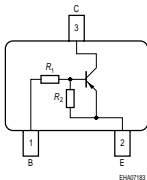


**PNP Silicon Digital Transistor**

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ( $R_1 = 4.7\text{ k}\Omega$  ,  $R_2 = 47\text{ k}\Omega$  )
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101


**BCR166**  
**BCR166W**


| Type    | Marking | Pin Configuration |     |     |   |   |   | Package |
|---------|---------|-------------------|-----|-----|---|---|---|---------|
| BCR166  | WTs     | 1=B               | 2=E | 3=C | - | - | - | SOT23   |
| BCR166W | WTs     | 1=B               | 2=E | 3=C | - | - | - | SOT323  |

**Maximum Ratings**

| Parameter  | Symbol       | Value       | Unit             |
|--|--------------|-------------|------------------|
| Collector-emitter voltage  | $V_{CEO}$    | 50          | V                |
| Collector-base voltage   | $V_{CBO}$    | 50          |                  |
| Input forward voltage  | $V_{i(fwd)}$ | 30          |                  |
| Input reverse voltage  | $V_{i(rev)}$ | 5           |                  |
| Collector current  | $I_C$        | 100         | mA               |
| Total power dissipation-<br>BCR166, $T_S \leq 102^\circ\text{C}$ | $P_{tot}$    | 200         | mW               |
| BCR166W, $T_S \leq 124^\circ\text{C}$                            |              | 250         |                  |
| Junction temperature   | $T_j$        | 150         | $^\circ\text{C}$ |
| Storage temperature  | $T_{stg}$    | -65 ... 150 |                  |

**Thermal Resistance**

| Parameter                                | Symbol     | Value | Unit |
|--|------------|-------|------|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ |       | K/W  |
| BCR166                                   |            | ≤ 240 |      |
| BCR166W                                  |            | ≤ 105 |      |

**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>$I_C = 10 \mu\text{A}, I_E = 0$                               | $V_{(BR)CBO}$ | 50   | -   | -    |                  |
| Collector-base cutoff current<br>$V_{CB} = 40 \text{ V}, I_E = 0$                                 | $I_{CBO}$     | -    | -   | 100  | nA               |
| Emitter-base cutoff current<br>$V_{EB} = 5 \text{ V}, I_C = 0$                                    | $I_{EBO}$     | -    | -   | 155  | $\mu\text{A}$    |
| DC current gain <sup>2)</sup><br>$I_C = 5 \text{ mA}, V_{CE} = 5 \text{ V}$                       | $h_{FE}$      | 70   | -   | -    | -                |
| Collector-emitter saturation voltage <sup>2)</sup><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  | $\text{k}\Omega$ |
| Resistor ratio  | $R_1/R_2$     | 0.09 | 0.1 | 0.11 | -                |

**AC Characteristics**

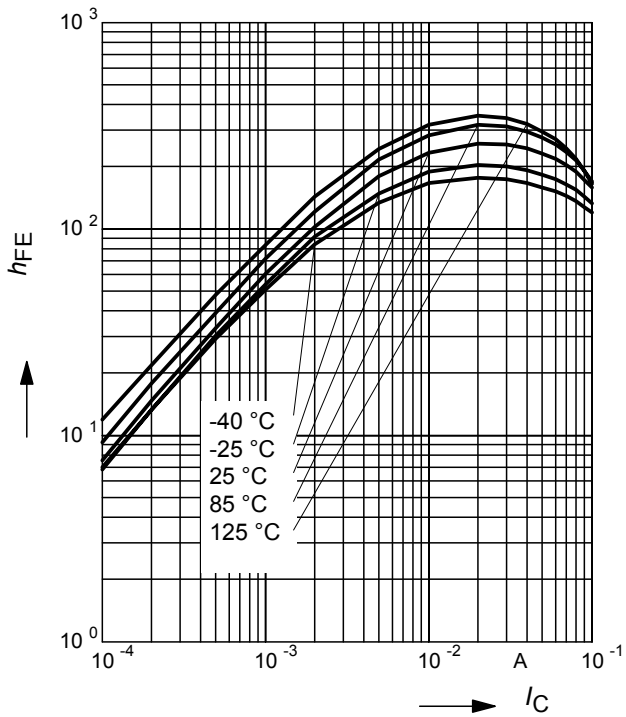
|  |          |   |     |   |     |
|--|----------|---|-----|---|-----|
| Transition frequency<br>$I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$ | $f_T$    | - | 160 | - | MHz |
| Collector-base capacitance<br>$V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$                 | $C_{cb}$ | -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

