

**2SC5957**

## Switching Regulator Applications

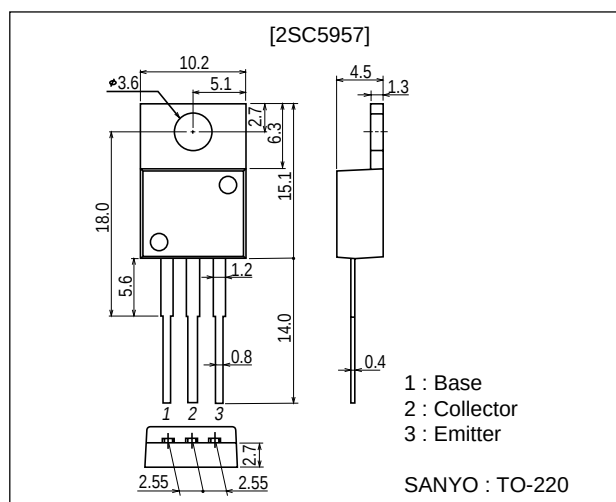
### Features

- High breakdown voltage and high reliability.
- High-speed switching.
- Wide ASO.
- Adoption of MBIT process.

### Package Dimensions

unit : mm

2010C



### Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter                    | Symbol           | Conditions               | Ratings     | Unit |
|------------------------------|------------------|--------------------------|-------------|------|
| Collector-to-Base Voltage    | V <sub>CB0</sub> |                          | 500         | V    |
| Collector-to-Emitter Voltage | V <sub>CEO</sub> |                          | 400         | V    |
| Emitter-to-Base Voltage      | V <sub>EB0</sub> |                          | 7           | V    |
| Collector Current            | I <sub>C</sub>   |                          | 10          | A    |
| Collector Current (Pulse)    | I <sub>CP</sub>  | PW≤300μs, duty cycle≤10% | 20          | A    |
| Base Current                 | I <sub>B</sub>   |                          | 3.5         | A    |
| Collector Dissipation        | P <sub>C</sub>   |                          | 1.75        | W    |
|                              |                  | T <sub>c</sub> =25°C     | 50          | 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>CB0</sub> | V <sub>CB</sub> =400V, I <sub>E</sub> =0 |         |     | 10  | μA   |
| Emitter Cutoff Current   | I <sub>EB0</sub> | V <sub>EB</sub> =5V, I <sub>C</sub> =0   |         |     | 10  | μA   |

