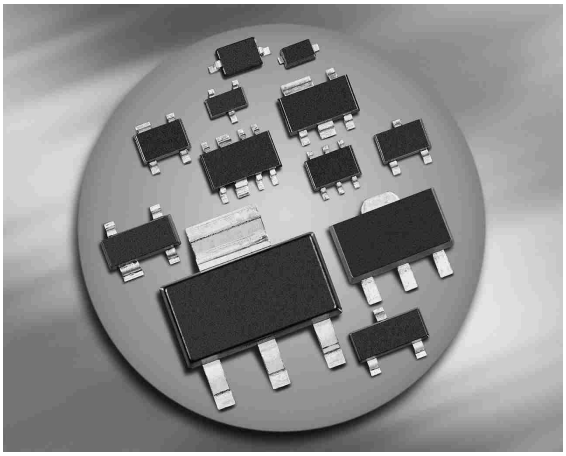
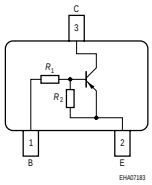
**PNP Silicon Digital Transistor**

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ($R_1$ = 4.7 kΩ , $R_2$ = 47 kΩ )
- 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, $T_S \leq 102°C$<br>BCR166W, $T_S \leq 124°C$ | $P_{tot}$ | <br>200<br>250 | mW |
| 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 |
| BCR166 | | ≤ 240 | |
| BCR166W | | ≤ 105 | |

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

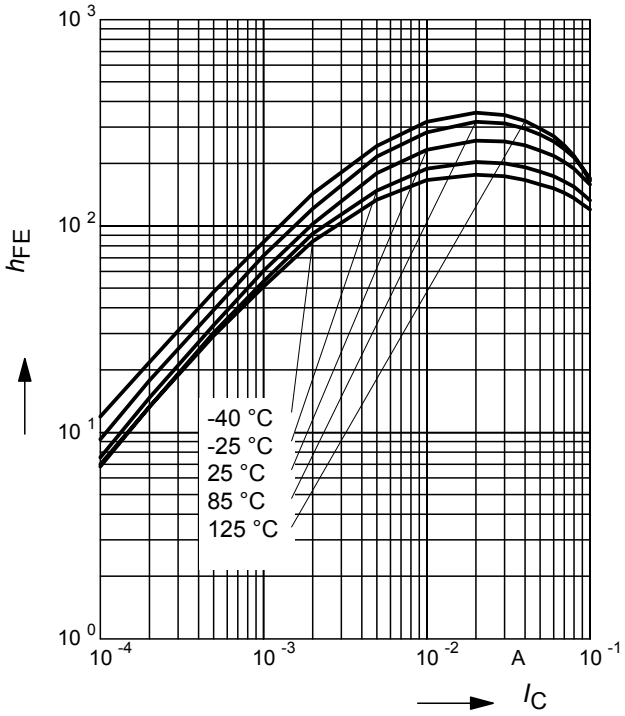
| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Collector-emitter breakdown voltage<br>$I_C$ = 100 µA, $I_B$ = 0 | $V_{(BR)CEO}$ | 50 | - | - | V |
| Collector-base breakdown voltage<br>$I_C$ = 10 µA, $I_E$ = 0 | $V_{(BR)CBO}$ | 50 | - | - | |
| Collector-base cutoff current<br>$V_{CB}$ = 40 V, $I_E$ = 0 | $I_{CBO}$ | - | - | 100 | nA |
| Emitter-base cutoff current<br>$V_{EB}$ = 5 V, $I_C$ = 0 | $I_{EBO}$ | - | - | 155 | µA |
| DC current gain[2)]<br>$I_C$ = 5 mA, $V_{CE}$ = 5 V | $h_{FE}$ | 70 | - | - | - |
| Collector-emitter saturation voltage[2)]<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 | $V_{i(off)}$ | 0.4 | - | 0.8 | |
| Input on voltage<br>$I_C$ = 2 mA, $V_{CE}$ = 0.3 V | $V_{i(on)}$ | 0.5 | - | 1.4 | |
| Input resistor | $R_1$ | 3.2 | 4.7 | 6.2 | kΩ |
| Resistor ratio | $R_1/R_2$ | 0.09 | 0.1 | 0.11 | - |
| **AC Characteristics** | | | | | |
| Transition frequency<br>$I_C$ = 10 mA, $V_{CE}$ = 5 V, $f$ = 100 MHz | $f_T$ | - | 160 | - | MHz |
| Collector-base capacitance<br>$V_{CB}$ = 10 V, $f$ = 1 MHz | $C_{cb}$ | - | 3 | - | pF |

