



## 2SA2016/2SC5569

### DC/DC Converter Applications

#### Applications

- Relay drivers, lamp drivers, motor drivers, strobes.

#### Features

- Adoption of FBET and MBIT processes.
- High current capacitance.
- Low collector-to-emitter saturation voltage.
- High-speed switching.
- Ultrasmall package facilitates miniaturization in end products.
- High allowable power dissipation.

#### Specifications

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

| Parameter                    | Symbol    | Conditions   | Ratings     | Unit             |
|------------------------------|-----------|--|-------------|------------------|
| Collector-to-Base Voltage    | $V_{CB0}$ |  | (-50)80     | V                |
| Collector-to-Emitter Voltage | $V_{CEO}$ |  | (-50)       | V                |
| Emitter-to-Base Voltage      | $V_{EBO}$ |  | (-6)        | V                |
| Collector Current            | $I_C$     |  | (-7)        | A                |
| Collector Current (Pulse)    | $I_{CP}$  |  | (-10)       | A                |
| Base Current                 | $I_B$     |  | (-1.2)      | A                |
| Collector Dissipation        | $P_C$     | Mounted on a ceramic board (250mm <sup>2</sup> ×0.8mm) | 1.3         | W                |
|                              |           | $T_c=25^\circ\text{C}$                                 | 3.5         | 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) | $\mu\text{A}$ |
| Emitter Cutoff Current   | $I_{EBO}$ | $V_{EB}=-4\text{V}, I_C=0$              |         |        | (-0.1) | $\mu\text{A}$ |
| DC Current Gain          | $h_{FE}$  | $V_{CE}=-2\text{V}, I_C=-500\text{mA}$  | 200     |        | 560    |               |
| Gain-Bandwidth Product   | $f_T$     | $V_{CE}=-10\text{V}, I_C=-500\text{mA}$ |         | (290)  |        | MHz           |
|                          |           |   |         | 330    |        | MHz           |
| Output Capacitance       | $C_{ob}$  | $V_{CB}=-10\text{V}, f=1\text{MHz}$     |         | (50)28 |        | pF            |

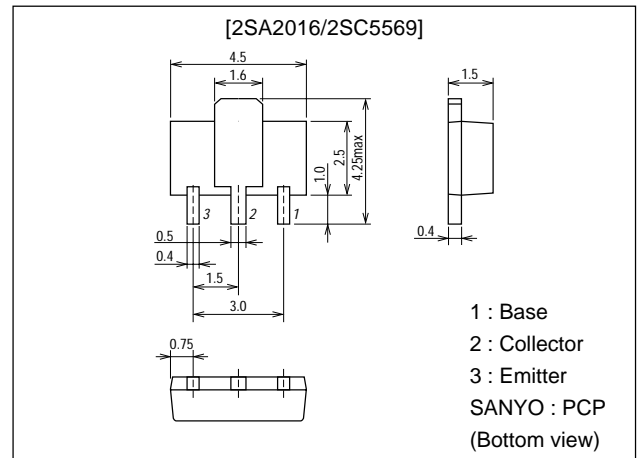
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#### Package Dimensions

