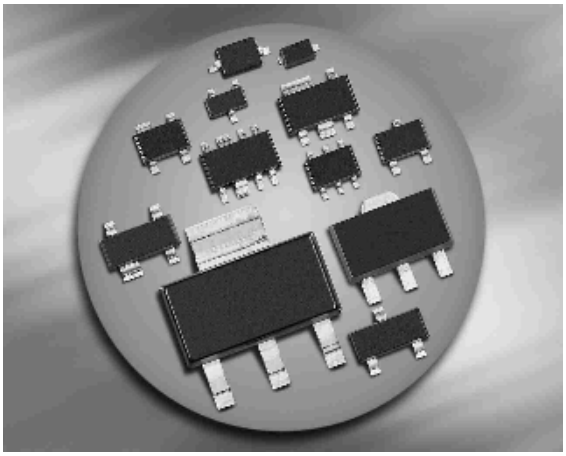
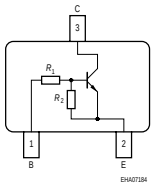
**NPN Silicon Digital Transistor**

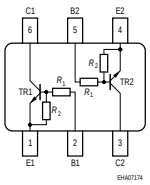


- Switching in circuit, inverter, interface circuit, drive circuit
- Built in bias resistor ($R_1$ = 10 kΩ, $R_2$ = 10 kΩ)
- BCR133S: Two internally isolated transistors with good matching in one multichip package
- BCR133S: For orientation in reel see package information below
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

AEC Qualified RoHS

**BCR133/W** **BCR133S**




| Type | Marking | Pin Configuration | | | | | | Package |
|---|---|---|---|---|---|---|---|---|
| BCR133 | WCs | 1=B | 2=E | 3=C | - | - | - | SOT23 |
| BCR133S | WCs | 1=E1 | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363 |
| BCR133W | WCs | 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 | $V_{i(rev)}$ | 10 | |
| Collector current | $I_C$ | 100 | mA |
| Total power dissipation- | $P_{tot}$ | | mW |
| BCR133, $T_S \leq 102°C$ | | 200 | |
| BCR133S, $T_S \leq 115°C$ | | 250 | |
| BCR133W, $T_S \leq 124°C$ | | 250 | |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature | $T_{stg}$ | -65 ... 150 | |

## Thermal Resistance

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction - soldering point[1)] | $R_{thJS}$ | | K/W |
| BCR133 | | ≤ 240 | |
| BCR133S | | ≤ 140 | |
| BCR133W | | ≤ 105 | |

[1]For calculation of $R_{thJA}$ please refer to Application Note AN077 (Thermal Resistance Calculation)

