



## 2SA2023/2SC5611

### 60V / 5A High-Speed Switching Applications

#### Applications

- Various inductance lamp drivers for electrical equipment.
- Inverters, converters (strobos, flash, fluorescent lamp lighting circuit).
- Power amplifier (high-power car stereo, motor control).
- High-speed switching (switching regulator, driver circuit).

#### Features

- Low collector-to-emitter saturation voltage.
- Excellent dependence of  $h_{FE}$  on current.
- High-speed switching.
- Micaless package facilitating mounting.

#### Specifications

Note \* ( ) : 2SA2023

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

| Parameter                    | Symbol    | Conditions             | Ratings     | Unit             |
|------------------------------|-----------|------------------------|-------------|------------------|
| Collector-to-Base Voltage    | $V_{CBO}$ |                        | (-)80       | V                |
| Collector-to-Emitter Voltage | $V_{CEO}$ |                        | (-)60       | V                |
| Emitter-to-Base Voltage      | $V_{EBO}$ |                        | (-)5        | V                |
| Collector Current            | $I_C$     |                        | (-)5        | A                |
| Collector Current (Pulse)    | $I_{CP}$  |                        | (-)7        | A                |
| Collector Dissipation        | $P_C$     |                        | 1.3         | W                |
|                              |           | $T_c=25^\circ\text{C}$ | 10          | 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                | $I_{CBO}$     | $V_{CB}=(-)40\text{V}, I_E=0$              |         |     | (-)0.1 | mA   |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=(-)4\text{V}, I_C=0$               |         |     | (-)0.1 | mA   |
| DC Current Gain                         | $h_{FE}$      | $V_{CE}=(-)2\text{V}, I_C=(-)1\text{A}$    | 110     |     | 200    |      |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=(-)5\text{V}, I_C=(-)1\text{A}$    |         | 100 |        | MHz  |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)2.5\text{A}, I_B=(-)0.125\text{A}$ |         |     | (-)0.4 | V    |

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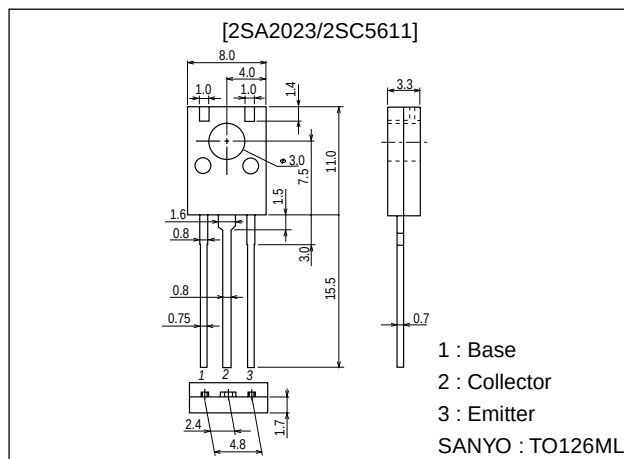
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#### Package Dimensions

