

**SANYO**

No.2021A

**2SB1166/2SD1723**

PNP/NPN Epitaxial Planar Silicon Transistors

**50V/8A Switching Applications****Applications**

- Relay drivers, high-speed inverters, converters

**Features**

- Low collector-to-emitter saturation voltage
- High  $f_T$
- Excellent linearity of  $h_{FE}$
- Fast switching time

( ): 2SB1166

**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            | $I_C$     | (-)8        | A                |
| Collector Current (Pulse)    | $I_{CP}$  | (-)12       | A                |
| Collector Dissipation        | $P_C$     | 1.2         | W                |
|                              |           | 20          | W                |
| Junction Temperature         | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage Temperature          | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

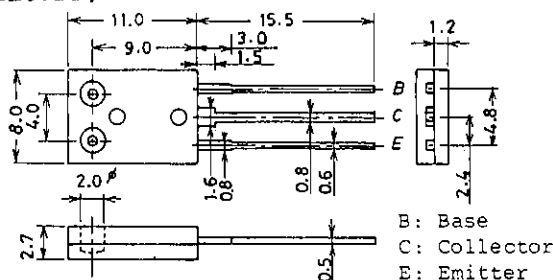
 $T_c=25^\circ\text{C}$ **Electrical Characteristics at  $T_a=25^\circ\text{C}$** 

|                          |               |                                           | min | typ    | max    | unit          |
|--------------------------|---------------|-------------------------------------------|-----|--------|--------|---------------|
| Collector Cutoff Current | $I_{CBO}$     | $V_{CB}=(-)40\text{V}, I_E=0$             |     |        | (-)1   | $\mu\text{A}$ |
| Emitter Cutoff Current   | $I_{EBO}$     | $V_{EB}=(-)4\text{V}, I_C=0$              |     |        | (-)1   | $\mu\text{A}$ |
| DC Current Gain          | $h_{FE}(1)$   | $V_{CE}=(-)2\text{V}, I_C=(-)0.5\text{A}$ | 70* |        | 400*   |               |
|                          | $h_{FE}(2)$   | $V_{CE}=(-)2\text{V}, I_C=(-)6\text{A}$   | 35  |        |        |               |
| Gain-Bandwidth Product   | $f_T$         | $V_{CE}=(-)5\text{V}, I_C=(-)1\text{A}$   |     | 180    |        | MHz           |
|                          |               |                                           |     | (130)  |        | MHz           |
| Output Capacitance       | $c_{ob}$      | $V_{CB}=(-)10\text{V}, f=1\text{MHz}$     |     | 65     |        | pF            |
|                          |               |                                           |     | (95)   |        | pF            |
| C-E Saturation Voltage   | $V_{CE(sat)}$ | $I_C=(-)4\text{A}, I_B=(-)0.2\text{A}$    |     | 200    | 400    | mV            |
|                          |               |                                           |     | (-250) | (-500) | mV            |

Continued on next page.

\*: The 2SB1166/2SD1723 are classified by 0.5A  $h_{FE}$  as follows:

|    |   |     |     |   |     |     |   |     |     |   |     |
|----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|
| 70 | Q | 140 | 100 | R | 200 | 140 | S | 280 | 200 | T | 400 |
|----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|

**Package Dimensions 2043A  
(unit:mm)**

SANYO: TO126LP

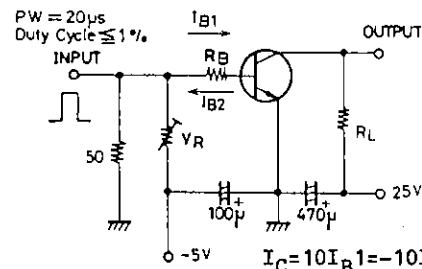
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TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110 JAPAN

