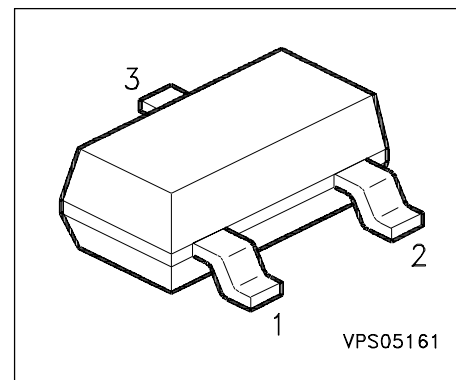
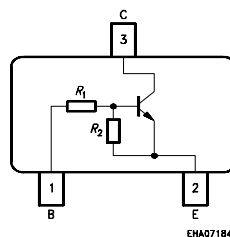


## NPN Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, drive circuit
- Built in bias resistor ( $R_1=4.7k\Omega$ ,  $R_2=4.7k\Omega$ )



| Type    | Marking | Ordering Code | Pin Configuration |       |       | Package |
|---------|---------|---------------|-------------------|-------|-------|---------|
| BCR 512 | XF5     | Q62702-C2445  | 1 = B             | 2 = E | 3 = C | SOT-23  |

### Maximum Ratings

| Parameter                                     | Symbol      | Values         | Unit |
|-----------------------------------------------|-------------|----------------|------|
| Collector-emitter voltage                     | $V_{CEO}$   | 50             | V    |
| Collector-base voltage                        | $V_{CBO}$   | 50             |      |
| Emitter-base voltage                          | $V_{EBO}$   | 10             |      |
| Input on Voltage                              | $V_{i(on)}$ | 30             |      |
| DC collector current                          | $I_C$       | 500            | mA   |
| Total power dissipation, $T_S = 79\text{ °C}$ | $P_{tot}$   | 330            | mW   |
| Junction temperature                          | $T_j$       | 150            | °C   |
| Storage temperature                           | $T_{stg}$   | - 65 ... + 150 |      |

### Thermal Resistance

|                                |            |            |     |
|--------------------------------|------------|------------|-----|
| Junction ambient <sup>1)</sup> | $R_{thJA}$ | $\leq 325$ | K/W |
| Junction - soldering point     | $R_{thJS}$ | $\leq 215$ |     |

1) Package mounted on pcb 40mm x 40mm x 1.5mm / 6cm<sup>2</sup> Cu

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

| Parameter | Symbol | Values |      |      | Unit |
|-----------|--------|--------|------|------|------|
|           |        | min.   | typ. | max. |      |

### DC Characteristics

|                                                                                           |               |     |     |      |            |
|-------------------------------------------------------------------------------------------|---------------|-----|-----|------|------------|
| Collector-emitter breakdown voltage<br>$I_C = 100\ \mu\text{A}$ , $I_B = 0$               | $V_{(BR)CEO}$ | 50  | -   | -    | V          |
| Collector-base breakdown voltage<br>$I_C = 10\ \mu\text{A}$ , $I_B = 0$                   | $V_{(BR)CBO}$ | 50  | -   | -    |            |
| Collector cutoff current<br>$V_{CB} = 40\ \text{V}$ , $I_E = 0$                           | $I_{CBO}$     | -   | -   | 100  | nA         |
| Emitter cutoff current<br>$V_{EB} = 10\ \text{V}$ , $I_C = 0$                             | $I_{EBO}$     | -   | -   | 1.61 | mA         |
| DC current gain<br>$I_C = 50\ \text{mA}$ , $V_{CE} = 5\ \text{V}$                         | $h_{FE}$      | 60  | -   | -    | -          |
| Collector-emitter saturation voltage 1)<br>$I_C = 50\ \text{mA}$ , $I_B = 2.5\ \text{mA}$ | $V_{CEsat}$   | -   | -   | 0.3  | mV         |
| Input off voltage<br>$I_C = 100\ \mu\text{A}$ , $V_{CE} = 5\ \text{V}$                    | $V_{i(off)}$  | 0.6 | -   | 1.5  | V          |
| Input on Voltage<br>$I_C = 2\ \text{mA}$ , $V_{CE} = 0.3\ \text{V}$                       | $V_{i(on)}$   | 1   | -   | 2.2  |            |
| Input resistor                                                                            | $R_1$         | 3.2 | 4.7 | 6.2  | k $\Omega$ |
| Resistor ratio                                                                            | $R_1/R_2$     | 0.9 | 1   | 1.1  | -          |

