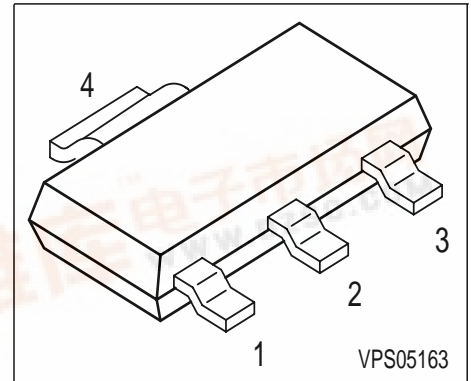




**BSP60 ... BSP62**

**PNP Silicon Darlington Transistors**

- High collector current
- Low collector-emitter saturation voltage
- Complementary types: BSP50 ... BSP52 (NPN)



| Type  | Marking | Pin Configuration |       |       |       | Package |
|-------|---------|-------------------|-------|-------|-------|---------|
| BSP60 | BSP 60  | 1 = B             | 2 = C | 3 = E | 4 = C | SOT223  |
| BSP61 | BSP 61  | 1 = B             | 2 = C | 3 = E | 4 = C | SOT223  |
| BSP62 | BSP 62  | 1 = B             | 2 = C | 3 = E | 4 = C | SOT223  |

**Maximum Ratings**

| Parameter                                      | Symbol    | BSP60       | BSP61 | BSP62 | Unit |
|--|-----------|-------------|-------|-------|------|
| Collector-emitter voltage                      | $V_{CEO}$ | 45          | 60    | 80    | V    |
| Collector-base voltage                         | $V_{CBO}$ | 60          | 80    | 90    |      |
| Emitter-base voltage                           | $V_{EBO}$ | 5           | 5     | 5     |      |
| DC collector current                           | $I_C$     | 1           |       |       | A    |
| Peak collector current                         | $I_{CM}$  | 2           |       |       |      |
| Base current                                   | $I_B$     | 100         |       |       | mA   |
| Total power dissipation, $T_S = 124\text{ °C}$ | $P_{tot}$ | 1.5         |       |       | W    |
| Junction temperature                           | $T_j$     | 150         |       |       | °C   |
| Storage temperature                            | $T_{stg}$ | -65 ... 150 |       |       |      |

**Thermal Resistance**

|  |            |     |     |
|--|------------|-----|-----|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | ≤17 | K/W |
|--|------------|-----|-----|

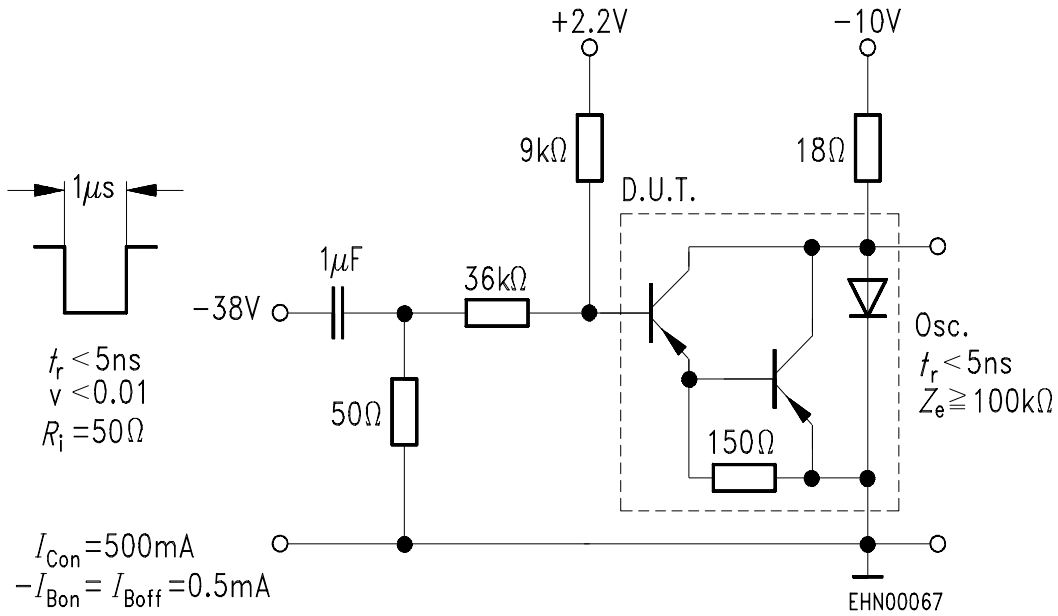
<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

