



# 2SB922 / 2SD1238

## Large Current Switching Applications

### Applications

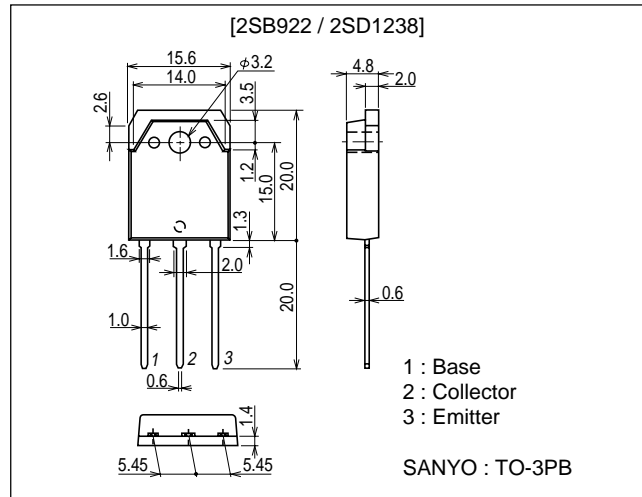
- Large current switching of relay drivers, high-speed inverters, converters.

### Features

- Low collector-to-emitter saturation voltage :  $V_{CE(sat)} = -0.5V$  (PNP),  $0.4V$  (NPN) max.
- Wide ASO and highly resistant to breakdown.

### Package Dimensions

unit : mm  
2022A



### Specifications

( ) : 2SB922

Absolute Maximum Ratings at  $T_a = 25^\circ C$

| Parameter                    | Symbol    | Conditions         | Ratings     | Unit       |
|------------------------------|-----------|--------------------|-------------|------------|
| Collector-to-Base Voltage    | $V_{CB0}$ |                    | (-)120      | V          |
| Collector-to-Emitter Voltage | $V_{CE0}$ |                    | (-)80       | V          |
| Emitter-to-Base Voltage      | $V_{EB0}$ |                    | (-)6        | V          |
| Collector Current            | $I_C$     |                    | (-)12       | A          |
| Collector Current (Pulse)    | $I_{CP}$  |                    | (-)20       | A          |
| Collector Dissipation        | $P_C$     | $T_c = 25^\circ C$ | 80          | W          |
| Junction Temperature         | $T_J$     |                    | 150         | $^\circ C$ |
| Storage Temperature          | $T_{stg}$ |                    | -55 to +150 | $^\circ C$ |

Electrical Characteristics at  $T_a = 25^\circ C$

| Parameter                | Symbol    | Conditions                 | Ratings |     |        | Unit |
|--------------------------|-----------|----------------------------|---------|-----|--------|------|
|                          |           |                            | min     | typ | max    |      |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB} = (-)80V, I_E = 0$ |         |     | (-)0.1 | mA   |
| Emitter Cutoff Current   | $I_{EBO}$ | $V_{EB} = (-)4V, I_C = 0$  |         |     | (-)0.1 | mA   |

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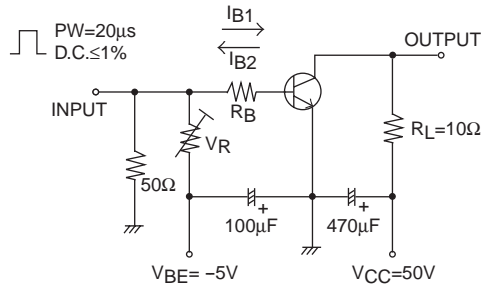
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| Parameter                               | Symbol        | Conditions                  | Ratings  |            |             | Unit    |
|---|---------------|-----------------------------|----------|------------|-------------|---------|
|   |               |                             | min      | typ        | max         |         |
| DC Current Gain                         | $h_{FE1}$     | $V_{CE}=(-)2V, I_C=(-)1A$   | 70*      |            | 280*        |         |
|   | $h_{FE2}$     | $V_{CE}=(-)2V, I_C=(-)6A$   | 30       |            |             |         |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=(-)5V, I_C=(-)1A$   |          | 20         |             | MHz     |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)6A, I_B=(-)0.6A$    |          |            | $(-0.5)0.4$ | V       |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=(-)1mA, I_E=0$         | $(-)120$ |            |             | V       |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$ | $(-)80$  |            |             | 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. |          | 0.2        |             | $\mu s$ |
| Storage Time                            | $t_{stg}$     | See specified test circuit. |          | $(0.7)1.7$ |             | $\mu s$ |
| Fall Time                               | $t_f$         | See specified test circuit. |          | $(0.1)0.2$ |             | $\mu s$ |

