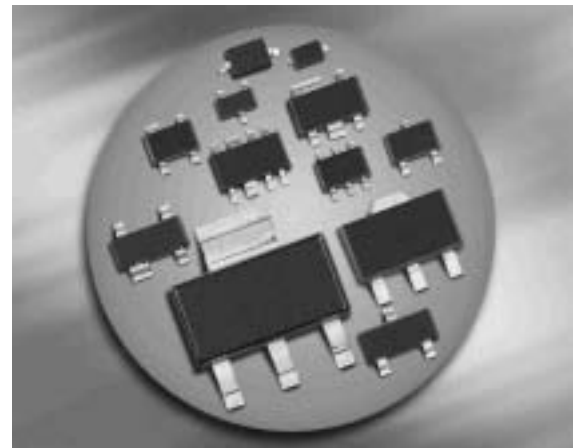
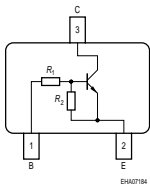


NPN Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ($R_1=22k\Omega$, $R_2=47k\Omega$)
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101


BCR142/W
BCR142F


| Type | Marking | Pin Configuration | | | | | | Package |
|---------|---------|-------------------|-----|-----|---|---|---|---------|
| | | 1=B | 2=E | 3=C | - | - | - | |
| BCR142 | WZs | 1=B | 2=E | 3=C | - | - | - | SOT23 |
| BCR142F | WZs | 1=B | 2=E | 3=C | - | - | - | TSFP-3 |
| BCR142W | WZs | 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 | $V_{I(fwd)}$ | 60 | |
| Input reverse voltage | $V_{I(rev)}$ | 10 | |
| Collector current | I_C | 100 | mA |
| Total power dissipation- | P_{tot} | | mW |
| BCR142, $T_S \leq 102^\circ\text{C}$ | | 200 | |
| BCR142W, $T_S \leq 124^\circ\text{C}$ | | 250 | |
| BCR142F, $T_S \leq 128^\circ\text{C}$ | | 250 | |
| Junction temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{stg} | -65 ... 150 | |

¹Pb-containing package may be available upon special request

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--|------------|-------|------|
| Junction - soldering point ¹⁾ | R_{thJS} | | K/W |
| BCR142 | | ≤ 240 | |
| BCR142W | | ≤ 105 | |
| BCR142F | | ≤ 90 | |

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} | - | - | 227 | μA |
| DC current gain ²⁾ $I_C = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ | h_{FE} | 70 | - | - | - |
| Collector-emitter saturation voltage ²⁾ $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ | V_{CEsat} | - | - | 0.3 | V |
| Input off voltage $I_C = 100 \mu\text{A}, V_{CE} = 5 \text{ V}$ | $V_{i(off)}$ | 0.5 | - | 1.2 | |
| Input on voltage $I_C = 2 \text{ mA}, V_{CE} = 0.3 \text{ V}$ | $V_{i(on)}$ | 0.8 | - | 2.5 | |
| Input resistor | R_1 | 15 | 22 | 29 | $k\Omega$ |
| Resistor ratio | R_1/R_2 | 0.42 | 0.47 | 0.52 | - |

AC Characteristics

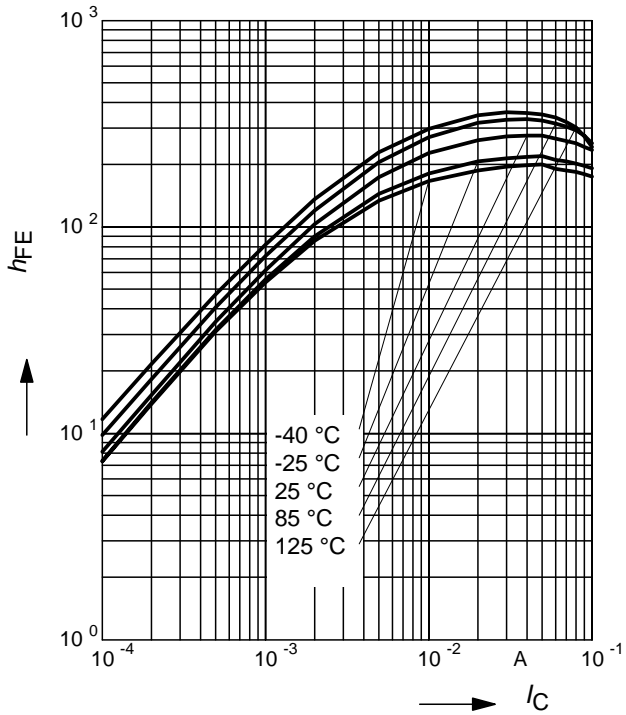
| | | | | | |
|--|----------|---|-----|---|-----|
| Transition frequency $I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$ | f_T | - | 150 | - | MHz |
| Collector-base capacitance $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$ | C_{cb} | - | 3 | - | pF |