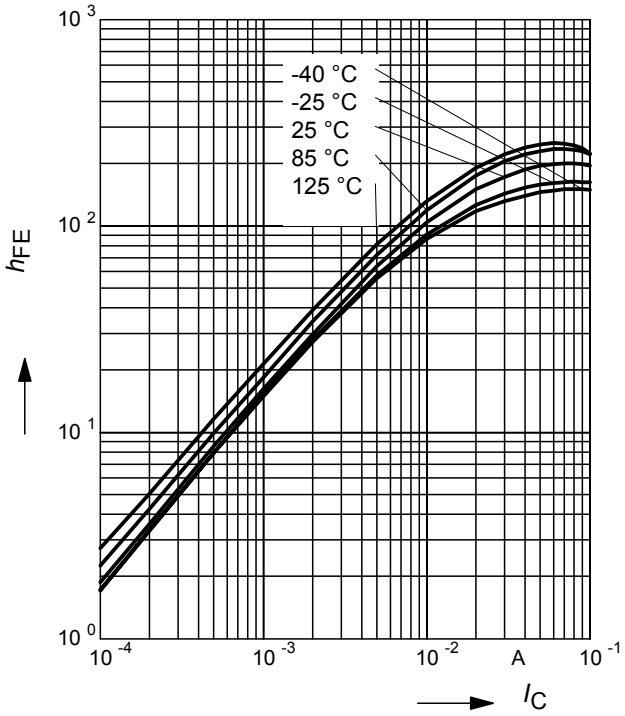
**Electrical Characteristics** at $T_A$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Collector-emitter breakdown voltage<br>$I_C$ = 100 µA, $I_B$ = 0 | $V_{(BR)CEO}$ | 50 | - | - | V |
| Collector-base breakdown voltage<br>$I_C$ = 10 µA, $I_E$ = 0 | $V_{(BR)CBO}$ | 50 | - | - | |
| Collector-base cutoff current<br>$V_{CB}$ = 40 V, $I_E$ = 0 | $I_{CBO}$ | - | - | 100 | nA |
| Emitter-base cutoff current<br>$V_{EB}$ = 10 V, $I_C$ = 0 | $I_{EBO}$ | - | - | 0.75 | mA |
| DC current gain[1)]<br>$I_C$ = 5 mA, $V_{CE}$ = 5 V | $h_{FE}$ | 30 | - | - | - |
| Collector-emitter saturation voltage[1)]<br>$I_C$ = 10 mA, $I_B$ = 0.5 mA | $V_{CEsat}$ | - | - | 0.3 | V |
| Input off voltage<br>$I_C$ = 100 µA, $V_{CE}$ = 5 V | $V_{i(off)}$ | 0.8 | - | 1.5 | |
| Input on voltage<br>$I_C$ = 2 mA, $V_{CE}$ = 0.3 V | $V_{i(on)}$ | 1 | - | 2.5 | |
| Input resistor | $R_1$ | 7 | 10 | 13 | kΩ |
| Resistor ratio | $R_1/R_2$ | 0.9 | 1 | 1.1 | - |
| **AC Characteristics** | | | | | |
| Transition frequency<br>$I_C$ = 10 mA, $V_{CE}$ = 5 V, $f$ = 100 MHz | $f_T$ | - | 130 | - | MHz |
| Collector-base capacitance<br>$V_{CB}$ = 10 V, $f$ = 1 MHz | $C_{cb}$ | - | 3 | - | pF |

