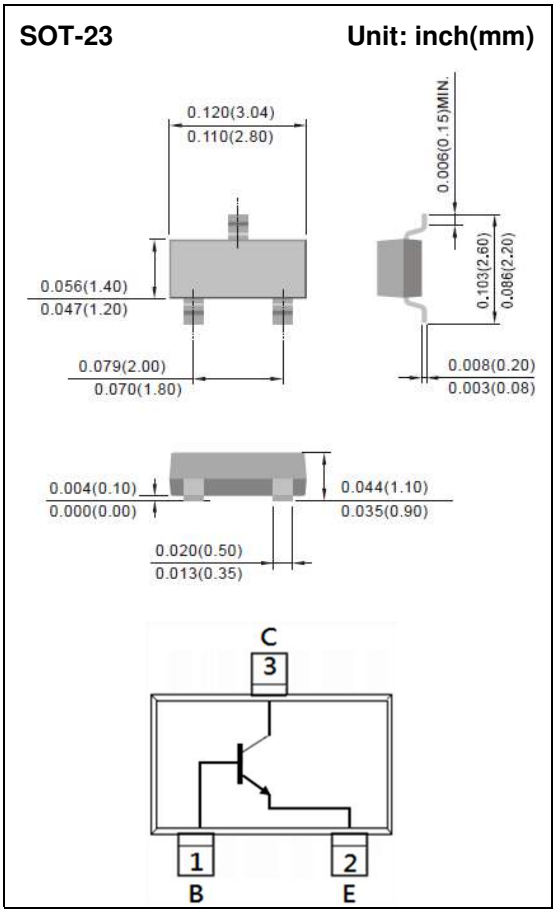
# 2SD1781A

## NPN Low Vce(sat) Transistor

| Voltage | 50V | Current | 3A |
|---|---|---|---|




### Features

- Silicon NPN epitaxial type
- Low Vce(sat) 0.14V(max)@Ic/Ib= 1A/100mA
- High collector current capability
- Excellent DC current gain characteristics
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case: SOT-23 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0003 ounces, 0.0084 grams

### Maximum Ratings and Thermal Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOL | LIMIT | UNITS |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 100 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 50 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 7 | V |
| Collector Current (DC) | $I_C$ | 3 | A |
| Collector Current (Pulse) | $I_{CP}$ | 5 | A |
| Collector Power Dissipation | $P_D$ | 1.25 | W |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55~150 | °C |
| Thermal Resistance from Junction to Ambient (Note ) | $R_{\theta JA}$ | 100 | °C/W |

Note: Mounted on FR4 with 2oz. PCB at 1 inch square copper pad.

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## Electrical Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | | |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$= 10mA, $I_B$= 0A | 50 | - | - | V |
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | $I_C$= 0.1mA, $I_E$= 0A | 100 | - | - | V |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | $I_E$= 0.1mA, $I_C$= 0A | 7 | 9.4 | - | V |
| Collector-Base Cutoff Current | $I_{CBO}$ | $V_{CB}$= 30V, $I_E$= 0A | - | 1 | 100 | nA |
| Emitter-Base Cutoff Current | $I_{EBO}$ | $V_{EB}$= 4V | - | 1 | 100 | nA |
| Collector-Emitter Cutoff Current | $I_{CES}$ | $V_{CES}$= 30V | - | 1 | 100 | nA |
| **ON characteristics** | | | | | | |
| DC Current Gain | $h_{FE}$ | $V_{CE}$= 5V $I_C$= 50mA | 300 | - | - | - |
| | | $V_{CE}$= 5V $I_C$= 0.5A | 300 | 500 | 900 | |
| | | $V_{CE}$= 5V $I_C$= 1A | 200 | - | - | |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C$= 100mA, $I_B$= 1mA | - | 52 | 75 | mV |
| | | $I_C$= 500mA, $I_B$= 50mA | - | 53 | 100 | |
| | | $I_C$= 1A, $I_B$= 100mA | - | 94 | 140 | |
| Base-Emitter Saturation voltage | $V_{BE(SAT)}$ | $I_C$= 1A, $I_B$= 100mA | - | 0.87 | 1.1 | V |
| Base-Emitter Turn-on voltage | $V_{BE(on)}$ | $I_C$= 1mA, $V_{CE}$= 2V | - | 0.52 | 1.1 | |
| Transition Frequency | $f_T$ | $I_C$= 100mA, $V_{CE}$= 5V f=100MHz | - | 250 | - | MHz |
| Collector Output Capacitance | $C_{OB}$ | $V_{CB}$= 10V $I_E$= 0A, f=1MHz | - | 13 | - | pF |

