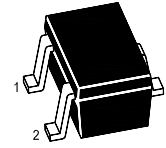


NPN Silicon Epitaxial Planar Transistor

for switching and amplifier applications



1.Base 2.Emitter 3.Collector
SOT-323 Plastic Package

Absolute Maximum Ratings ($T_a = 25\text{ }^\circ\text{C}$)

| Parameter | Symbol | Value | Unit |
|---------------------------|-----------|---------------|------------------|
| Collector Base Voltage | V_{CBO} | 60 | V |
| Collector Emitter Voltage | V_{CEO} | 40 | V |
| Emitter Base Voltage | V_{EBO} | 6 | V |
| Collector Current | I_C | 200 | mA |
| Total Power Dissipation | P_{tot} | 200 | mW |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | - 55 to + 150 | $^\circ\text{C}$ |

Characteristics at $T_a = 25\text{ }^\circ\text{C}$

| Parameter | Symbol | Min. | Max. | Unit |
|---|--|-----------------------------|-------------------------|-----------------------|
| DC Current Gain at $V_{CE} = 1\text{ V}$, $I_C = 0.1\text{ mA}$ at $V_{CE} = 1\text{ V}$, $I_C = 1\text{ mA}$ at $V_{CE} = 1\text{ V}$, $I_C = 10\text{ mA}$ at $V_{CE} = 1\text{ V}$, $I_C = 50\text{ mA}$ at $V_{CE} = 1\text{ V}$, $I_C = 100\text{ mA}$ | h_{FE} h_{FE} h_{FE} h_{FE} h_{FE} | 40 70 100 60 30 | - - 300 - - | - - - - - |
| Collector Emitter Cutoff Current at $V_{CE} = 30\text{ V}$ | I_{CES} | - | 50 | nA |
| Emitter Base Cutoff Current at $V_{EB} = 3\text{ V}$ | I_{EBO} | - | 50 | nA |
| Collector Base Breakdown Voltage at $I_C = 10\text{ }\mu\text{A}$ | $V_{(BR)CBO}$ | 60 | - | V |
| Collector Emitter Breakdown Voltage at $I_C = 1\text{ mA}$ | $V_{(BR)CEO}$ | 40 | - | V |
| Emitter Base Breakdown Voltage at $I_E = 10\text{ }\mu\text{A}$ | $V_{(BR)EBO}$ | 6 | - | V |
| Collector Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$ | $V_{CE(sat)}$ | - - | 0.2 0.3 | V |
| Base Emitter Saturation Voltage at $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$ at $I_C = 50\text{ mA}$, $I_B = 5\text{ mA}$ | $V_{BE(sat)}$ | 0.65 - | 0.85 0.95 | V |
| Transition Frequency at $V_{CE} = 20\text{ V}$, $-I_E = 10\text{ mA}$, $f = 100\text{ MHz}$ | f_T | 300 | - | MHz |
| Collector Output Capacitance at $V_{CB} = 10\text{ V}$, $f = 100\text{ KHz}$ | C_{ob} | - | 4 | pF |
| Delay Time at $V_{CC} = 3\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$ | t_d | - | 35 | ns |
| Rise Time at $V_{CC} = 3\text{ V}$, $V_{BE(OFF)} = 0.5\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = 1\text{ mA}$ | t_r | - | 35 | ns |
| Storage Time at $V_{CC} = 3\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = -I_{B2} = 1\text{ mA}$ | t_{stg} | - | 200 | ns |
| Fall Time at $V_{CC} = 3\text{ V}$, $I_C = 10\text{ mA}$, $I_{B1} = -I_{B2} = 1\text{ mA}$ | t_f | - | 50 | ns |

