

# 2SD1705

## Silicon NPN epitaxial planar type

For power switching

Complementary to 2SB1154

### ■ Features

- Low collector-emitter saturation voltage  $V_{CE(sat)}$
- Satisfactory linearity of forward current transfer ratio  $h_{FE}$
- Large collector current  $I_C$
- Full-pack package which can be installed to the heat sink with one screw

### ■ Absolute Maximum Ratings $T_C = 25^\circ\text{C}$

| Parameter                             | Symbol    | Rating                   | Unit             |
|---------------------------------------|-----------|--------------------------|------------------|
| Collector-base voltage (Emitter open) | $V_{CBO}$ | 130                      | V                |
| Collector-emitter voltage (Base open) | $V_{CEO}$ | 80                       | V                |
| Emitter-base voltage (Collector open) | $V_{EBO}$ | 7                        | V                |
| Collector current                     | $I_C$     | 10                       | A                |
| Peak collector current                | $I_{CP}$  | 20                       | A                |
| Collector power dissipation           | $P_C$     | 70                       | W                |
|                                       |           | $T_a = 25^\circ\text{C}$ |                  |
| Junction temperature                  | $T_j$     | 150                      | $^\circ\text{C}$ |
| Storage temperature                   | $T_{stg}$ | -55 to +150              | $^\circ\text{C}$ |

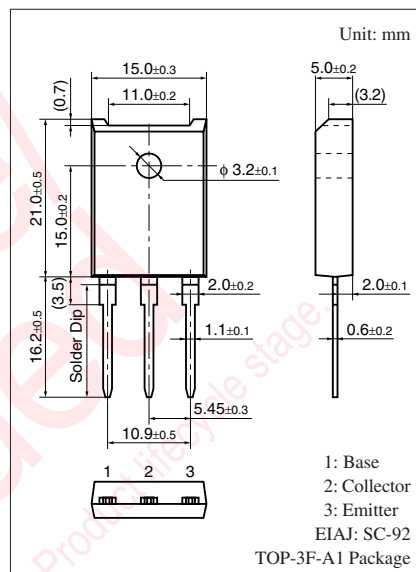
### ■ Electrical Characteristics $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

