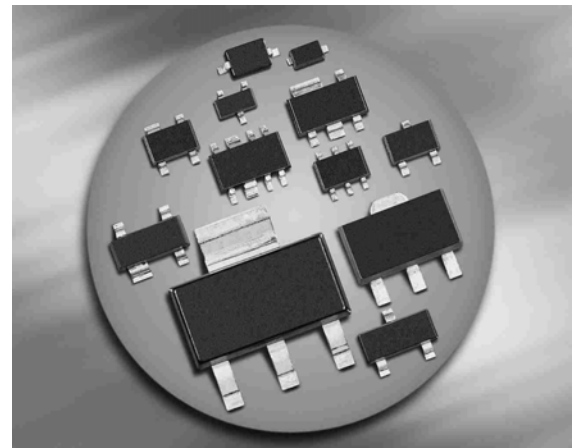


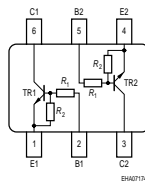
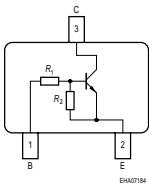
NPN Silicon Digital Transistor

- Switching in circuit, inverter, interface circuit, drive circuit
- Built in bias resistor ($R_1 = 10\text{ k}\Omega$, $R_2 = 10\text{ k}\Omega$)
- 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



BCR133/W

BCR133S



| Type | Marking | Pin Configuration | | | | | | Package |
|---------|---------|-------------------|------|------|------|------|------|---------|
| | | 1=B | 2=E | 3=C | - | - | - | |
| 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- BCR133, $T_S \leq 102^\circ\text{C}$ BCR133S, $T_S \leq 115^\circ\text{C}$ BCR133W, $T_S \leq 124^\circ\text{C}$ | P_{tot} | 200 250 250 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -65 ... 150 | |

Thermal Resistance

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

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

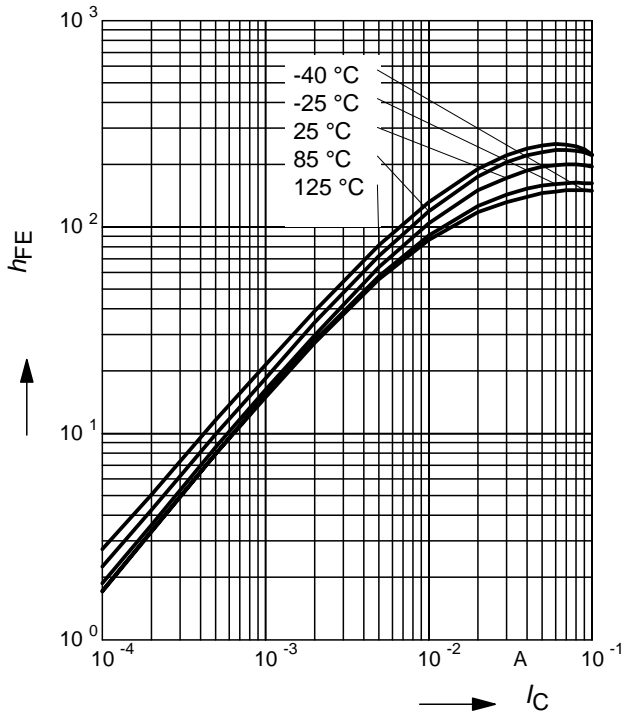
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

