



# 2SC5994

NPN Epitaxial Planar Silicon Transistor

## High-Current Switching Applications

### Applications

- Voltage regulators, relay drivers, lamp drivers, electrical equipment.

### Features

- Adoption of MBIT process.
- High current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.

### Specifications

#### Absolute Maximum Ratings at Ta=25°C

| Parameter                    | Symbol           | Conditions  | Ratings     | Unit |
|------------------------------|------------------|---|-------------|------|
| Collector-to-Base Voltage    | V <sub>CB0</sub> |   | 100         | V    |
| Collector-to-Emitter Voltage | V <sub>CES</sub> |   | 100         | V    |
| Collector-to-Emitter Voltage | V <sub>CEO</sub> |   | 50          | V    |
| Emitter-to-Base Voltage      | V <sub>EBO</sub> |   | 6           | V    |
| Collector Current            | I <sub>C</sub>   |   | 2           | A    |
| Collector Current (Pulse)    | I <sub>CP</sub>  |   | 4           | A    |
| Base Current                 | I <sub>B</sub>   |   | 400         | mA   |
| Collector Dissipation        | P <sub>C</sub>   | Mounted on a ceramic board (450mm <sup>2</sup> X0.8m) | 1.3         | W    |
|                              |                  | T <sub>C</sub> =25°C                                  | 3.5         | W    |
| Junction Temperature         | T <sub>J</sub>   |   | 150         | °C   |
| Storage Temperature          | T <sub>stg</sub> |   | -55 to +150 | °C   |

#### Electrical Characteristics at Ta=25°C

| Parameter                | Symbol           | Conditions                                 | Ratings |     |     | Unit |
|--------------------------|------------------|--|---------|-----|-----|------|
|                          |                  |  | min     | typ | max |      |
| Collector Cutoff Current | I <sub>CBO</sub> | V <sub>CB</sub> =50V, I <sub>E</sub> =0    |         |     | 1   | μA   |
| Emitter Cutoff Current   | I <sub>EBO</sub> | V <sub>EB</sub> =4V, I <sub>C</sub> =0     |         |     | 1   | μA   |
| DC Current Gain          | h <sub>FE1</sub> | V <sub>CE</sub> =2V, I <sub>C</sub> =100mA | 200     |     | 560 |      |
|                          | h <sub>FE2</sub> | V <sub>CE</sub> =2V, I <sub>C</sub> =1.5A  | 40      |     |     |      |

Marking : FJ

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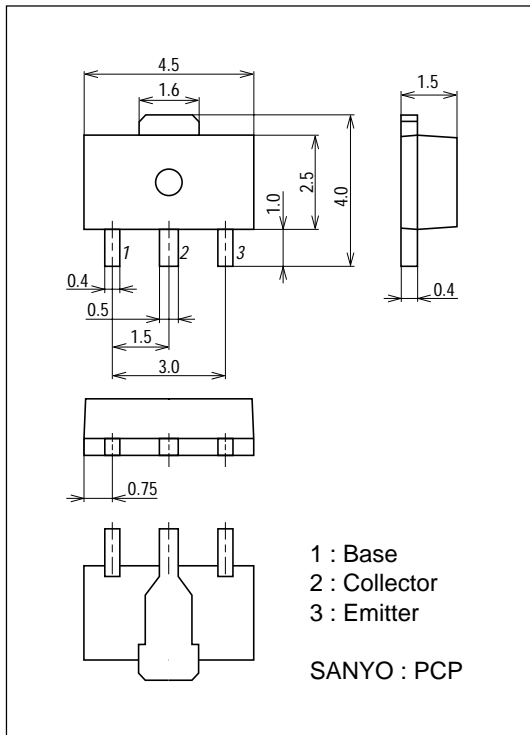
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| Parameter                               | Symbol        | Conditions                  | Ratings |     |     | Unit |
|---|---------------|-----------------------------|---------|-----|-----|------|
|   |               |                             | min     | typ | max |      |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=10V, I_C=300mA$     |         | 420 |     | MHz  |
| Output Capacitance                      | $C_{ob}$      | $V_{CB}=10V, f=1MHz$        |         | 9   |     | pF   |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=1A, I_B=50mA$          |         | 135 | 300 | mV   |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=1A, I_B=50mA$          |         | 0.9 | 1.2 | V    |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=10\mu A, I_E=0$        | 100     |     |     | V    |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CES}$ | $I_C=100\mu A, R_{BE}=0$    | 100     |     |     | V    |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=1mA, R_{BE}=\infty$    | 50      |     |     | V    |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=10\mu A, I_C=0$        | 6       |     |     | V    |
| Turn-ON Time                            | $t_{on}$      | See specified Test Circuit. |         | 30  |     | ns   |
| Storage Time                            | $t_{stg}$     | See specified Test Circuit. |         | 330 |     | ns   |
| Fall Time                               | $t_f$         | See specified Test Circuit. |         | 40  |     | ns   |