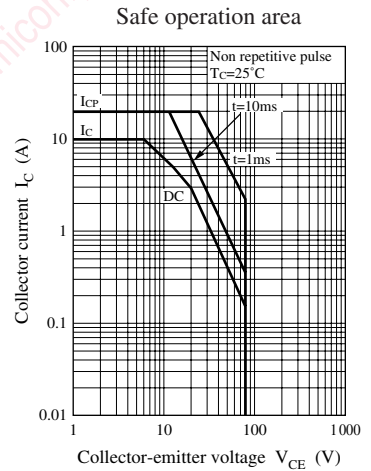
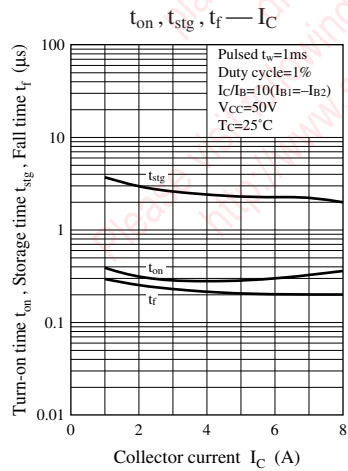
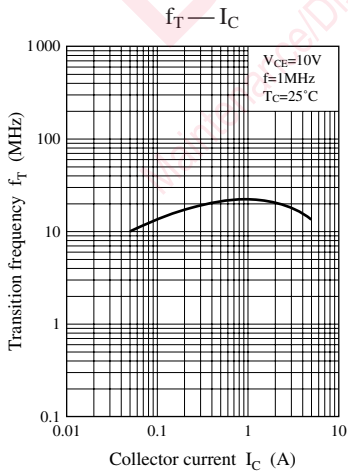
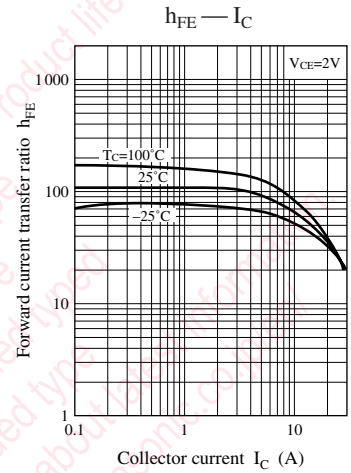
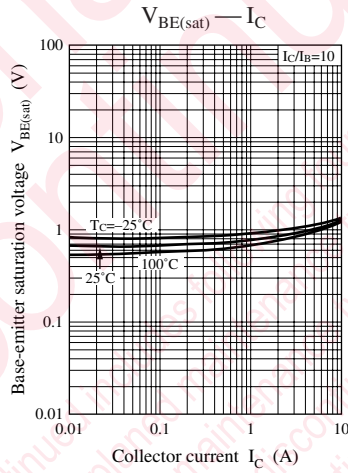
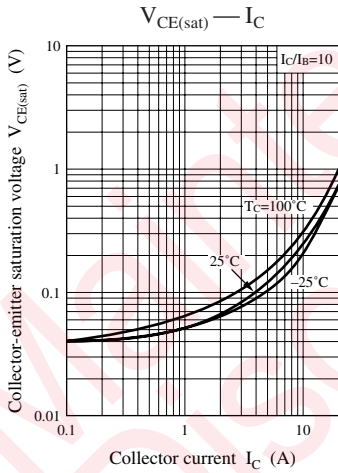
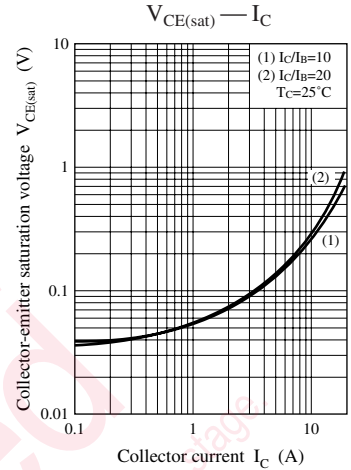
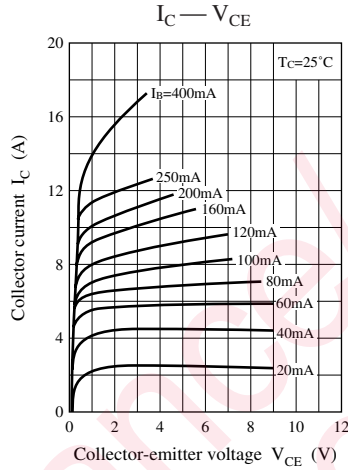
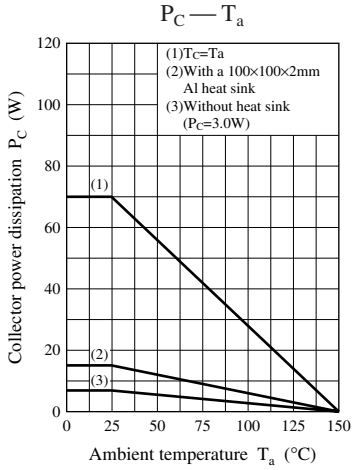
| Parameter                                    | Symbol         | Conditions   | Min | Typ | Max | Unit          |
|--|----------------|--|-----|-----|-----|---------------|
| Collector-emitter voltage (Base open)        | $V_{CEO}$      | $I_C = 10 \text{ mA}, I_B = 0$                                       | 80  |     |     | V             |
| Collector-base cutoff current (Emitter open) | $I_{CBO}$      | $V_{CB} = 100 \text{ V}, I_E = 0$                                    |     |     | 10  | $\mu\text{A}$ |
| Emitter-base cutoff current (Collector open) | $I_{EBO}$      | $V_{EB} = 5 \text{ V}, I_C = 0$                                      |     |     | 50  | $\mu\text{A}$ |
| Forward current transfer ratio               | $h_{FE1}$      | $V_{CE} = 2 \text{ V}, I_C = 0.1 \text{ A}$                          | 45  |     |     | —             |
|  | $h_{FE2}^*$    | $V_{CE} = 2 \text{ V}, I_C = 3 \text{ A}$                            | 90  | 260 |     |               |
|  | $h_{FE3}$      | $V_{CE} = 2 \text{ V}, I_C = 6 \text{ A}$                            | 30  |     |     |               |
| Collector-emitter saturation voltage         | $V_{CE(sat)1}$ | $I_C = 6 \text{ A}, I_B = 0.3 \text{ A}$                             |     |     | 0.5 | V             |
|  | $V_{CE(sat)2}$ | $I_C = 10 \text{ A}, I_B = 1 \text{ A}$                              |     |     | 1.5 |               |
| Base-emitter saturation voltage              | $V_{BE(sat)1}$ | $I_C = 6 \text{ A}, I_B = 0.3 \text{ A}$                             |     |     | 1.5 | V             |
|  | $V_{BE(sat)2}$ | $I_C = 10 \text{ A}, I_B = 1 \text{ A}$                              |     |     | 2.5 |               |
| Transition frequency                         | $f_T$          | $V_{CE} = 10 \text{ V}, I_C = 0.5 \text{ A}, f = 1 \text{ MHz}$      |     | 20  |     | MHz           |
| Turn-on time                                 | $t_{on}$       | $I_C = 6 \text{ A}, I_{B1} = 0.6 \text{ A}, I_{B2} = -0.6 \text{ A}$ |     | 0.5 |     | $\mu\text{s}$ |
| Storage time                                 | $t_{stg}$      | $V_{CC} = 50 \text{ V}$  |     | 2.0 |     | $\mu\text{s}$ |
| Fall time                                    | $t_f$          |  |     | 0.2 |     | $\mu\text{s}$ |

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

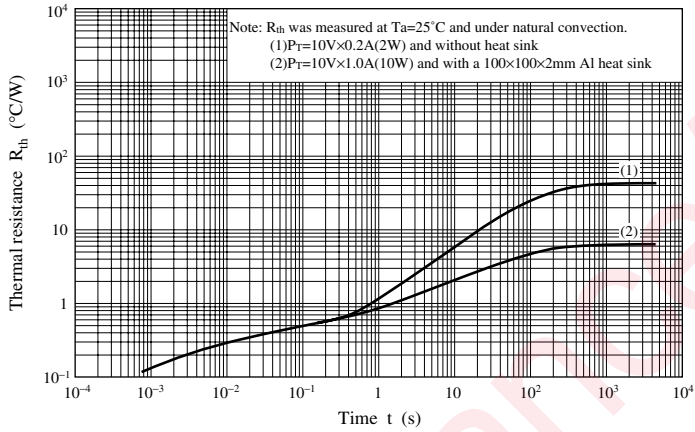
2. \*: Rank classification

| Rank      | Q         | P          |
|-----------|-----------|------------|
| $h_{FE2}$ | 90 to 180 | 130 to 260 |





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Maintenance/Discontinued includes following four Product lifecycle stage.  
 planned maintenance type  
 maintenance type  
 planned discontinued type  
 discontinued type  
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