[1]Pulse test: t < 300µs; D < 2%

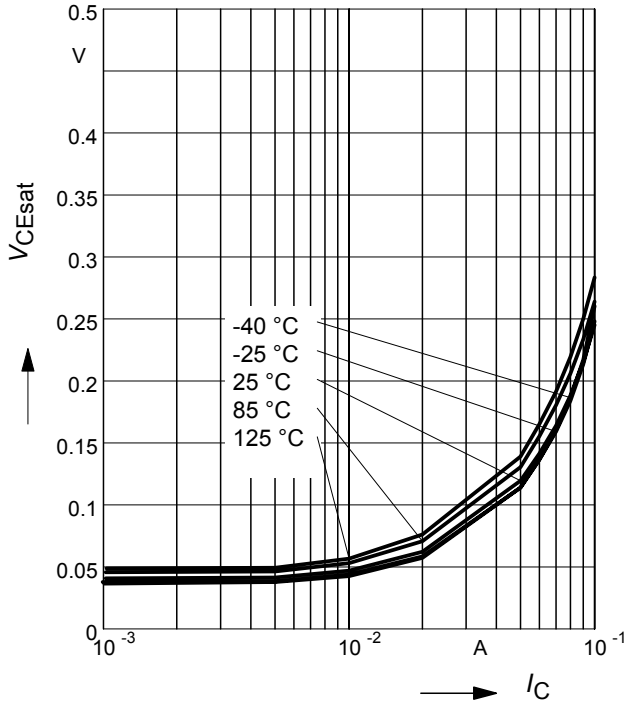
**DC current gain $h_{FE} = f(I_C)$**

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



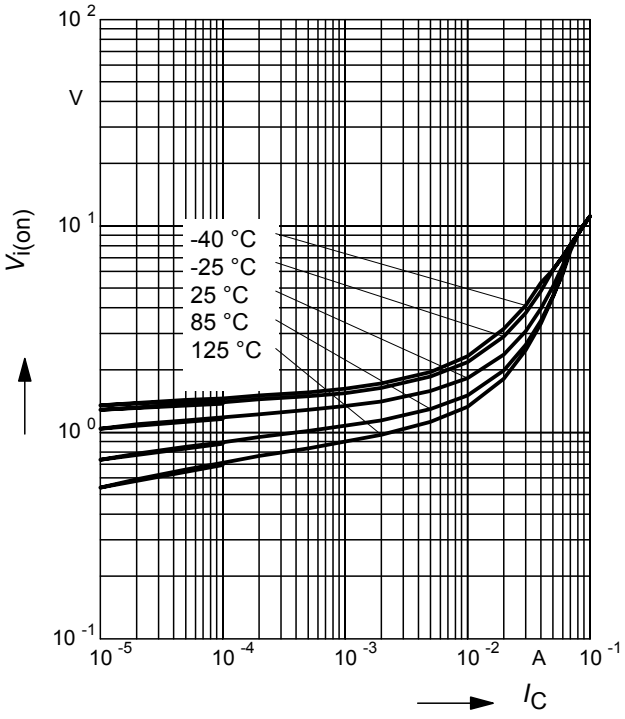

**Collector-emitter saturation voltage**

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



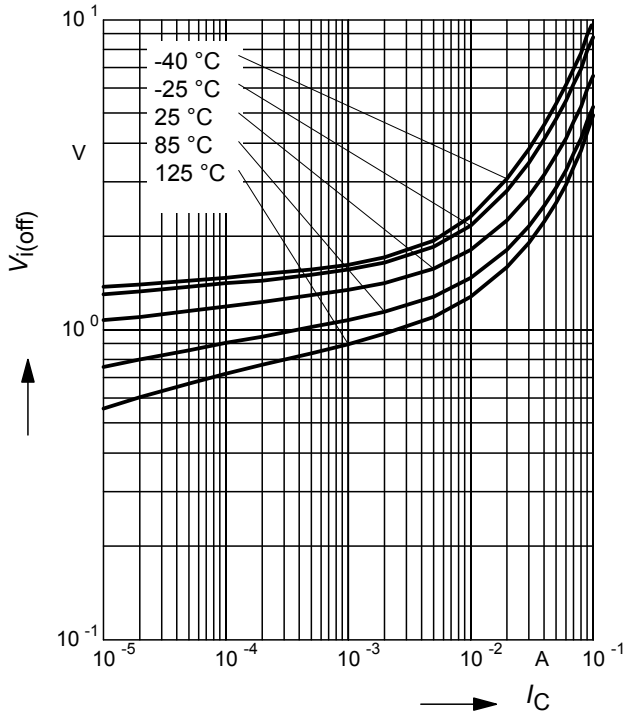

