



## 2SB1228/2SD1830

### Driver Applications

#### Applications

- Suitable for use in control of motor drivers, printer hammer drivers, relay drivers, and constant-voltage regulators.

#### Features

- High DC current gain.
- Large current capacity and wide ASO.
- Low saturation voltage.
- Micaless package facilitating mounting.

( ) : 2SB1228

#### Specifications

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

| Parameter                    | Symbol    | Conditions             | Ratings     | Unit             |
|------------------------------|-----------|------------------------|-------------|------------------|
| Collector-to-Base Voltage    | $V_{CBO}$ |                        | (-)110      | V                |
| Collector-to-Emitter Voltage | $V_{CEO}$ |                        | (-)100      | V                |
| Emitter-to-Base Voltage      | $V_{EBO}$ |                        | (-)6        | V                |
| Collector Current            | $I_C$     |                        | (-)8        | A                |
| Collector Current (Pulse)    | $I_{CP}$  |                        | (-)12       | A                |
| Collector Dissipation        | $P_C$     |                        | 2.0         | W                |
|                              |           | $T_c=25^\circ\text{C}$ | 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                | $I_{CBO}$     | $V_{CB}=(-)80\text{V}, I_E=0$           |         |        | (-)0.1 | mA   |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=(-)5\text{V}, I_C=0$            |         |        | (-)3.0 | mA   |
| DC Current Gain                         | $h_{FE}$      | $V_{CE}=(-)3\text{V}, I_C=(-)4\text{A}$ | 1500    | 4000   |        |      |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=(-)5\text{V}, I_C=(-)4\text{A}$ |         | 20     |        | MHz  |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)4\text{A}, I_B=(-)8\text{mA}$   |         | 0.9    | (-)1.5 | V    |
|                                         |               |                                         |         | (-1.0) |        | V    |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=(-)4\text{A}, I_B=(-)8\text{mA}$   |         |        | (-)2.0 | V    |

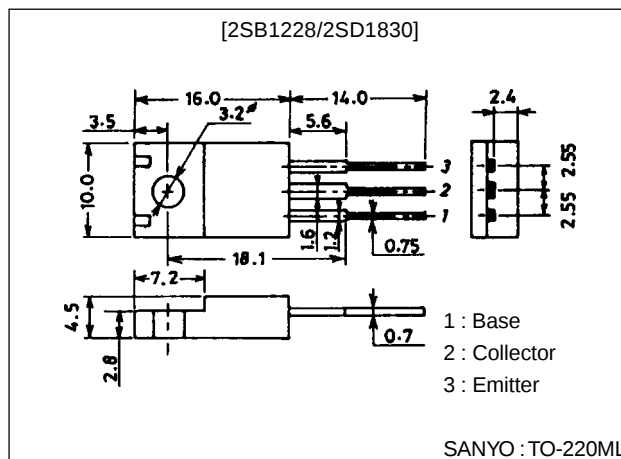
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#### Package Dimensions

unit:mm

2041A



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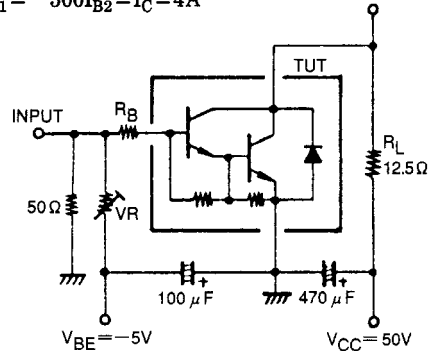
2SB1228/2SD1830

| Parameter                              | Symbol        | Conditions                   | Ratings   |              |     | Unit    |
|----------------------------------------|---------------|------------------------------|-----------|--------------|-----|---------|
|                                        |               |                              | min       | typ          | max |         |
| Collector-to-Base Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C=(-)5mA, I_E=0$          | $(- )110$ |              |     | V       |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=(-)50mA, R_{BE}=\infty$ | $(- )100$ |              |     | V       |
| Turn-ON Time                           | $t_{on}$      | See specified Test Circuit   |           | 0.6<br>(0.7) |     | $\mu s$ |
| Storage Time                           | $t_{stg}$     | See specified Test Circuit   |           | 4.8<br>(1.4) |     | $\mu s$ |
| Fall Time                              | $t_f$         | See specified Test Circuit   |           | 1.6<br>(1.5) |     | $\mu s$ |

