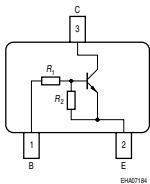


**NPN Silicon Digital Transistor**

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ( $R_1=2.2k\Omega$ ,  $R_2=2.2k\Omega$ )


**BCR103F**  
**BCR103L3/T**


| Type     | Marking | Pin Configuration |     |     |   |   |   | Package  |
|----------|---------|-------------------|-----|-----|---|---|---|----------|
| BCR103F  | WAs     | 1=B               | 2=E | 3=C | - | - | - | TSFP-3   |
| BCR103L3 | WA      | 1=B               | 2=E | 3=C | - | - | - | TSLP-3-4 |
| BCR103T  | WAs     | 1=B               | 2=E | 3=C | - | - | - | SC75     |

**Maximum Ratings**

| Parameter                              | Symbol      | Value       | Unit             |
|----------------------------------------|-------------|-------------|------------------|
| Collector-emitter voltage              | $V_{CEO}$   | 50          | V                |
| Collector-base voltage                 | $V_{CBO}$   | 50          |                  |
| Emitter-base voltage                   | $V_{EBO}$   | 5           |                  |
| Input on voltage                       | $V_{i(on)}$ | 10          |                  |
| Collector current                      | $I_C$       | 100         | mA               |
| Total power dissipation-               | $P_{tot}$   |             | mW               |
| BCR103F, $T_S \leq 128^\circ\text{C}$  |             | 250         |                  |
| BCR103L3, $T_S \leq 135^\circ\text{C}$ |             | 250         |                  |
| BCR103T, $T_S \leq 109^\circ\text{C}$  |             | 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  |
| BCR103F                                  |            | ≤ 90  |      |
| BCR103L3                                 |            | ≤ 60  |      |
| BCR103T                                  |            | ≤ 165 |      |

**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>$V_{EB} = 10\ \text{V}$ , $I_C = 0$                                 | $I_{EBO}$     | -   | -   | 3.5 | mA |
| DC current gain <sup>2)</sup><br>$I_C = 20\ \text{mA}$ , $V_{CE} = 5\ \text{V}$                    | $h_{FE}$      | 20  | -   | -   | -  |
| Collector-emitter saturation voltage <sup>2)</sup><br>$I_C = 20\ \text{mA}$ , $I_B = 1\ \text{mA}$ | $V_{CEsat}$   | -   | -   | 0.3 | V  |
| Input off voltage<br>$I_C = 100\ \mu\text{A}$ , $V_{CE} = 5\ \text{V}$                             | $V_{i(off)}$  | 0.8 | -   | 1.5 |    |
| Input on voltage<br>$I_C = 2\ \text{mA}$ , $V_{CE} = 0.3\ \text{V}$                                | $V_{i(on)}$   | 0.8 | -   | 2.5 |    |
| Input resistor                                                                                     | $R_1$         | 1.5 | 2.2 | 2.9 | kΩ |
| Resistor ratio                                                                                     | $R_1/R_2$     | 0.9 | 1   | 1.1 | -  |

