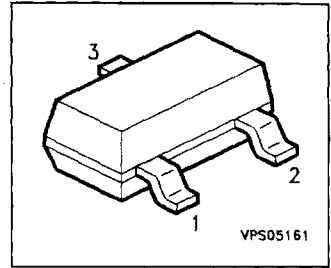
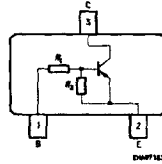


## PNP Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ( $R_1=4.7k\Omega$ ,  $R_2=47k\Omega$ )



| Type    | Marking | Ordering Code | Pin Configuration |     |     | Package |
|---------|---------|---------------|-------------------|-----|-----|---------|
| BCR 166 | WTs     | Q62702-C2339  | 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                               | $V_{EBO}$   | 5              |                  |
| Input on Voltage                                   | $V_{i(on)}$ | 15             |                  |
| DC collector current                               | $I_C$       | 100            | mA               |
| Total power dissipation, $T_S = 102^\circ\text{C}$ | $P_{Tot}$   | 200            | mW               |
| Junction temperature                               | $T_j$       | 150            | $^\circ\text{C}$ |
| Storage temperature                                | $T_{stg}$   | - 65 ... + 150 |                  |

### Thermal Resistance

|                                |            |            |     |
|--------------------------------|------------|------------|-----|
| Junction ambient <sup>1)</sup> | $R_{thJA}$ | $\leq 350$ | K/W |
| Junction - soldering point     | $R_{thJS}$ | $\leq 240$ |     |

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>$V_{EB} = 5 \text{V}$ , $I_C = 0$                             | $I_{EBO}$     | -    | -   | 155  | $\mu\text{A}$ |
| DC current gain<br>$I_C = 5 \text{mA}$ , $V_{CE} = 5 \text{V}$                          | $h_{FE}$      | 70   | -   | -    | -             |
| Collector-emitter saturation voltage 1)<br>$I_C = 10 \text{mA}$ , $I_B = 0.5 \text{mA}$ | $V_{CEsat}$   | -    | -   | 0.3  | V             |
| Input off voltage<br>$I_C = 100 \mu\text{A}$ , $V_{CE} = 5 \text{V}$                    | $V_{i(off)}$  | 0.4  | -   | 0.8  |               |
| Input on Voltage<br>$I_C = 2 \text{mA}$ , $V_{CE} = 0.3 \text{V}$                       | $V_{i(on)}$   | 0.5  | -   | 1.4  |               |
| Input resistor  | $R_1$         | 3.2  | 4.7 | 6.2  | k $\Omega$    |
| Resistor ratio  | $R_1/R_2$     | 0.09 | 0.1 | 0.11 | -             |

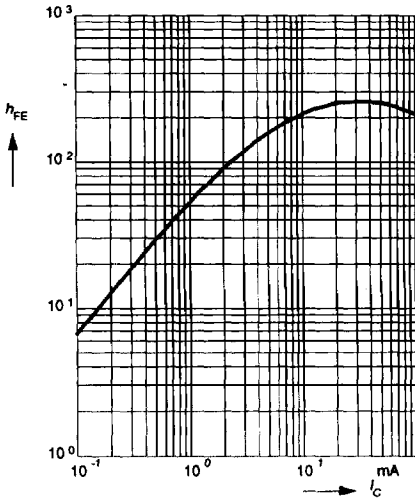
**AC Characteristics**

|   |          |   |     |   |     |
|---|----------|---|-----|---|-----|
| Transition frequency<br>$I_C = 10 \text{mA}$ , $V_{CE} = 5 \text{V}$ , $f = 100 \text{MHz}$ | $f_T$    | - | 160 | - | MHz |
| Collector-base capacitance<br>$V_{CB} = 10 \text{V}$ , $f = 1 \text{MHz}$                   | $C_{cb}$ | - | 3   | - | pF  |

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

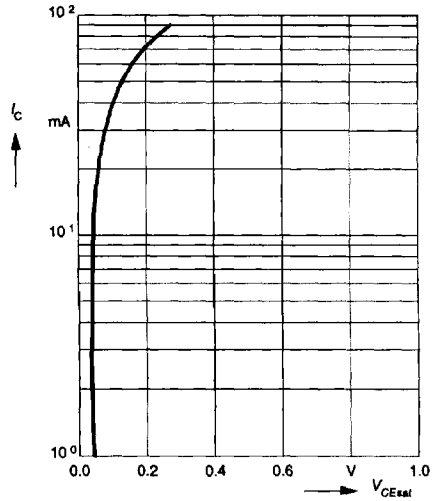
**DC Current Gain  $h_{FE} = f(I_C)$**

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



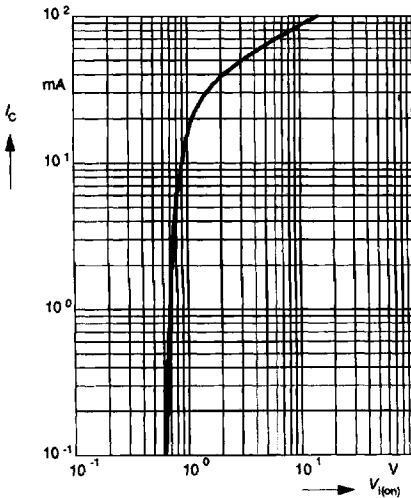
**Collector-Emitter Saturation Voltage  $V_{CEsat} = f(I_C)$ ,  $h_{FE} = 20$**

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



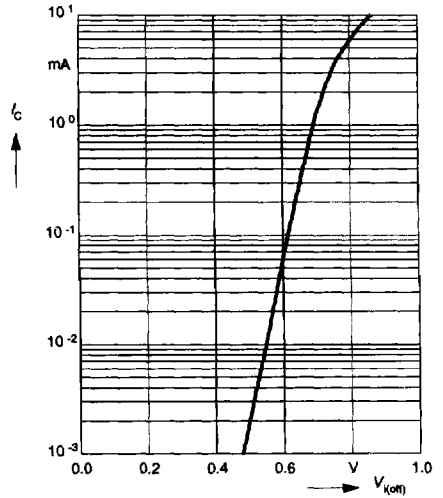
**Input on Voltage  $V_{i(on)} = f(I_C)$**

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



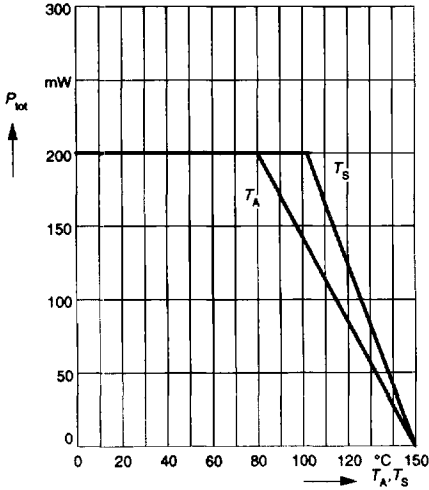
**Input off voltage  $V_{i(off)} = f(I_C)$**

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



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

\* Package mounted on epoxy



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

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