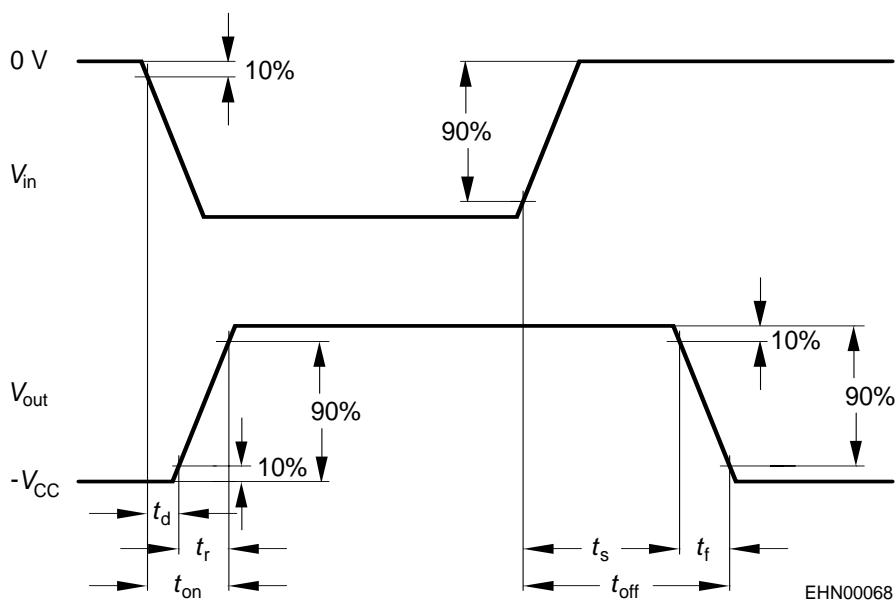
| Parameter  | Symbol        | Values |      |      | Unit          |
|--|---------------|--------|------|------|---------------|
|  |               | min.   | typ. | max. |               |
| <b>DC Characteristics</b>  |               |        |      |      |               |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ mA}, I_B = 0$   | $V_{(BR)CEO}$ |        |      |      | V             |
| BSP60  |               | 45     | -    | -    |               |
| BSP61  |               | 60     | -    | -    |               |
|  | BSP62         | 80     | -    | -    |               |
| Collector-base breakdown voltage<br>$I_C = 100\text{ }\mu\text{A}, I_E = 0$  | $V_{(BR)CBO}$ |        |      |      |               |
| BSP60  |               | 60     | -    | -    |               |
| BSP61  |               | 80     | -    | -    |               |
|  | BSP62         | 90     | -    | -    |               |
| Emitter-base breakdown voltage<br>$I_E = 100\text{ }\mu\text{A}, I_C = 0$  | $V_{(BR)EBO}$ | 5      | -    | -    |               |
| Collector-emitter cutoff current<br>$V_{CE} = V_{CE0max}, V_{BE} = 0$  | $I_{CES}$     | -      | -    | 10   | $\mu\text{A}$ |
| Emitter cutoff current<br>$V_{EB} = 4\text{ V}, I_C = 0$   | $I_{EBO}$     | -      | -    | 10   |               |
| DC current gain 1)<br>$I_C = 150\text{ mA}, V_{CE} = 10\text{ V}$<br>$I_C = 500\text{ mA}, V_{CE} = 10\text{ V}$               | $h_{FE}$      | 1000   | -    | -    | -             |
|  |               | 2000   | -    | -    |               |
| Collector-emitter saturation voltage1)<br>$I_C = 500\text{ mA}, I_B = 0.55\text{ mA}$<br>$I_C = 1\text{ A}, I_B = 1\text{ mA}$ | $V_{CEsat}$   | -      | -    | 1.3  | V             |
|  |               | -      | -    | 1.8  |               |
| Base-emitter saturation voltage 1)<br>$I_C = 500\text{ mA}, I_B = 0.5\text{ mA}$<br>$I_C = 1\text{ A}, I_B = 1\text{ mA}$      | $V_{BEsat}$   | -      | -    | 1.9  |               |
|  |               | -      | -    | 2.2  |               |
| <b>AC Characteristics</b>  |               |        |      |      |               |
| Transition frequency<br>$I_C = 100\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$   | $f_T$         | -      | 200  | -    | MHz           |
| Turn-on time<br>$I_C = 500\text{ mA}, I_{B1} = I_{B2} = 0.5\text{ mA}$   | $t_{(on)}$    | -      | 400  | -    | ns            |
| Turn-off time<br>$I_C = 500\text{ mA}, I_{B1} = I_{B2} = 0.5\text{ mA}$  | $t_{(off)}$   | -      | 1500 | -    |               |

