

|                                                                                   |          |                                                                                                         |
|-----------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------|
|  | No.2091B | <b>2SB1134/2SD1667</b><br>PNP/NPN Epitaxial Planar Silicon Transistors<br>50V/5A Switching Applications |
|                                                                                   |          |                                                                                                         |

### Applications

- Relay drivers, high-speed inverters, converters, and other general high-current switching applications.

### Features

- Low-saturation collector-to-emitter voltage:  $V_{CE(sat)} = -0.4V \text{ max}/I_C = (-)3A, I_B = (-)0.3A$ .
- Micaless package facilitating mounting.

( ): 2SB1134

### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

|                              |           |             | unit             |
|------------------------------|-----------|-------------|------------------|
| Collector-to-Base Voltage    | $V_{CBO}$ | (-)60       | V                |
| Collector-to-Emitter Voltage | $V_{CEO}$ | (-)50       | V                |
| Emitter-to-Base Voltage      | $V_{EBO}$ | (-)6        | V                |
| Collector Current            | $I_C$     | (-)5        | A                |
| Collector Current (Pulse)    | $I_{CP}$  | (-)9        | A                |
| Collector Dissipation        | $P_C$     | 2           | W                |
|                              |           | 25          | W                |
| Junction Temperature         | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage Temperature          | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

$T_c = 25^\circ\text{C}$

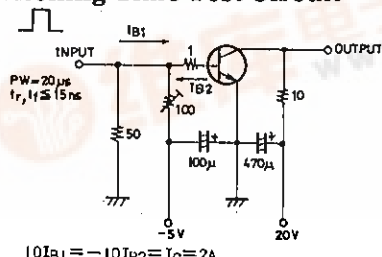
### Electrical Characteristics at $T_a = 25^\circ\text{C}$

|                          |               |                                    | min      | typ   | max    | unit          |
|--------------------------|---------------|------------------------------------|----------|-------|--------|---------------|
| Collector Cutoff Current | $I_{CBO}$     | $V_{CB} = (-)40V, I_E = 0$         |          |       | (-)0.1 | mA            |
| Emitter Cutoff Current   | $I_{EBO}$     | $V_{EB} = (-)4V, I_C = 0$          |          |       | (-)0.1 | mA            |
| DC Current Gain          | $h_{FE}(1)$   | $V_{CE} = (-)2V, I_C = (-)1A$      | 70※      |       | 280※   |               |
|                          | $h_{FE}(2)$   | $V_{CE} = (-)2V, I_C = (-)3A$      | 30       |       |        |               |
| Gain Bandwidth Product   | $f_T$         | $V_{CE} = (-)5V, I_C = (-)1A$      |          | 30    |        | MHz           |
| Output Capacitance       | $C_{ob}$      | $V_{CB} = (-)10V, f = 1\text{MHz}$ |          | 100   |        | pF            |
|                          |               |                                    |          | (160) |        |               |
| C-E Saturation Voltage   | $V_{CE(sat)}$ | $I_C = (-)3A, I_B = (-)0.3A$       |          |       | (-)0.4 | V             |
| C-B Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C = (-)1mA, I_E = 0$            | (-)60    |       |        | V             |
| C-E Breakdown Voltage    | $V_{(BR)CEO}$ | $I_C = (-)1mA, R_{BE} = \infty$    | (-)50    |       |        | V             |
| E-B Breakdown Voltage    | $V_{(BR)EBO}$ | $I_E = (-)1mA, I_C = 0$            | (-)6     |       |        | V             |
| Rise Time                | $t_{on}$      | See specified Test Circuit.        |          | 0.1   |        | $\mu\text{s}$ |
| Storage Time             | $t_{stg}$     | "                                  | (0.7)1.4 |       |        | $\mu\text{s}$ |
| Fall Time                | $t_f$         | "                                  |          | 0.2   |        | $\mu\text{s}$ |

※: The 2SB1134/2SD1667 are classified by 1A  $h_{FE}$  as follows:

|    |   |     |     |   |     |     |   |     |
|----|---|-----|-----|---|-----|-----|---|-----|
| 70 | Q | 140 | 100 | R | 200 | 140 | S | 280 |
|----|---|-----|-----|---|-----|-----|---|-----|

