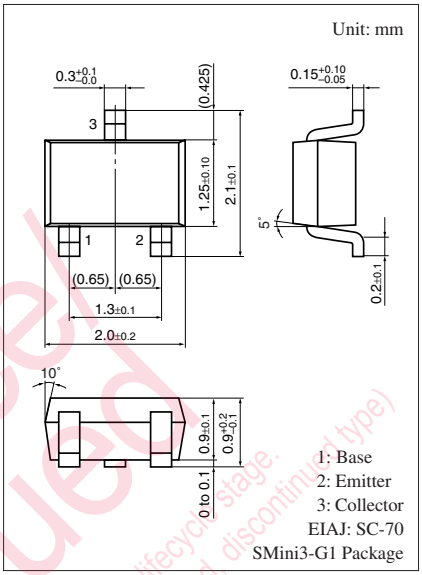
# 2SC3938

## Silicon NPN epitaxial planar type

For high-speed switching




Marking Symbol: 2Y

### ■ Features

- Low collector-emitter saturation voltage $V_{CE(sat)}$
- S-Mini type package, allowing downsizing of the equipment and automatic insertion through the tape packing

### ■ Absolute Maximum Ratings $T_a = 25°C$

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-base voltage (Emitter open) | $V_{CBO}$ | 40 | V |
| Collector-emitter voltage (E-B short) | $V_{CES}$ | 40 | V |
| Emitter-base voltage (Collector open) | $V_{EBO}$ | 5 | V |
| Collector current | $I_C$ | 100 | mA |
| Peak collector current | $I_{CP}$ | 300 | mA |
| Collector power dissipation | $P_C$ | 150 | mW |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature | $T_{stg}$ | −55 to +150 | °C |

### ■ Electrical Characteristics $T_a = 25°C \pm 3°C$

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Collector-base cutoff current (Emitter open) | $I_{CBO}$ | $V_{CB}$ = 40 V, $I_E$ = 0 | | | 0.1 | µA |
| Emitter-base cutoff current (Collector open) | $I_{EBO}$ | $V_{EB}$ = 4 V, $I_C$ = 0 | | | 0.1 | µA |
| Forward current transfer ratio * | $h_{FE}$ | $V_{CE}$ = 1 V, $I_C$ = 10 mA | 60 | | 200 | — |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C$ = 10 mA, $I_B$ = 1 mA | | 0.17 | 0.25 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C$ = 10 mA, $I_B$ = 1 mA | | | 1 | V |
| Transition frequency | $f_T$ | $V_{CB}$ = 10 V, $I_E$ = −10 mA, f = 200 MHz | | 450 | | MHz |
| Collector output capacitance (Common base, input open circuited) | $C_{ob}$ | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | | 2 | 6 | pF |
| Turn-on time | $t_{on}$ | Refer to the measurement circuit | | 17 | | ns |
| Turn-off time | $t_{off}$ | | | 17 | | ns |
| Storage time | $t_{stg}$ | | | 10 | | ns |

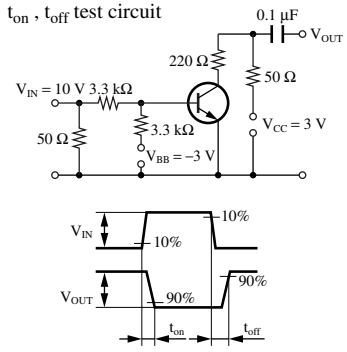
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. *: Rank classification

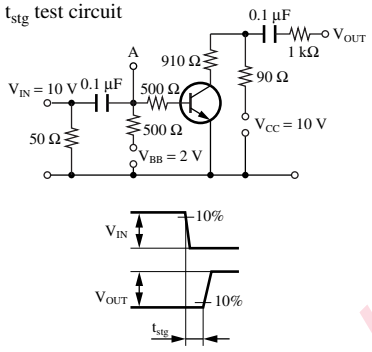
| Rank | Q | R |
|---|---|---|
| $h_{FE}$ | 60 to 120 | 90 to 200 |