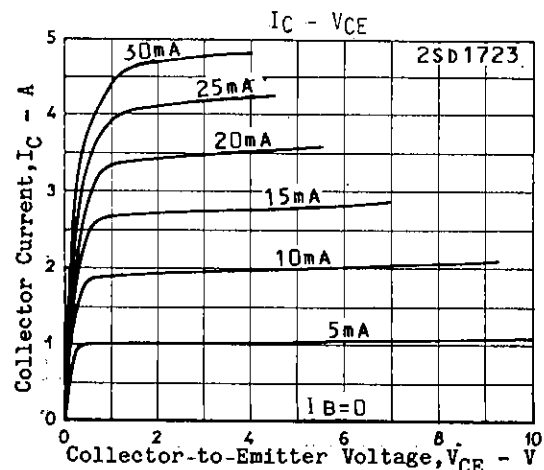
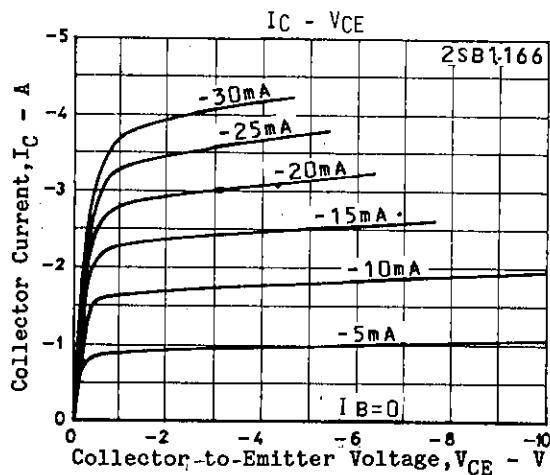
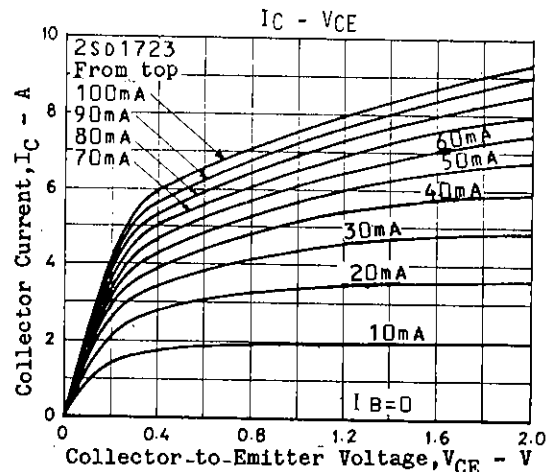
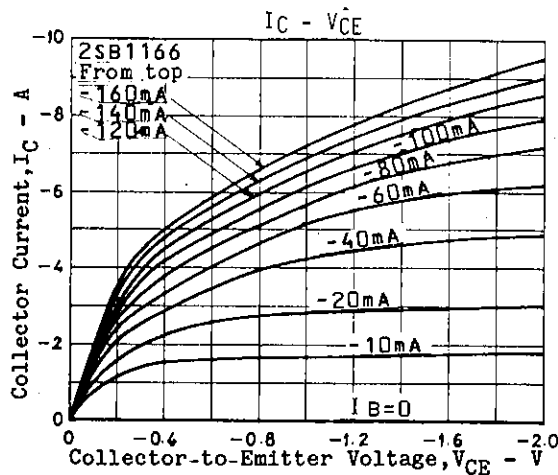
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|                        |               |                             | min | typ     | max    | unit |
|------------------------|---------------|-----------------------------|-----|---------|--------|------|
| B-E Saturation Voltage | $V_{BE(sat)}$ | $I_C=(-)4A, I_B=(-)0.2A$    |     | (-)0.95 | (-)1.3 | V    |
| C-B Breakdown Voltage  | $V_{(BR)CBO}$ | $I_C=(-)10\mu A, I_E=0$     |     | (-)60   |        | V    |
| C-E Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$ |     | (-)50   |        | V    |
| E-B Breakdown Voltage  | $V_{(BR)EBO}$ | $I_E=(-)10\mu A, I_C=0$     |     | (-)6    |        | V    |
| Turn-on Time           | $t_{on}$      | See specified Test Circuit. |     | 50      |        | ns   |
|                        |               |                             |     | (50)    |        | ns   |
| Storage Time           | $t_{stg}$     | "                           |     | 500     |        | ns   |
|                        |               |                             |     | (450)   |        | ns   |
| Fall Time              | $t_f$         | "                           |     | 20      |        | ns   |
|                        |               |                             |     | (20)    |        | ns   |

