



## 2SB824/2SD1060

### 50V/5A Switching Applications

#### Applications

- Suitable for relay drivers, high-speed inverters, converters, and other general large-current switching.

#### Features

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

( ) : 2SB824

#### Specifications

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

| Parameter                    | Symbol    | Conditions               | Ratings     | 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        | $P_C$     | $T_c = 25^\circ\text{C}$ | 30          | W                |
| Junction Temperature         | $T_J$     |                          | 150         | $^\circ\text{C}$ |
| Storage Temperature          | $T_{stg}$ |                          | -55 to +150 | $^\circ\text{C}$ |

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

| Parameter                | Symbol    | Conditions                         | Ratings |       |        | Unit |
|--------------------------|-----------|------------------------------------|---------|-------|--------|------|
|                          |           |                                    | min     | typ   | max    |      |
| 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          | $h_{FE1}$ | $V_{CE} = (-)2V, I_C = (-)1A$      | 70*     |       | 280*   |      |
|                          | $h_{FE2}$ | $V_{CE} = (-)2V, I_C = (-)3A$      | 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) |        | pF   |

\* : The 2SB824/2SD1060 are graded as follows by  $h_{FE}$  at 1A :

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

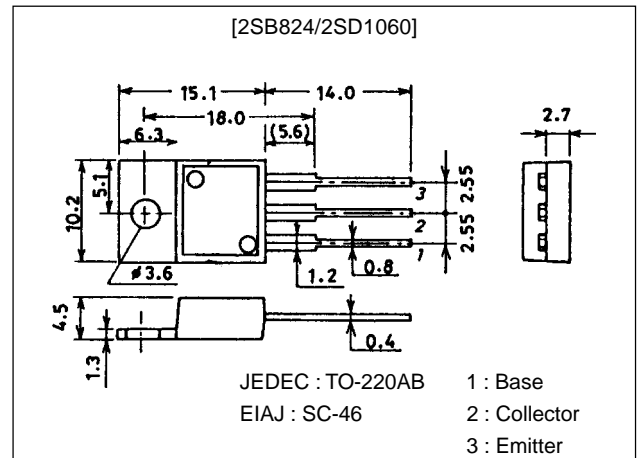
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#### Package Dimensions