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## TYPICAL CHARACTERISTIC CURVES

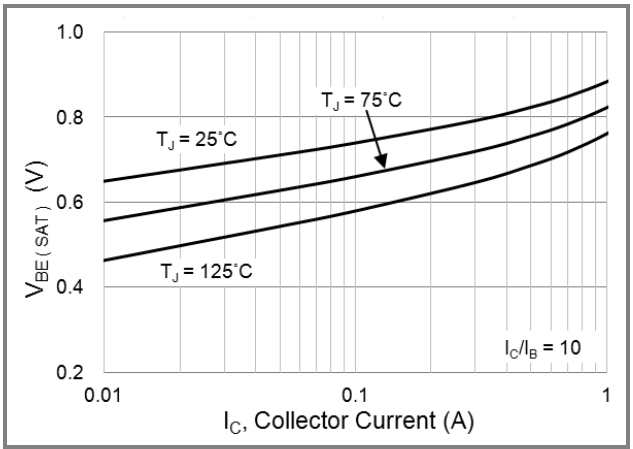


Fig.1 Typical Base-Emitter Saturation Voltage

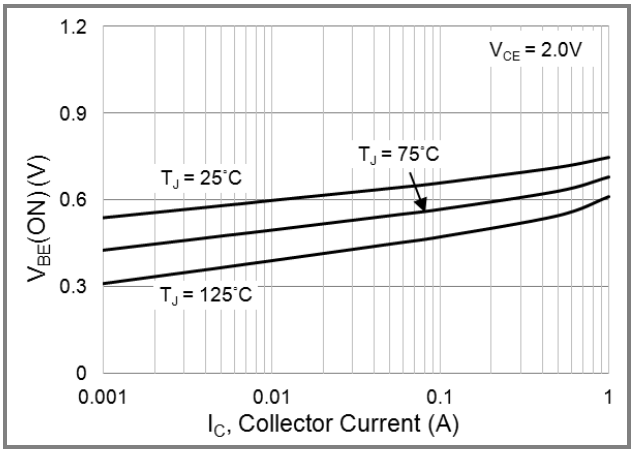


Fig.2 Typical Base-Emitter Turn-on Voltage

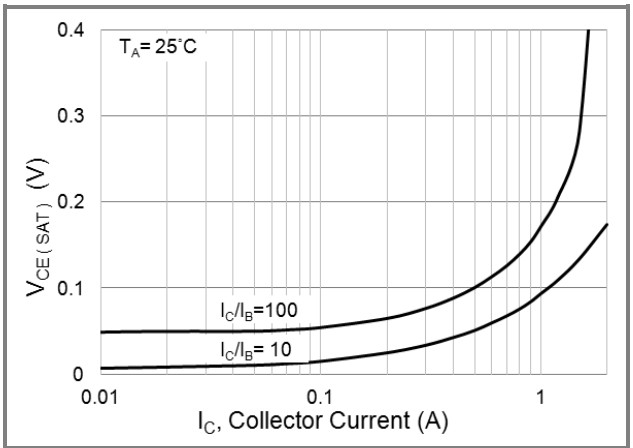


Fig.3 Typical Collector-Emitter Saturation

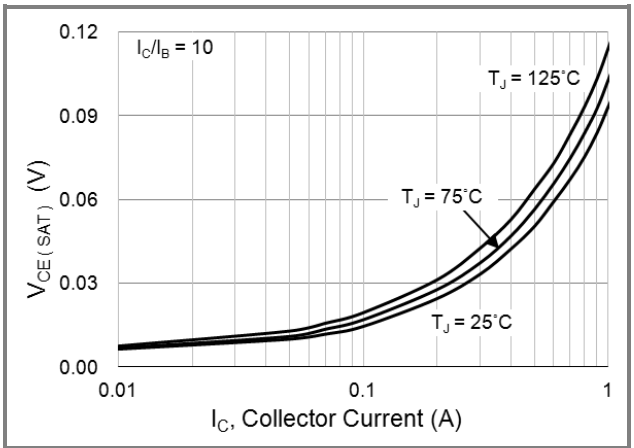


Fig.4 Typical Collector-Emitter Saturation

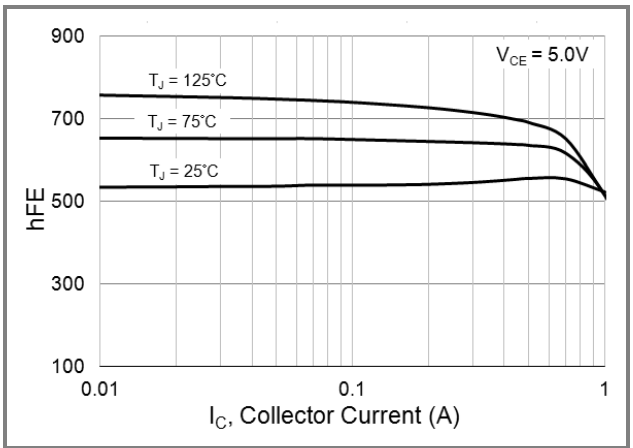