Switching Time Test Circuit

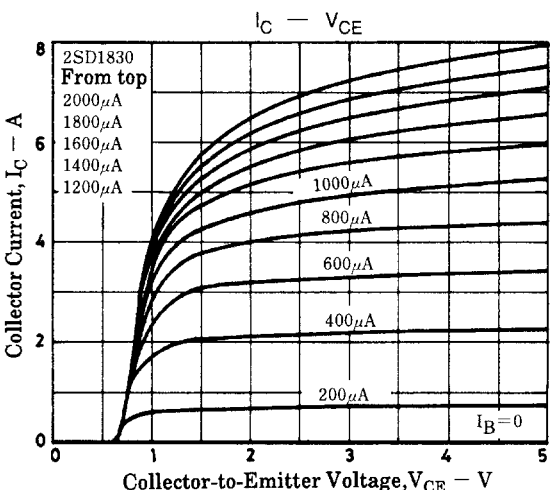
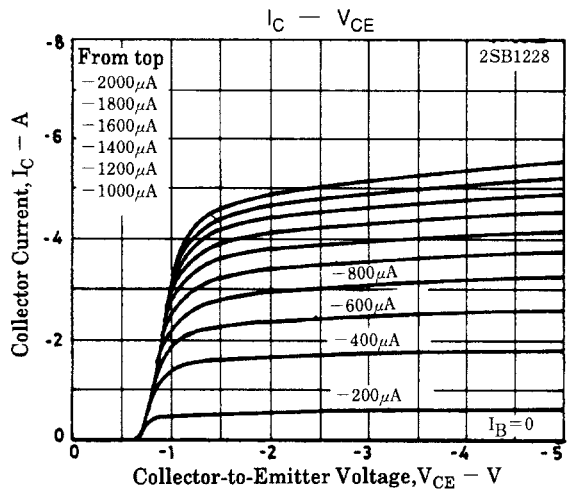
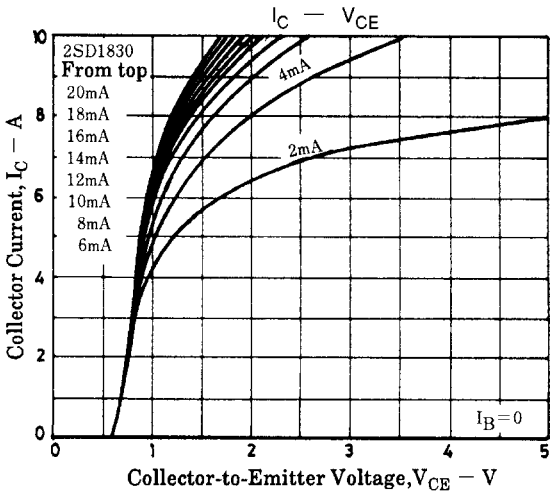
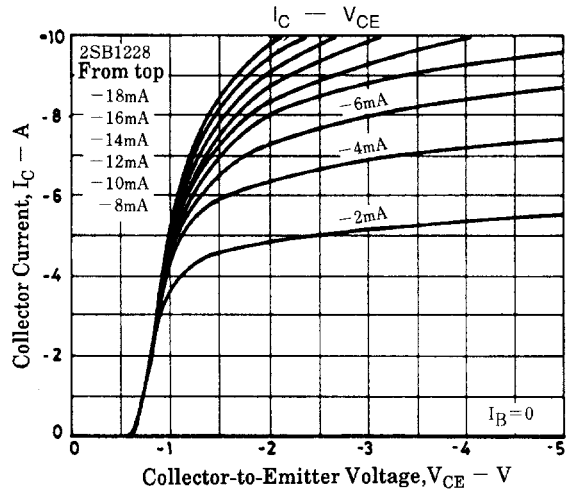
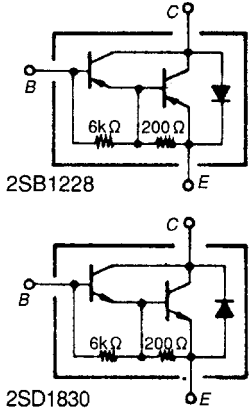
PW = 50 $\mu$ s, Duty cycle  $\leq$  1%