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

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

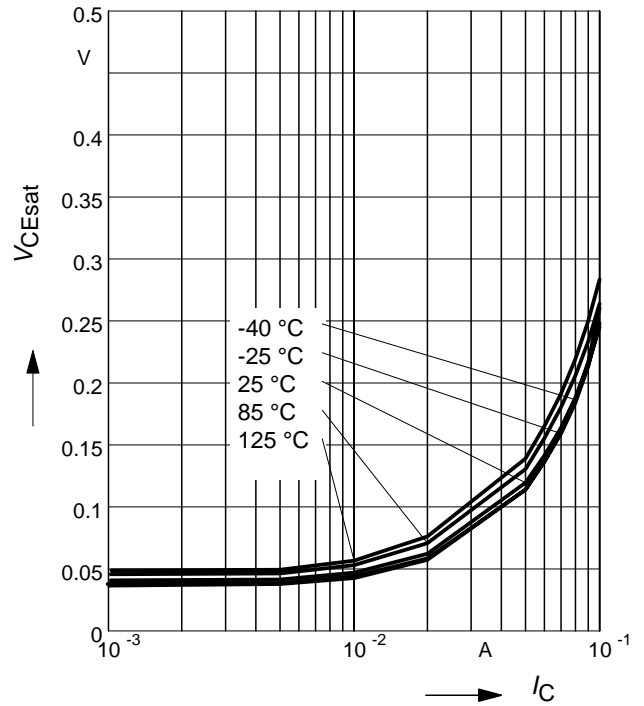
DC current gain $h_{FE} = f(I_C)$

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



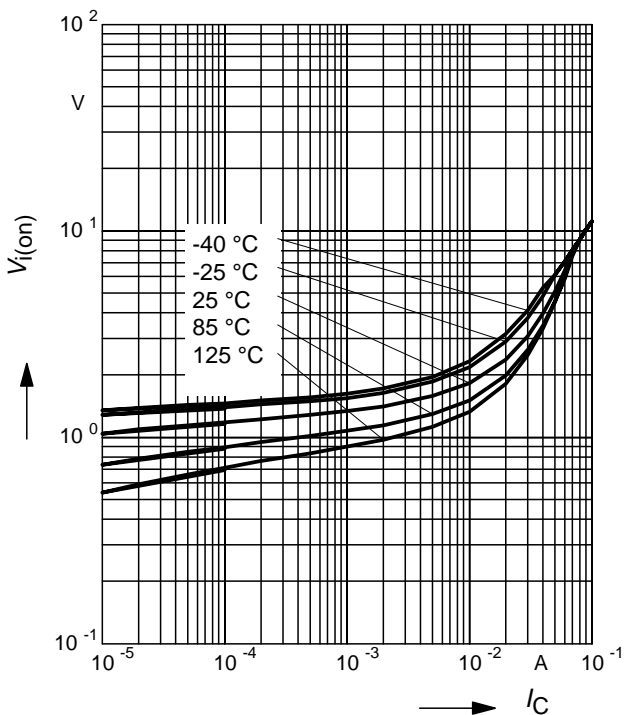
Collector-emitter saturation voltage

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



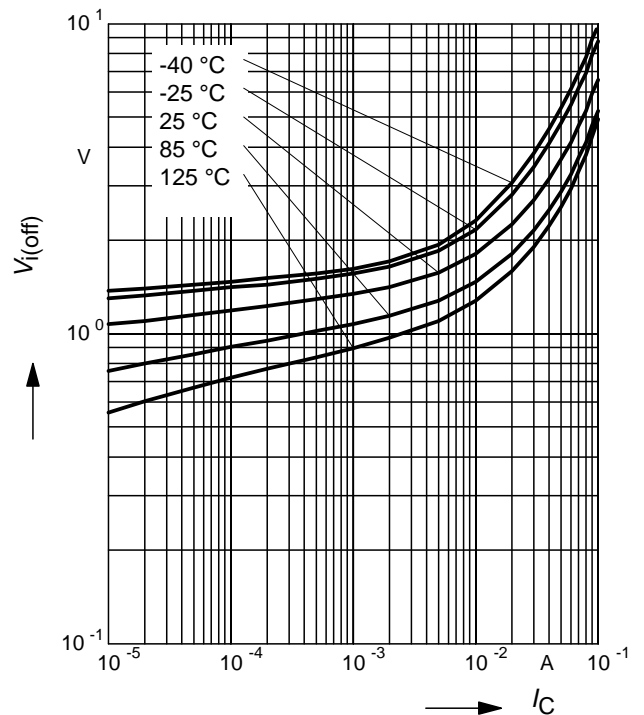
