



ON Semiconductor®

**ON Semiconductor**  
**DATA SHEET****SOP8501**PNP Epitaxial Planar Silicon Transistor  
NPN Triple Diffused Planar Silicon Transistor**High-Voltage Driver Applications****Features**

- High breakdown voltage. ( $V_{CEO} \geq 400V$ )
- Excellent  $h_{FE}$  linearity.

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

| Parameter                    | Symbol    | Conditions                                                    | PNP         | NPN | Unit |
|------------------------------|-----------|---------------------------------------------------------------|-------------|-----|------|
| Collector-to-Base Voltage    | $V_{CBO}$ |                                                               | -400        | 400 | V    |
| Collector-to-Emitter Voltage | $V_{CEO}$ |                                                               | -400        | 400 | V    |
| Emitter-to-Base Voltage      | $V_{EBO}$ |                                                               | -5          | 5   | V    |
| Collector Current            | $I_C$     |                                                               | -1          | 0.2 | A    |
| Collector Current (Pulse)    | $I_{CP}$  |                                                               | -2          | 0.4 | A    |
| Collector Dissipation        | $P_C$     | Mounted on a ceramic board (2000mm <sup>2</sup> ×0.8mm) 1unit | 1.3         |     | W    |
|                              | $P_T$     | Mounted on a ceramic board (2000mm <sup>2</sup> ×0.8mm) 1unit | 1.6         |     | W    |
| Junction Temperature         | $T_J$     |                                                               | 150         |     | °C   |
| Storage Temperature          | $T_{stg}$ |                                                               | -55 to +150 |     | °C   |

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

| Parameter                               | Symbol                | Conditions                                    | Ratings |      |      | Unit |
|-----------------------------------------|-----------------------|-----------------------------------------------|---------|------|------|------|
|                                         |                       |                                               | min     | typ  | max  |      |
| [PNP]                                   |                       |                                               |         |      |      |      |
| Collector Cutoff Current                | I <sub>CBO</sub>      | V <sub>CB</sub> =-300V, I <sub>E</sub> =0     |         |      | -1.0 | μA   |
| Emitter Cutoff Current                  | I <sub>EBO</sub>      | V <sub>EB</sub> =-4V, I <sub>C</sub> =0       |         |      | -1.0 | μA   |
| DC Current Gain                         | h <sub>FE</sub>       | V <sub>CE</sub> =-10V, I <sub>C</sub> =-100mA | 40      |      | 200  |      |
| Gain-Bandwidth Product                  | f <sub>T</sub>        | V <sub>CE</sub> =-10V, I <sub>C</sub> =-50mA  |         | 50   |      | MHz  |
| Collector-to-Emitter Saturation Voltage | V <sub>CE</sub> (sat) | I <sub>C</sub> =-200mA, I <sub>B</sub> =-20mA |         |      | -1.0 | V    |
| Base-to-Emitter Saturation Voltage      | V <sub>BE</sub> (sat) | I <sub>C</sub> =-200mA, I <sub>B</sub> =-20mA |         |      | -1.0 | V    |
| Collector-to-Base Breakdown Voltage     | V <sub>(BR)CBO</sub>  | I <sub>C</sub> =-10μA, I <sub>E</sub> =0      | -400    |      |      | V    |
| Collector-to-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub>  | I <sub>C</sub> =-1mA, R <sub>BE</sub> =∞      | -400    |      |      | V    |
| Emitter-to-Base Breakdown Voltage       | V <sub>(BR)EBO</sub>  | I <sub>E</sub> =-10μA, I <sub>C</sub> =0      | -5      |      |      | V    |
| Output Capacitance                      | C <sub>ob</sub>       | V <sub>CB</sub> =-30V, f=1MHz                 |         | 12   |      | pF   |
| Turn-ON Time                            | t <sub>on</sub>       | See specified Test Circuit.                   |         | 0.25 |      | μs   |
| Storage Time                            | t <sub>stg</sub>      | See specified Test Circuit.                   |         | 3.0  |      | μs   |
| Fall Time                               | t <sub>f</sub>        | See specified Test Circuit                    |         | 0.3  |      | μs   |