**AC Characteristics**

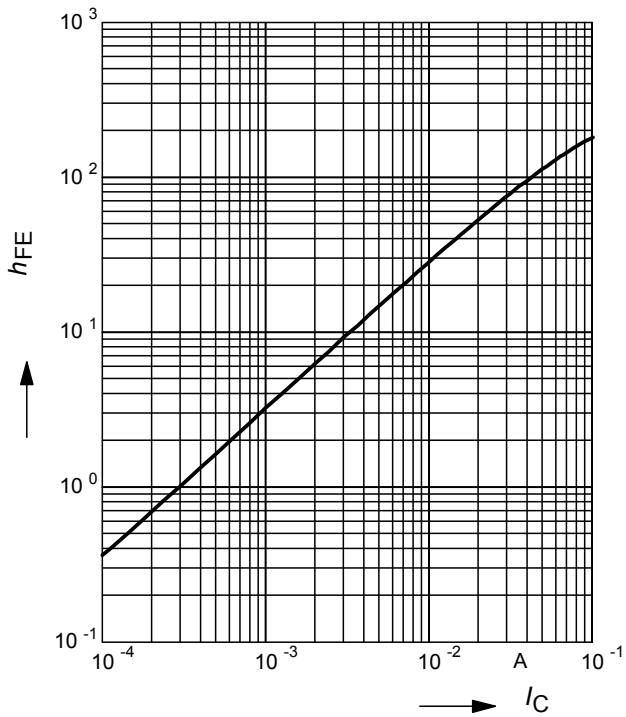
|                                                                                              |          |   |     |   |     |
|----------------------------------------------------------------------------------------------|----------|---|-----|---|-----|
| Transition frequency<br>$I_C = 10\ \text{mA}$ , $V_{CE} = 5\ \text{V}$ , $f = 1\ \text{MHz}$ | $f_T$    | - | 140 | - | 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 Thermal Resistance

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

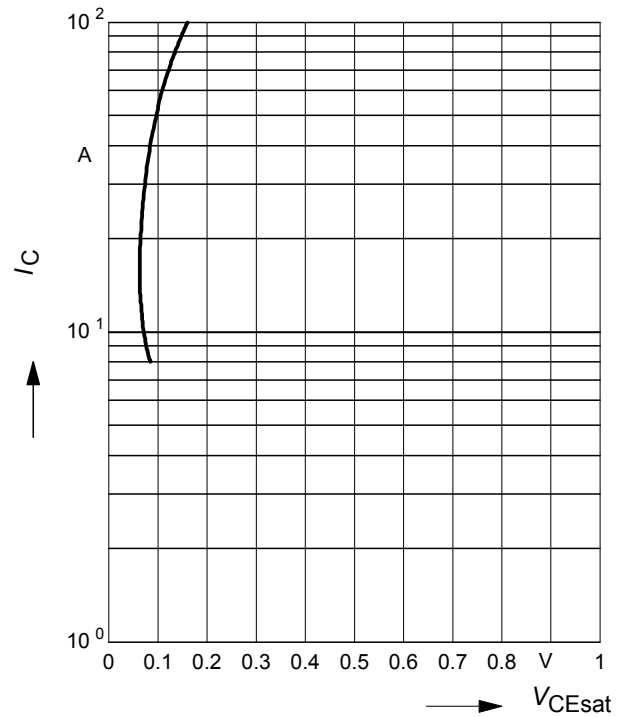
**DC current gain  $h_{FE} = f(I_C)$**

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



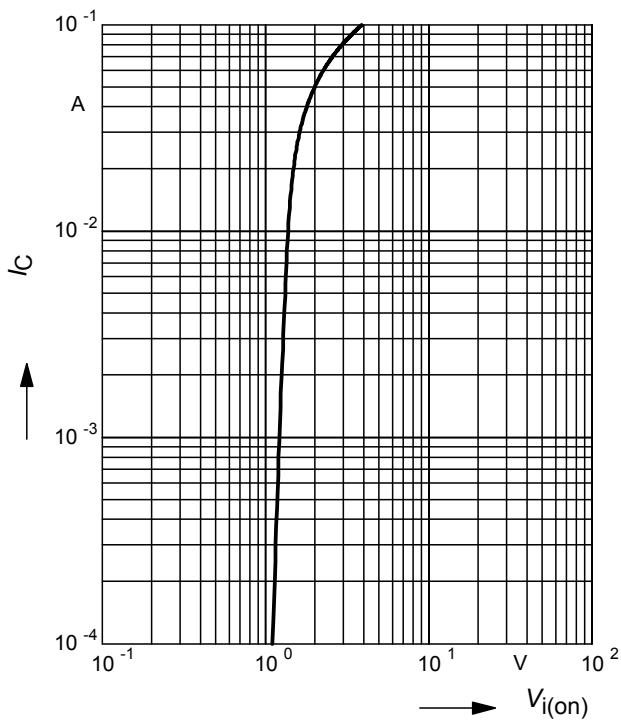
**Collector-emitter saturation voltage**