Input on Voltage $V_{i(on)} = f(I_C)$

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



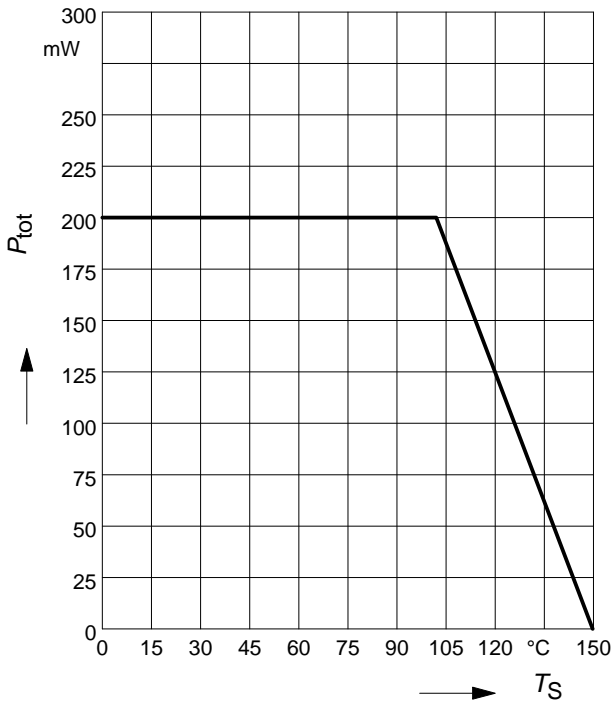
Input off voltage $V_{i(off)} = f(I_C)$

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



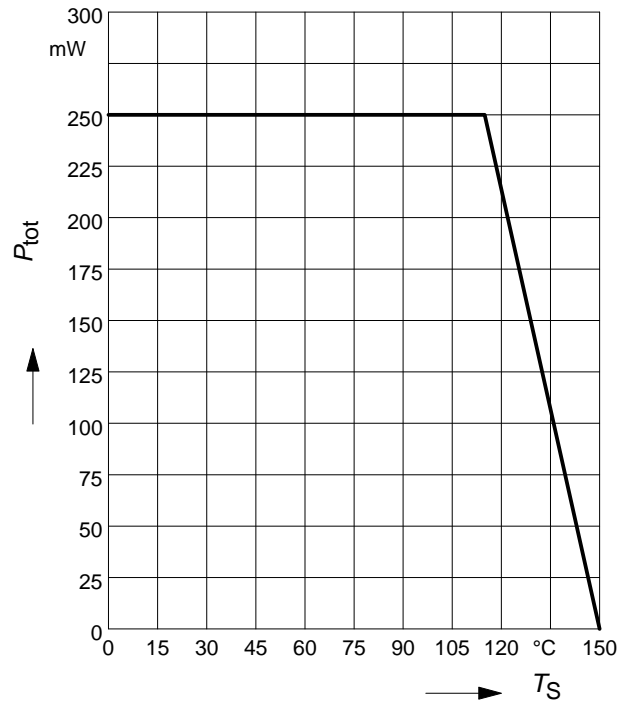
Total power dissipation $P_{tot} = f(T_S)$

BCR133



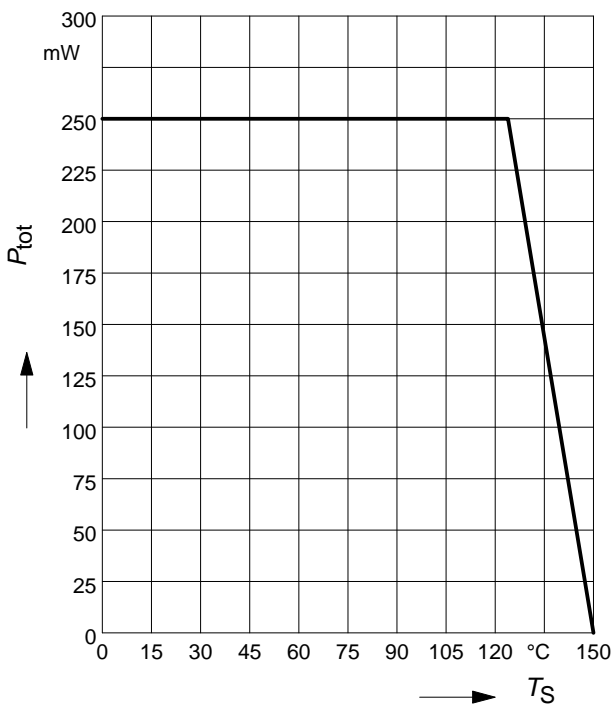
Total power dissipation $P_{tot} = f(T_S)$