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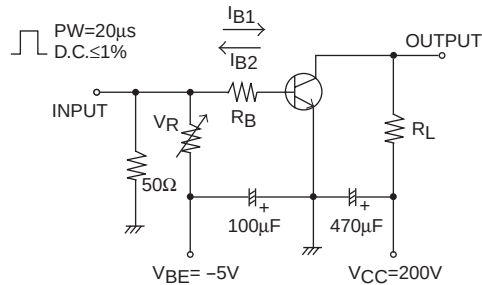
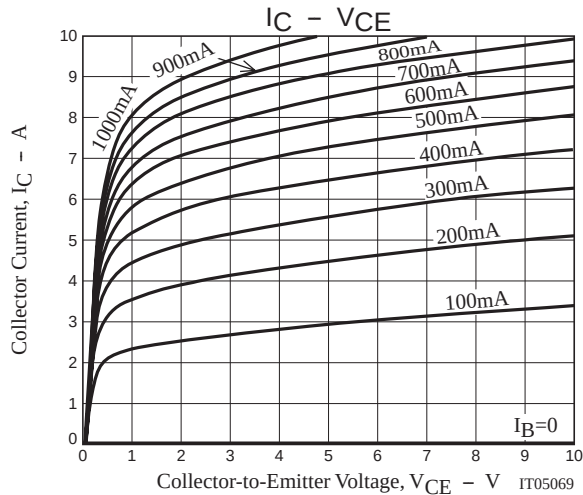
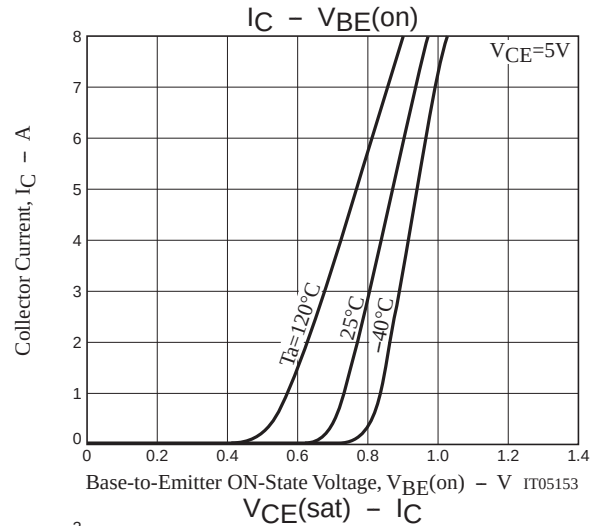
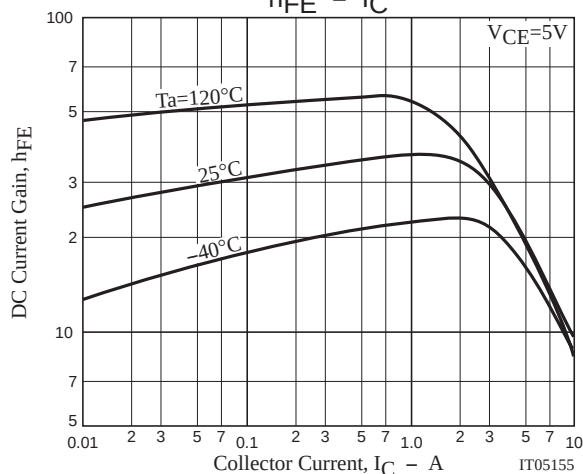
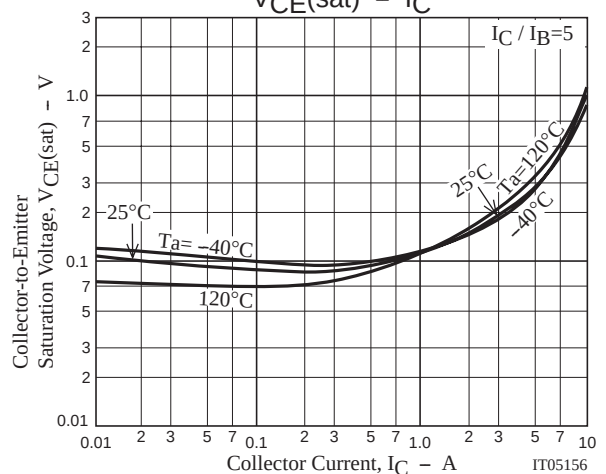
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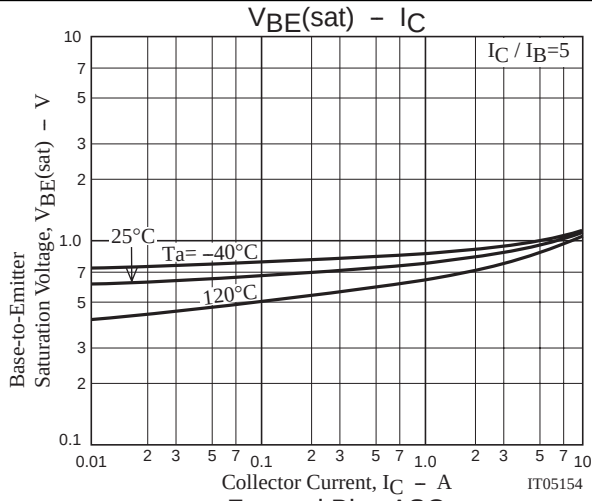
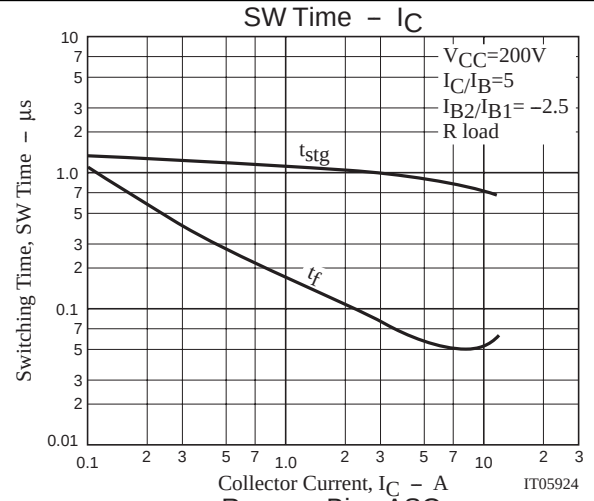
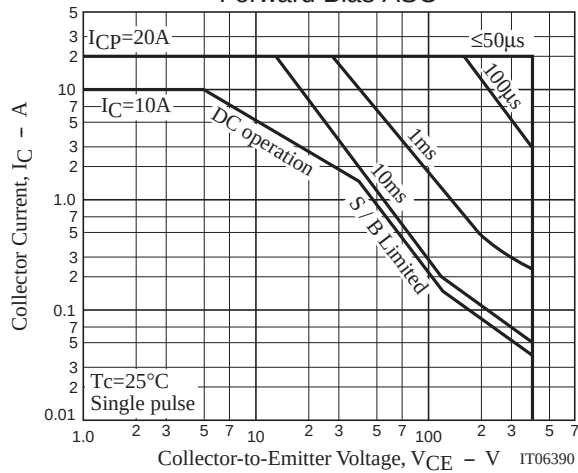
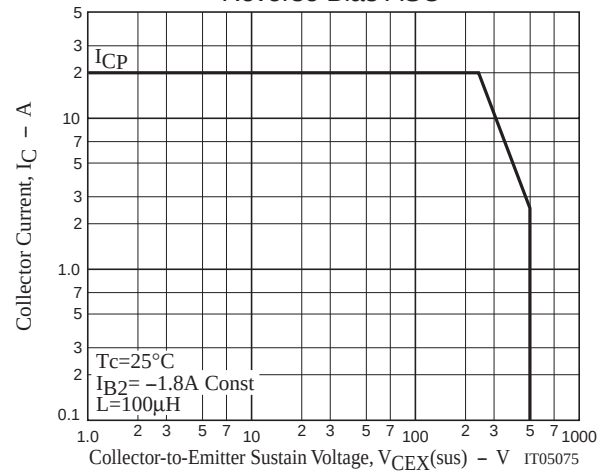
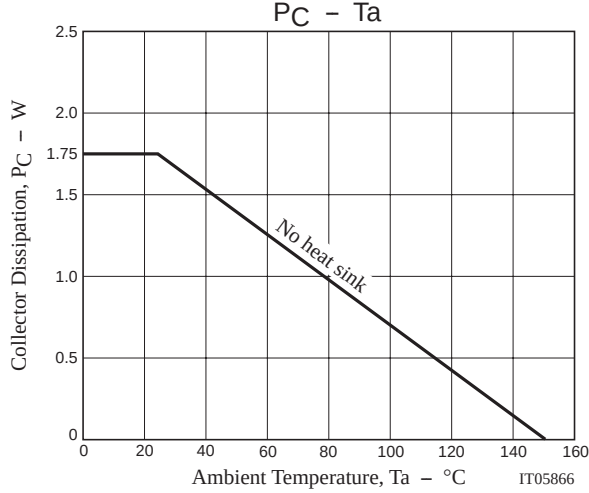
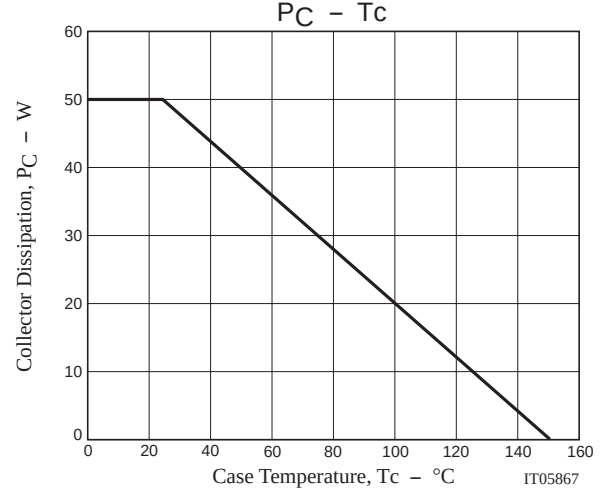
| Parameter                               | Symbol        | Conditions                                                       | Ratings |     |     | Unit    |
|-----------------------------------------|---------------|------------------------------------------------------------------|---------|-----|-----|---------|
|                                         |               |                                                                  | min     | typ | max |         |
| DC Current Gain                         | $h_{FE1}$     | $V_{CE}=5V, I_C=1.2A$                                            | 20*     |     | 50* |         |
|                                         | $h_{FE2}$     | $V_{CE}=5V, I_C=6A$                                              | 10      |     |     |         |
|                                         | $h_{FE3}$     | $V_{CE}=5V, I_C=1mA$                                             | 10      |     |     |         |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=10V, I_C=1.2A$                                           |         | 15  |     | MHz     |
