

**NPN Silicon Digital Transistor**

- Switching circuit, inverter, interface circuit driver circuit
- Built in bias resistor ( $R_1=10\text{ k}\Omega$ ,  $R_2=47\text{ k}\Omega$ )
- BCR135S: Two internally isolated transistors with good matching in one multichip package
- BCR135S: For orientation in reel see package information below
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101


**BCR135  
BCR135W**

**BCR135S**


| Type    | Marking | Pin Configuration |      |      |      |      |      | Package |
|---------|---------|-------------------|------|------|------|------|------|---------|
|         |         | 1=B               | 2=E  | 3=C  | -    | -    | -    |         |
| BCR135  | WJs     | 1=B               | 2=E  | 3=C  | -    | -    | -    | SOT23   |
| BCR135S | WJs     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363  |
| BCR135W | WJs     | 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                 | $V_{i(fwd)}$ | 40          |      |
| Input reverse voltage                 | $V_{i(rev)}$ | 6           |      |
| Collector current                     | $I_C$        | 100         | mA   |
| Total power dissipation               | $P_{tot}$    |             | mW   |
| BCR135, $T_S \leq 102^\circ\text{C}$  |              | 200         |      |
| BCR135S, $T_S \leq 115^\circ\text{C}$ |              | 250         |      |
| BCR135W, $T_S \leq 124^\circ\text{C}$ |              | 250         |      |
| Junction temperature                  | $T_j$        | 150         | °C   |
| Storage temperature                   | $T_{stg}$    | -65 ... 150 |      |

**Thermal Resistance**

| Parameter                                | Symbol     | Value      | Unit |
|--|------------|------------|------|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ |            | K/W  |
| BCR135                                   |            | $\leq 240$ |      |
| BCR135S                                  |            | $\leq 140$ |      |
| BCR135W                                  |            | $\leq 105$ |      |

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

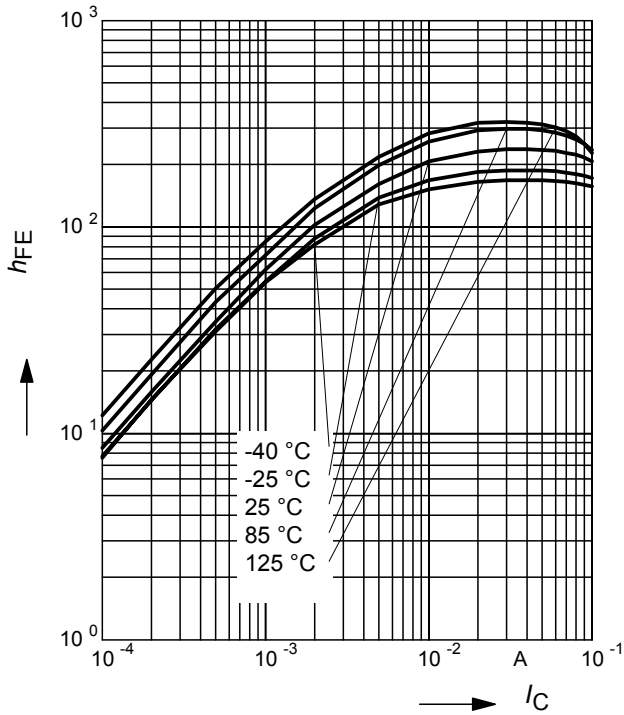
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