¹For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

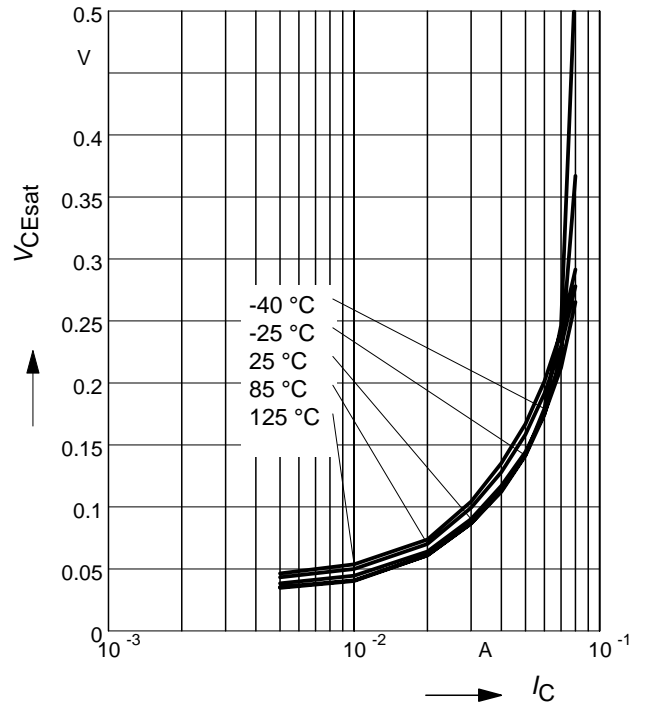
DC current gain $h_{FE} = f(I_C)$

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



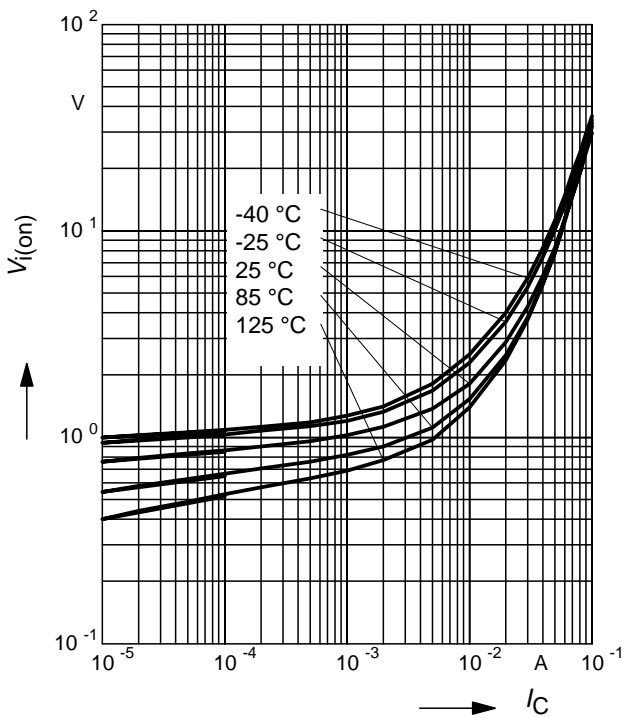
Collector-emitter saturation voltage

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