Measurement circuit

$t_{on}$ , $t_{off}$ test circuit

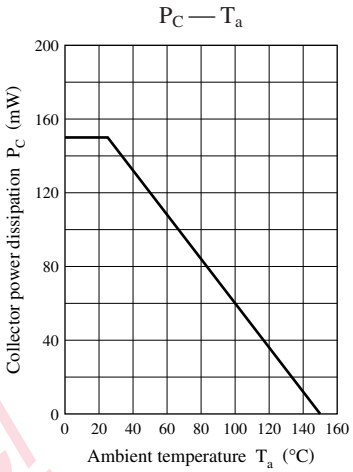



$t_{stg}$ test circuit

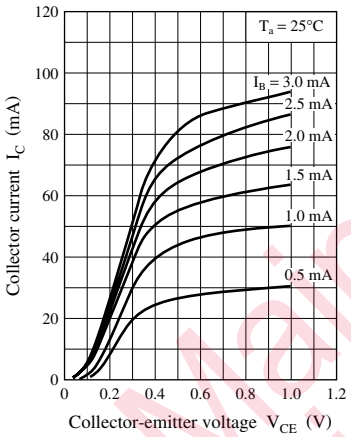



(Waveform at A)

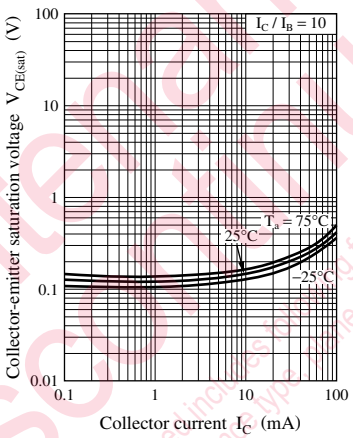
$P_C$ — $T_a$



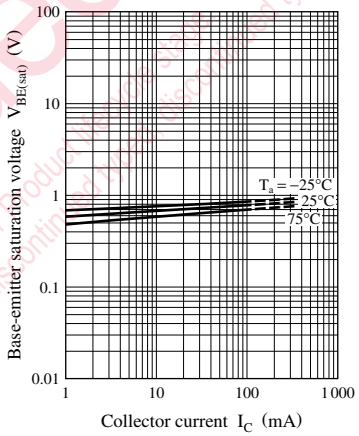

$I_C$ — $V_{CE}$



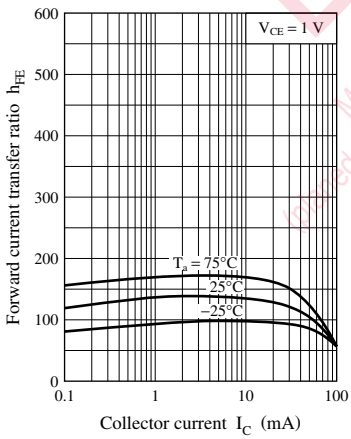

$V_{CE(sat)}$ — $I_C$



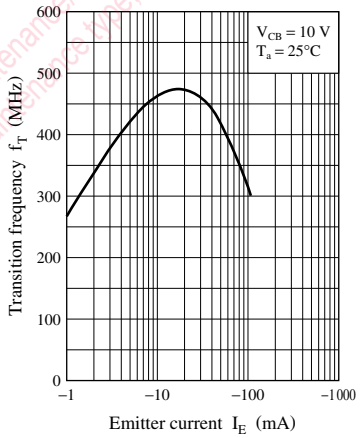

$V_{BE(sat)}$ — $I_C$



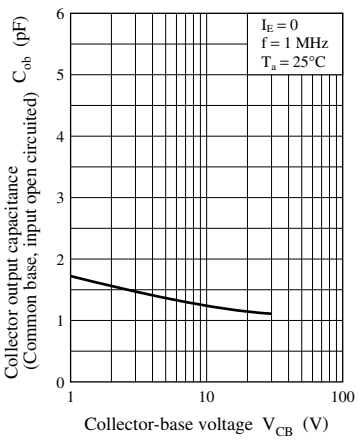

$h_{FE}$ — $I_C$




$f_T$ — $I_E$




$C_{ob}$ — $V_{CB}$



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