**Input on Voltage $V_{i(on)} = f(I_C)$**

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

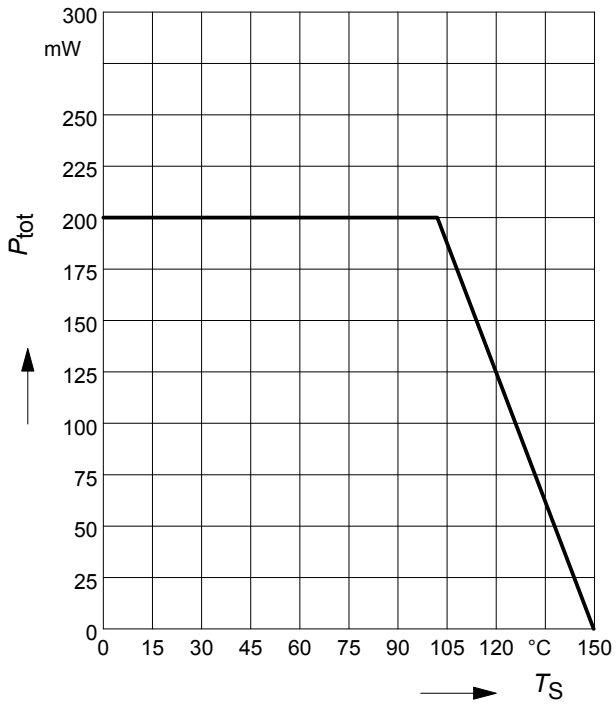



**Input off voltage $V_{i(off)} = f(I_C)$**

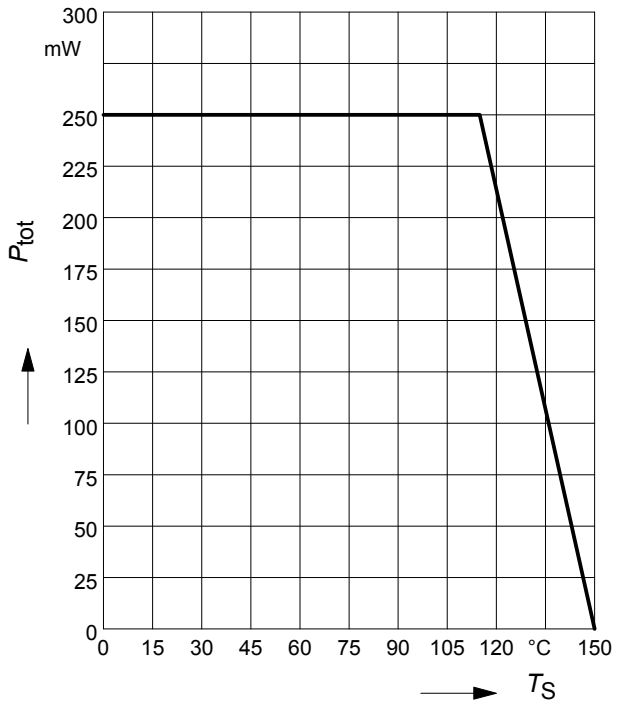
$V_{CE}$ = 5V (common emitter configuration)



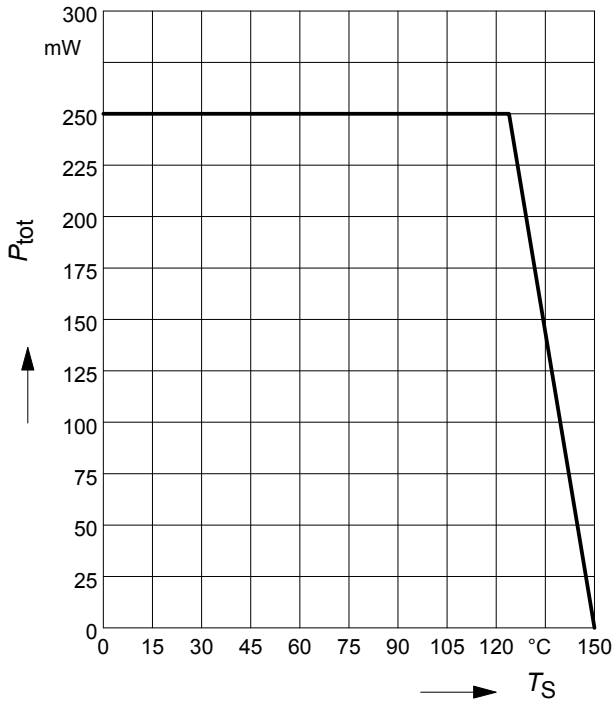
**Total power dissipation $P_{tot} = f(T_S)$**
BCR133