500I<sub>B1</sub> = -500I<sub>B2</sub> = I<sub>C</sub> = 4A

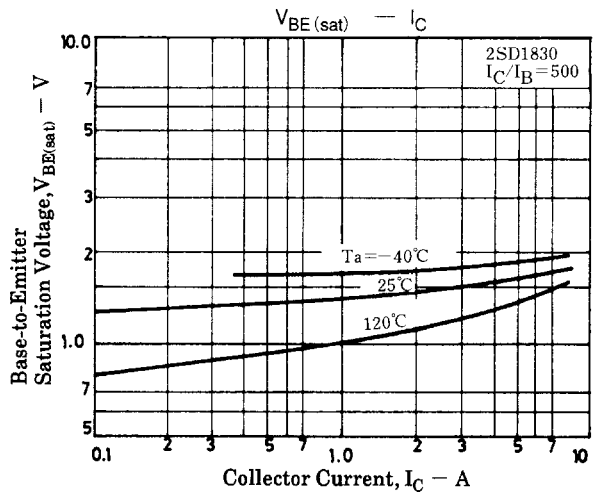
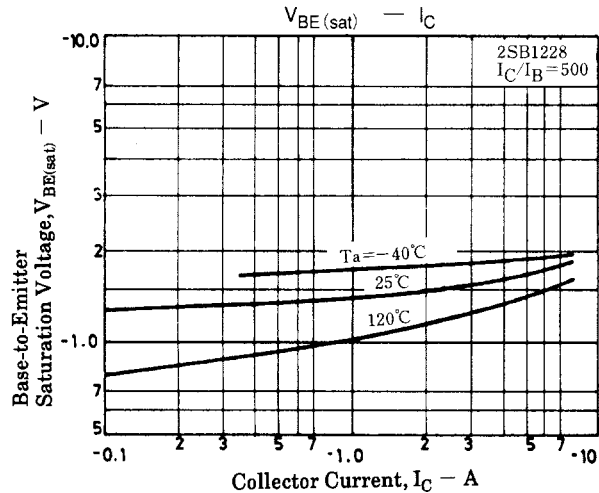
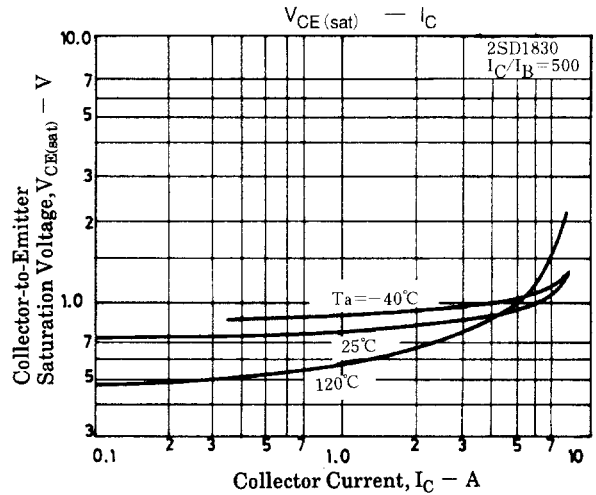