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# SOP8501

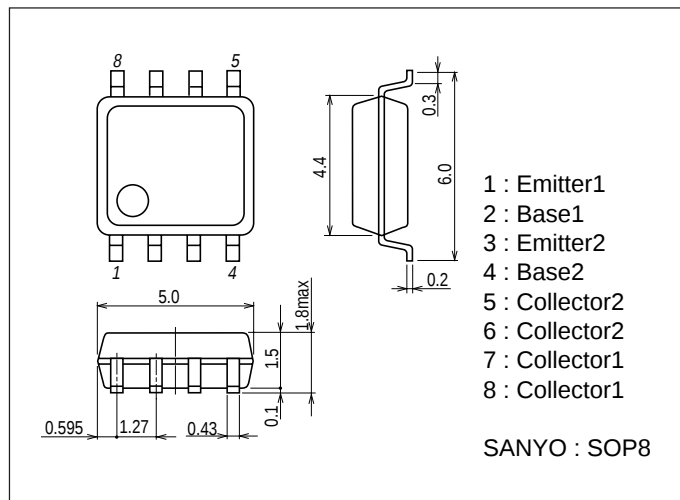
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| Parameter                               | Symbol               | Conditions                                 | Ratings |      |     | Unit |
|-----------------------------------------|----------------------|--------------------------------------------|---------|------|-----|------|
|                                         |                      |                                            | min     | typ  | max |      |
| [NPN]                                   |                      |                                            |         |      |     |      |
| Collector Cutoff Current                | I <sub>CBO</sub>     | V <sub>CB</sub> =300V, I <sub>E</sub> =0   |         |      | 1.0 | μA   |
| Emitter Cutoff Current                  | I <sub>EBO</sub>     | V <sub>EB</sub> =4V, I <sub>C</sub> =0     |         |      | 1.0 | μA   |
| DC Current Gain                         | h <sub>FE</sub>      | V <sub>CE</sub> =10V, I <sub>C</sub> =50mA | 60      |      | 200 |      |
| Gain-Bandwidth Product                  | f <sub>T</sub>       | V <sub>CE</sub> =30V, I <sub>C</sub> =10mA |         | 70   |     | MHz  |
| Collector-to-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> =50mA, I <sub>B</sub> =5mA  |         |      | 0.6 | V    |
| Base-to-Emitter Saturation Voltage      | V <sub>BE(sat)</sub> | I <sub>C</sub> =50mA, I <sub>B</sub> =5mA  |         |      | 1.0 | V    |
| Collector-to-Base Breakdown Voltage     | V(BR)CBO             | I <sub>C</sub> =10μA, I <sub>E</sub> =0    | 400     |      |     | V    |
| Collector-to-Emitter Breakdown Voltage  | V(BR)CEO             | I <sub>C</sub> =1mA, R <sub>BE</sub> =∞    | 400     |      |     | V    |
| Emitter-to-Base Breakdown Voltage       | V(BR)EBO             | I <sub>E</sub> =10μA, I <sub>C</sub> =0    | 5       |      |     | V    |
| Output Capacitance                      | C <sub>ob</sub>      | V <sub>CB</sub> =30V, f=1MHz               |         | 4    |     | pF   |
| Reverse Transfer Capacitance            | C <sub>re</sub>      | V <sub>CB</sub> =30V, f=1MHz               |         | 3    |     | pF   |
| Turn-ON Time                            | t <sub>on</sub>      | See specified Test Circuit.                |         | 0.25 |     | μs   |
| Turn-OFF Time                           | t <sub>off</sub>     | See specified Test Circuit.                |         | 5.0  |     | μs   |