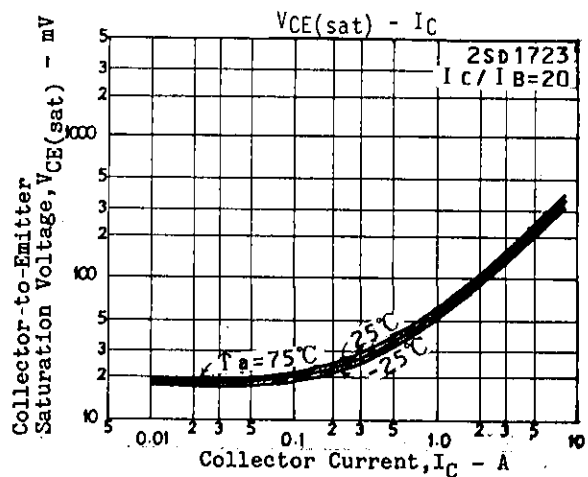
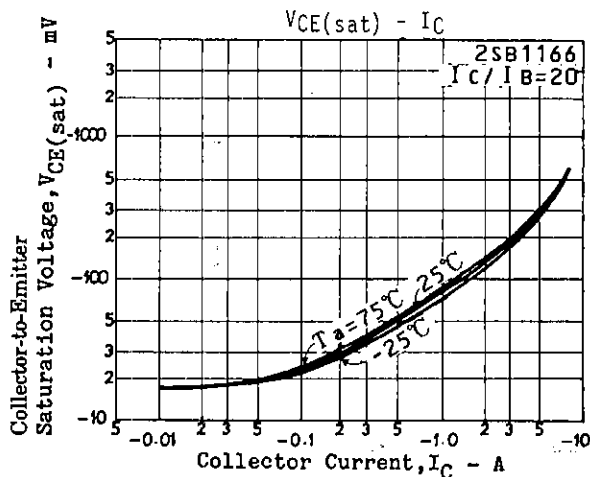
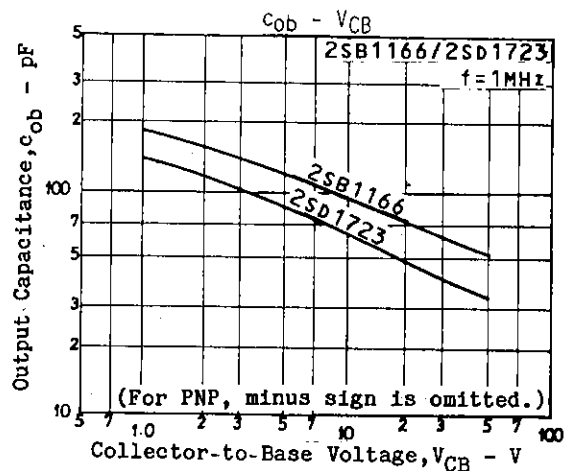
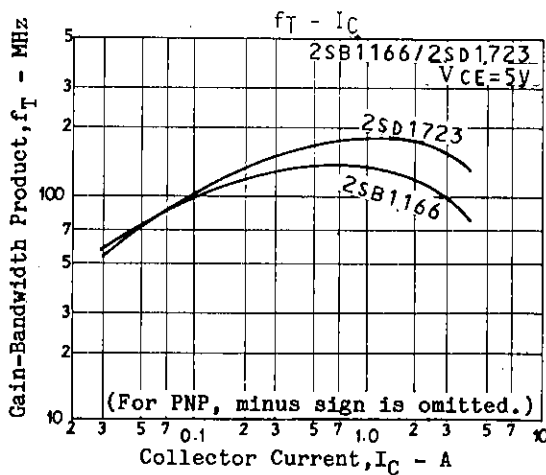