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



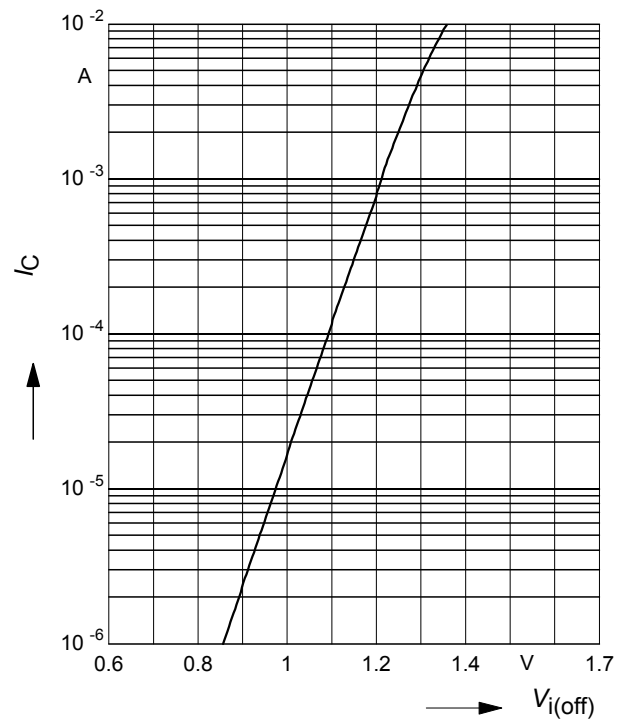
**Input on Voltage  $V_{i(on)} = f(I_C)$**

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



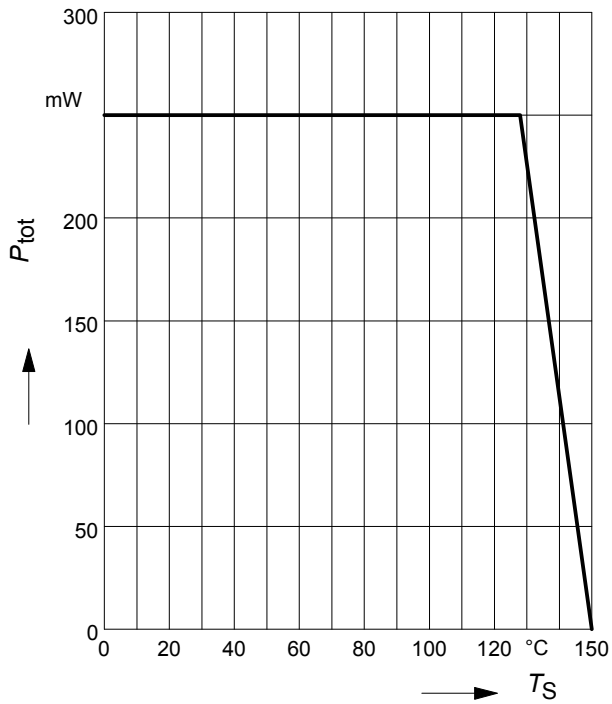
**Input off voltage  $V_{i(off)} = f(I_C)$**