### Switching Time Test Circuit



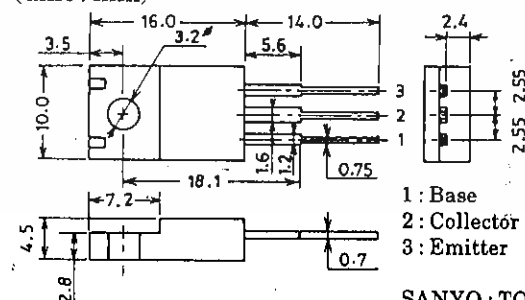
$10I_{B1} = -10I_{B2} = I_C = 2A$

(For PNP, the polarity is reversed.)

Unit (Resistance:  $\Omega$ , Capacitance: F)

### Package Dimensions 2041A

(unit: mm)



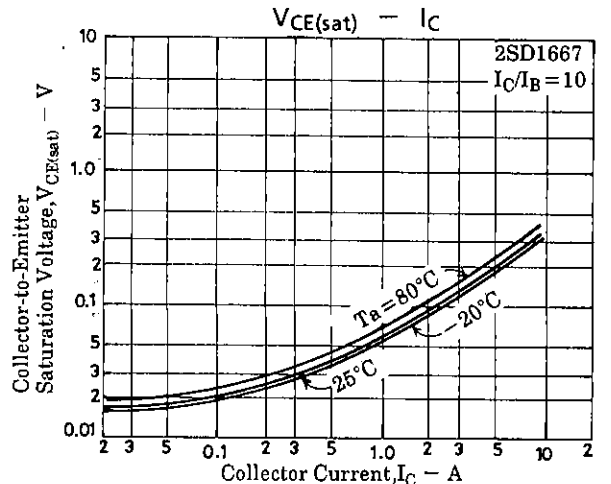
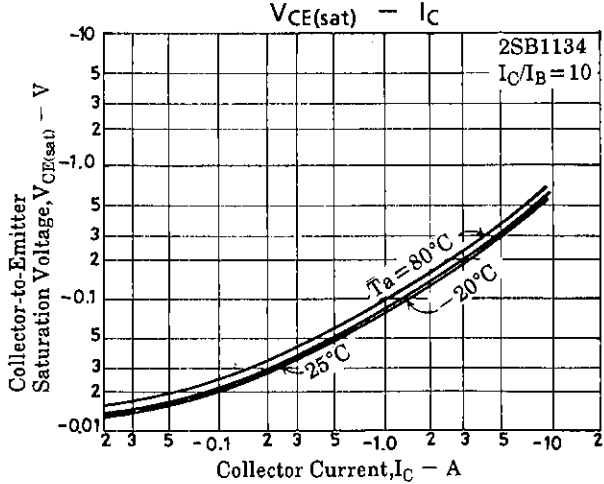