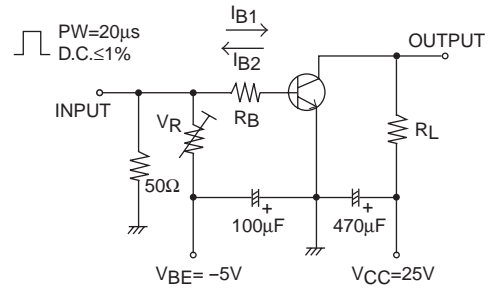
## Package Dimensions

unit : mm

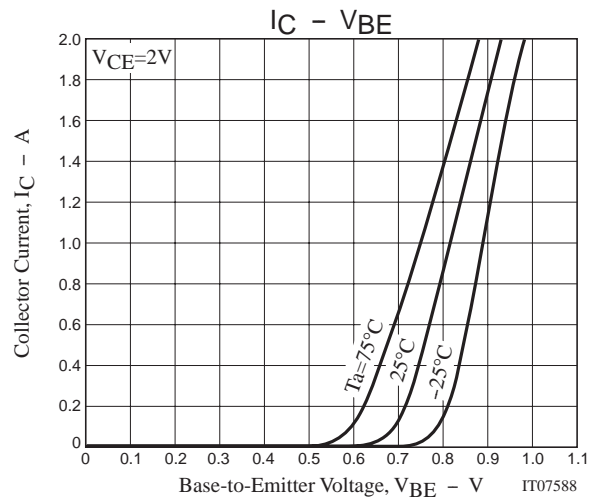
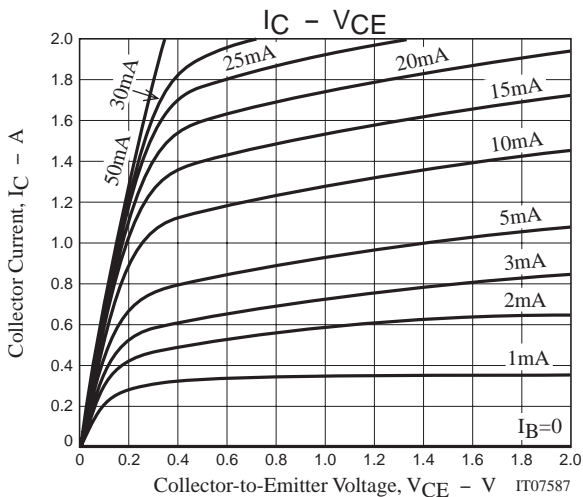
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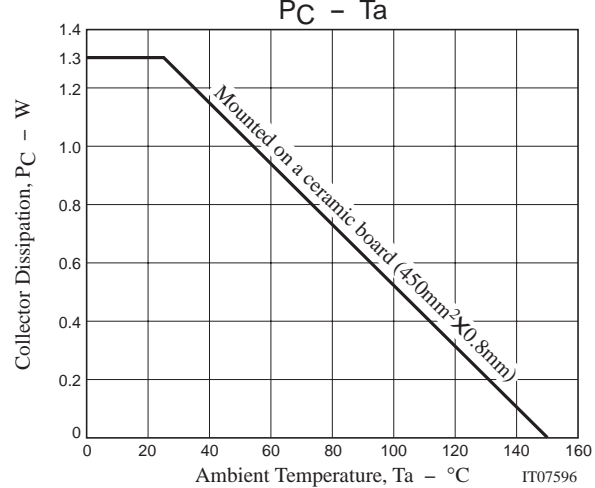