\*The 2SB922 / 2SD1238 are graded as follows by  $h_{FE}$  at 1A :

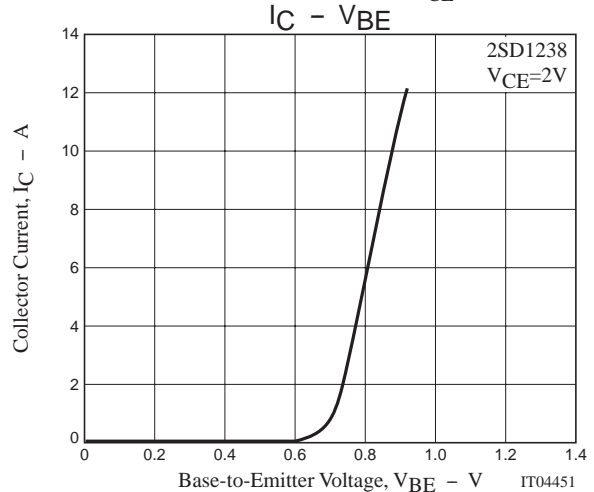
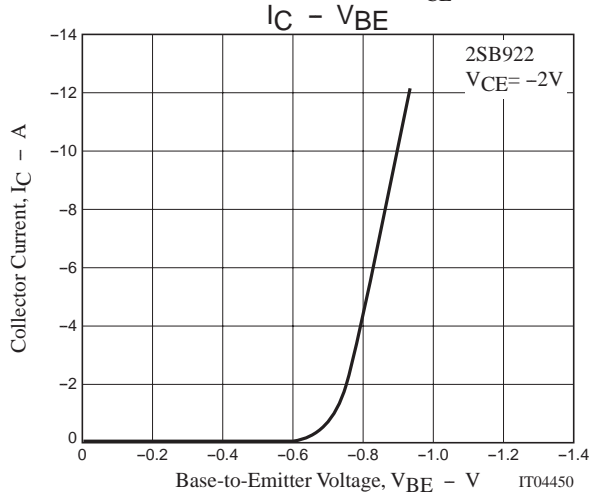
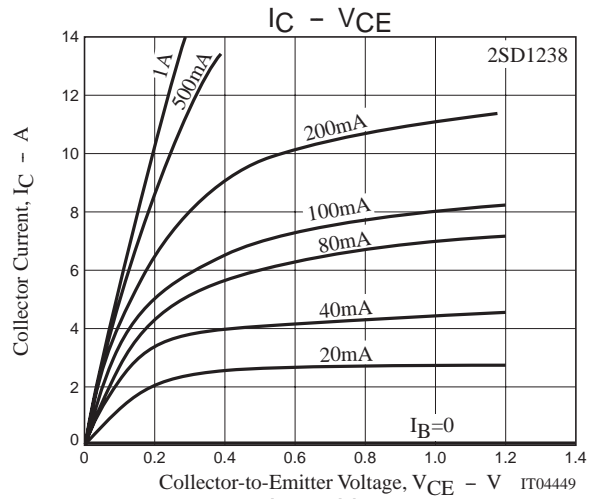
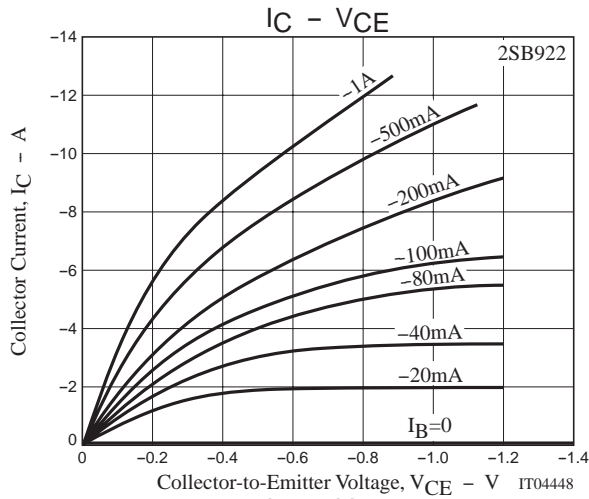
| Rank     | Q         | R          | S          |
|----------|-----------|------------|------------|
| $h_{FE}$ | 70 to 140 | 100 to 200 | 140 to 280 |