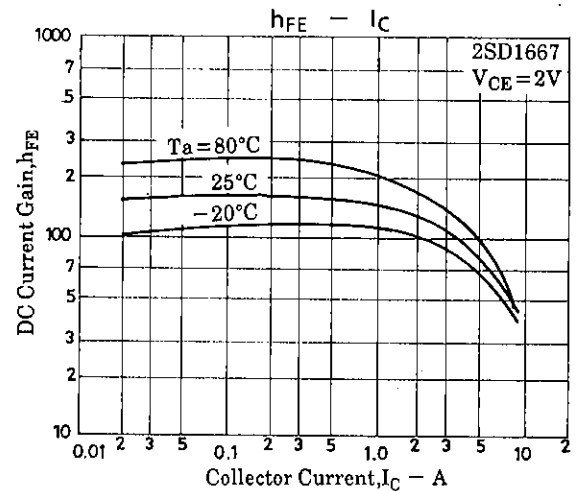
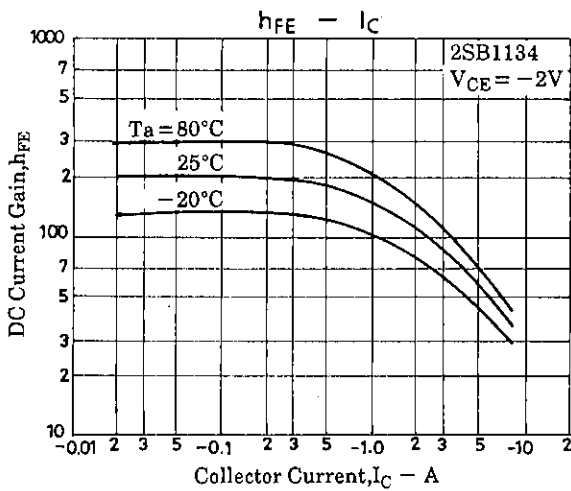
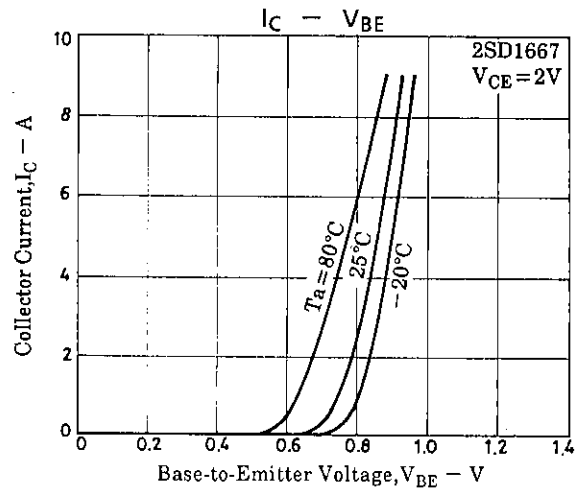
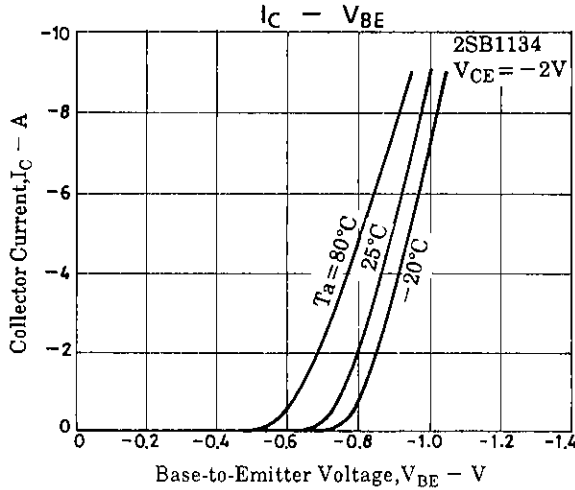
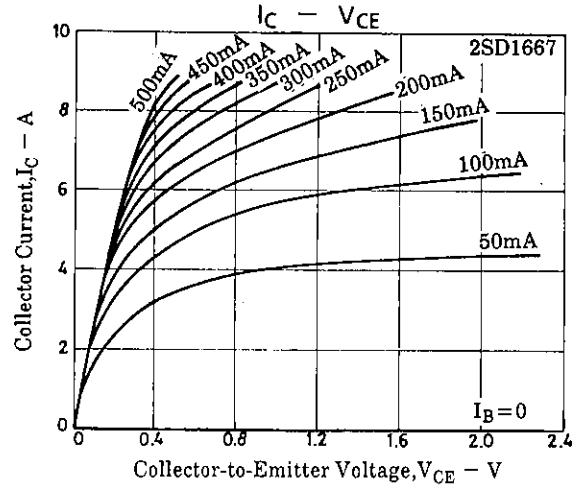
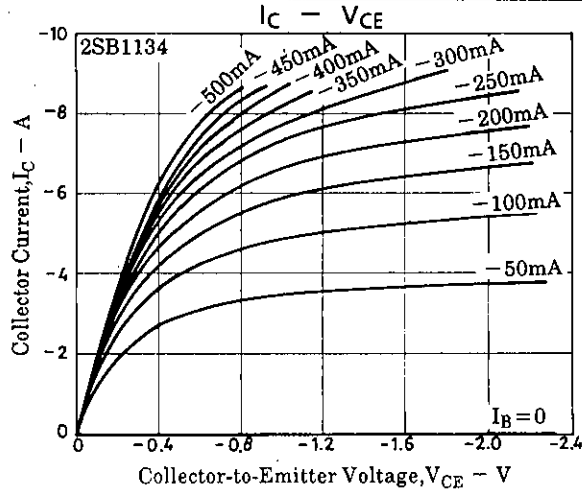
1: Base  
2: Collector  
3: Emitter