unit:mm

2163



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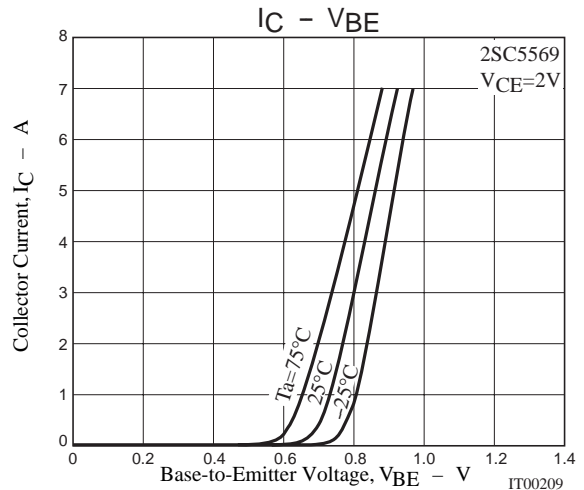
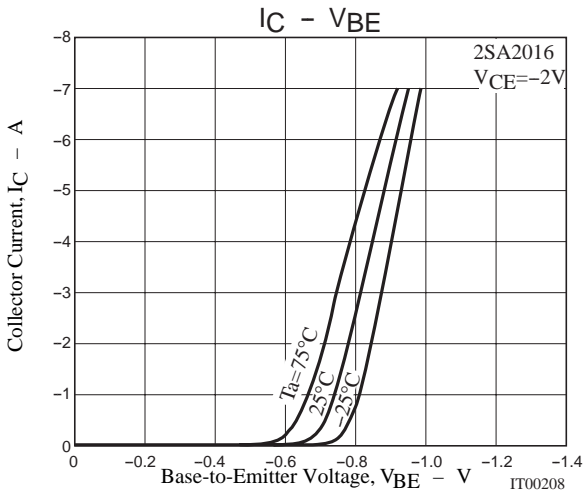
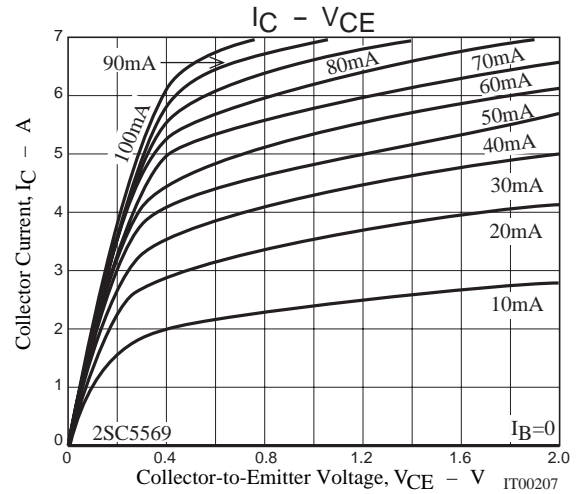
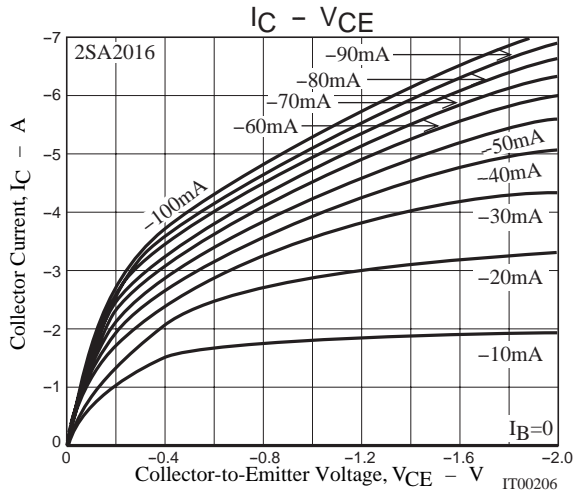
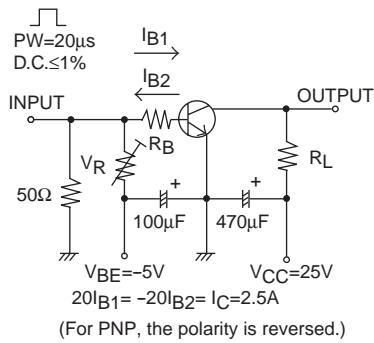
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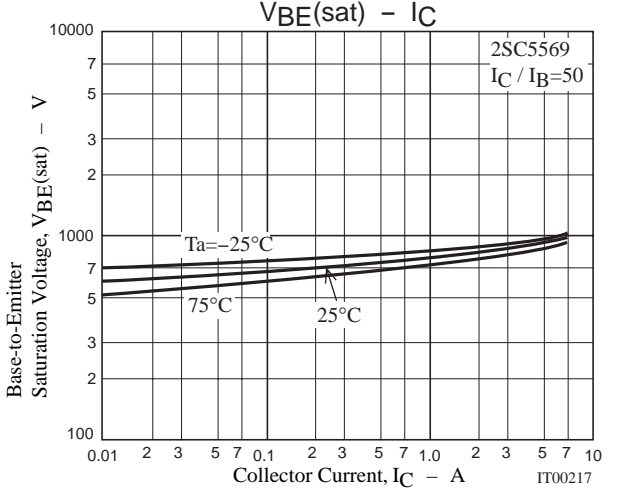
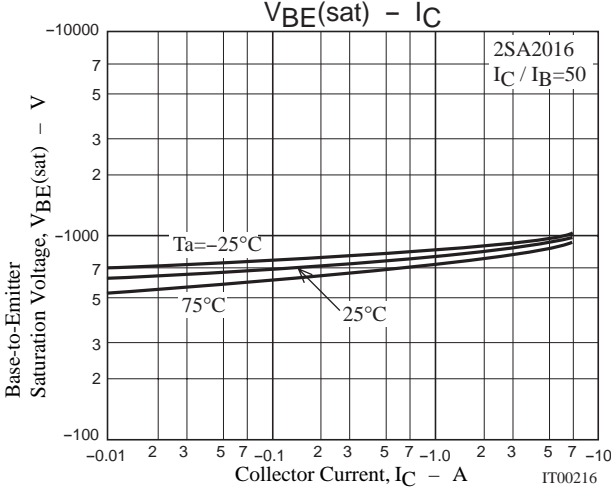
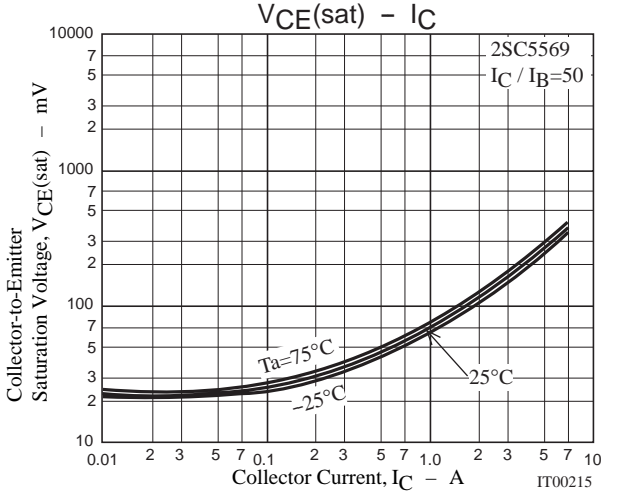
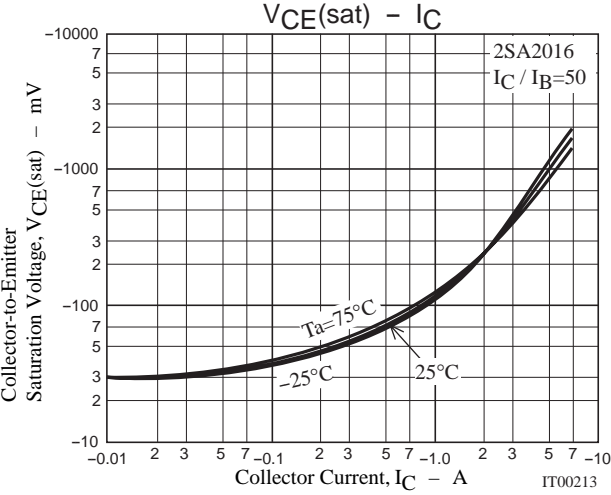
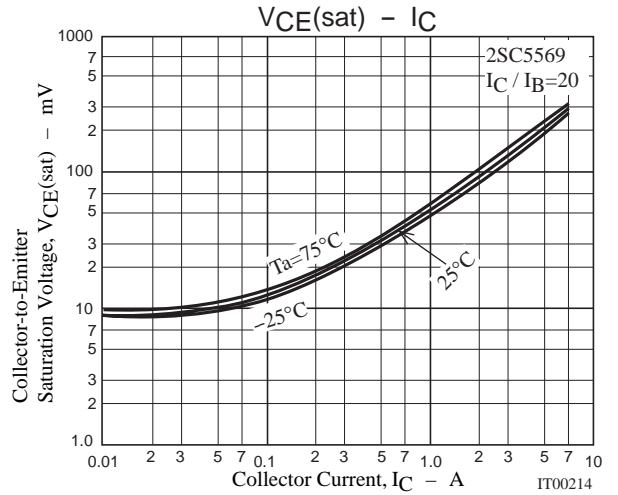
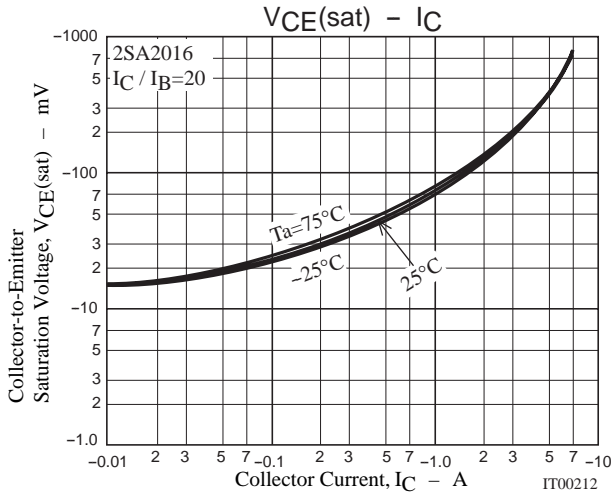
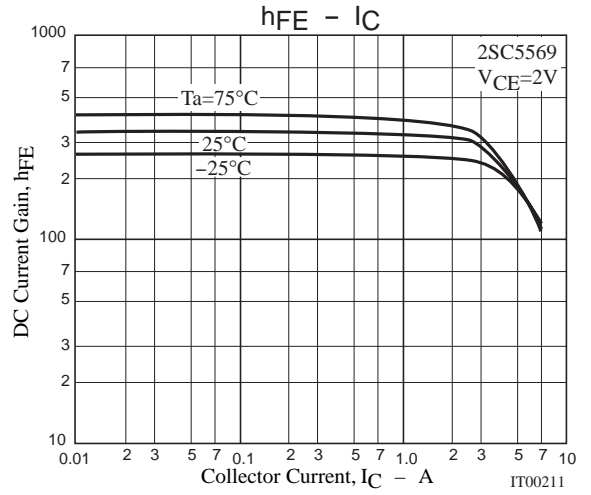
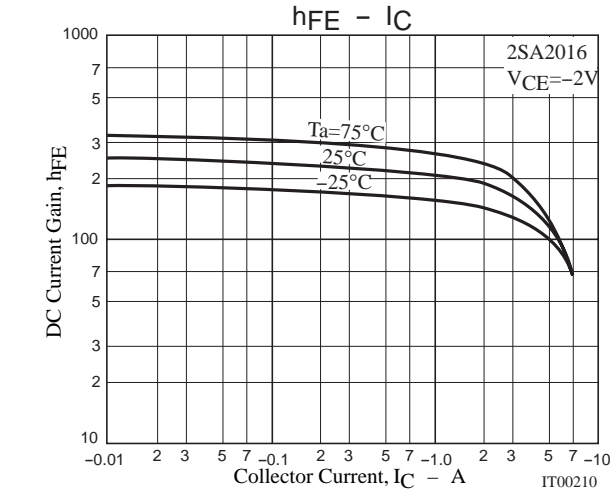
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| Parameter                               | Symbol        | Conditions                  | Ratings |         |        | Unit |
|---|---------------|-----------------------------|---------|---------|--------|------|
|   |               |                             | min     | typ     | max    |      |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)3.5A, I_B=(-)175mA$ |         | (-230)  | (-390) | mV   |
|   |               |                             |         | 160     | 240    | mV   |
|   |               |                             |         | (-240)  | (-400) | mV   |
|   |               |                             | 110     | 170     | mV     |      |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=(-)2A, I_B=(-)40mA$    |         | (-0.83) | (-1.2) | V    |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=(-)10\mu A, I_E=0$     | (-50)   |         |        | V    |
|   |               |                             | 80      |         |        | V    |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$ | (-50)   |         |        | V    |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=(-)10\mu A, I_C=0$     | (-6)    |         |        | V    |
| Turn-ON Time                            | $t_{on}$      | See specified Test Circuit  |         | (40)30  |        | ns   |
| Storage Time                            | $t_{stg}$     | See specified Test Circuit  |         | (225)   |        | ns   |
|   |               |                             |         | 420     |        | ns   |
| Fall Time                               | $t_f$         | See specified Test Circuit  |         | 25      |        | ns   |