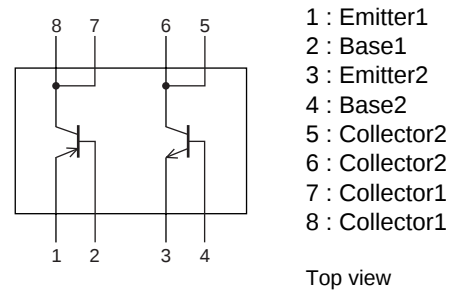
## Package Dimensions

unit : mm

2233



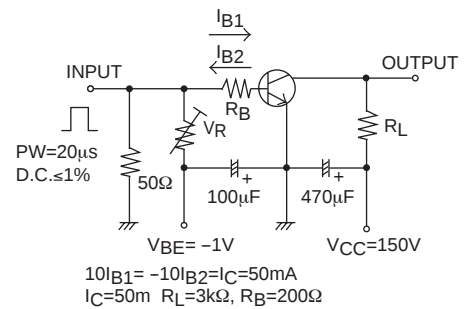
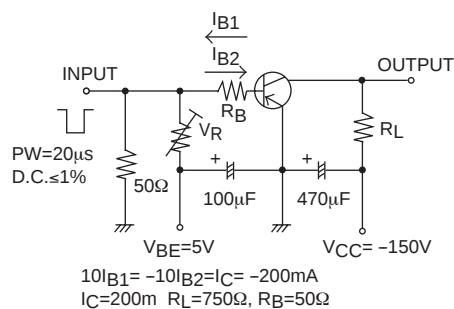
## Electrical Connection