| Parameter   | Symbol        | Values |      |      | Unit             |
|---|---------------|--------|------|------|------------------|
|   |               | min.   | typ. | max. |                  |
| <b>DC Characteristics</b>   |               |        |      |      |                  |
| Collector-emitter breakdown voltage<br>$I_C = 100\ \mu\text{A}, I_B = 0$                          | $V_{(BR)CEO}$ | 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>$V_{EB} = 6\ \text{V}, I_C = 0$                                    | $I_{EBO}$     | -      | -    | 167  | $\mu\text{A}$    |
| DC current gain <sup>1)</sup><br>$I_C = 5\ \text{mA}, V_{CE} = 5\ \text{V}$                       | $h_{FE}$      | 70     | -    | -    | -                |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 10\ \text{mA}, I_B = 0.5\ \text{mA}$ | $V_{CEsat}$   | -      | -    | 0.3  | V                |
| Input off voltage<br>$I_C = 100\ \mu\text{A}, V_{CE} = 5\ \text{V}$                               | $V_{i(off)}$  | 0.5    | -    | 1    |                  |
| Input on voltage<br>$I_C = 2\ \text{mA}, V_{CE} = 0.3\ \text{V}$                                  | $V_{i(on)}$   | 0.5    | -    | 1.4  |                  |
| Input resistor  | $R_1$         | 7      | 10   | 13   | $\text{k}\Omega$ |
| Resistor ratio  | $R_1/R_2$     | 0.19   | 0.21 | 0.24 | -                |
| <b>AC Characteristics</b>   |               |        |      |      |                  |
| Transition frequency<br>$I_C = 10\ \text{mA}, V_{CE} = 5\ \text{V}, f = 100\ \text{MHz}$          | $f_T$         | -      | 150  | -    | MHz              |
| Collector-base capacitance<br>$V_{CB} = 10\ \text{V}, f = 1\ \text{MHz}$                          | $C_{cb}$      | -      | 3    | -    | pF               |

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

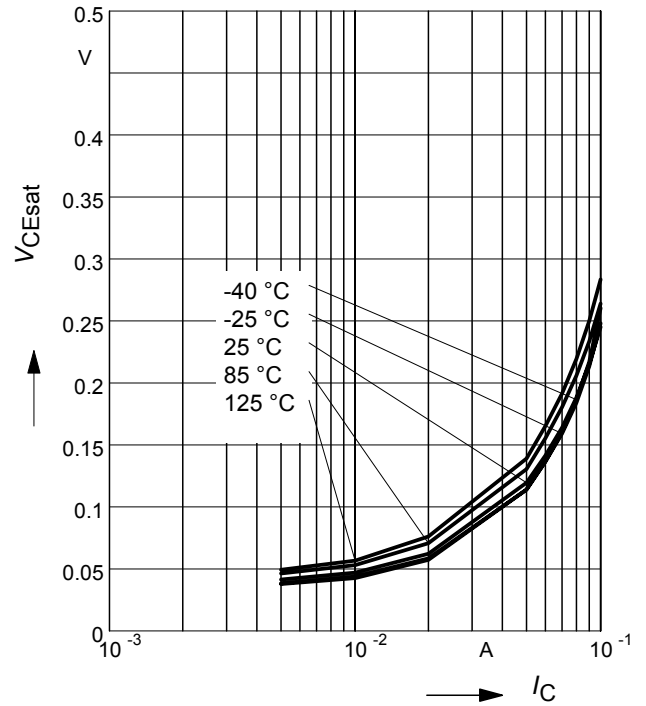
**DC current gain  $h_{FE} = f(I_C)$**

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



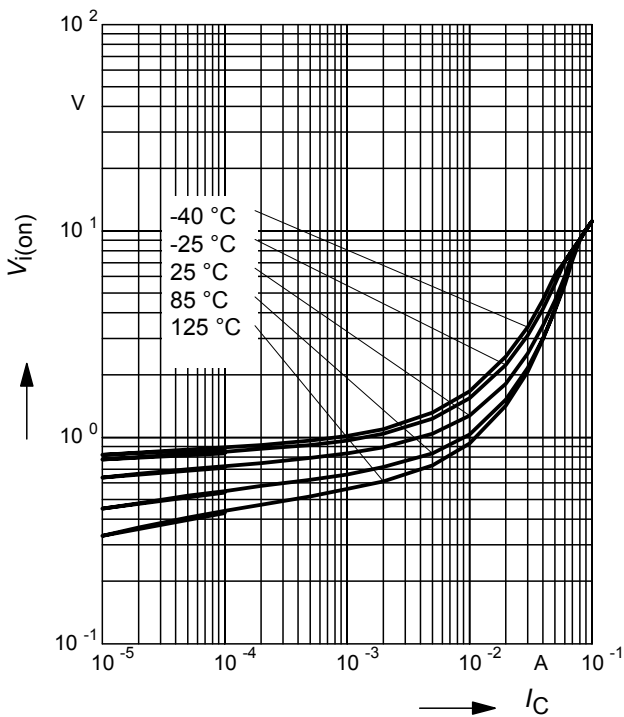
**Collector-emitter saturation voltage**