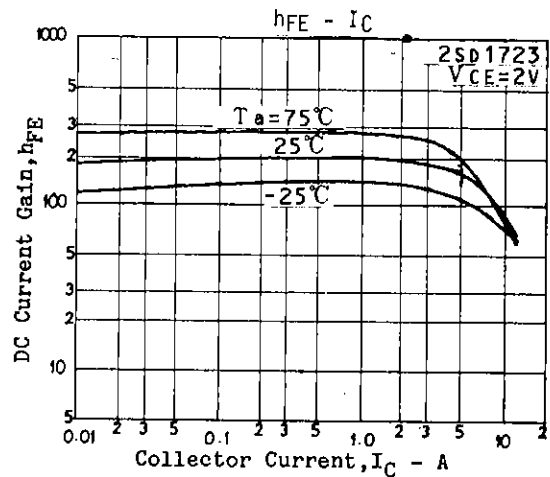
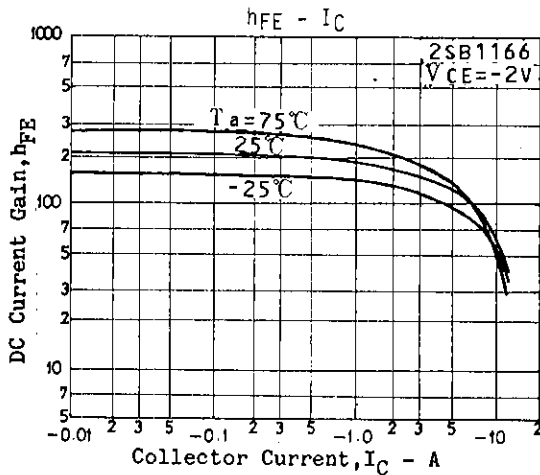
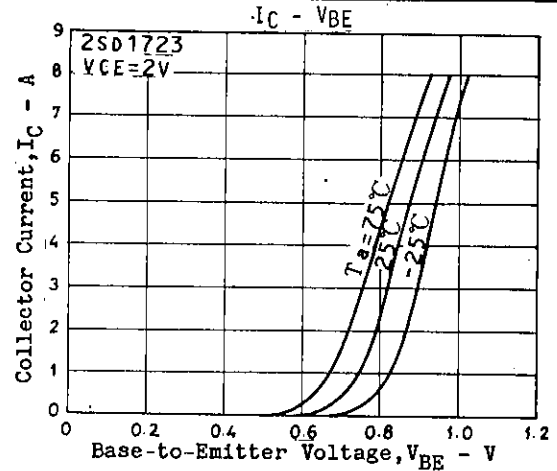
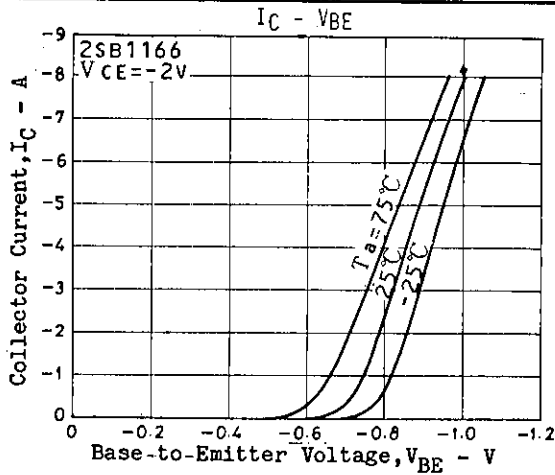
## Switching Time Test Circuit