unit:mm

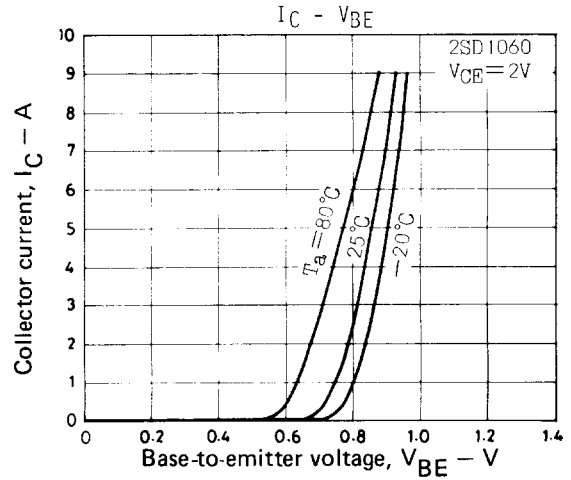
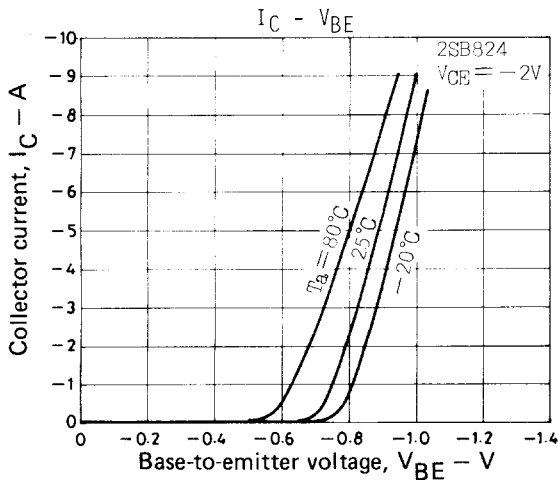
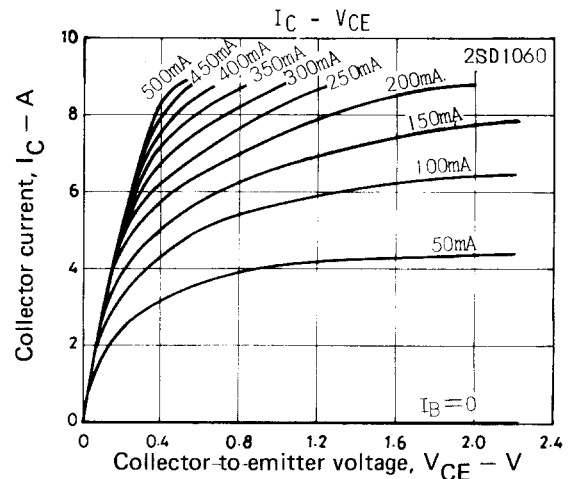
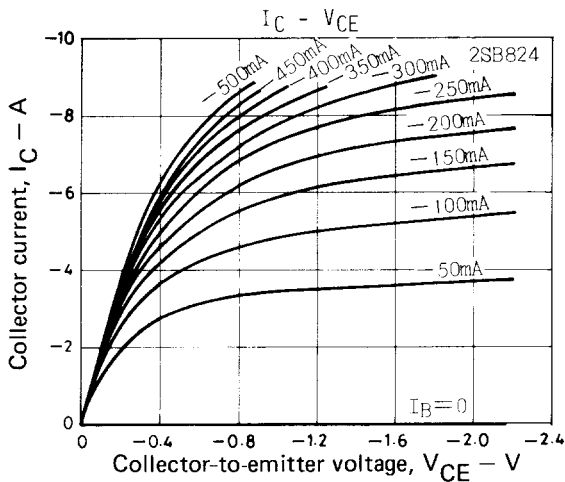
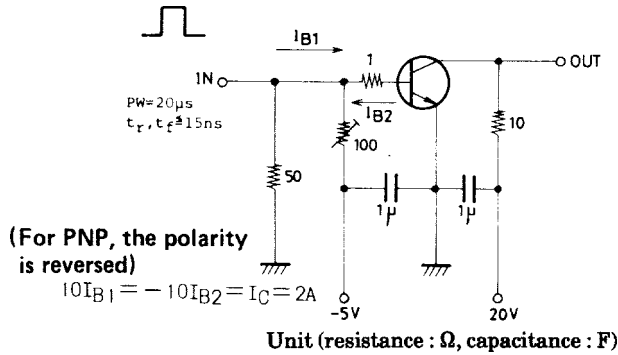
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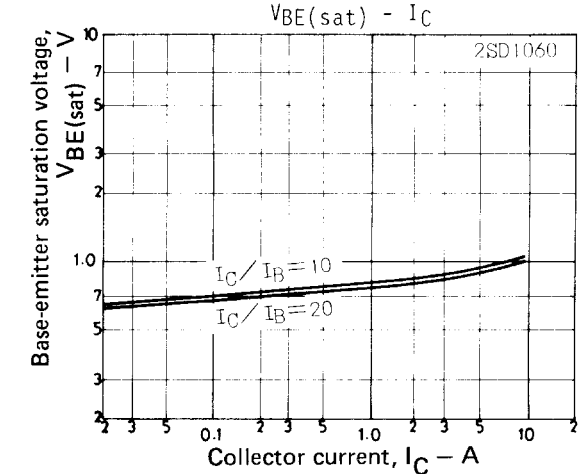