BCR133S



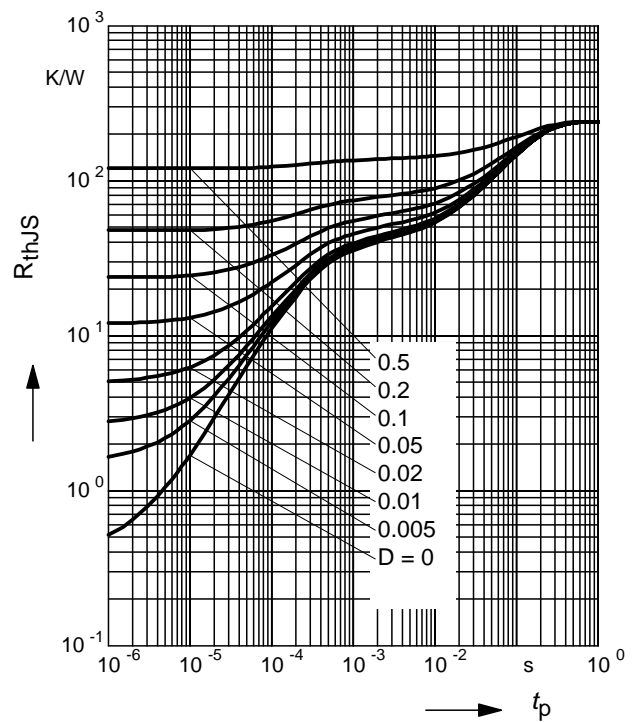
Total power dissipation $P_{tot} = f(T_S)$