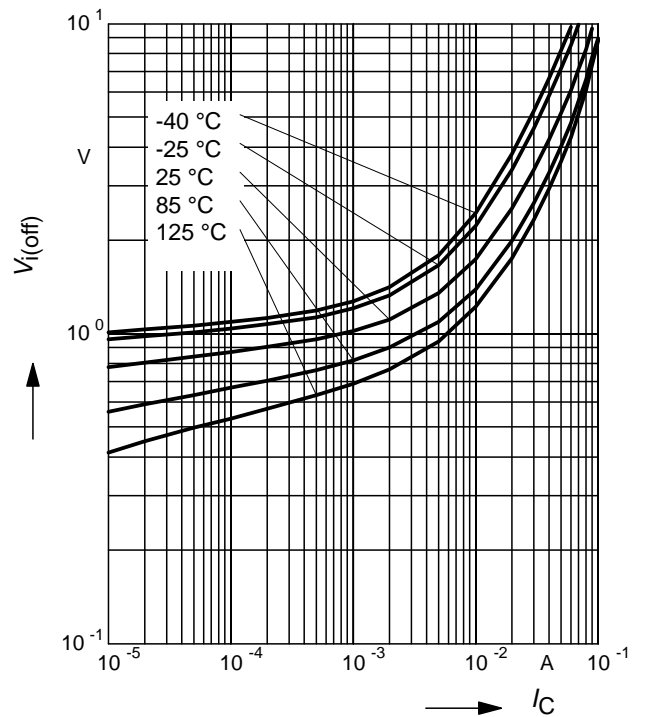
Input on Voltage $V_{i(on)} = f(I_C)$

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



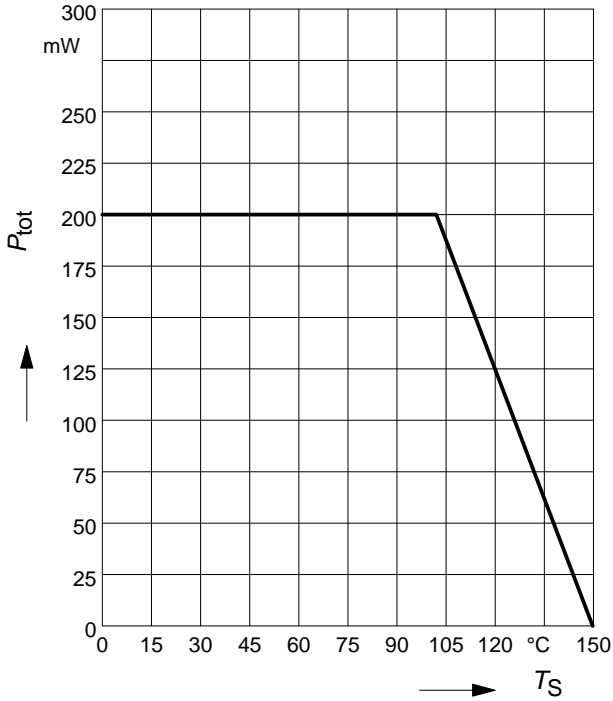
Input off voltage $V_{i(off)} = f(I_C)$

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



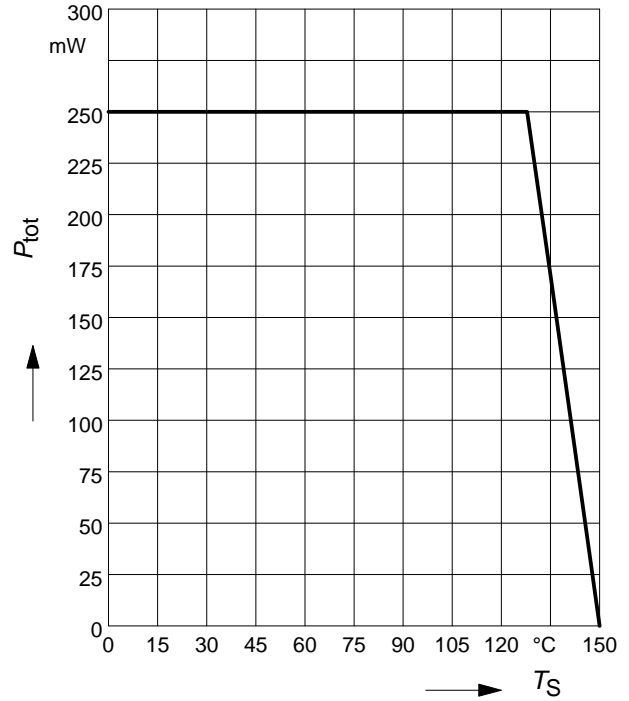
Total power dissipation $P_{tot} = f(T_S)$