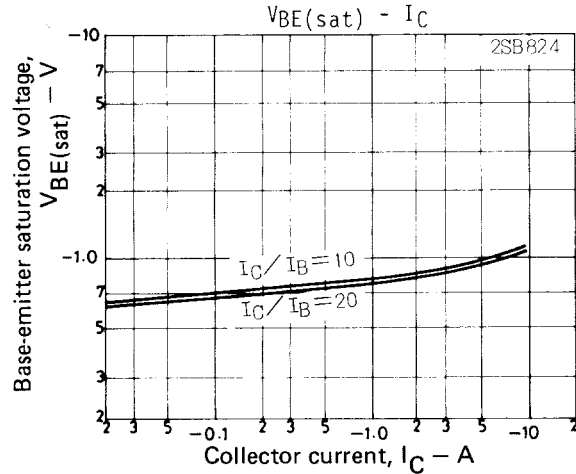
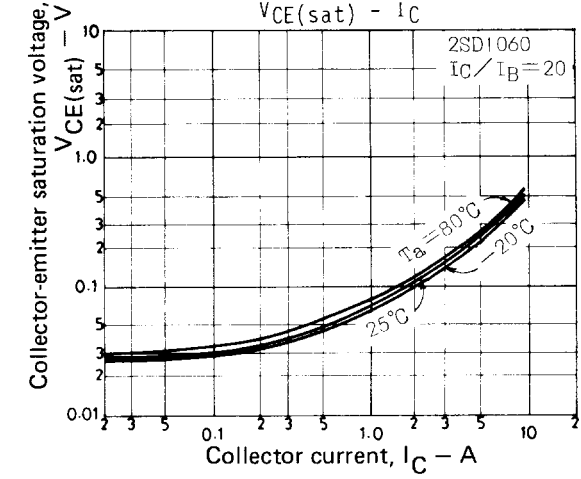
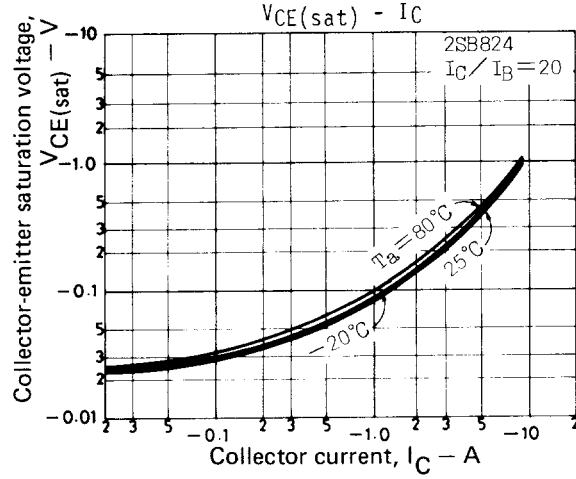
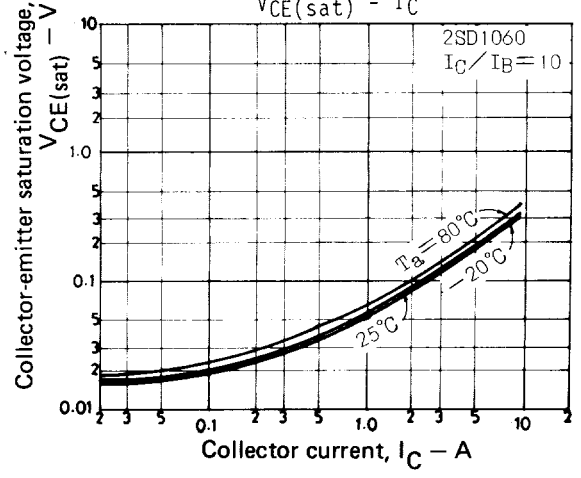
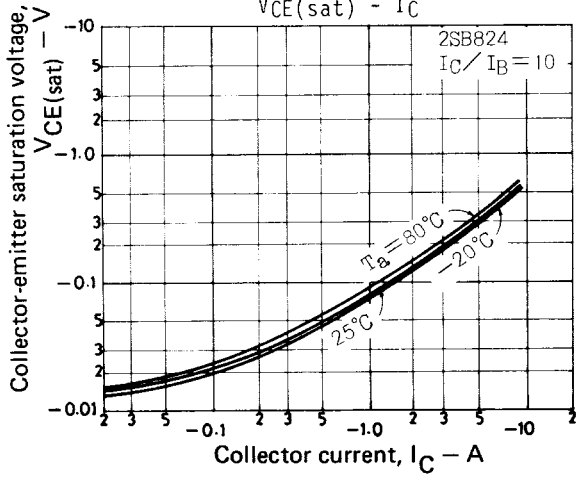
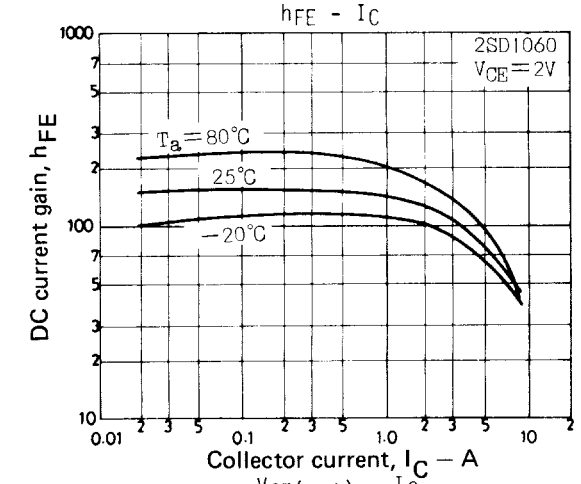
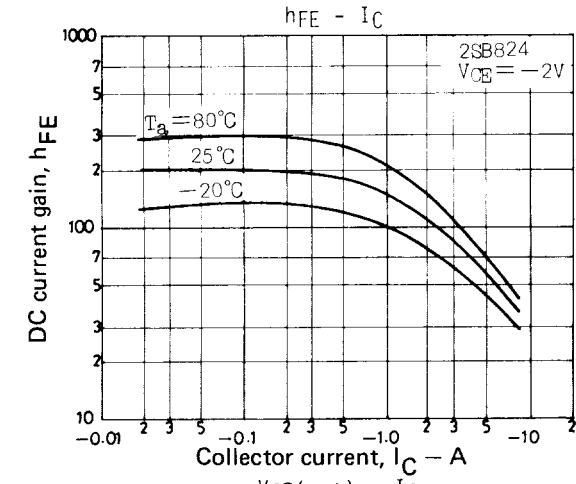
# 2SB824/2SD1060