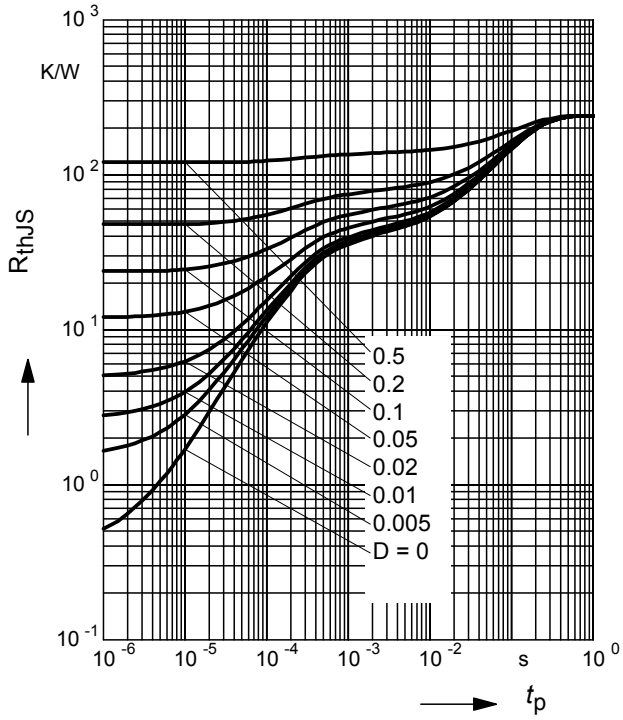

**Total power dissipation $P_{tot} = f(T_S)$**
BCR133S




**Total power dissipation $P_{tot} = f(T_S)$**
BCR133W



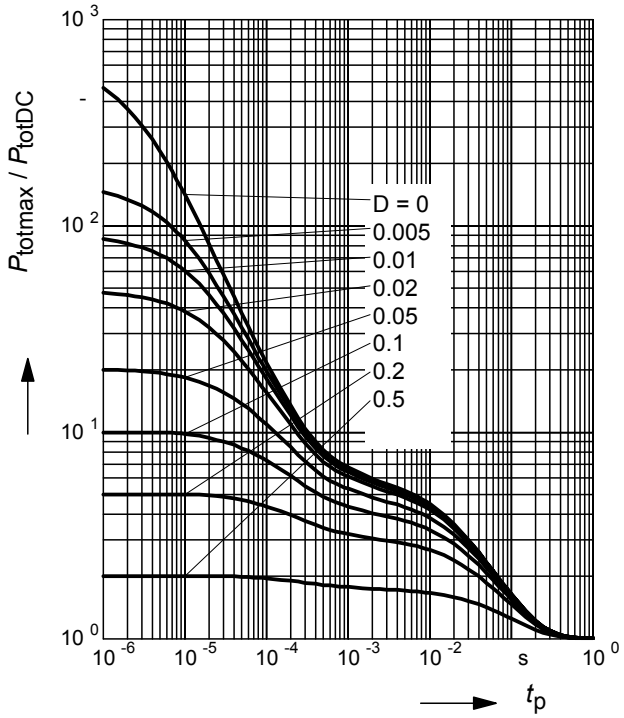

**Permissible Pulse Load $R_{thJS} = f(t_p)$**
BCR133



**Permissible Pulse Load**

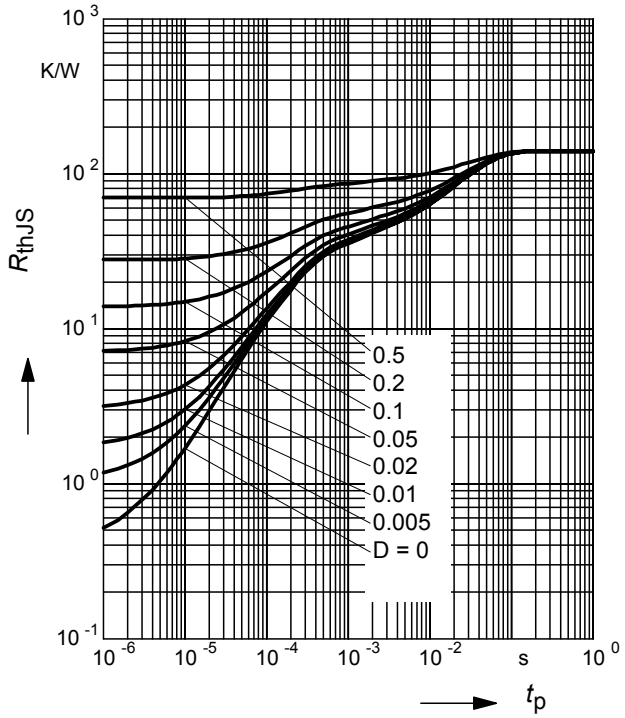
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133