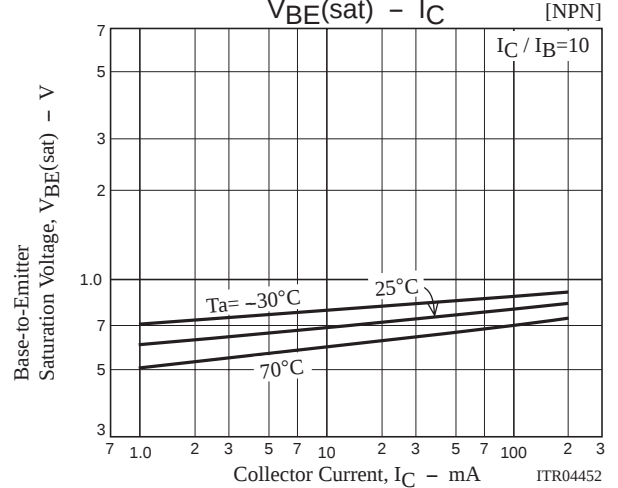
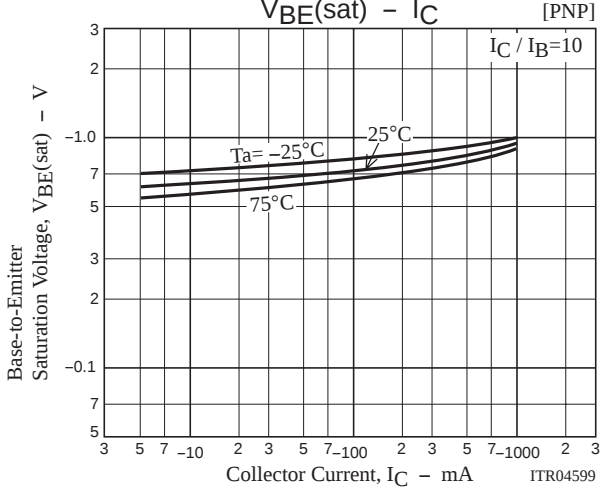
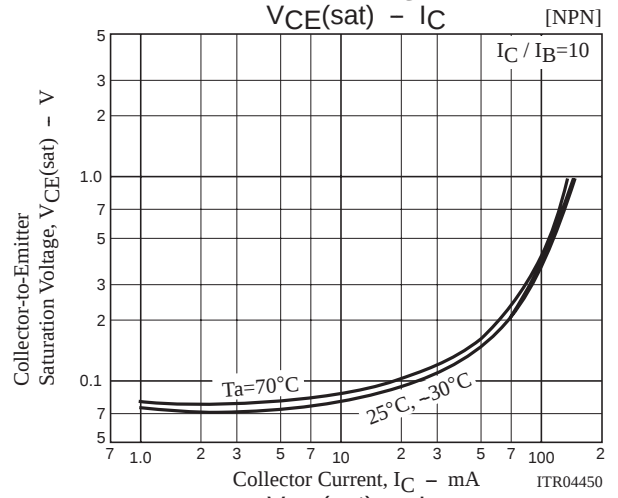
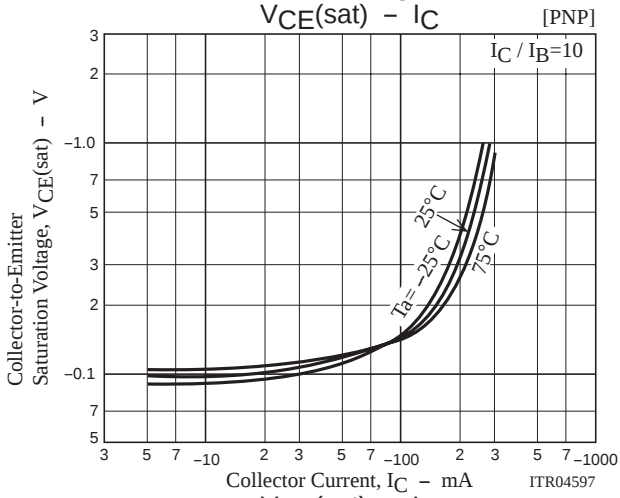