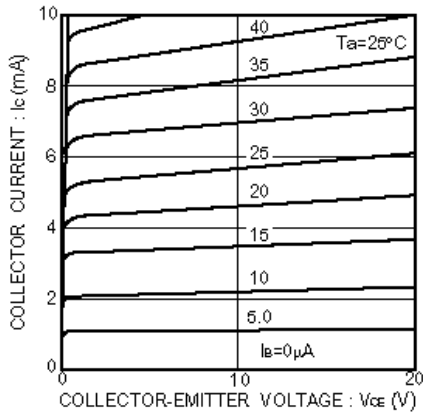


Fig.1 Grounded emitter output characteristics

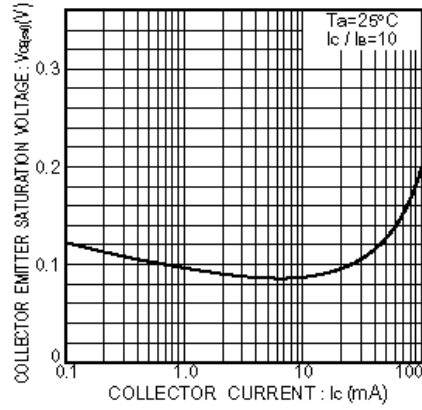


Fig.2 Collector-emitter saturation voltage vs. collector current

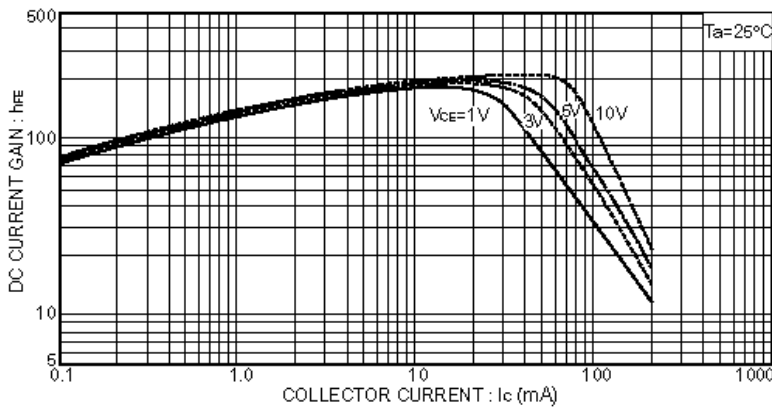


Fig.3 DC current gain vs. collector current (I)

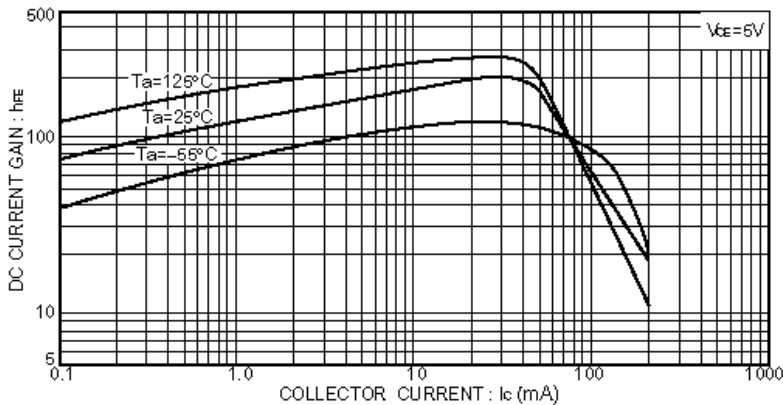


Fig.4 DC current gain vs. collector current (II)