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



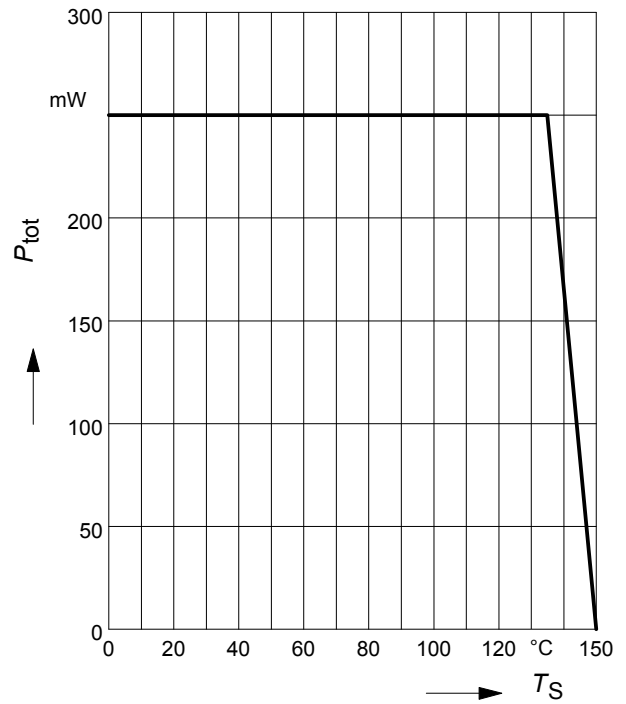
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR103F



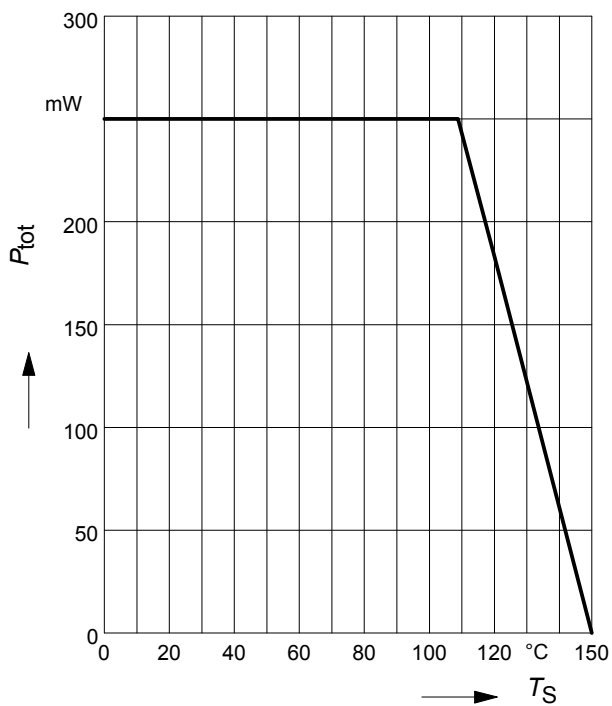
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR103L3



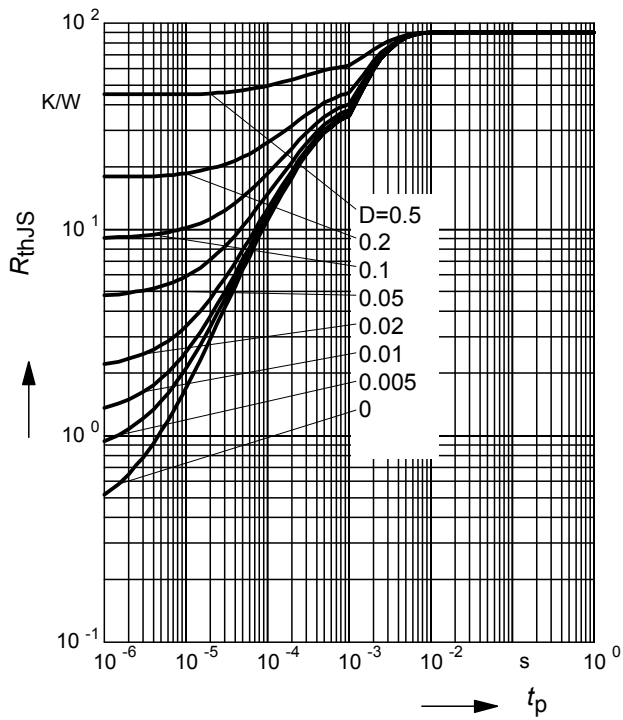
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR103T