unit:mm

2165

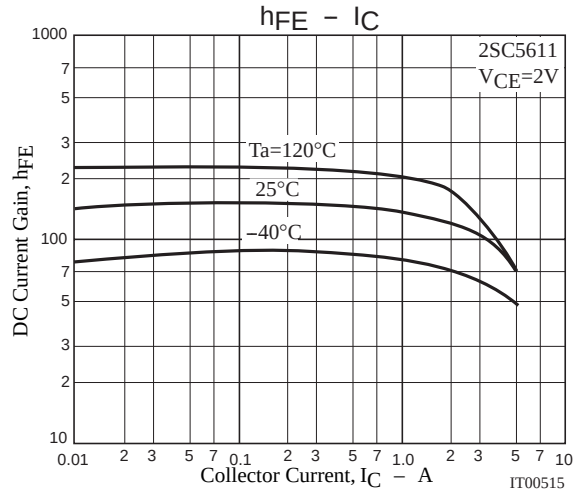
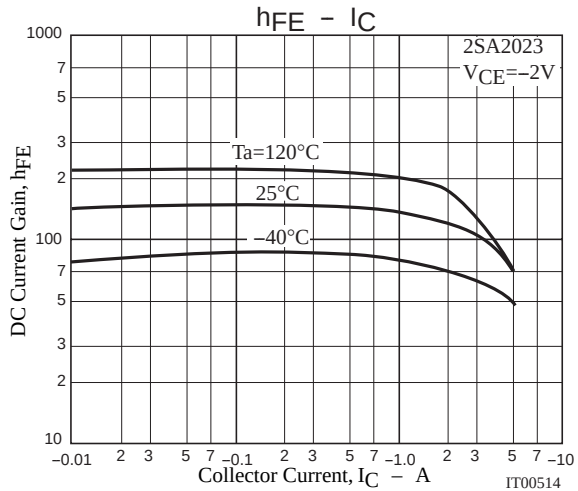
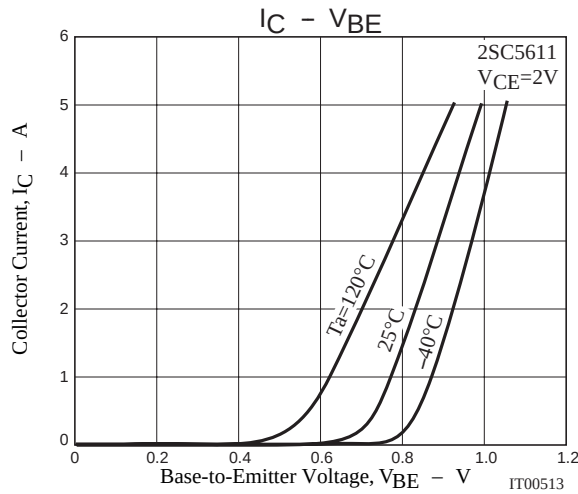
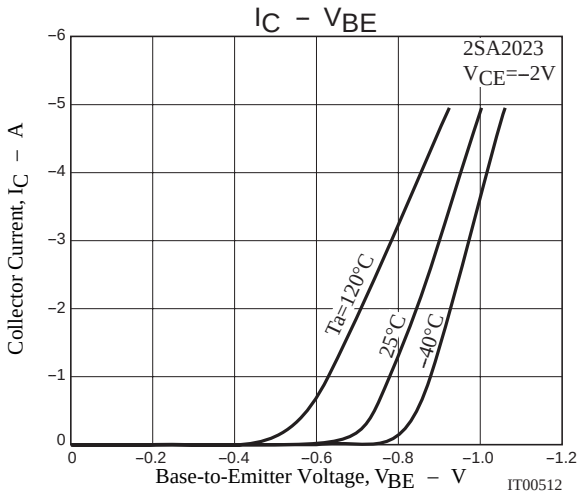
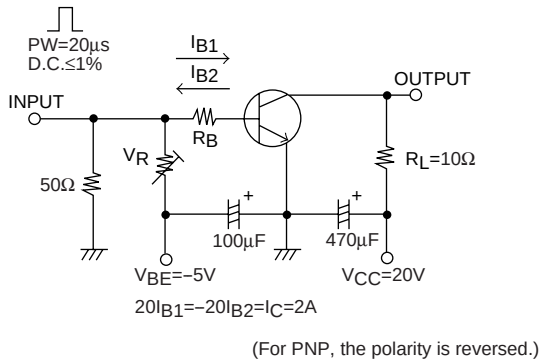