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

[2]Pulse test: t < 300µs; D < 2%

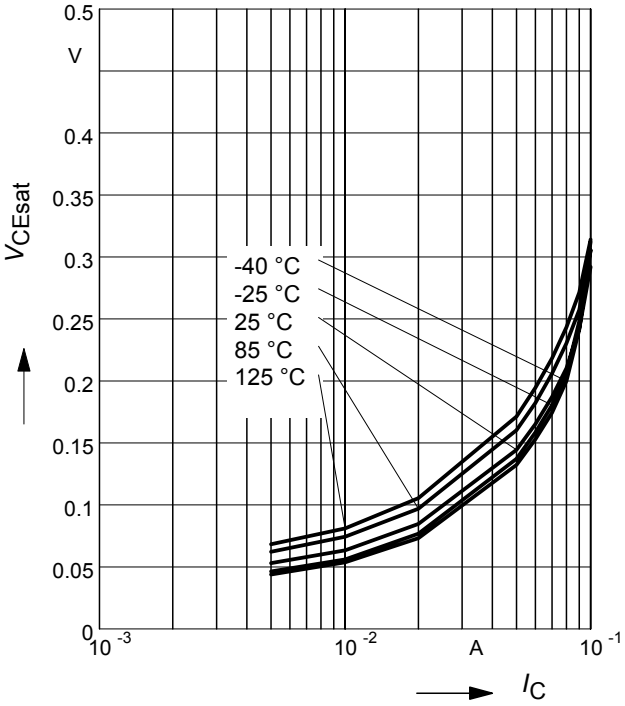
**DC current gain $h_{FE} = f(I_C)$**

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



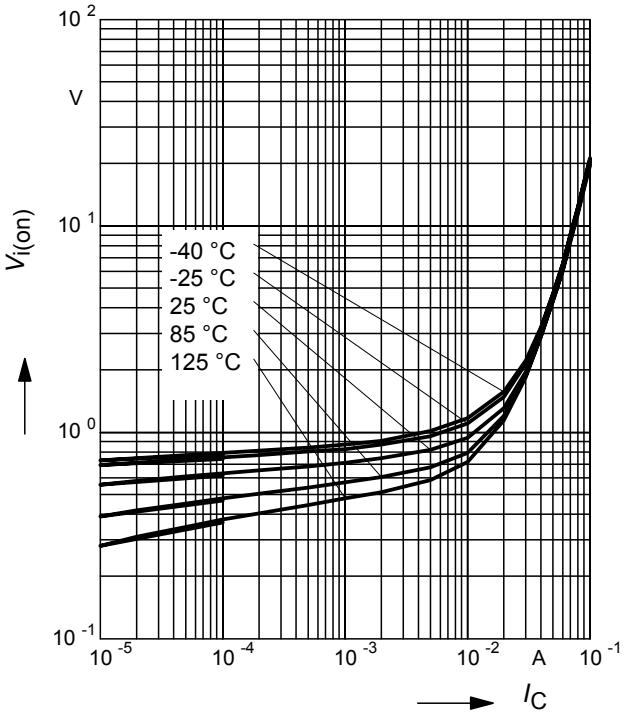

**Collector-emitter saturation voltage**

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



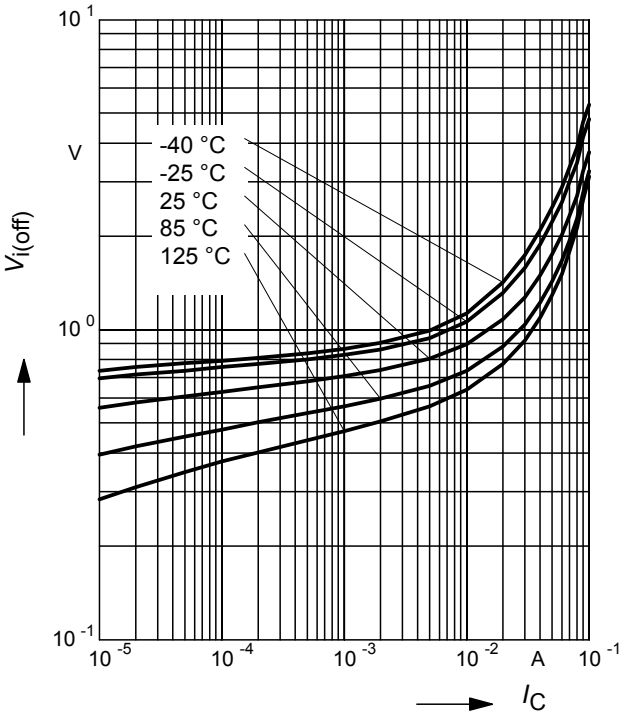