 1) Pulse test:  $t \leq 300\text{ }\mu\text{s}$ ,  $D = 2\%$

### Switching time test circuit

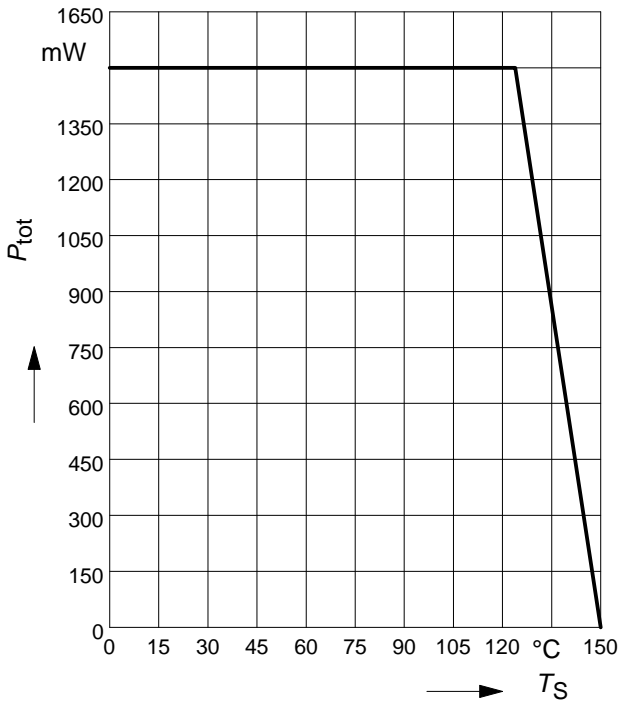


### Switching time waveform



1) Pulse test:  $t \leq 300\mu\text{s}$ ,  $D = 2\%$

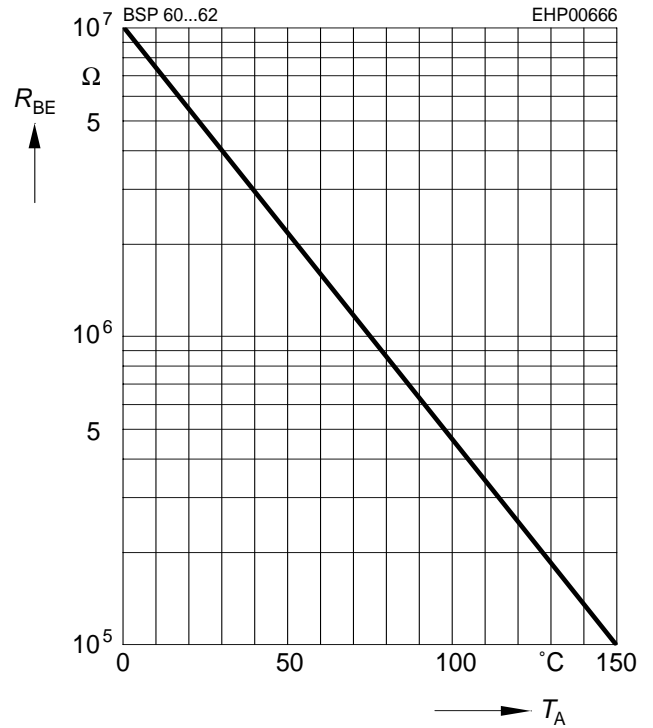
**Total power dissipation  $P_{tot} = f(T_S)$**