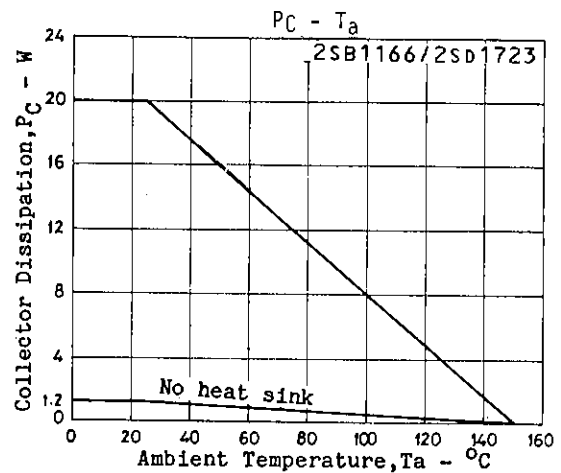
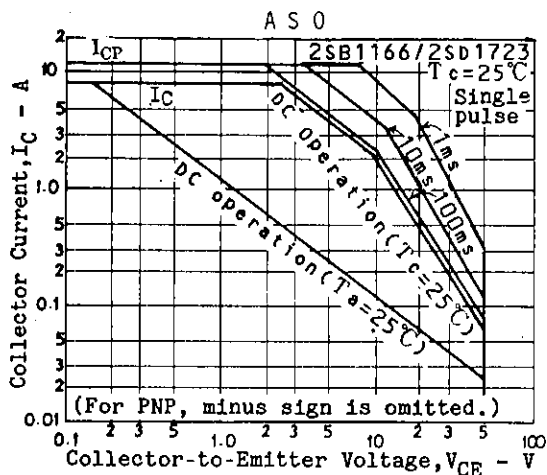
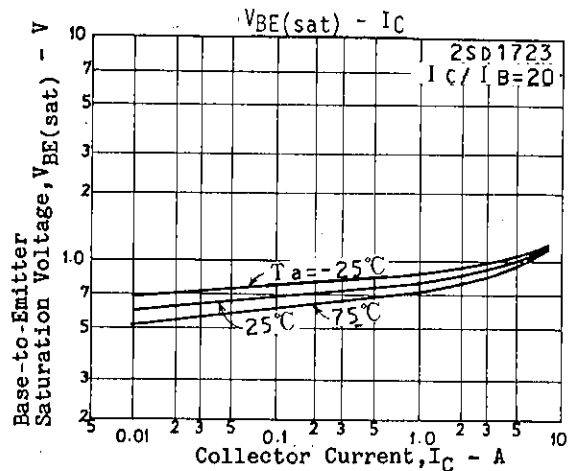
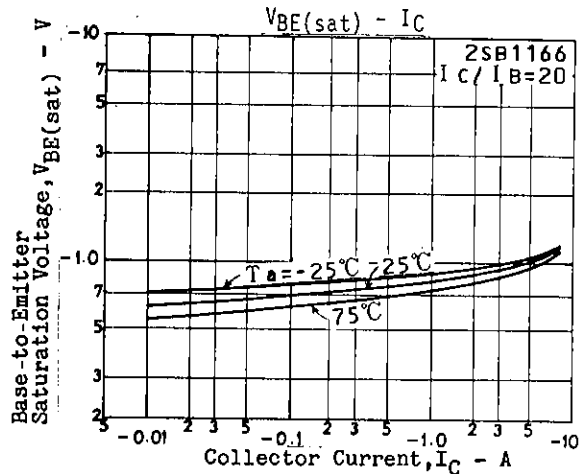
Unit (Resistance:  $\Omega$ , Capacitance: F)

For PNP, the polarity is reversed.



# 2SB1166/2SD1723





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