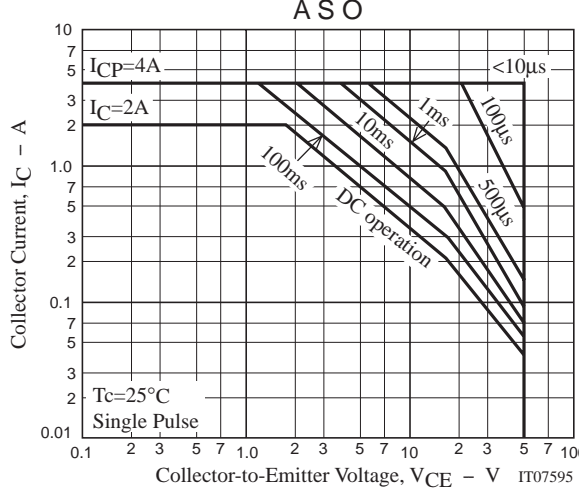
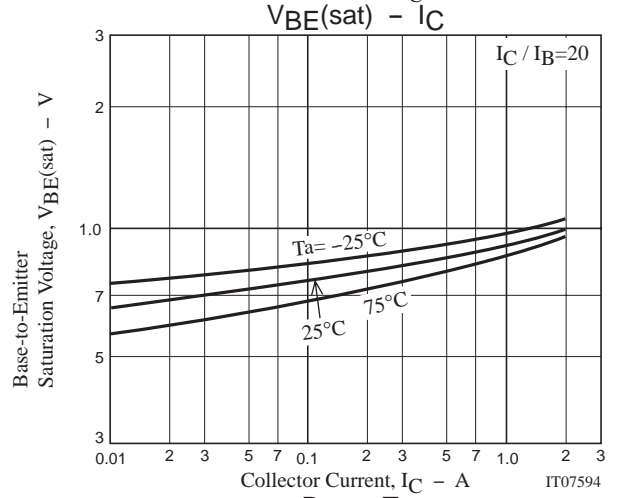
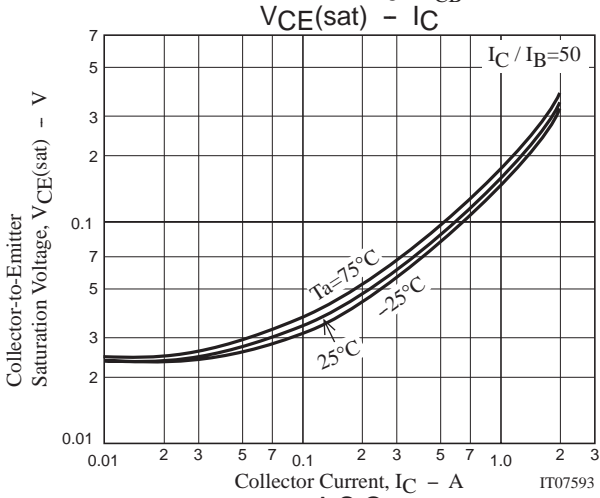
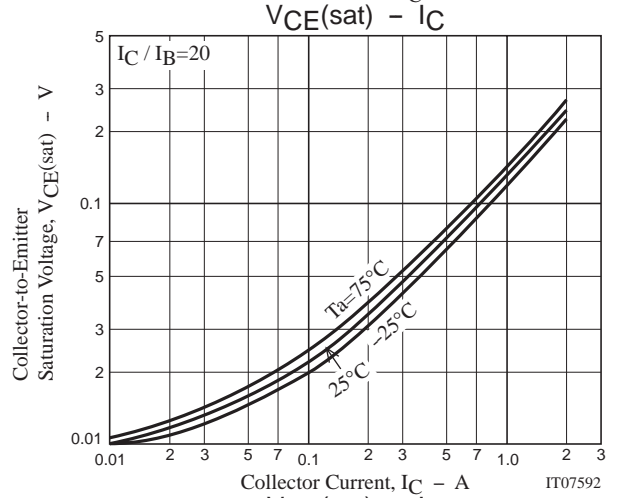
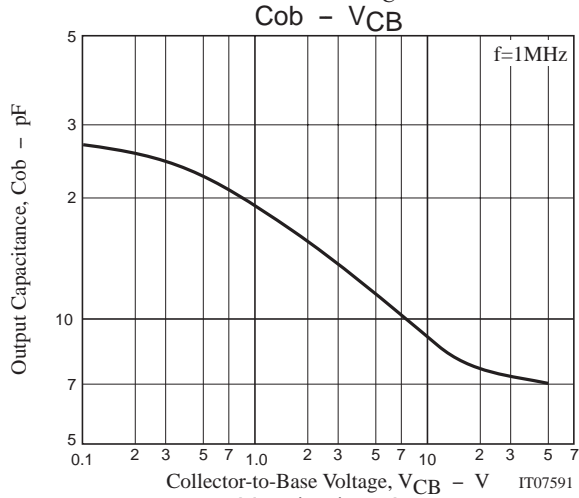