**Input on Voltage $V_{i(on)} = f(I_C)$**

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

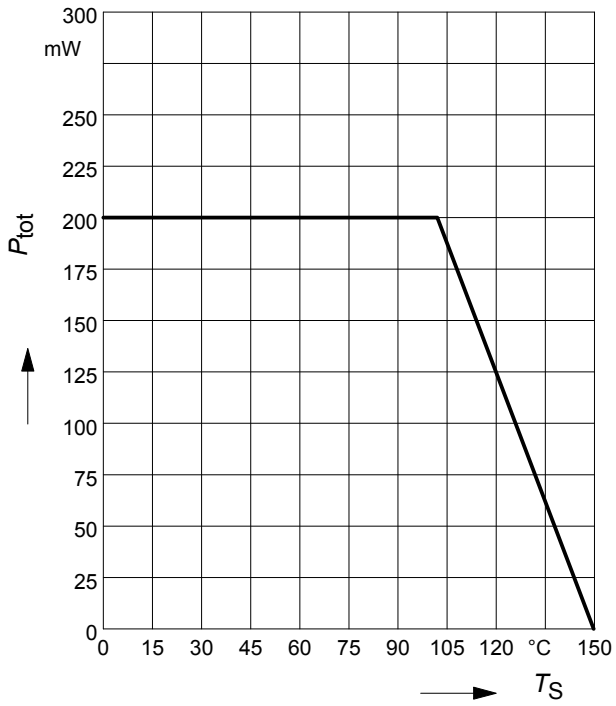



**Input off voltage $V_{i(off)} = f(I_C)$**

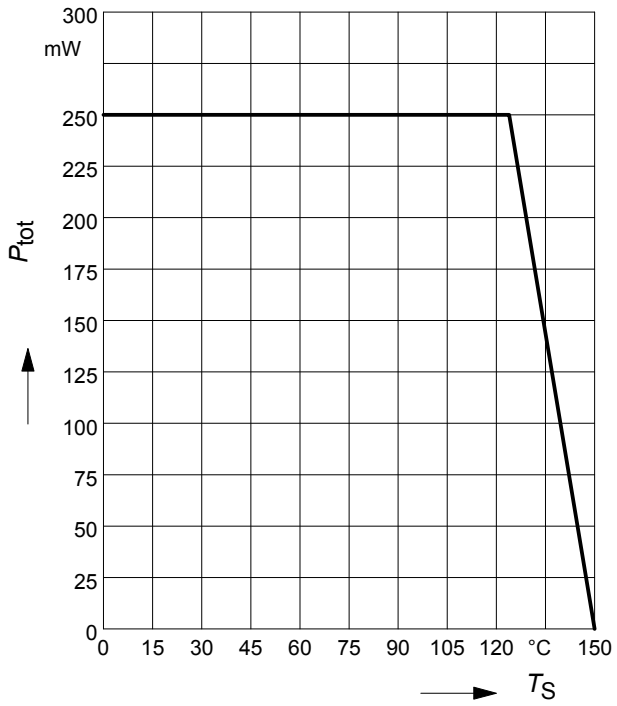
$V_{CE}$ = 5V (common emitter configuration)



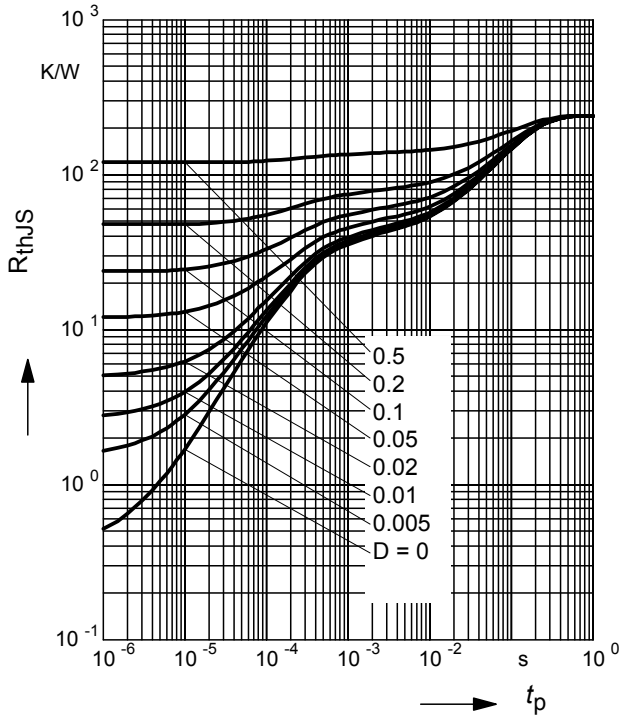
**Total power dissipation $P_{tot} = f(T_S)$**
BCR166