| Output Capacitance                      | $C_{ob}$      | $V_{CB}=10V, f=1MHz$                                             |         | 80  |     | pF      |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=6A, I_B=1.2A$                                               |         |     | 0.8 | V       |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=6A, I_B=1.2A$                                               |         |     | 1.5 | V       |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=1mA, I_E=0$                                                 | 500     |     |     | V       |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=5mA, R_{BE}=\infty$                                         | 400     |     |     | V       |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=1mA, I_C=0$                                                 | 7       |     |     | V       |
| Turn-ON Time                            | $t_{on}$      | $I_C=7A, I_{B1}=1.4A, I_{B2}=-2.8A, R_L=28.6\Omega, V_{CC}=200V$ |         |     | 0.5 | $\mu s$ |
| Storage Time                            | $t_{stg}$     | $I_C=7A, I_{B1}=1.4A, I_{B2}=-2.8A, R_L=28.6\Omega, V_{CC}=200V$ |         |     | 2.5 | $\mu s$ |
| Fall Time                               | $t_f$         | $I_C=7A, I_{B1}=1.4A, I_{B2}=-2.8A, R_L=28.6\Omega, V_{CC}=200V$ |         |     | 0.3 | $\mu s$ |

\* : The  $h_{FE1}$  of the 2SC5957 is classified as follows.

| Rank     | M        | N        |
|----------|----------|----------|
| $h_{FE}$ | 20 to 40 | 30 to 50 |

### Switching Time Test Circuit





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