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



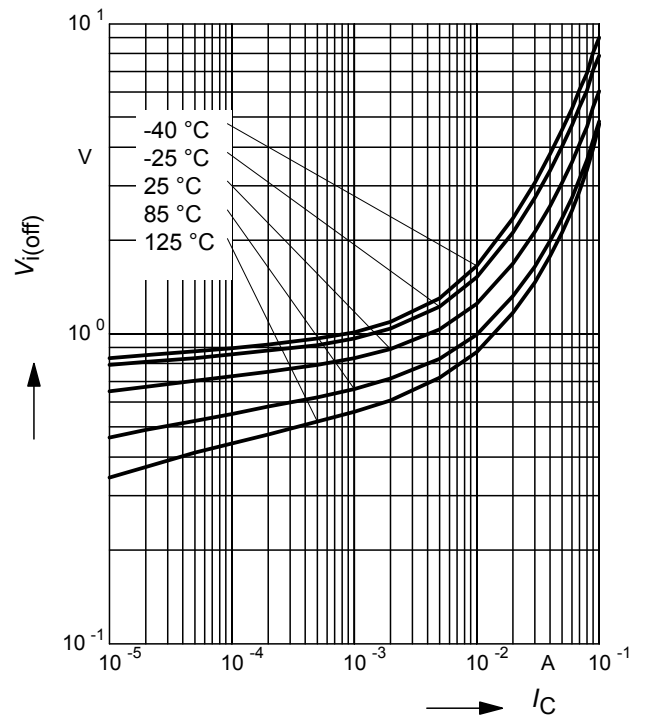
**Input on Voltage  $V_{i(on)} = f(I_C)$**

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



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

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



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

BCR135



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

BCR135S



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

BCR135W



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

BCR135



**Permissible Pulse Load**

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

BCR135



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

BCR135S



**Permissible Pulse Load**

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

BCR135S



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

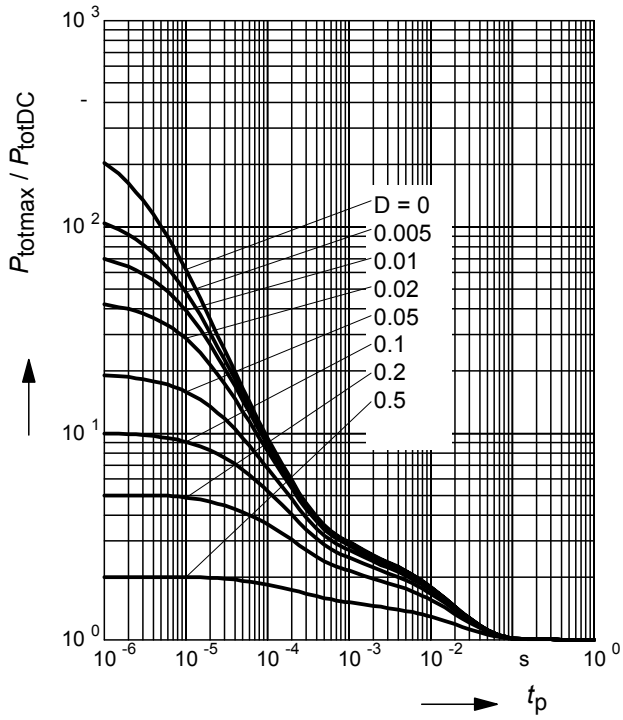
BCR135W



**Permissible Pulse Load**

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

BCR135W



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

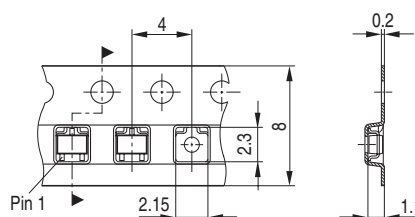


Marking Layout (Example)



Standard Packing

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



Package Outline



Foot Print



Marking Layout (Example)

Small variations in positioning of Date code, Type code and Manufacture are possible.



Standard Packing

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

For symmetric types no defined Pin 1 orientation in reel.



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