BCR142



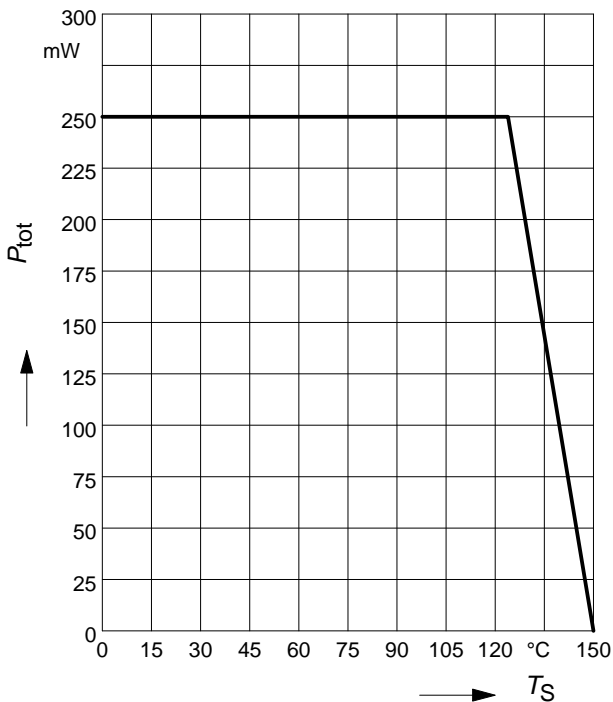
Total power dissipation $P_{tot} = f(T_S)$

BCR142F



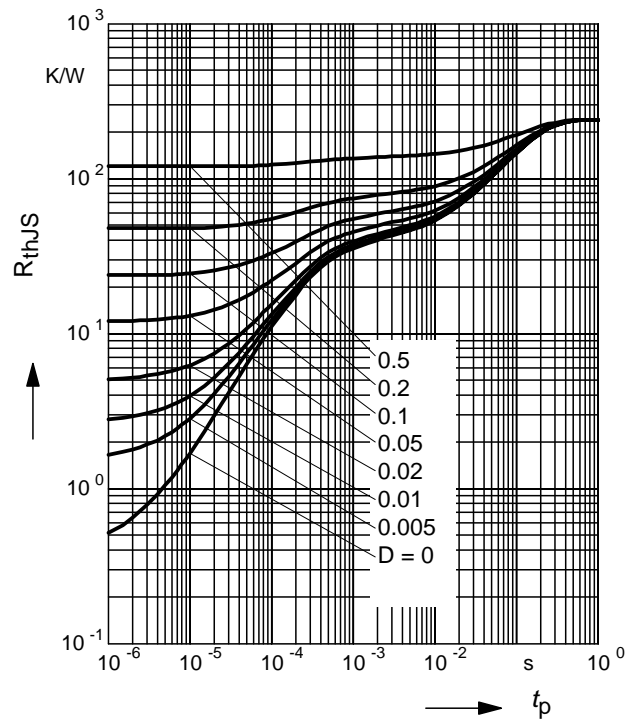
Total power dissipation $P_{tot} = f(T_S)$