BCR133W



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

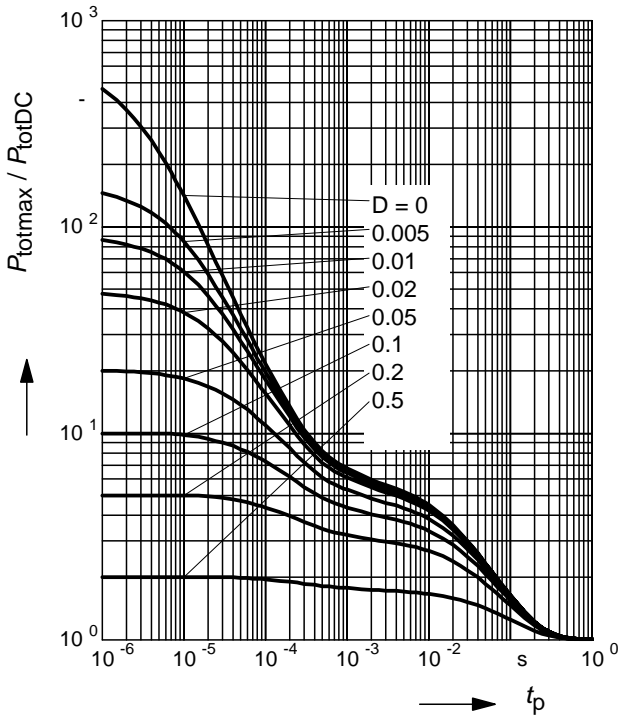
BCR133



Permissible Pulse Load

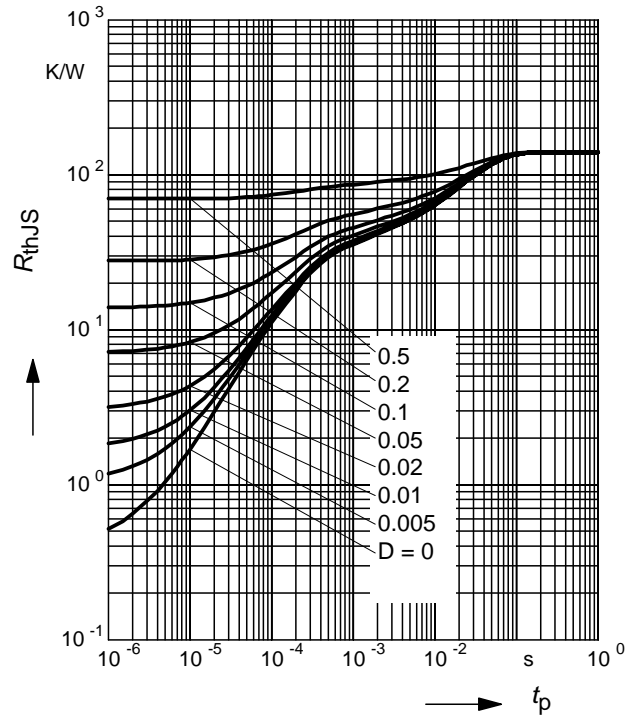
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR133



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

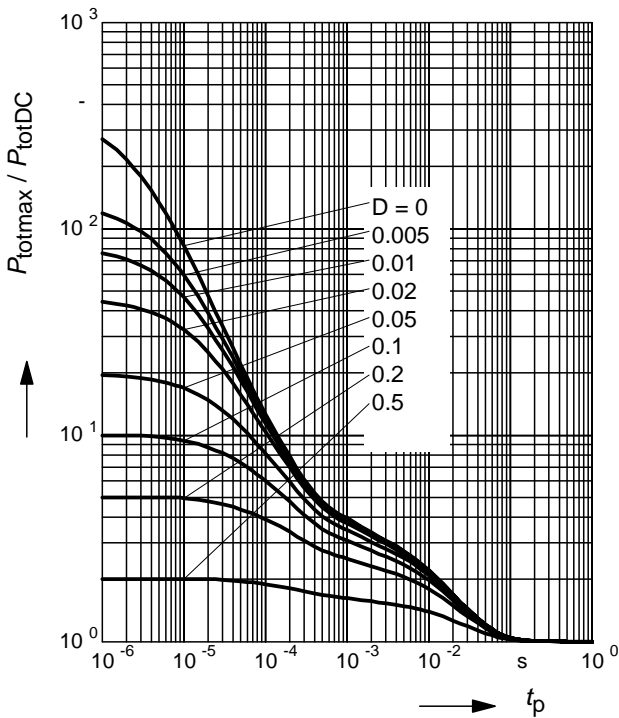
BCR133S



Permissible Pulse Load

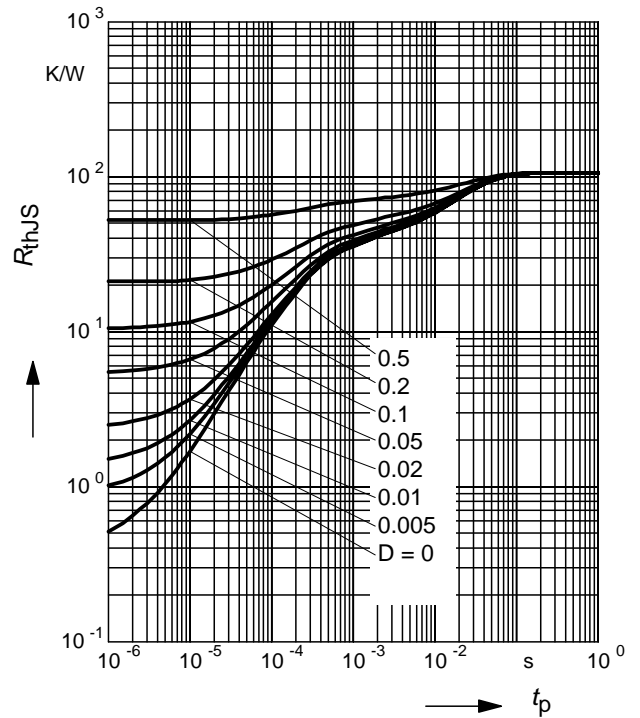
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR133S