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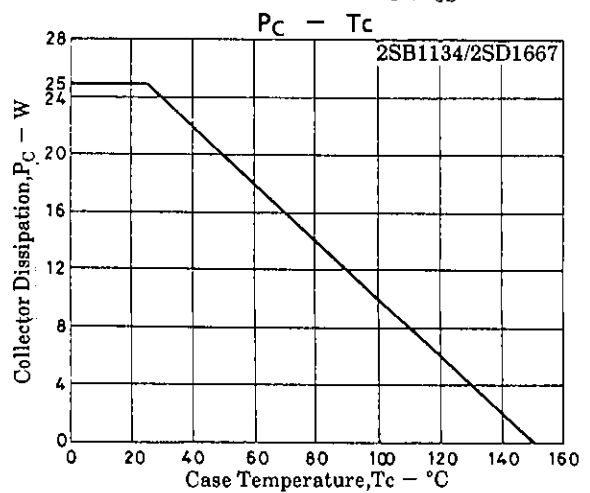
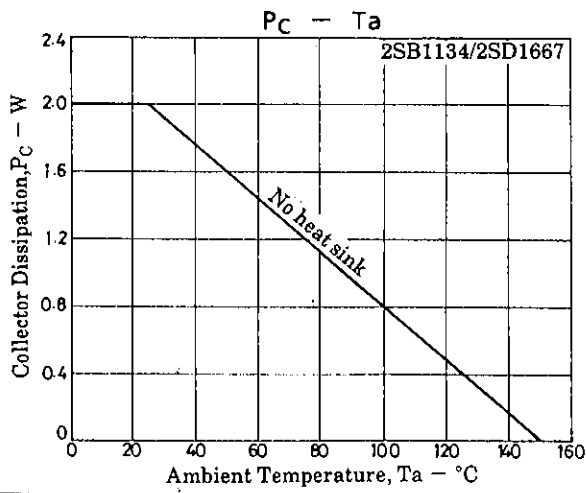
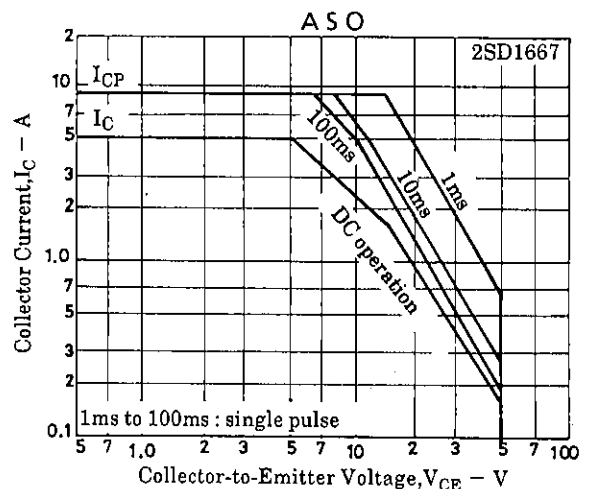
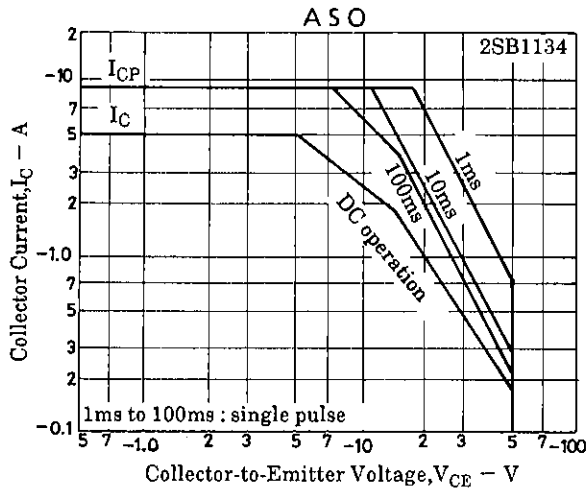