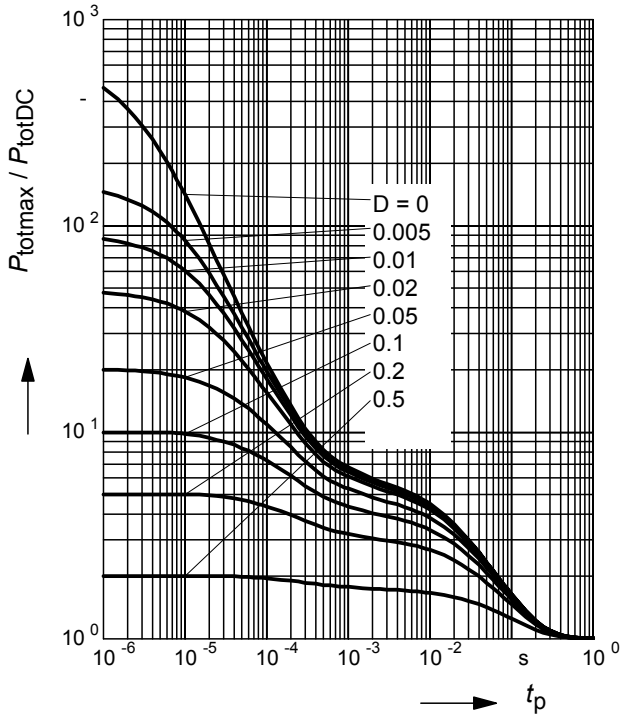

**Total power dissipation $P_{tot} = f(T_S)$**
BCR166W




**Permissible Pulse Load $R_{thJS} = f(t_p)$**
BCR166

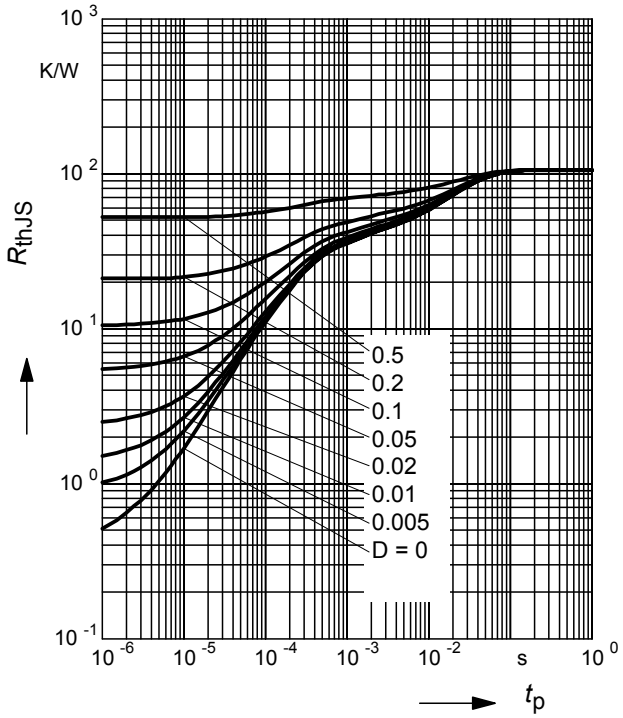



**Permissible Pulse Load**
$P_{totmax}/P_{totDC} = f(t_p)$
BCR166



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

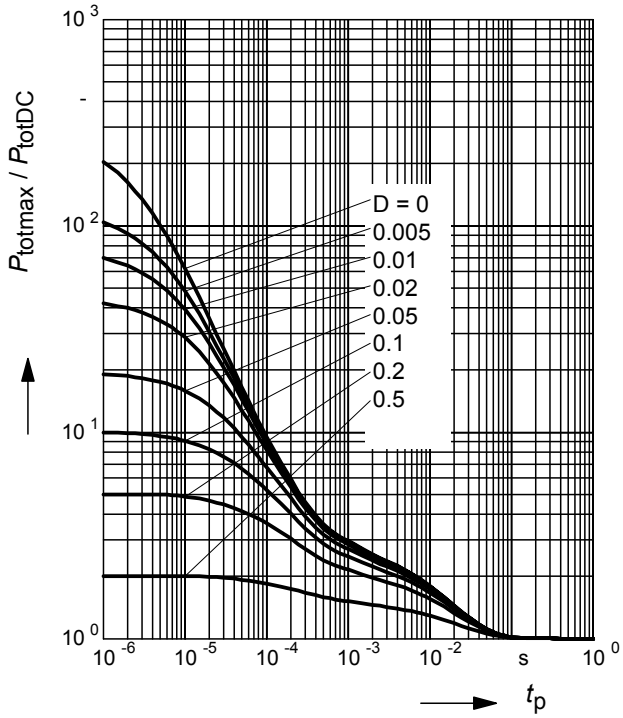
BCR166W



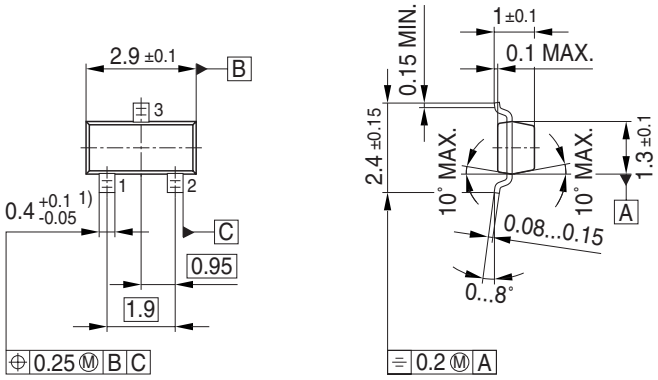

**Permissible Pulse Load**

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

BCR166W

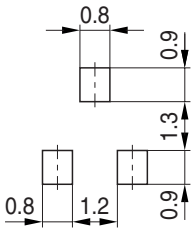


## Package Outline

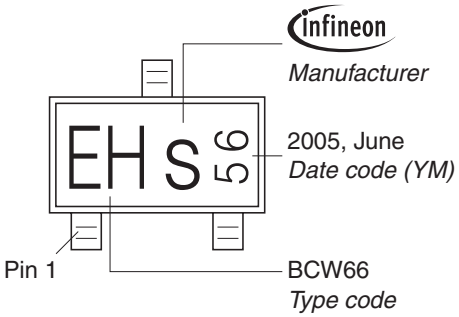