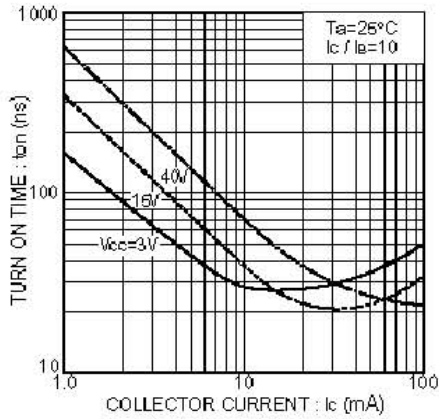


Fig.5 Turn-on time vs. collector current

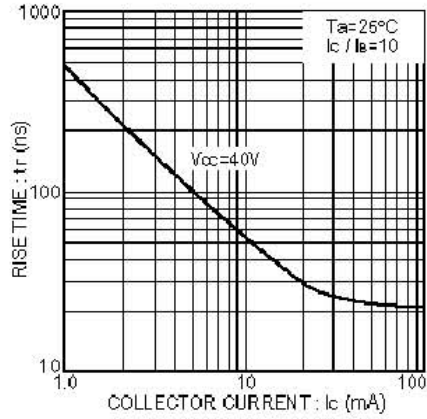


Fig.6 Rise time vs. collector current

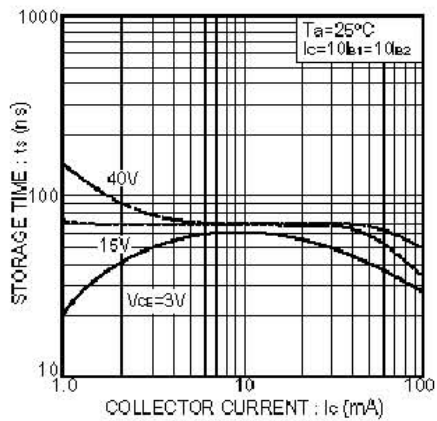


Fig.7 Storage time vs. collector current

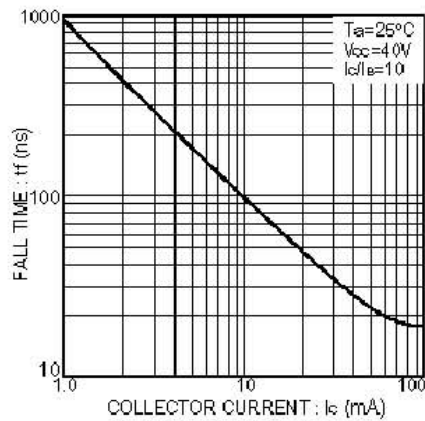


Fig.8 Fall time vs. collector current

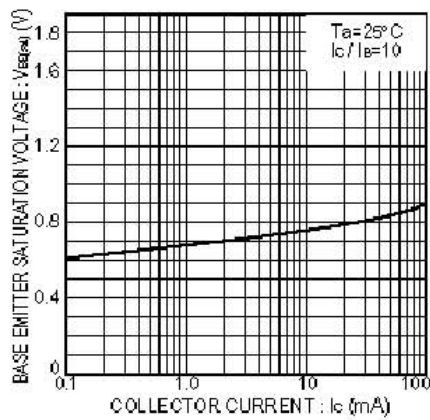


Fig.9 Base-emitter saturation voltage vs. collector current

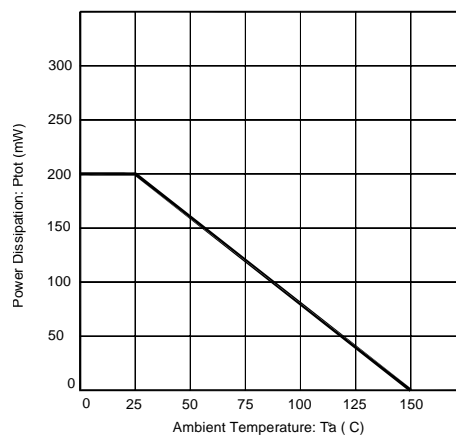
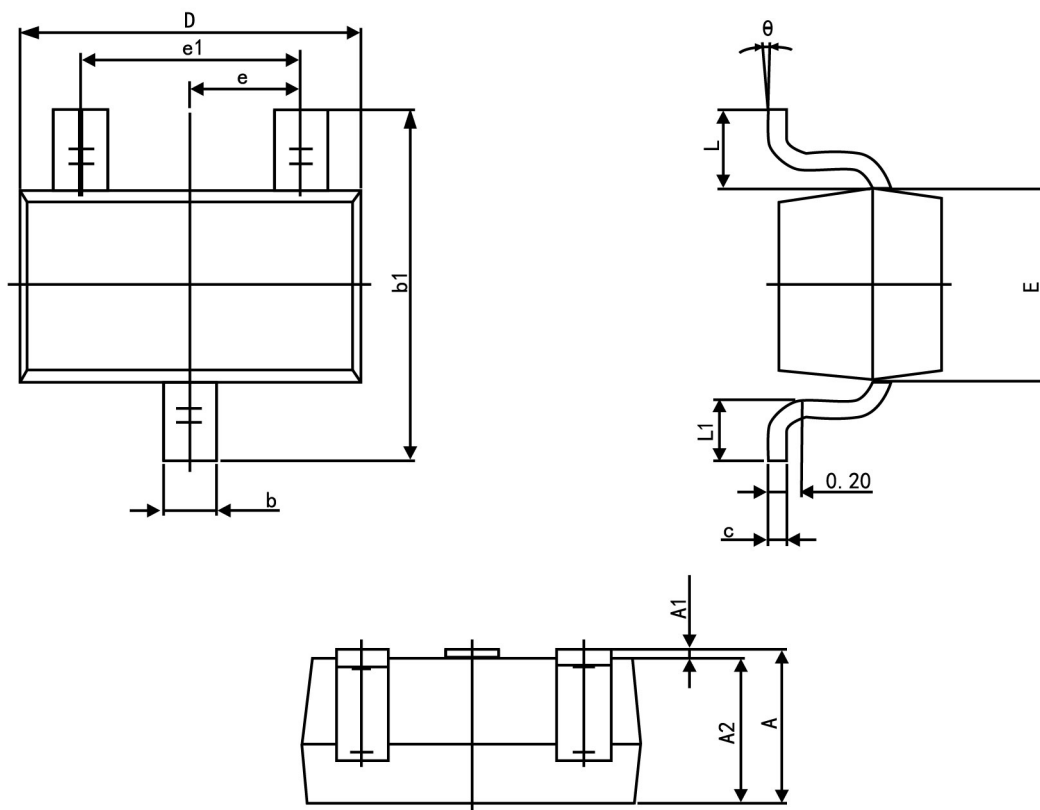


Fig.10 Power Dissipation vs Ambient Temperature

SOT-323 Package Outline Dimensions


| Symbol | Dimension in Millimeters | |
|--------|--------------------------|-------|
| | Min | Max |
| A | 0.900 | 1.100 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.000 |
| b | 0.200 | 0.400 |
| c | 0.080 | 0.150 |
| D | 2.000 | 2.200 |
| E | 1.150 | 1.350 |
| E1 | 2.150 | 2.450 |
| e | 0.650 TYP. | |
| e1 | 1.200 | 1.400 |
| L | 0.525 REF. | |
| L1 | 0.260 | 0.460 |
| theta | 0° | 8° |