### Swicthing Time Test Circuit

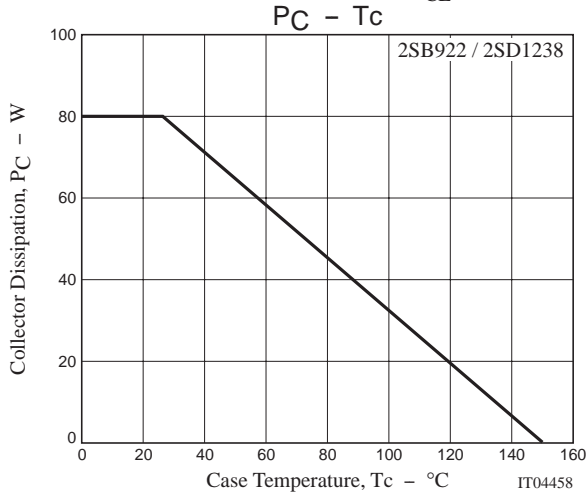
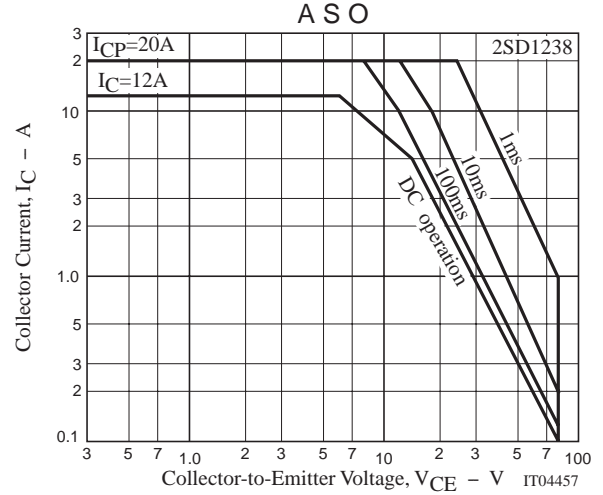
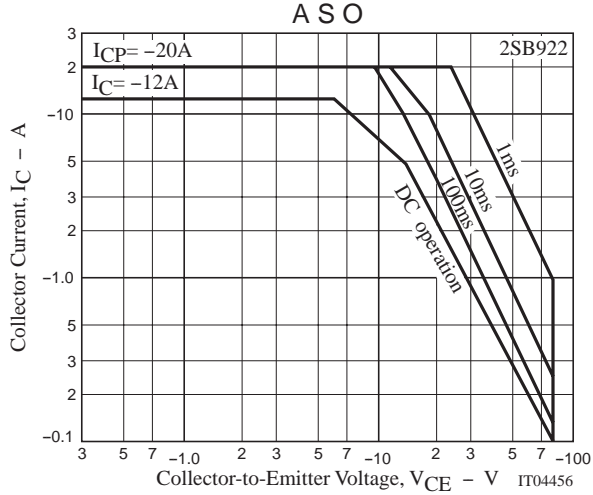
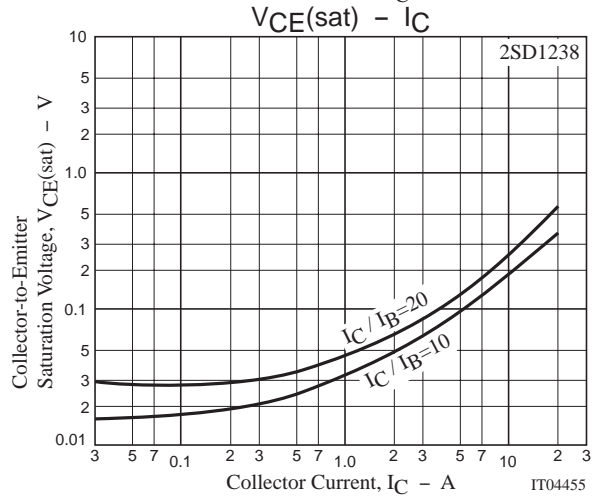
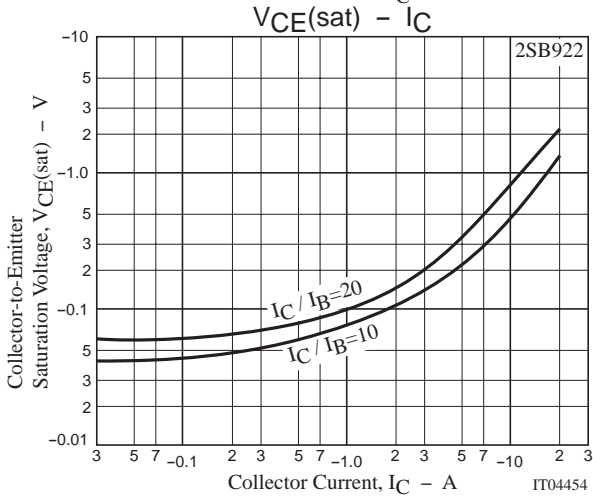