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

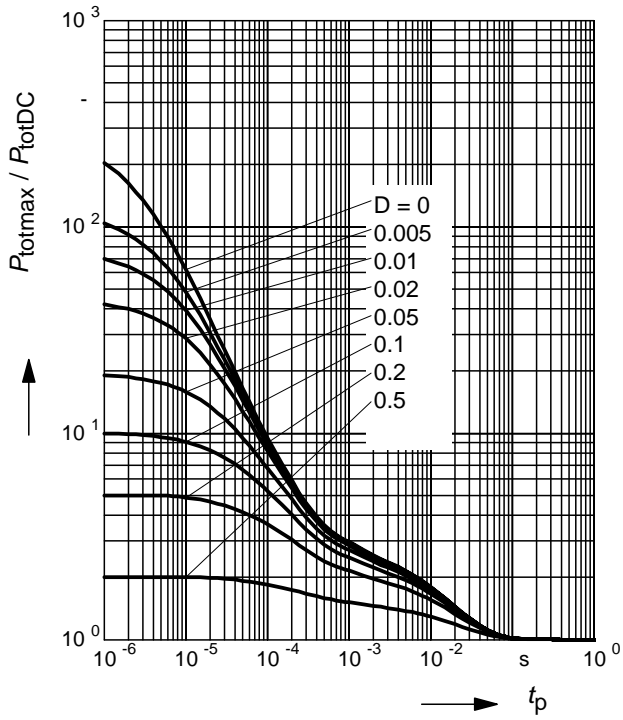
BCR133W



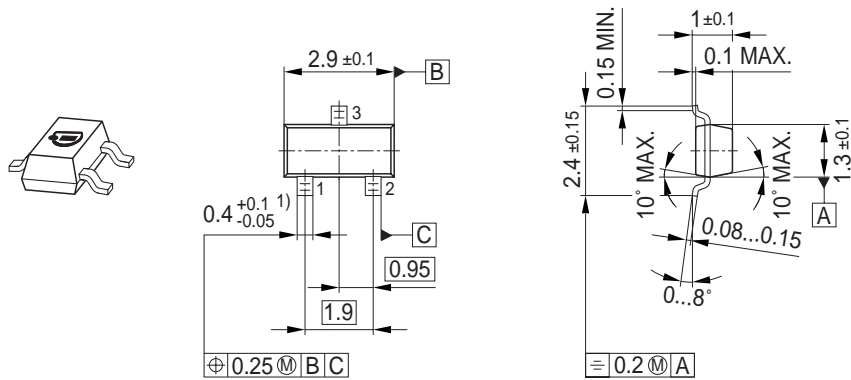
Permissible Pulse Load

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

BCR133W

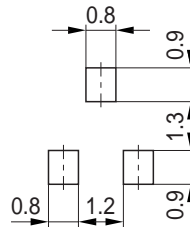


Package Outline

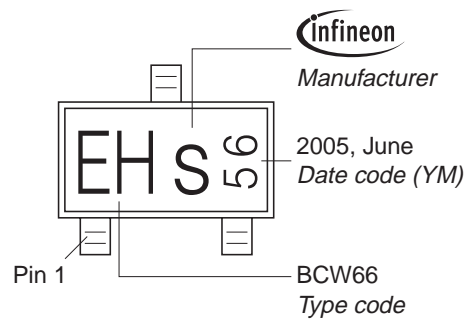


1) Lead width can be 0.6 max. in dambar area

Foot Print

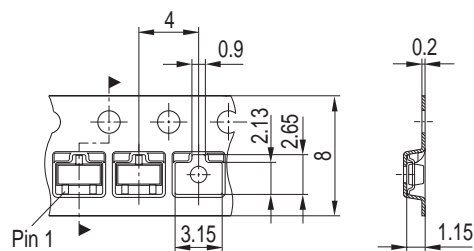


Marking Layout (Example)