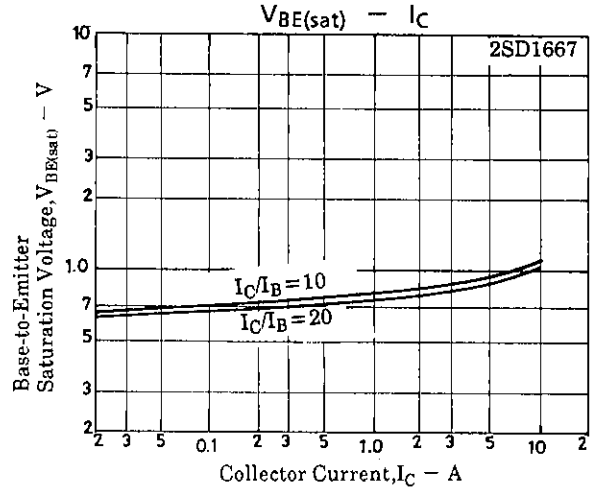
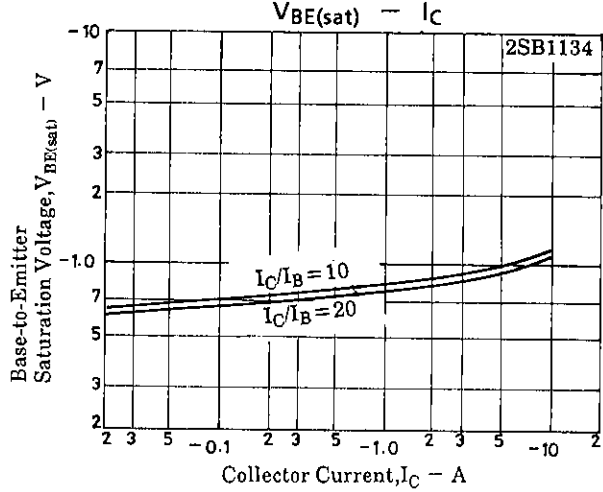
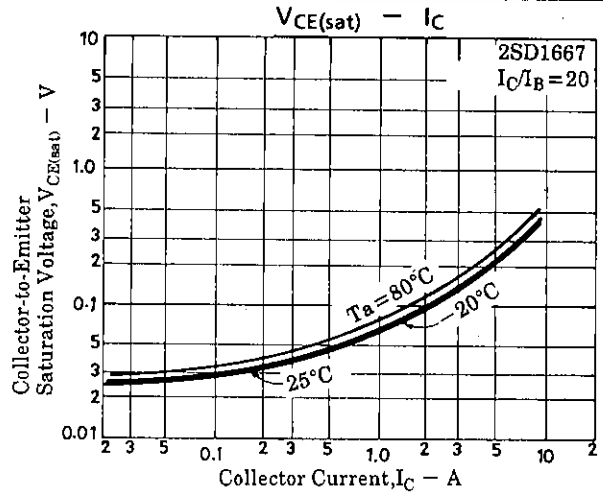
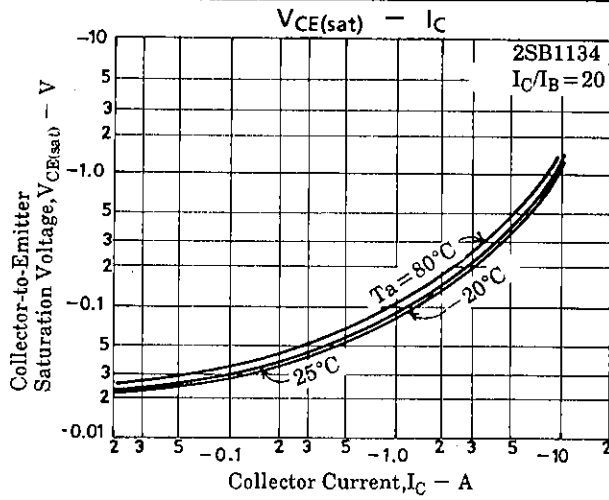
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