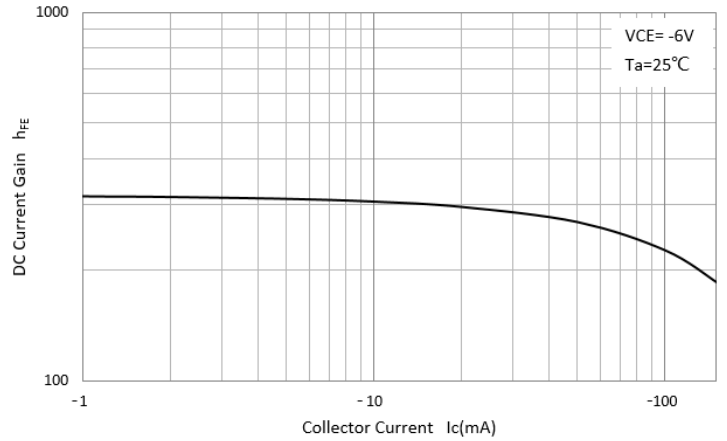
| PREFERRED P/N | PACKING CODE | UNIT WEIGHT(g)    | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-------------------|----------------------|-------------------------|----------------------------|---------------|
| 2SA812        | F2           | Approximate 0.008 | 3000                 | 30000                   | 120000                     | 7" reel       |

■ Characteristics(Typical)

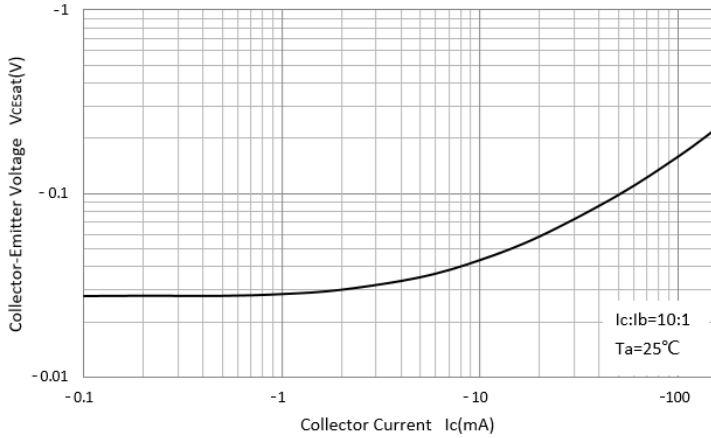
Static Characteristic



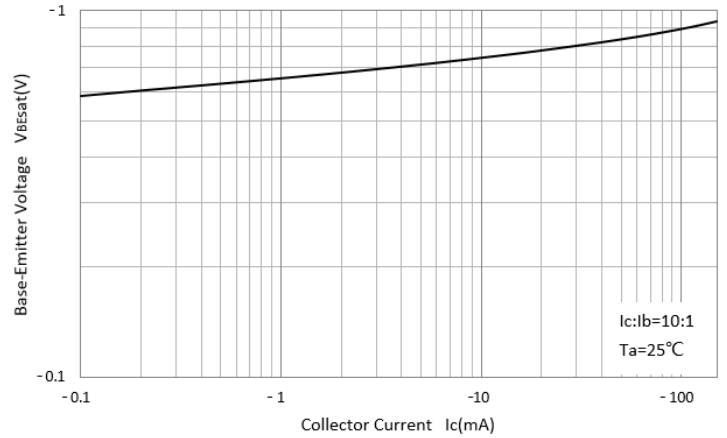
DC Current Gain



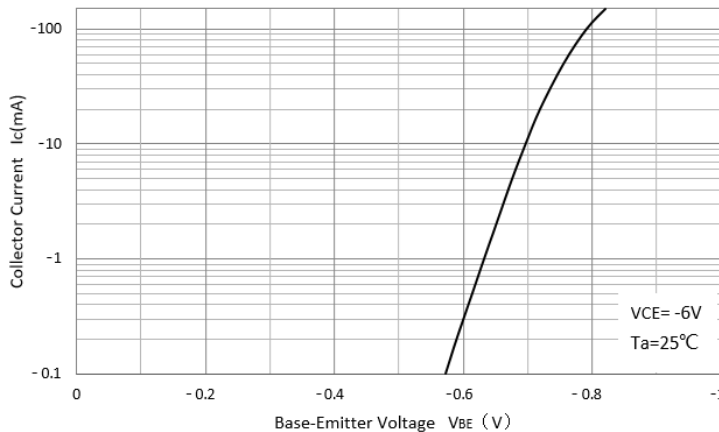
Collector-Emmitter Saturation Voltage



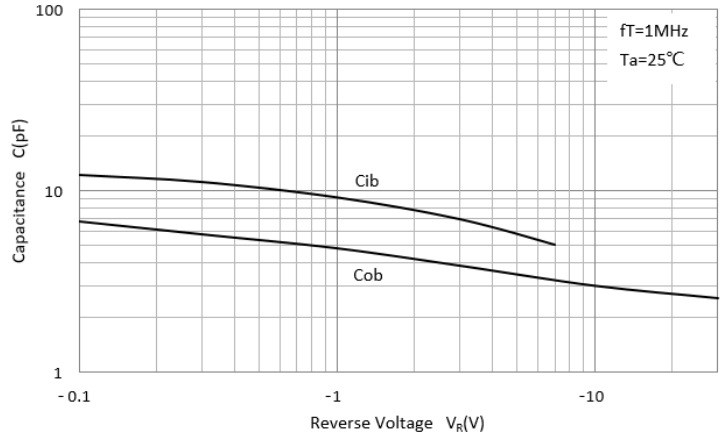
Base-Emmitter Saturation Voltage



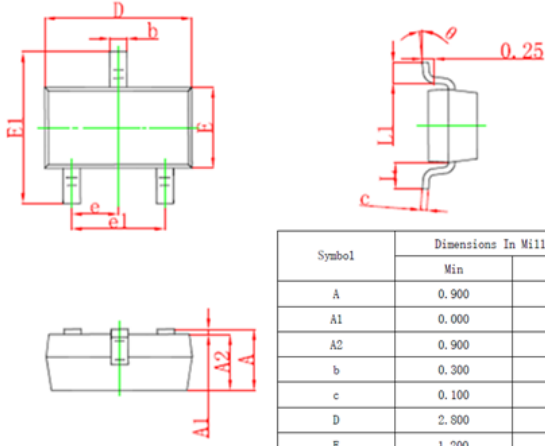
Base-Emmitter On Voltage



Cob/Cib-V<sub>CB</sub>/V<sub>EB</sub>

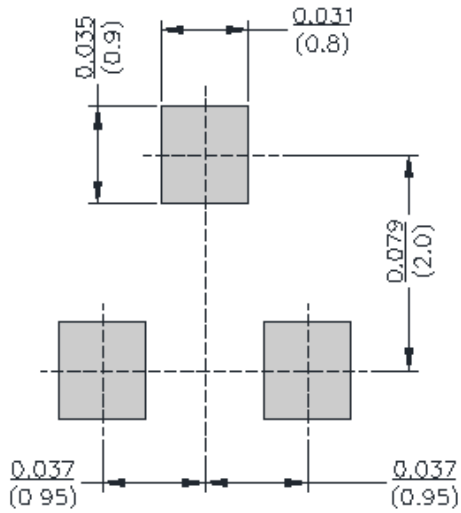


## ■SOT-23 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950TYP                  |       | 0.037TYP             |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550REF                  |       | 0.022REF             |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| ø      | 0°                        | 8°    | 0°                   | 8°    |

## ■SOT-23 Soldering Footprint





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