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

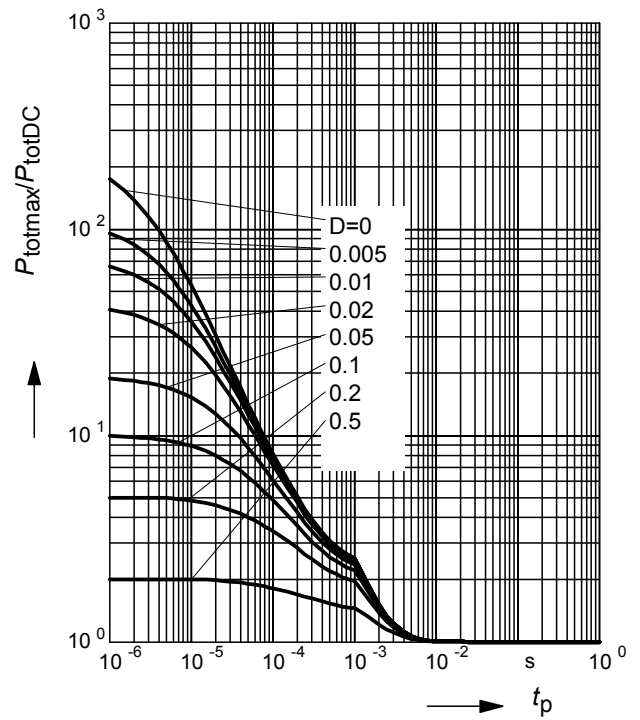
BCR103F



### Permissible Pulse Load

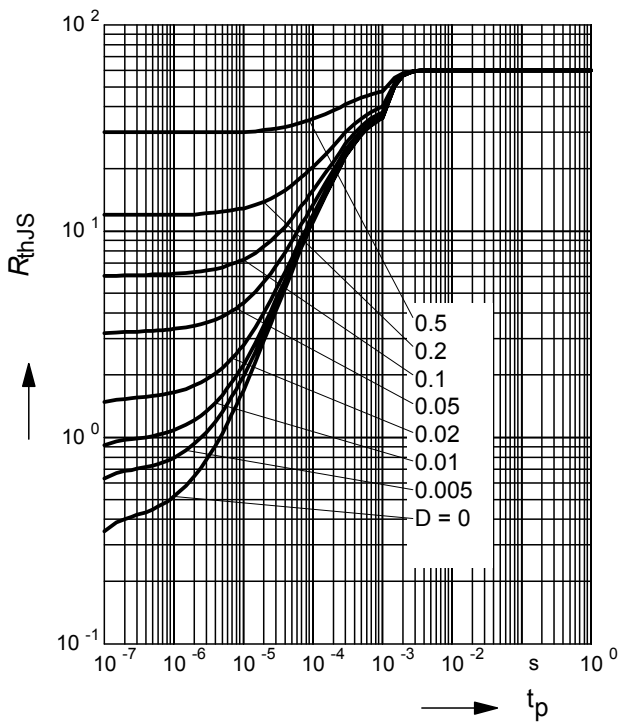
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR103F