**External resistance  $R_{BE} = f(T_A)^{**}$**

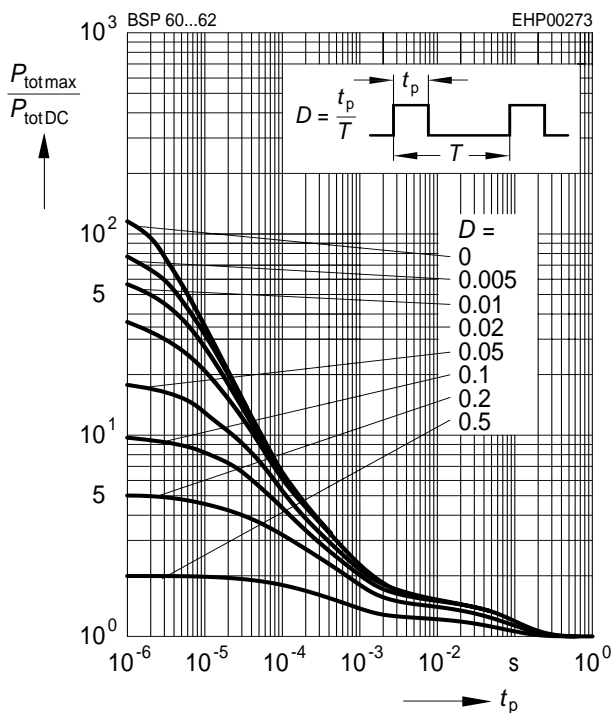
$V_{CB} = V_{CEmax}$

**\*\*  $R_{BEmax}$  for thermal stability**



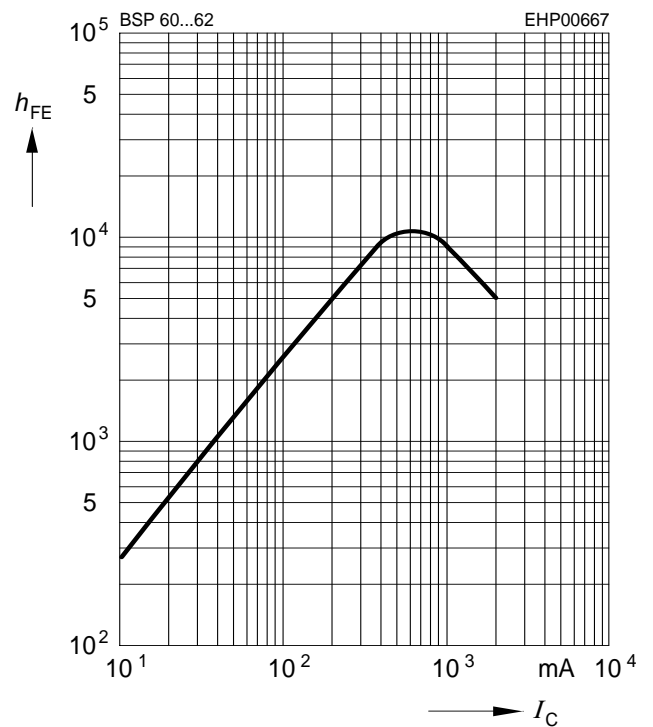
**Permissible pulse load**

$P_{totmax} / P_{totDC} = f(t_p)$



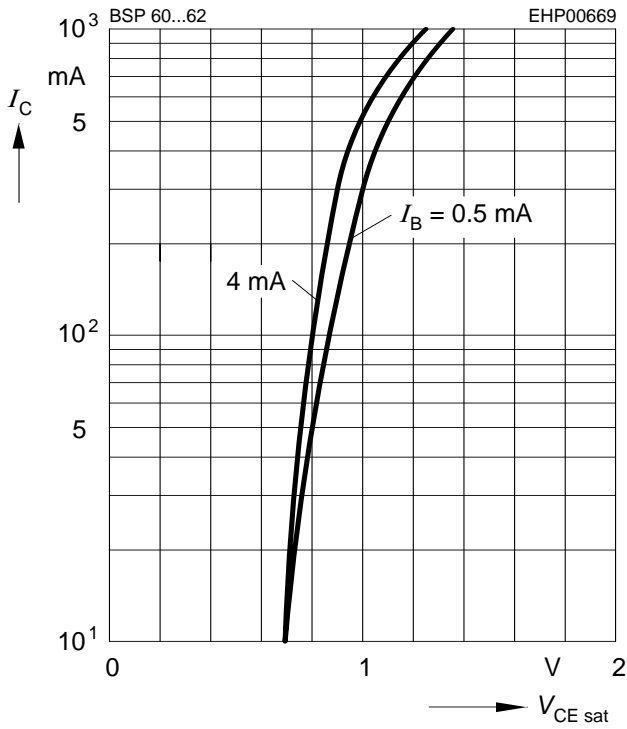