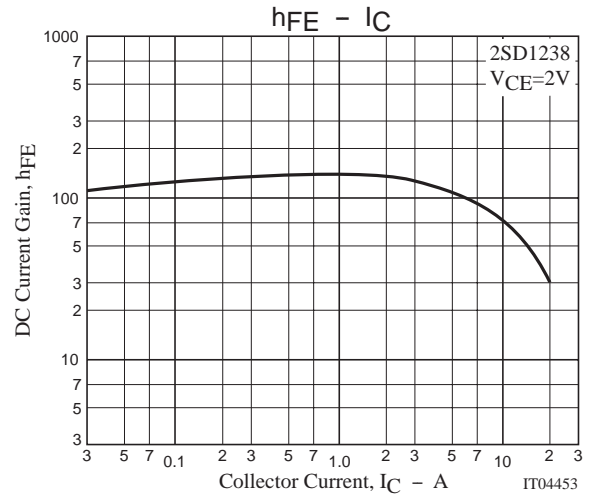
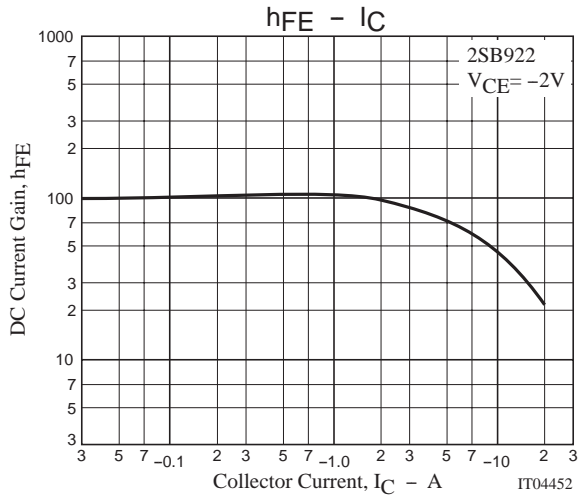


$$I_C = 10I_{B1} = -10I_{B2} = 5A$$

For PNP, the polarity is reversed.



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