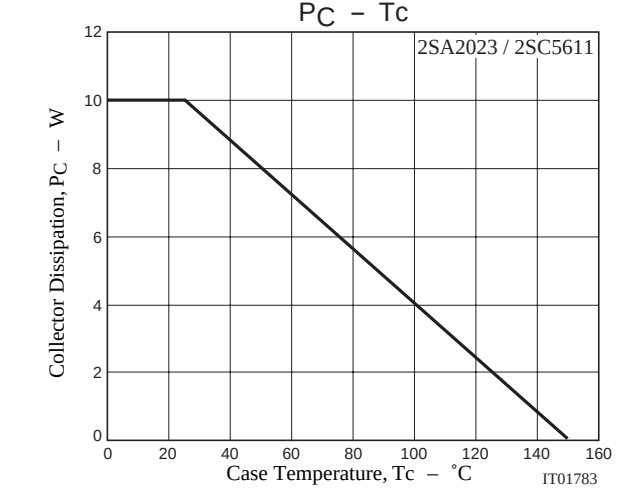
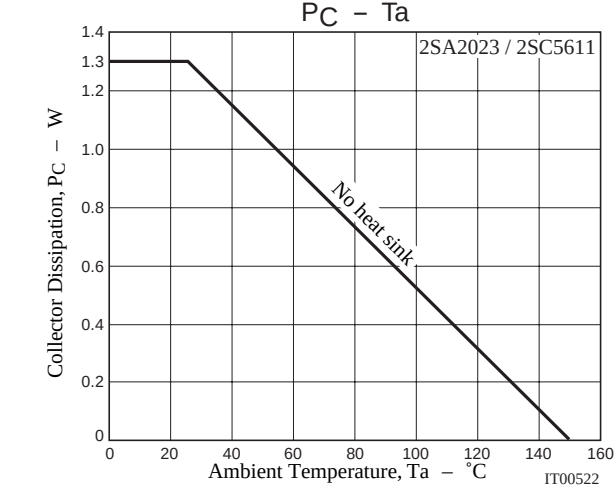
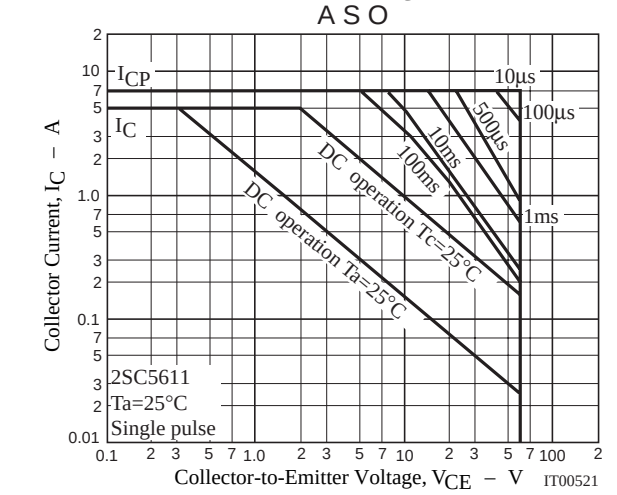
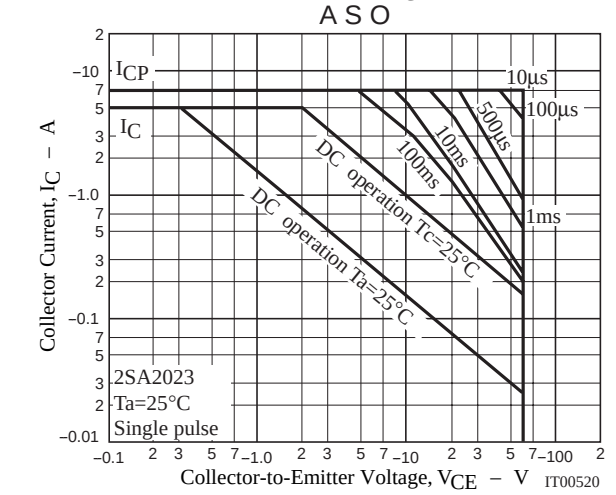
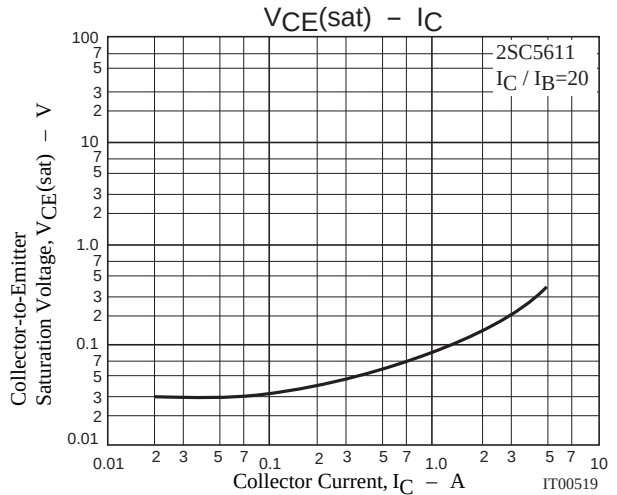
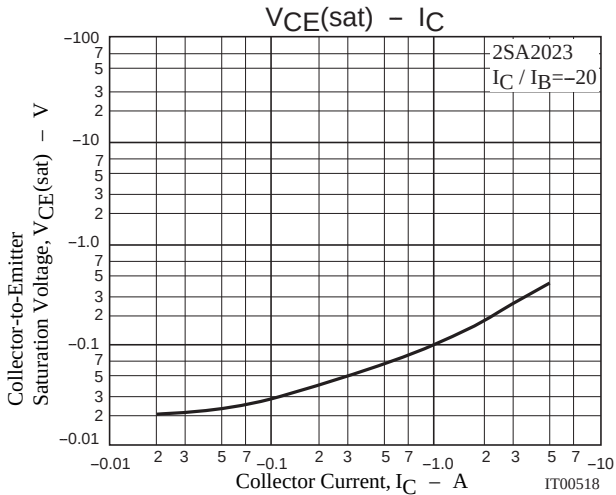
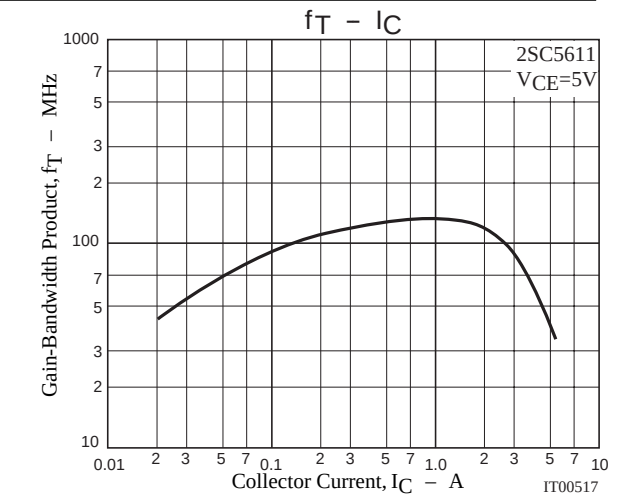
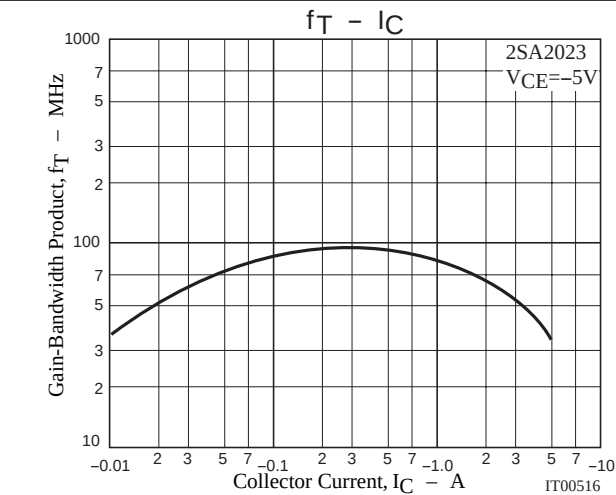
Note : The emitter and base are reversely assigned to those of our standard products encapsulated in the TO-126ML package.

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| Parameter                              | Symbol        | Conditions                  | Ratings |     |     | Unit    |
|----------------------------------------|---------------|-----------------------------|---------|-----|-----|---------|
|                                        |               |                             | min     | typ | max |         |
| Collector-to-Base Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C=(-)1mA, I_E=0$         | (-)80   |     |     | V       |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$ | (-)60   |     |     | V       |
| Emitter-to-Base Breakdown Voltage      | $V_{(BR)EBO}$ | $I_E=(-)1mA, I_C=0$         | (-)5    |     |     | V       |
| Turn-ON Time                           | $t_{on}$      | See specified Test Circuit  |         | 0.1 |     | $\mu s$ |
| Storage Time                           | $t_{stg}$     | See specified Test Circuit  |         | 0.5 |     | $\mu s$ |
| Fall Time                              | $t_f$         | See specified Test Circuit  |         | 0.1 |     | $\mu s$ |

Switching Time Test Circuit





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