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

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

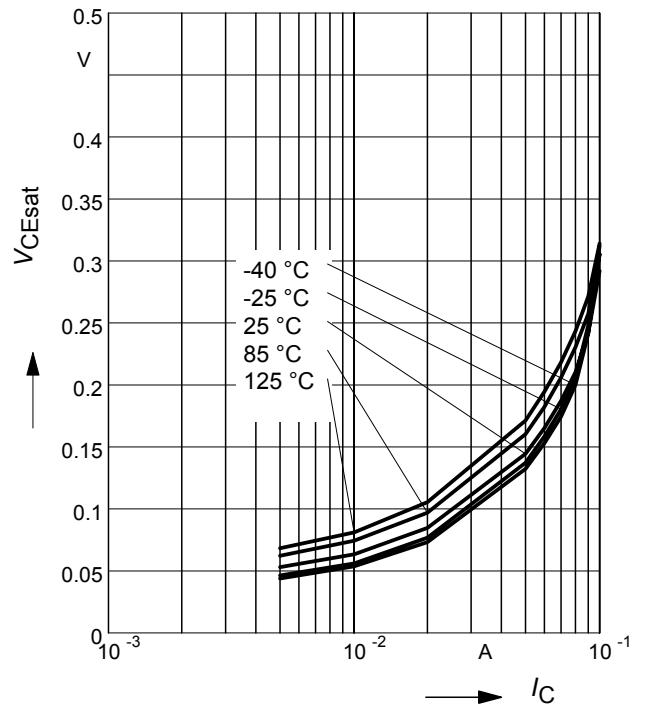
**DC current gain  $h_{FE} = f(I_C)$**

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



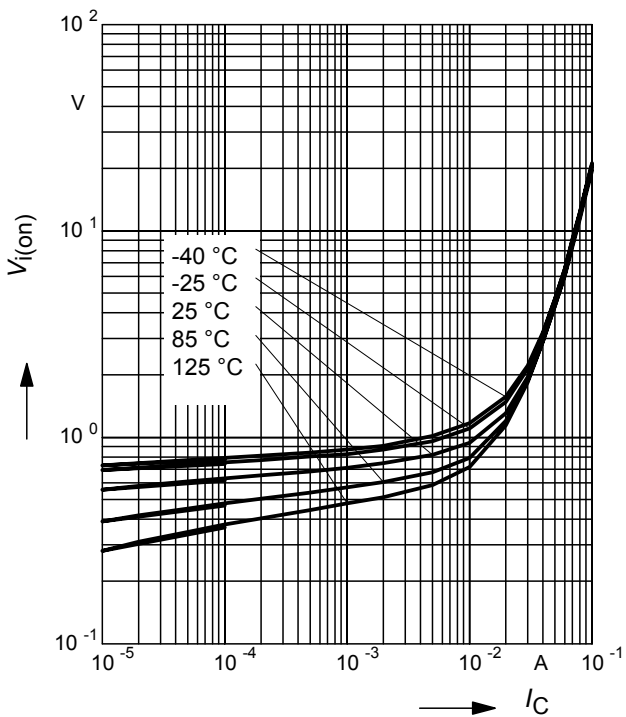
**Collector-emitter saturation voltage**