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

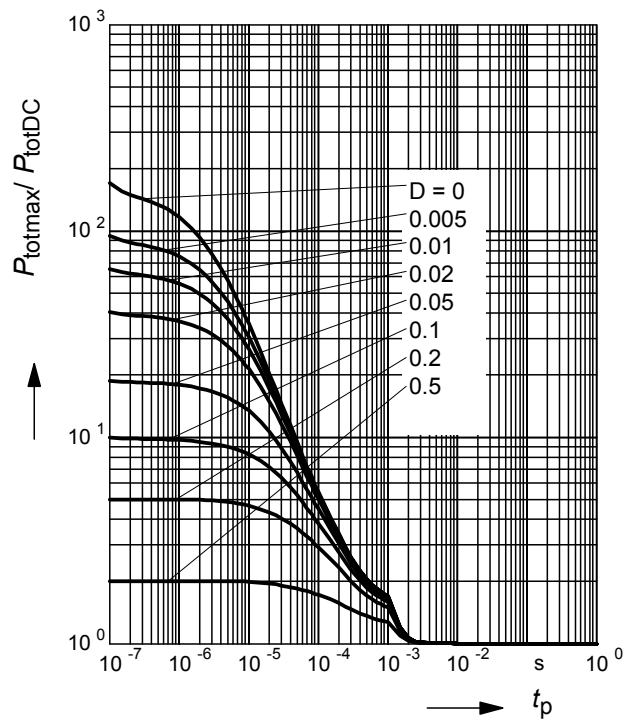
BCR103L3



### Permissible Pulse Load

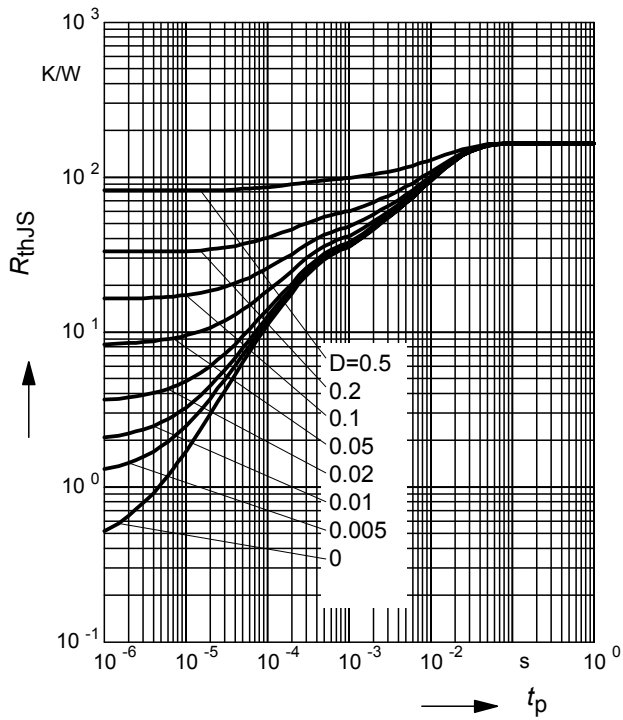
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR103L3