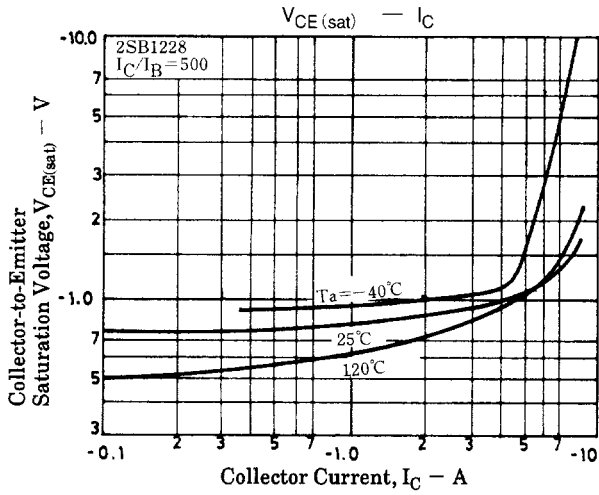
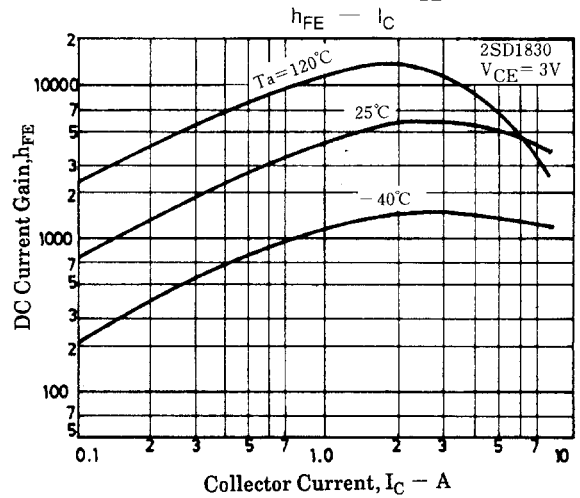
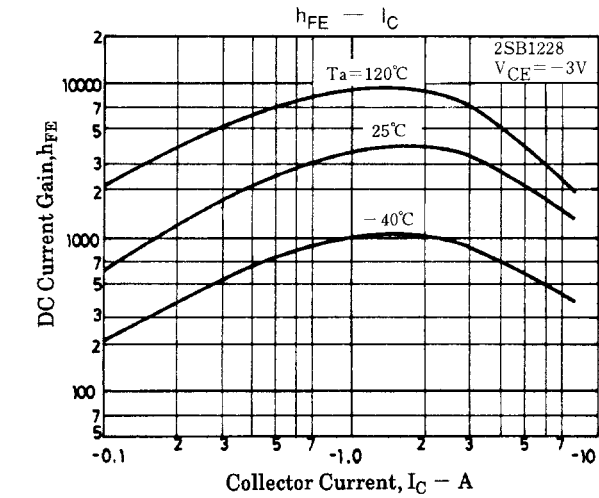
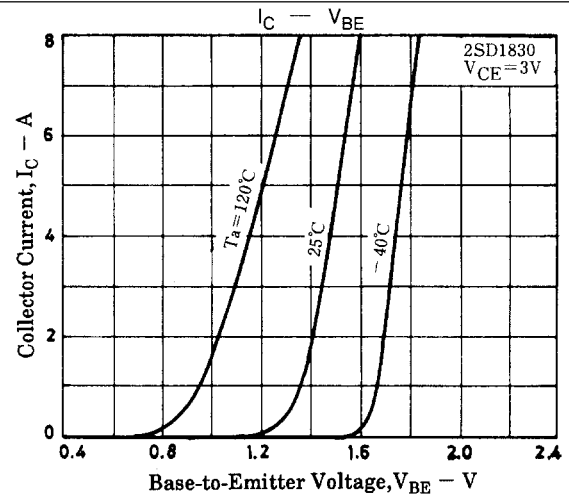
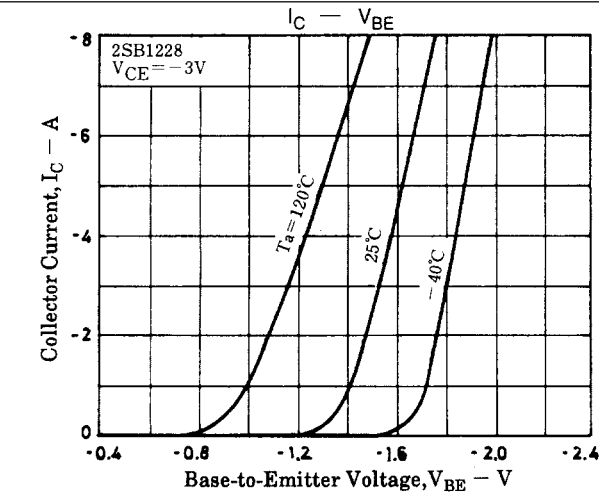