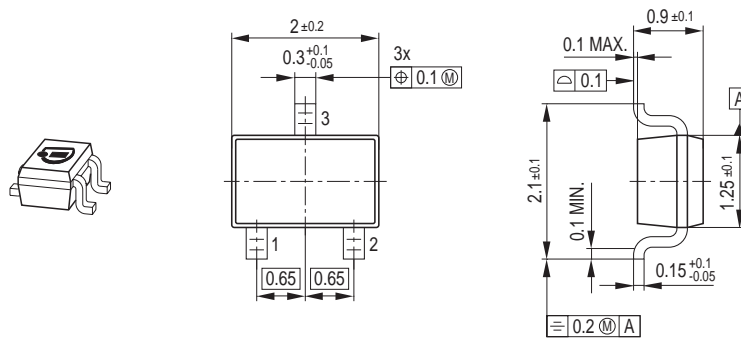


Standard Packing

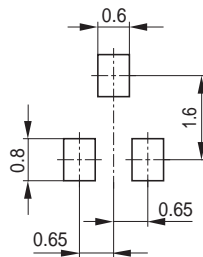
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



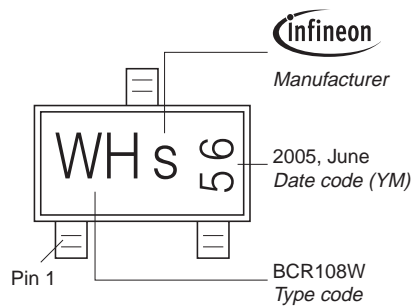
Package Outline



Foot Print

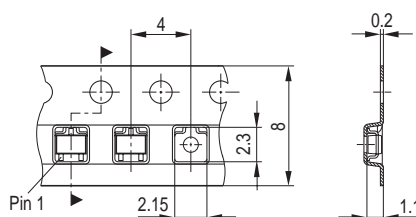


Marking Layout (Example)

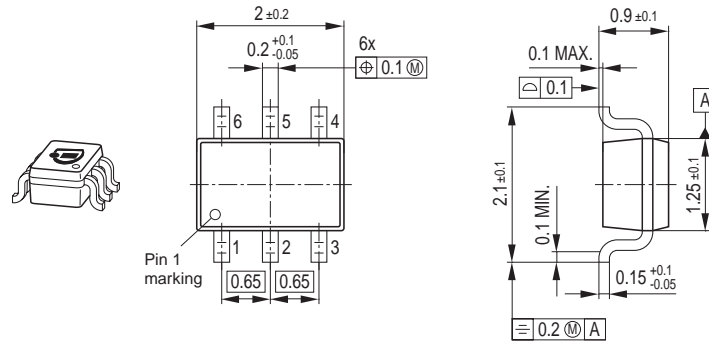


Standard Packing

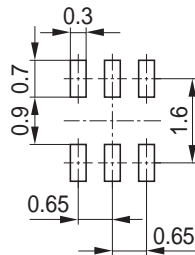
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



Package Outline

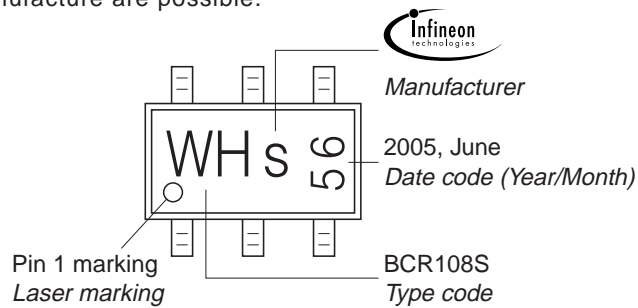


Foot Print



Marking Layout (Example)

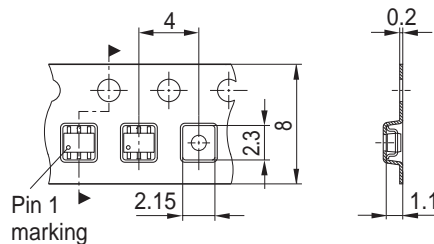
Small variations in positioning of Date code, Type code and Manufacture are possible.



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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