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

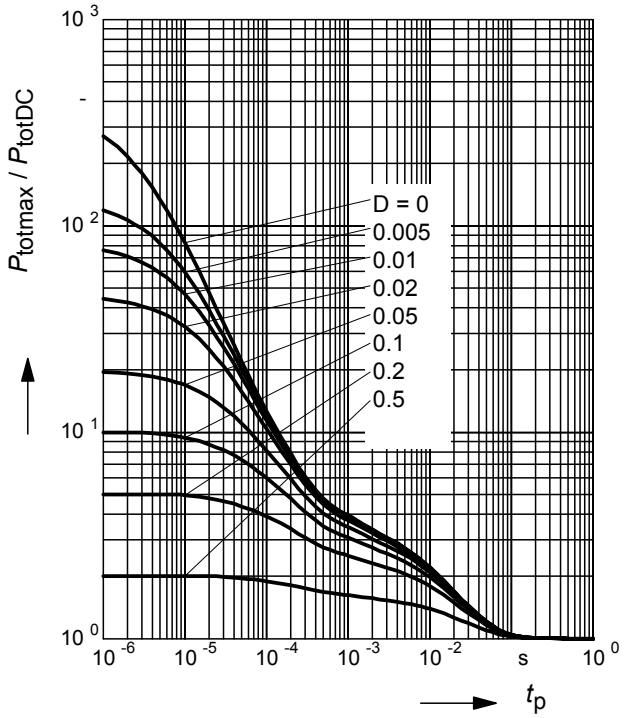
BCR133S




**Permissible Pulse Load**

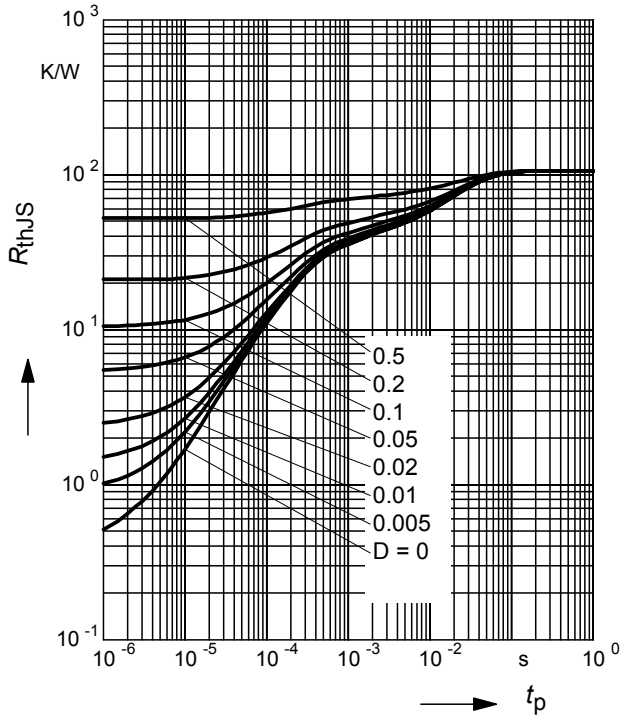
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133S