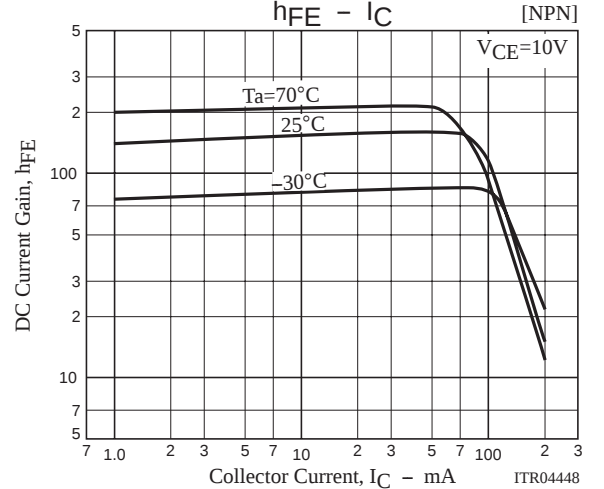
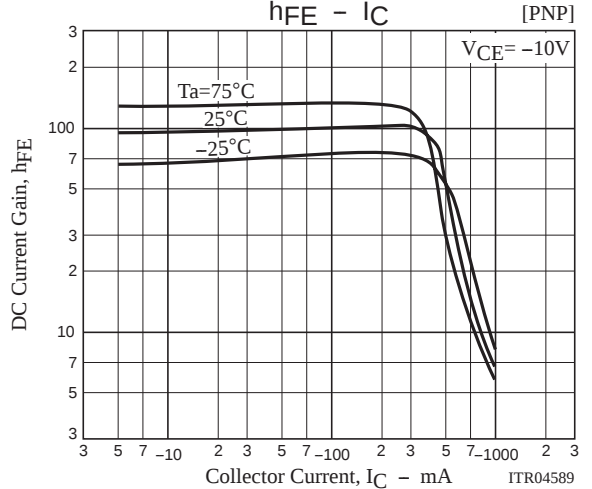
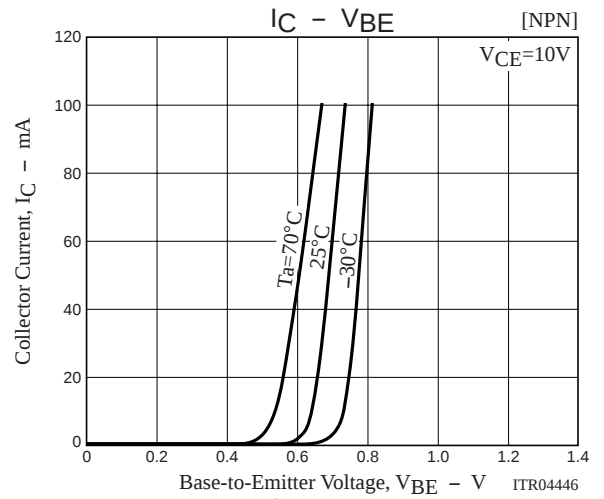
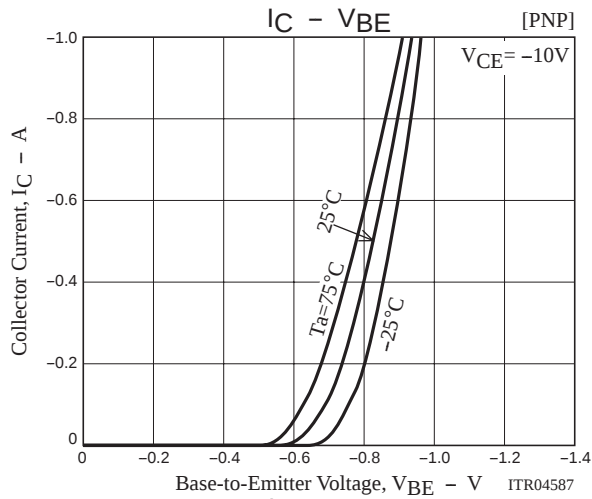