| Parameter                               | Symbol        | Conditions                  | Ratings |       |        | Unit    |
|---|---------------|-----------------------------|---------|-------|--------|---------|
|   |               |                             | min     | typ   | max    |         |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)3A, I_B=(-)0.3A$    |         |       | (-)0.4 | V       |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=(-)1mA, I_E=0$         | (-)60   |       |        | V       |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$ | (-)50   |       |        | V       |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=(-)1mA, I_C=0$         | (-)6    |       |        | V       |
| Turn-ON Time                            | $t_{on}$      | See specified test circuit. |         | 0.1   |        | $\mu s$ |
| Storage Time                            | $t_{stg}$     | See specified test circuit. |         | (0.7) |        | $\mu s$ |
|   |               |                             |         | 1.4   |        | $\mu s$ |
| Fall Time                               | $t_f$         | See specified test circuit. |         | 0.2   |        | $\mu s$ |

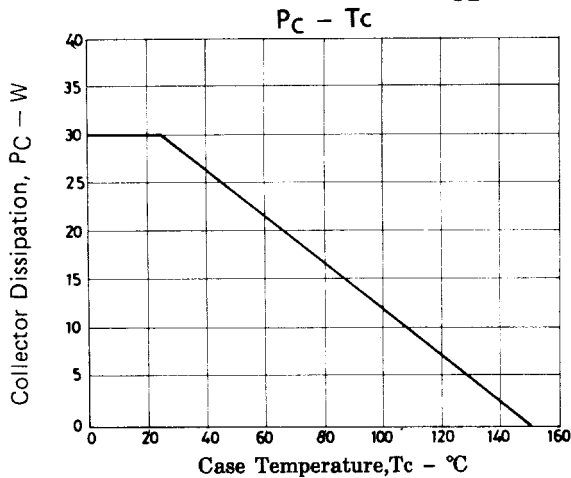
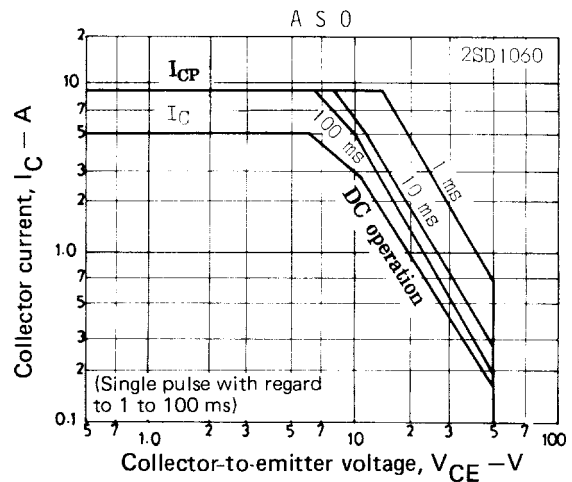
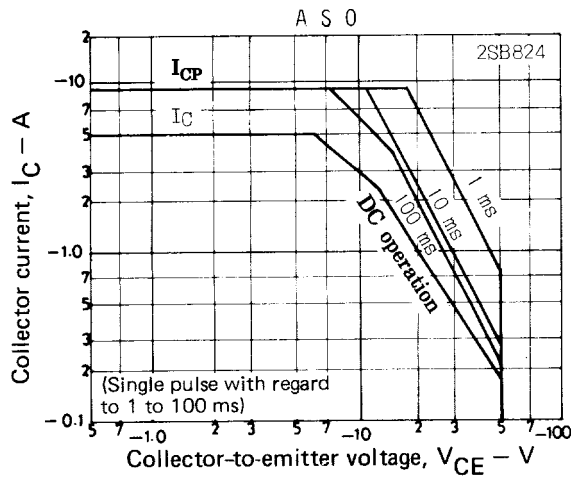
## Switching Time Test Circuit



# 2SB824/2SD1060



## 2SB824/2SD1060



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