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

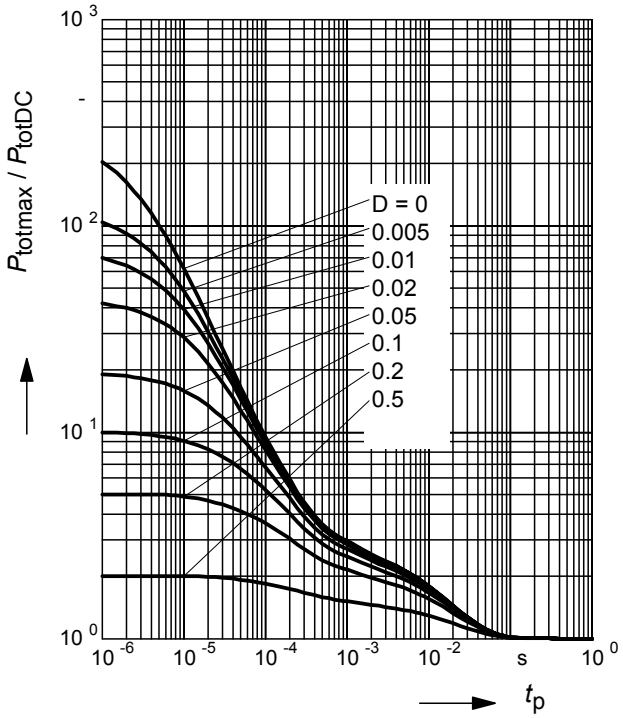
BCR133W



## Permissible Pulse Load

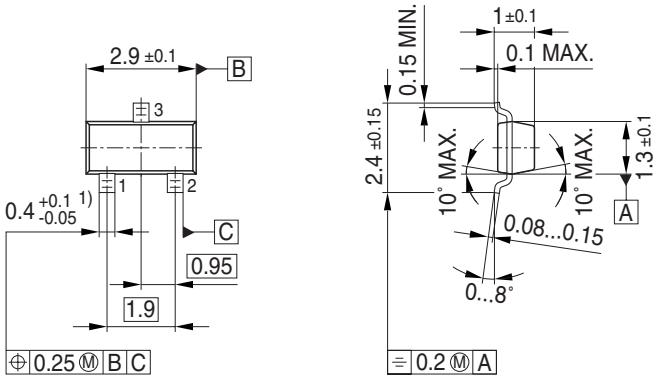
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133W