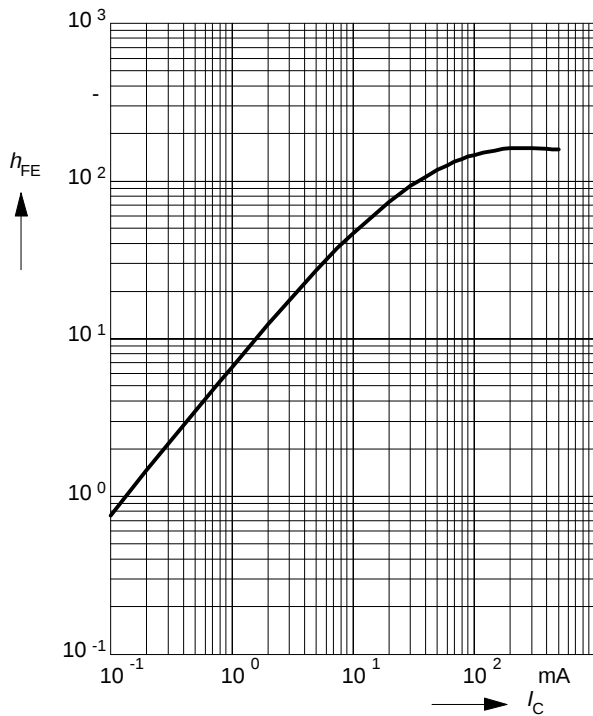
### AC Characteristics

|                                                                                                |       |   |     |   |     |
|------------------------------------------------------------------------------------------------|-------|---|-----|---|-----|
| Transition frequency<br>$I_C = 50\ \text{mA}$ , $V_{CE} = 5\ \text{V}$ , $f = 100\ \text{MHz}$ | $f_T$ | - | 100 | - | MHz |
|------------------------------------------------------------------------------------------------|-------|---|-----|---|-----|

1) Pulse test:  $t < 300\ \mu\text{s}$ ;  $D < 2\%$

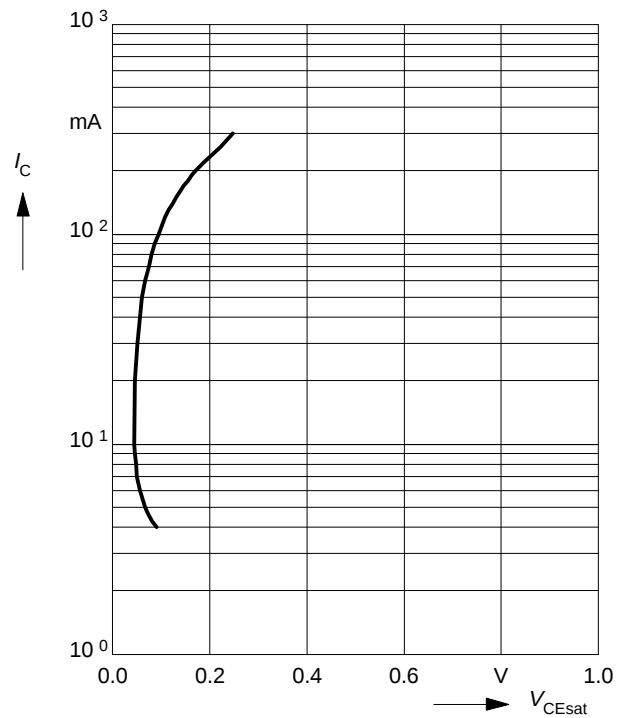
## DC Current Gain $h_{FE} = f(I_C)$

$V_{CE} = 5V$  (common emitter configuration)