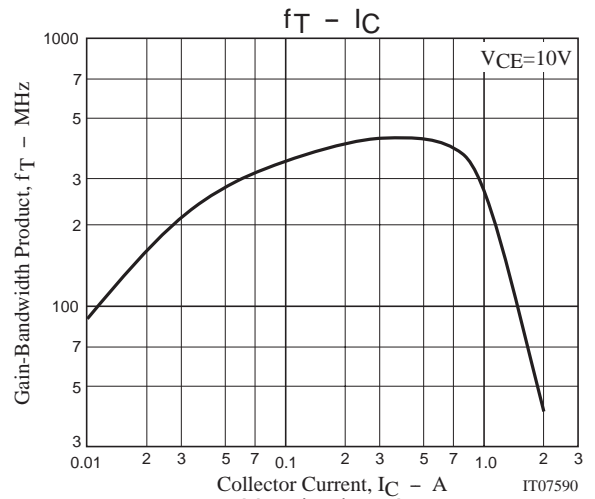
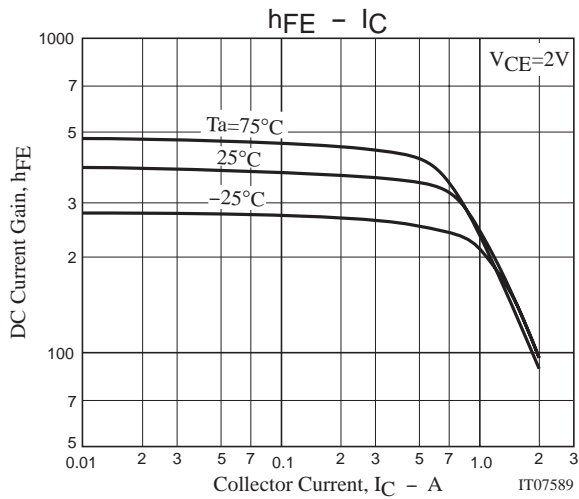


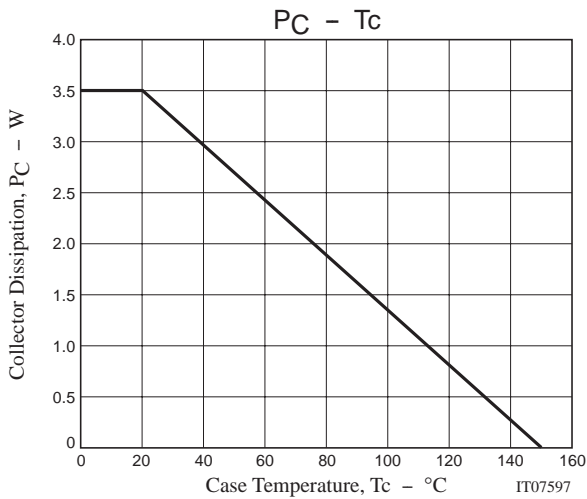
## Switching Time Test Circuit



$$I_C = 10I_{B1} = -10I_{B2} = 700mA$$







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