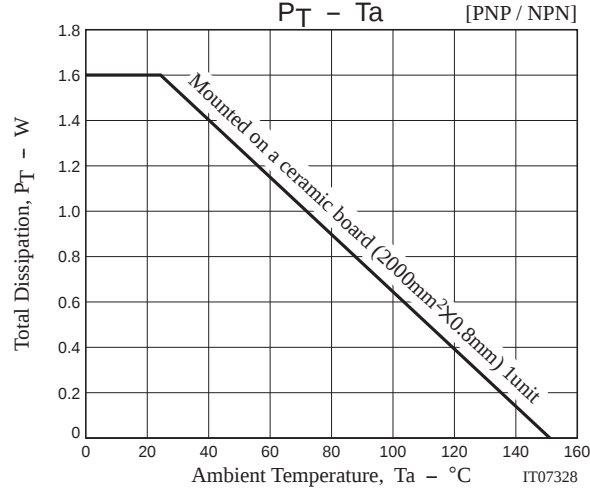
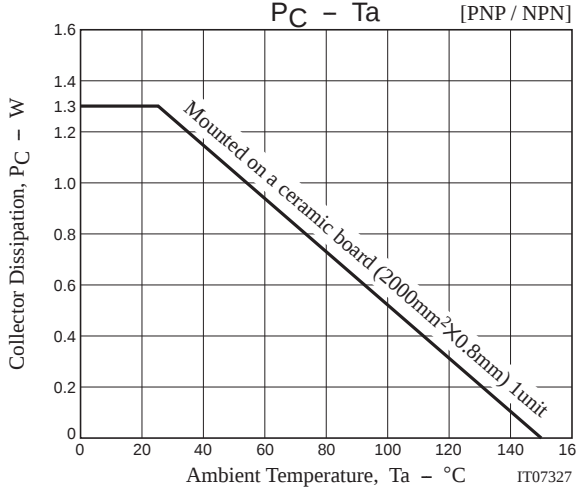
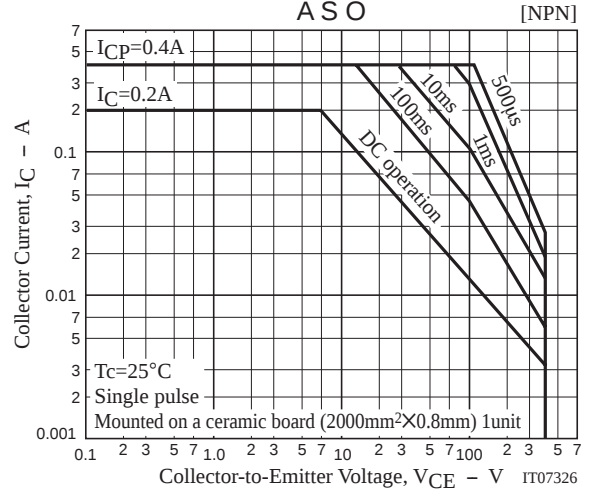
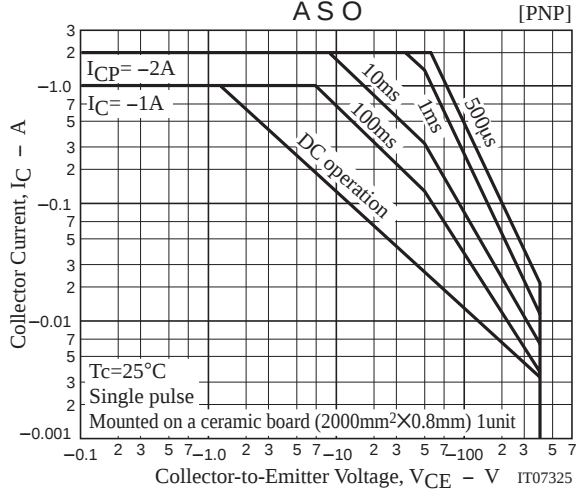
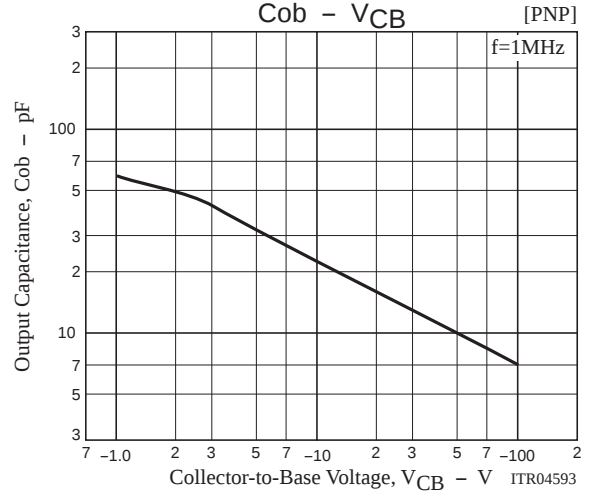
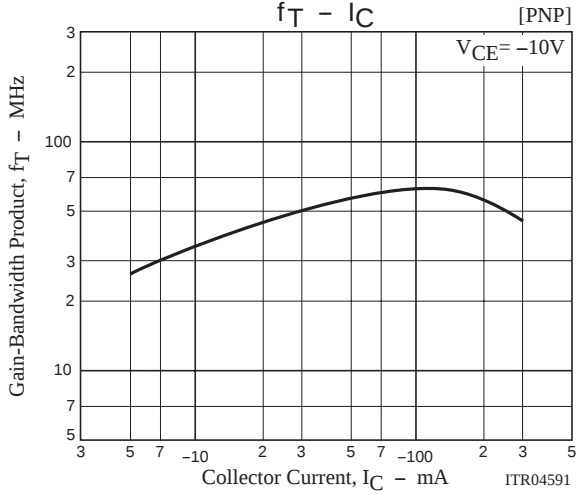
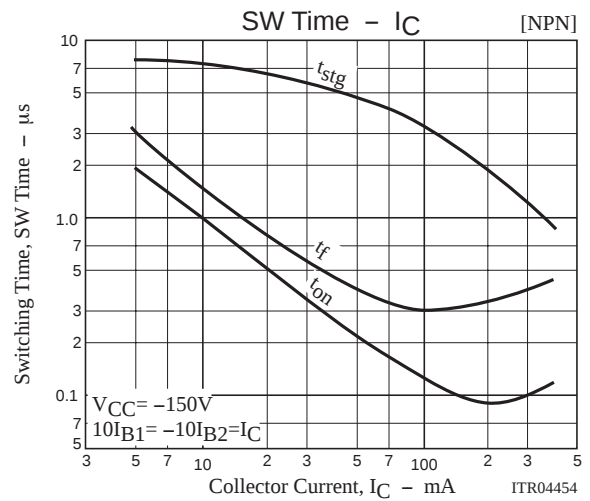
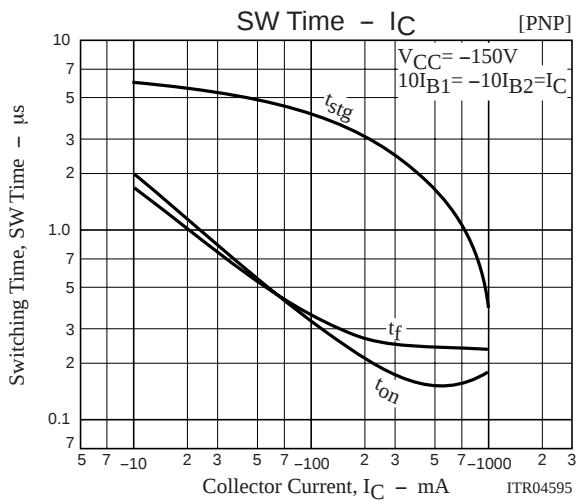
## Switching Time Test Circuit

[PNP]

[NPN]







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