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

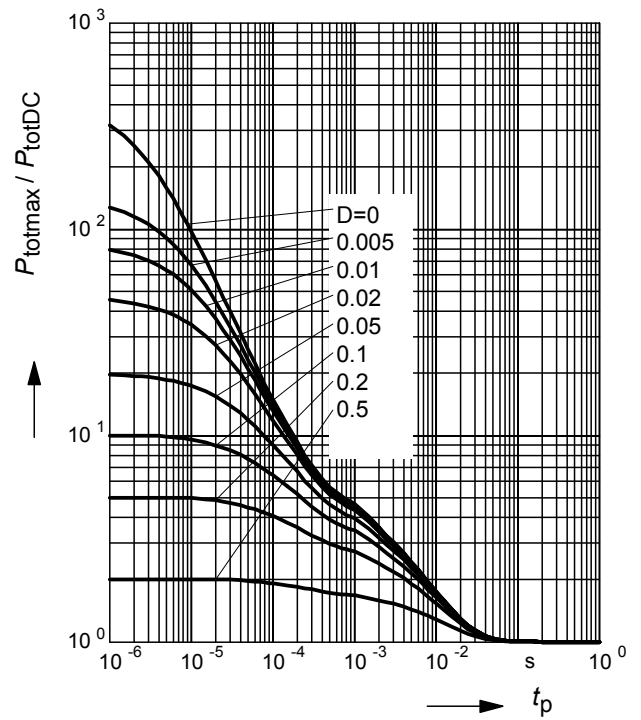
BCR103T



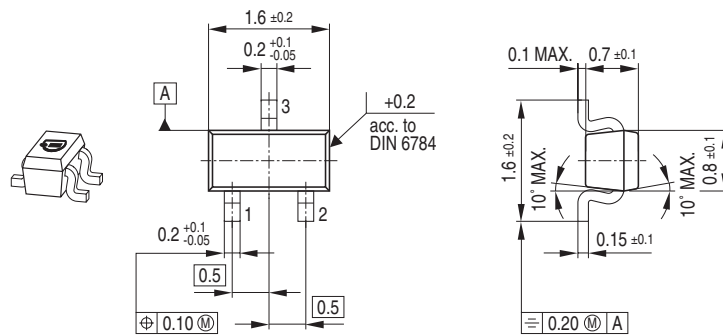
### Permissible Pulse Load

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

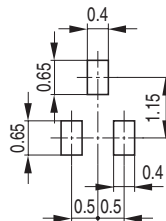
BCR103T



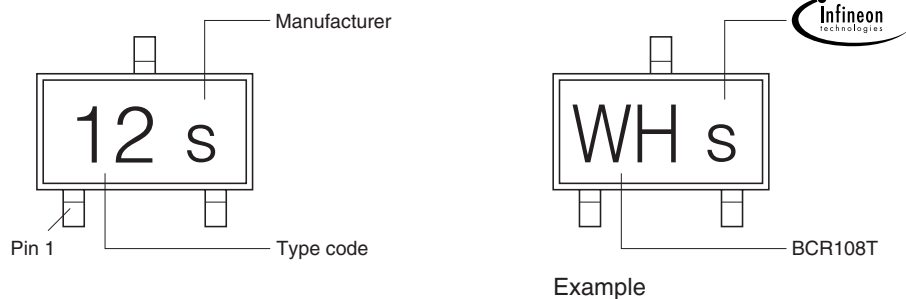
## Package Outline



## Foot Print

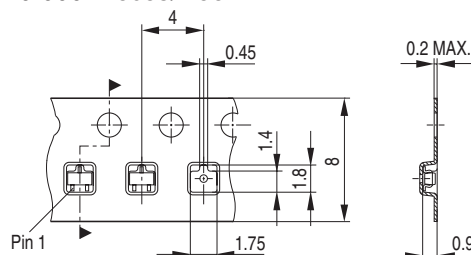


## Marking Layout

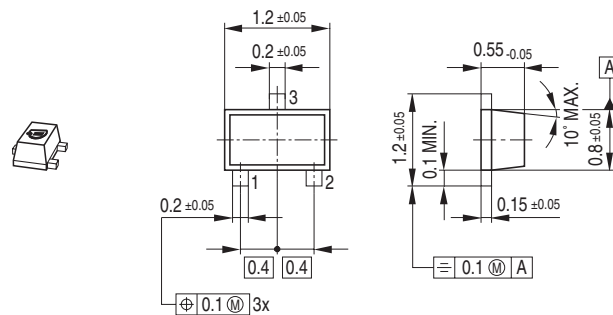


## Packing

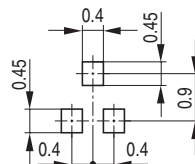
Code E6327: Reel ø180 mm = 3.000 Pieces/Reel  
Code E6433: Reel ø330 mm = 10.000 Pieces/Reel