$V_{CEsat} = f(I_C), I_C/I_B = 20$



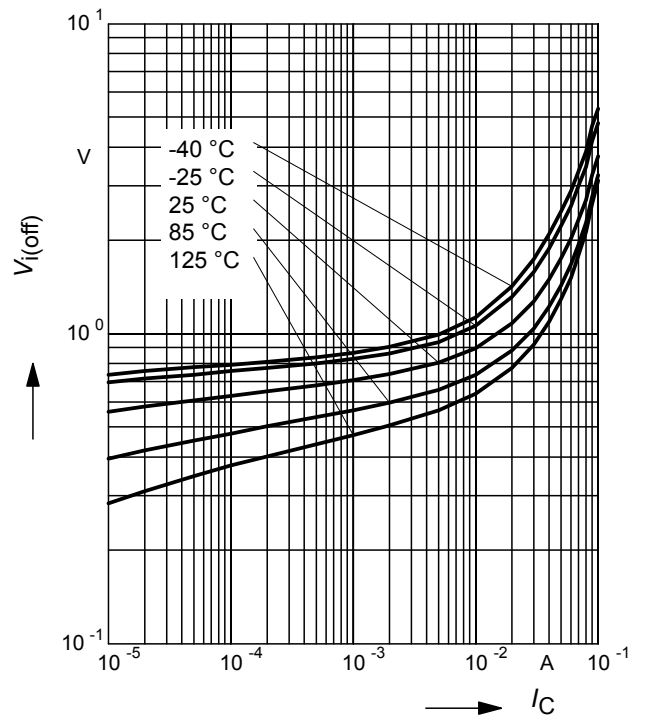
**Input on Voltage  $V_{i(on)} = f(I_C)$**

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



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

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



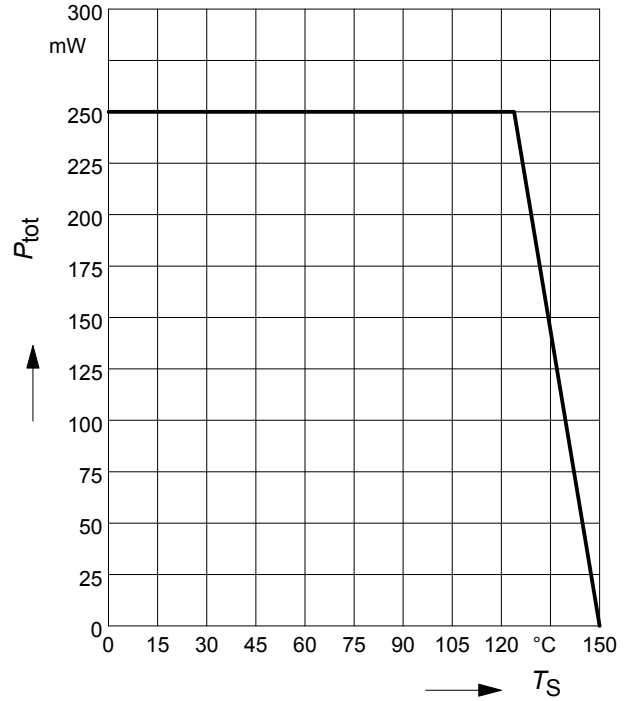
**Total power dissipation  $P_{tot} = f(T_S)$**

BCR166



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

BCR166W



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

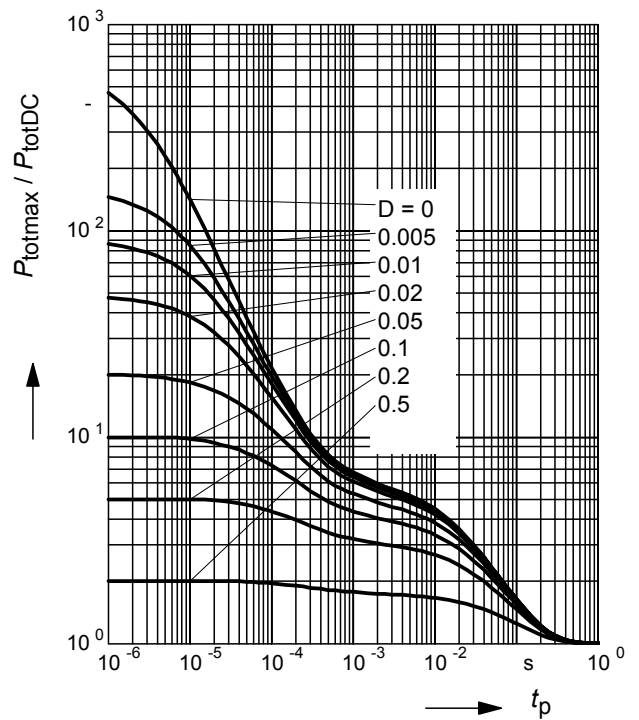
BCR166



**Permissible Pulse Load**

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

BCR166



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

BCR166W



**Permissible Pulse Load**

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

BCR166W



Package Outline



1) Lead width can be 0.6 max. in dambar area

Foot Print



Marking Layout (Example)



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



Package Outline



Foot Print



Marking Layout (Example)



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



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