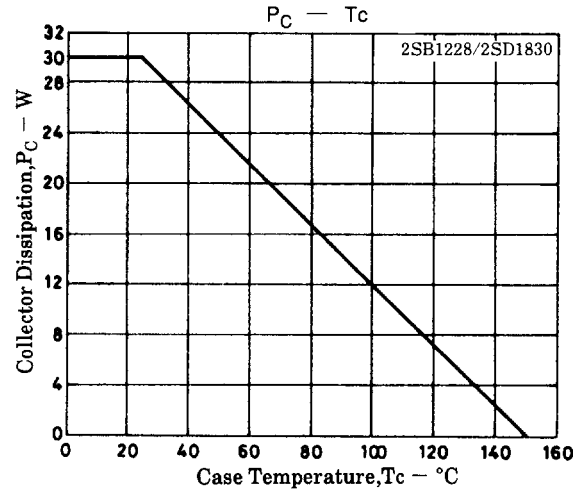
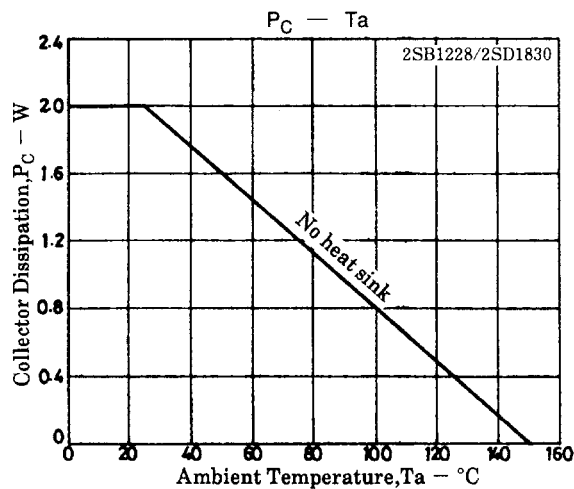
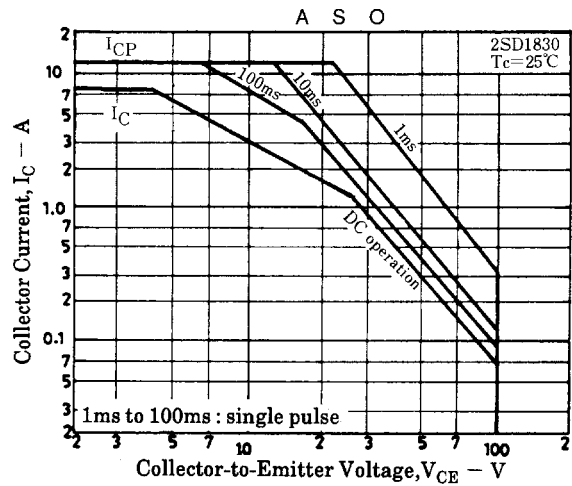
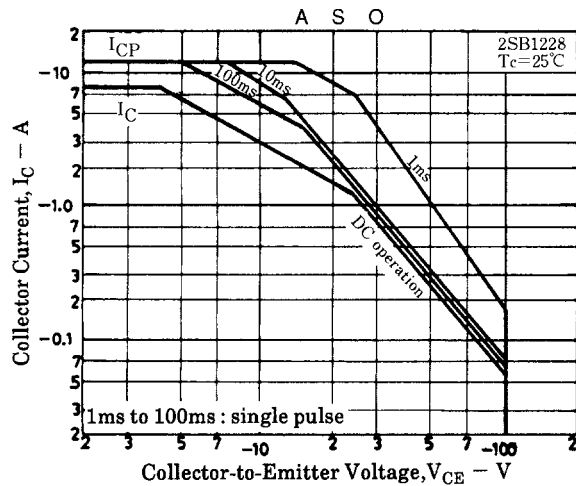
(For PNP, the polarity is reversed.)

Electrical Connection



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