1) Lead width can be 0.6 max. in dambar area

## Foot Print

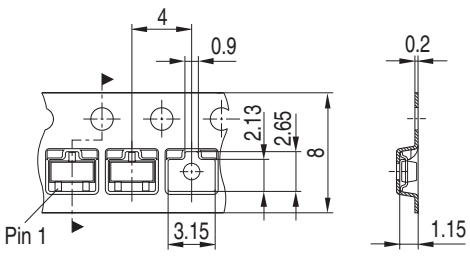



## Marking Layout (Example)

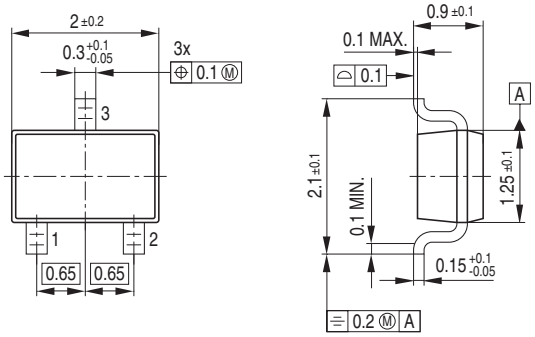



## Standard Packing

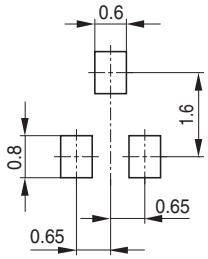
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



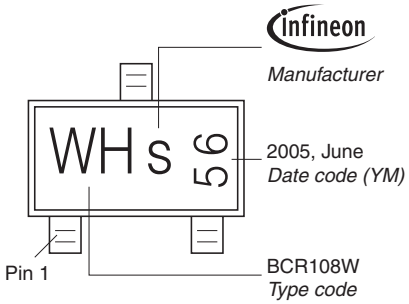
## Package Outline




## Foot Print




## Marking Layout (Example)

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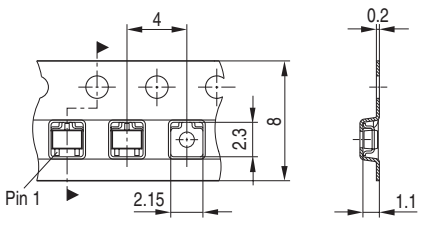

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