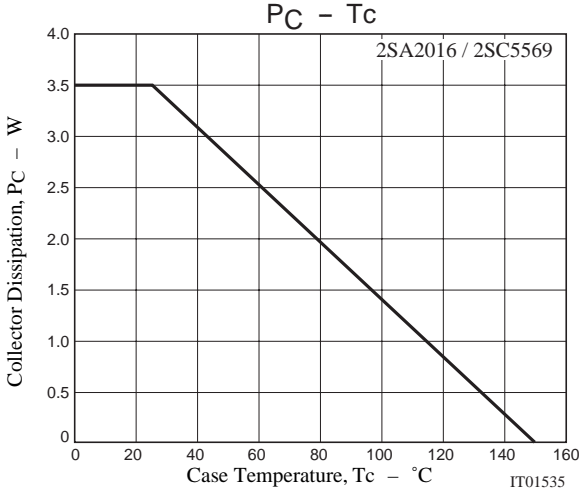
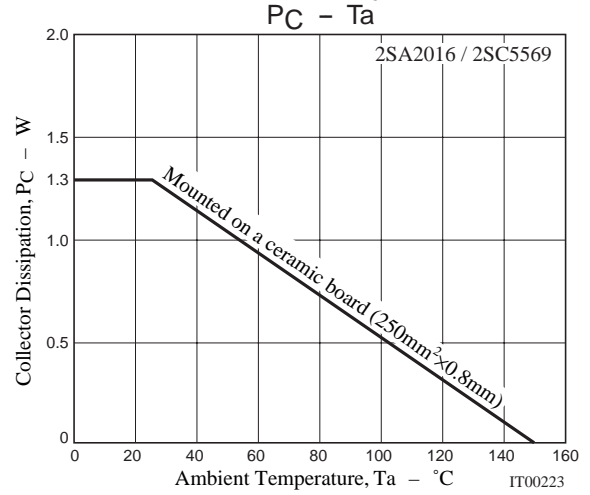
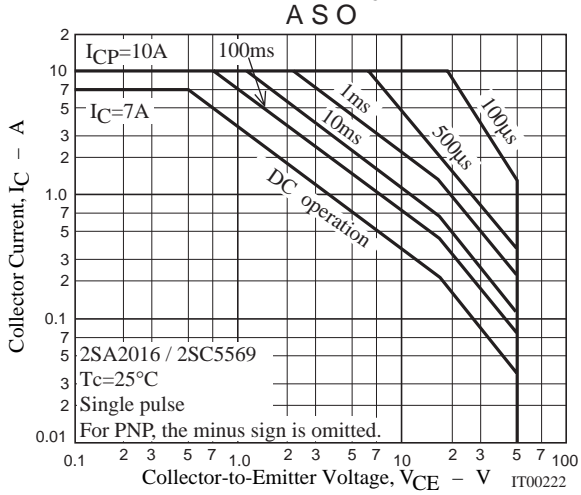
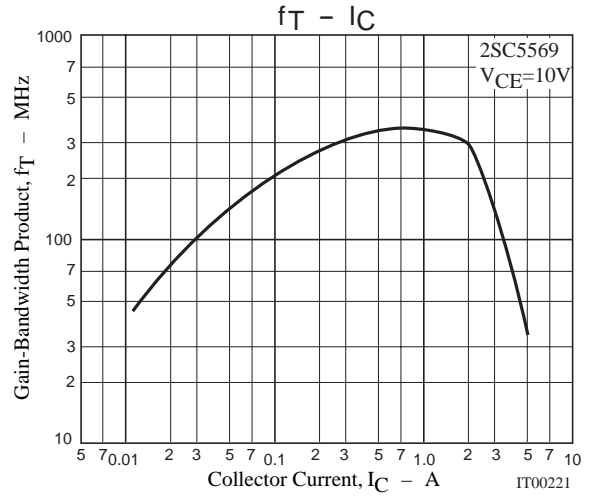
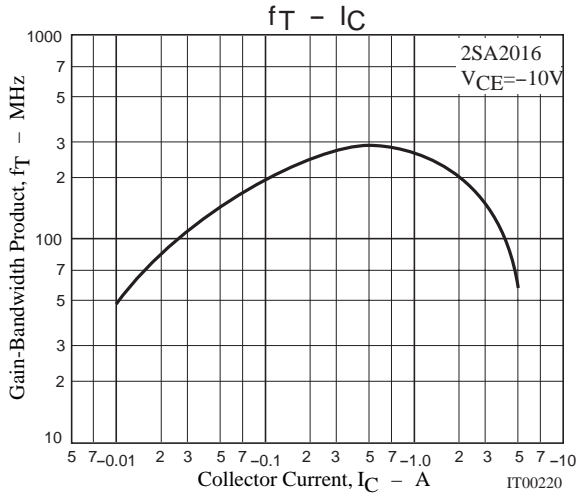