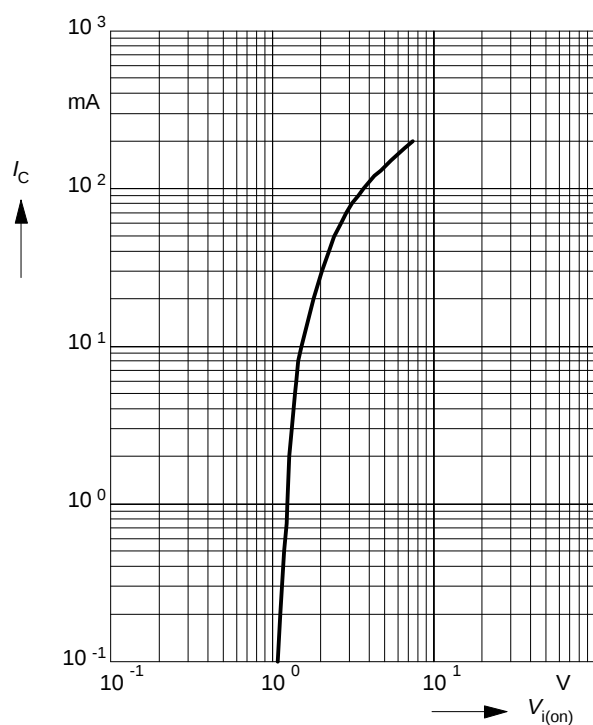
## Collector-Emitter Saturation Voltage

$V_{CEsat} = f(I_C), h_{FE} = 20$



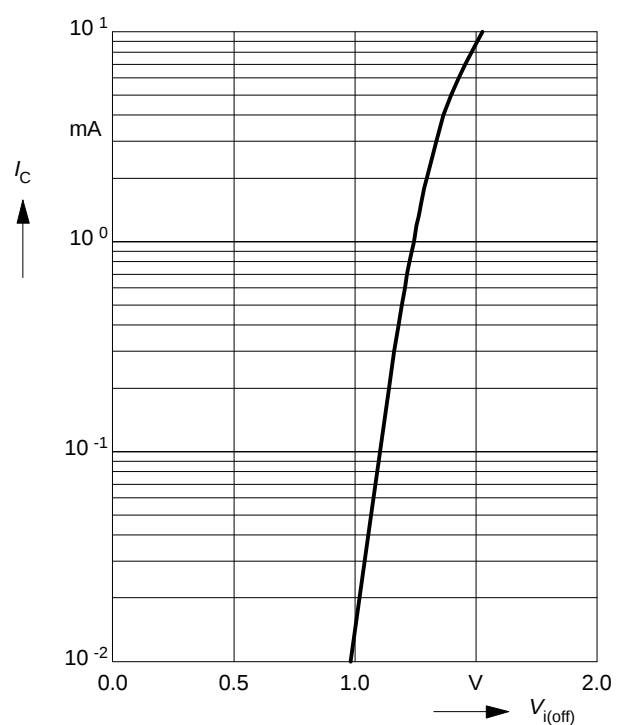
## Input on Voltage $V_{i(on)} = f(I_C)$

$V_{CE} = 0.3V$  (common emitter configuration)



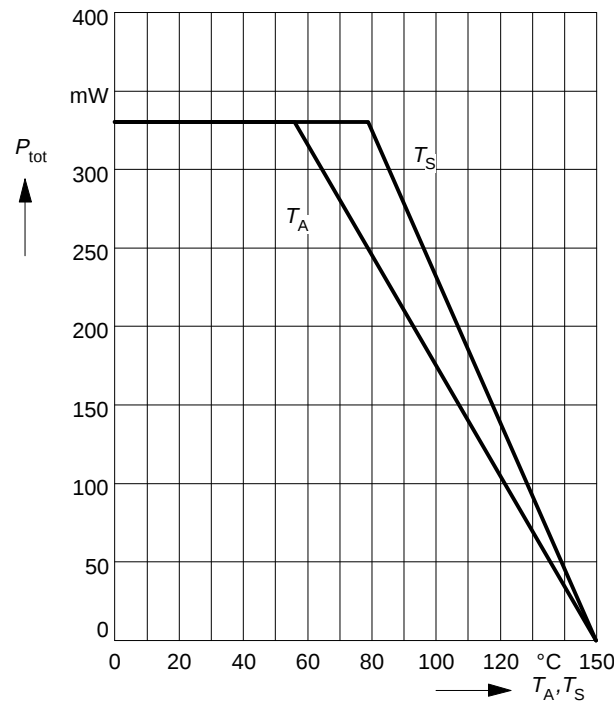
## Input off voltage $V_{i(off)} = f(I_C)$

$V_{CE} = 5V$  (common emitter configuration)

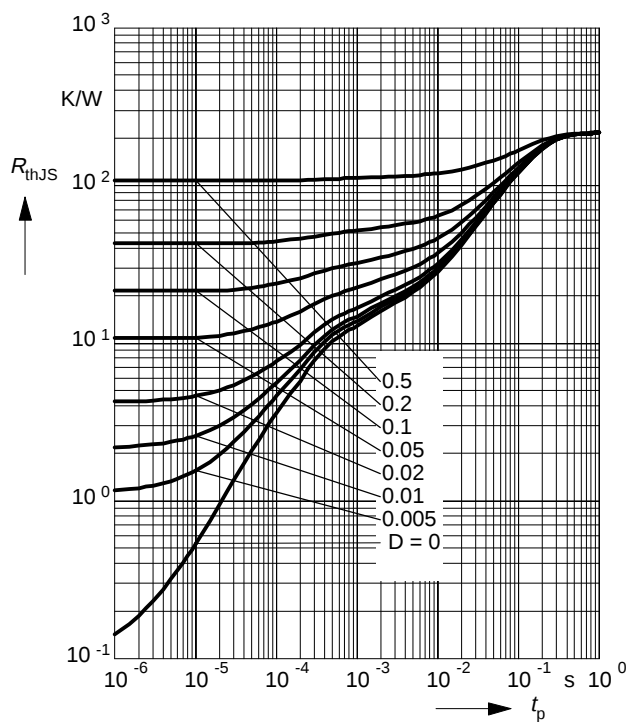


**Total power dissipation  $P_{\text{tot}} = f(T_A^*; T_S)$**

\* Package mounted on epoxy



**Permissible Pulse Load  $R_{\text{thJS}} = f(t_p)$**



**Permissible Pulse Load  $P_{\text{totmax}} / P_{\text{totDC}} = f(t_p)$**