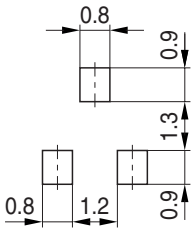
## Package Outline



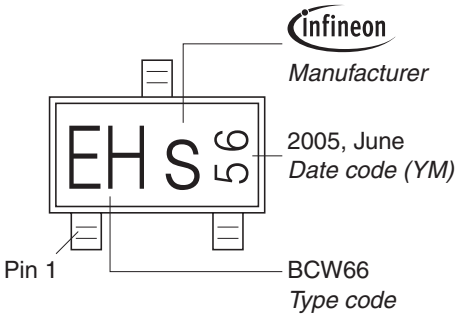



1) Lead width can be 0.6 max. in dambar area

## Foot Print

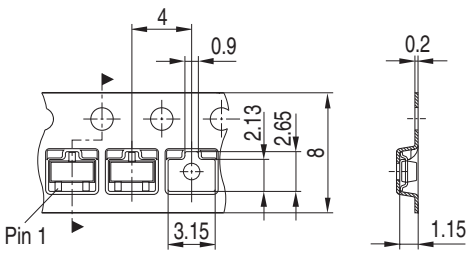



## Marking Layout (Example)



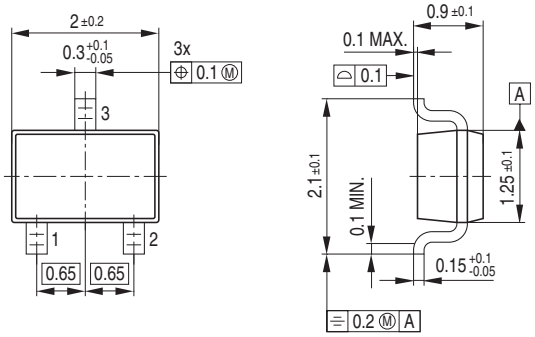

## Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel

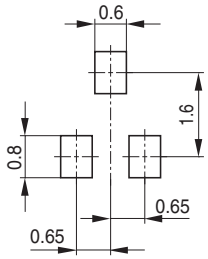


## Package Outline

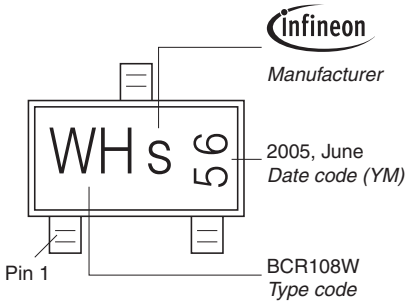





## Foot Print

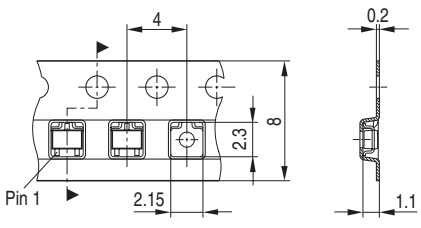



## Marking Layout (Example)

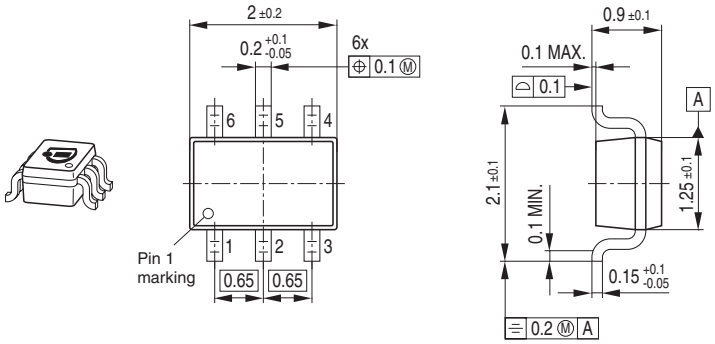



## Standard Packing

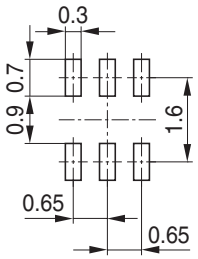
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



## Package Outline

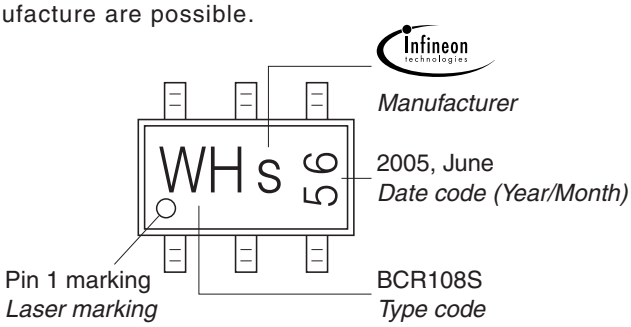



## Foot Print




## Marking Layout (Example)

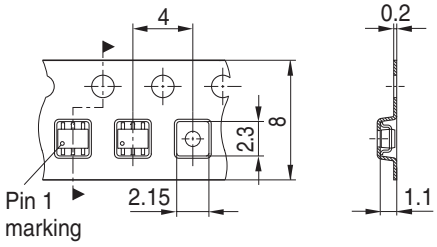
Small variations in positioning of
Date code, Type code and Manufacture are possible.




## Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.



**Edition 2009-11-16**

**Published by**
**Infineon Technologies AG**
**81726 Munich, Germany**

**© 2009 Infineon Technologies AG**
**All Rights Reserved.**

## Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

## Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (<www.infineon.com>).

## Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.
Infineon Technologies components may be used in life-support devices or systems only 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.