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 10V$



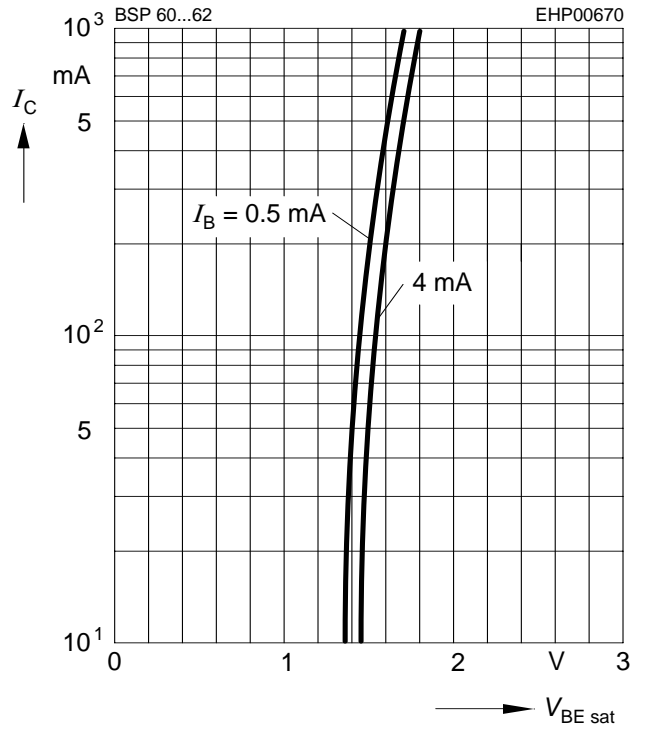
**Collector-emitter saturation voltage**

$I_C = f(V_{CEsat}), I_B$  - parameter



**Base-emitter saturation voltage**

$I_C = f(V_{BEsat}), I_B$  - parameter



**Transition frequency  $f_T = f(I_C)$**

$V_{CE} = 10V, f = 100MHz$