Fig.5 Typical DC Current Gain vs Collector Current

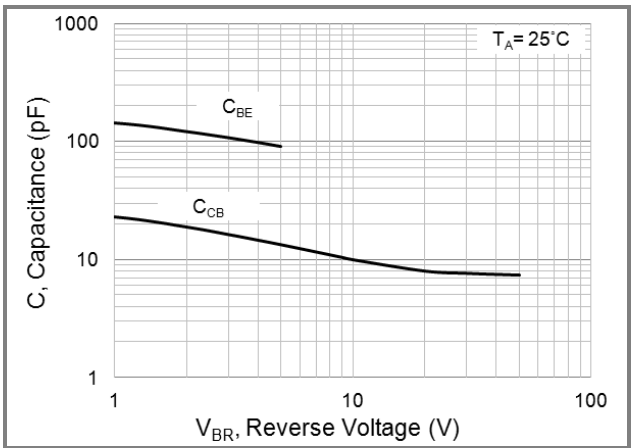


Fig.6 Typical Capacitance

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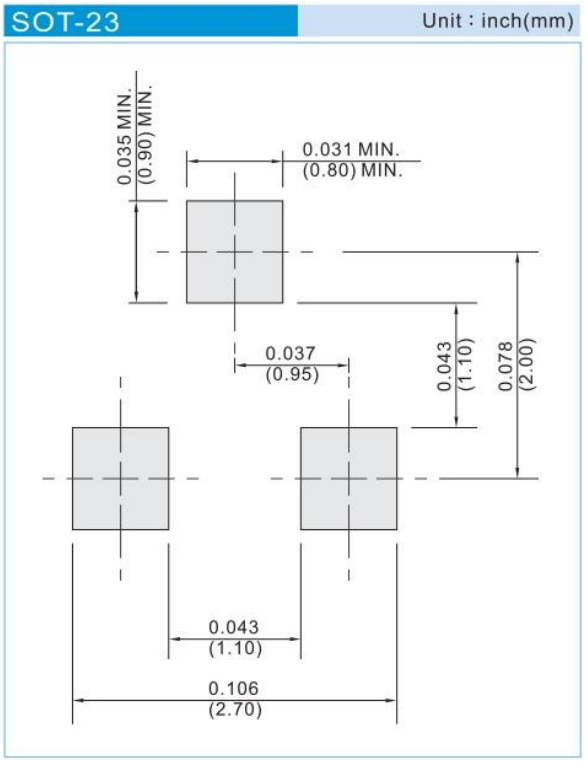
## PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|---|---|---|---|---|
| 2SD1781A_R1_00001 | SOT-23 | 3K pcs / 7” reel | D81 | Halogen free |
| 2SD1781A_R2_00001 | SOT-23 | 12K pcs / 13” reel | D81 | Halogen free |

## MOUNTING PAD LAYOUT



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