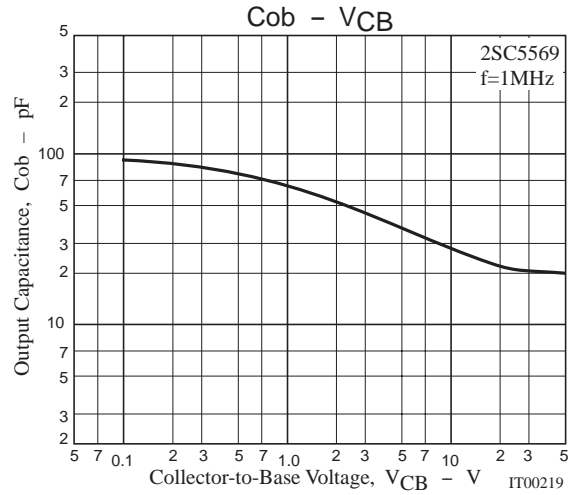
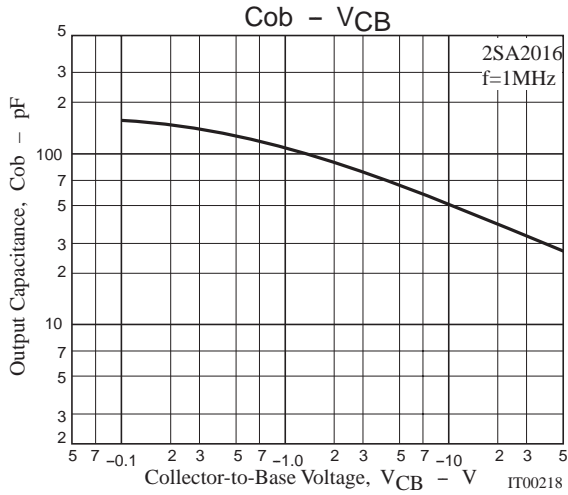
## Switching Time Test Circuit



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