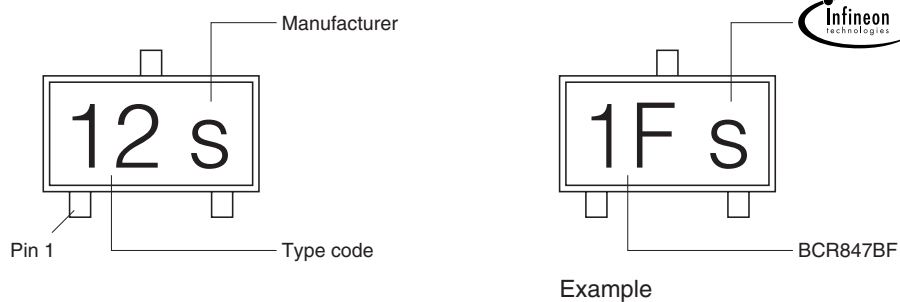
## Package Outline



## Foot Print

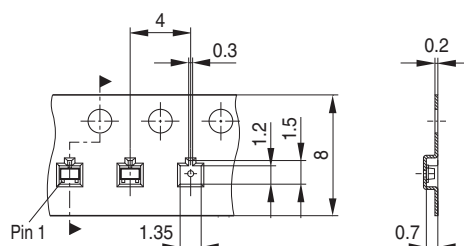


## Marking Layout

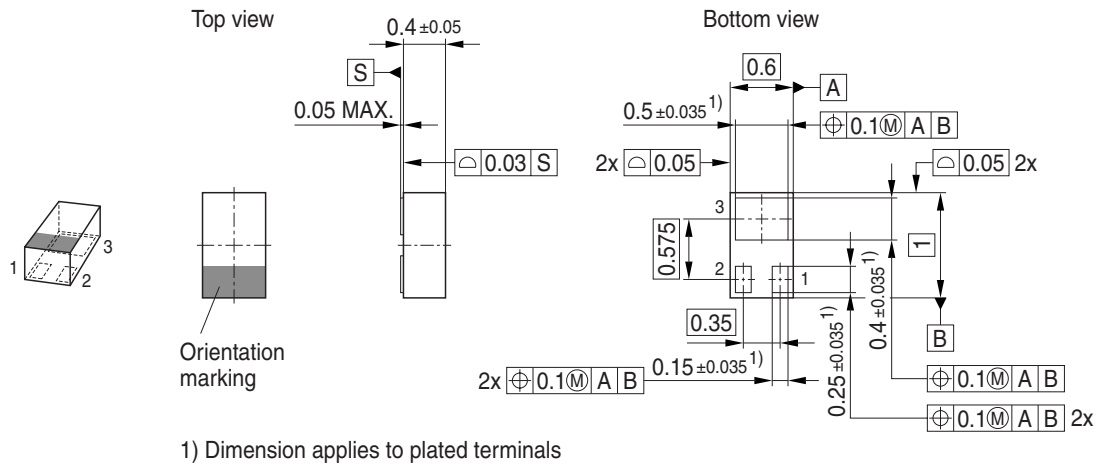


## Packing

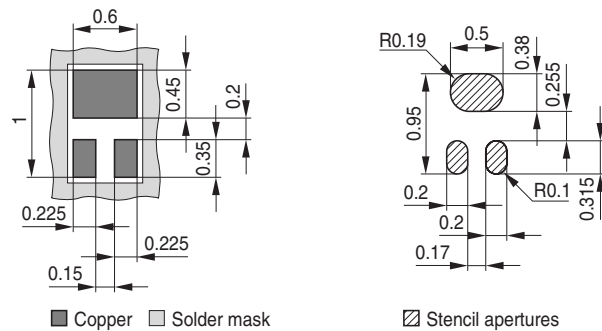
Code E6327: Reel ø180 mm = 3.000 Pieces/Reel  
 Code E6433: Reel ø330 mm = 10.000 Pieces/Reel



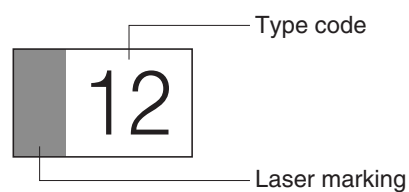
## Package Outline



## Foot Print

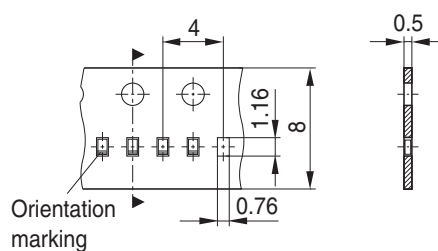


## Marking Layout



## Packing

Code E6327: Reel ø180 mm = 15.000 Pieces/Reel



Published by Infineon Technologies AG,  
St.-Martin-Strasse 53,  
81669 München  
© Infineon Technologies AG 2005.  
All Rights Reserved.

**Attention please!**

The information herein is given to describe certain components and shall not be considered as a guarantee of characteristics.

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

**Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

**Warnings**

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.