BCR142W



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

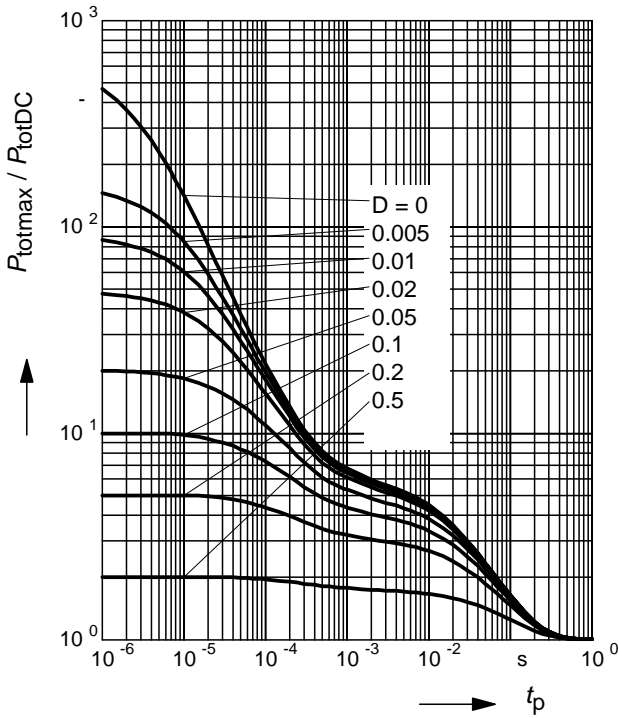
BCR142



Permissible Pulse Load

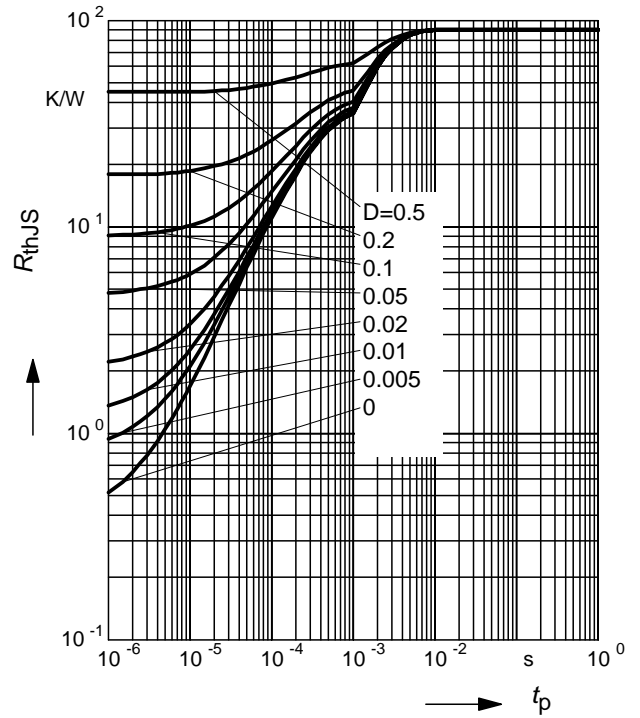
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR142



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

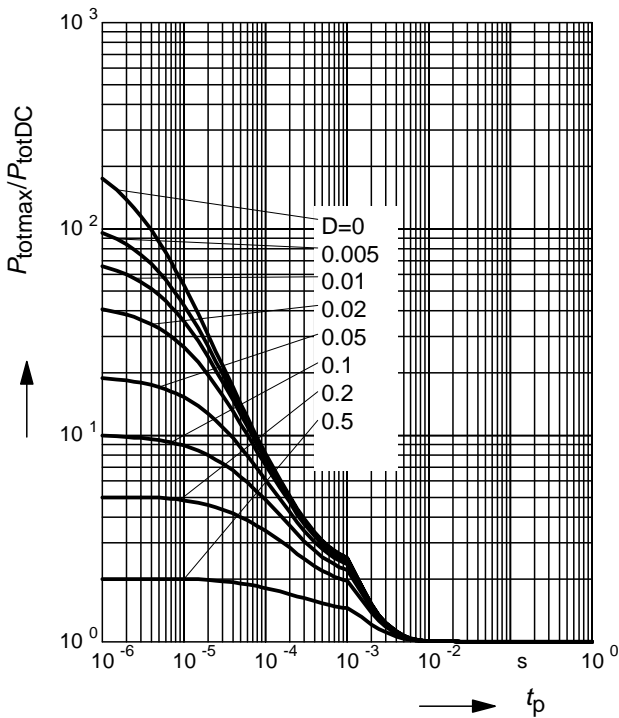
BCR142F



Permissible Pulse Load

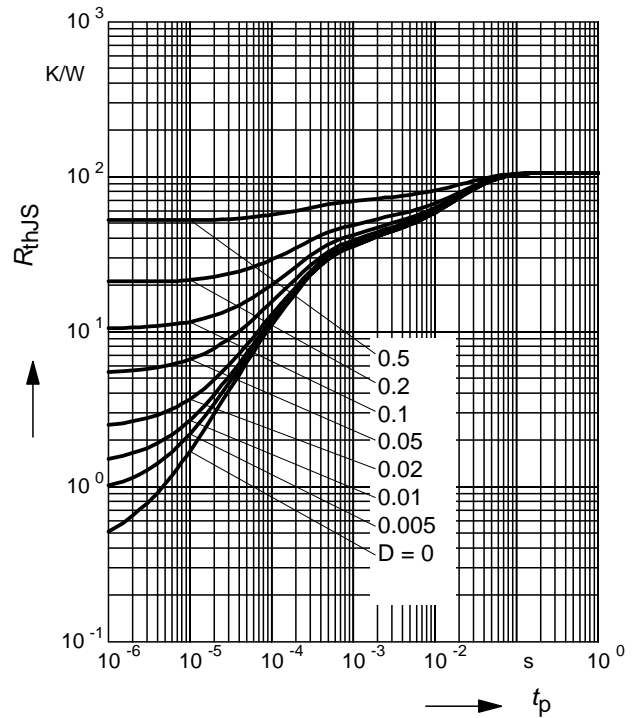
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR142F



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

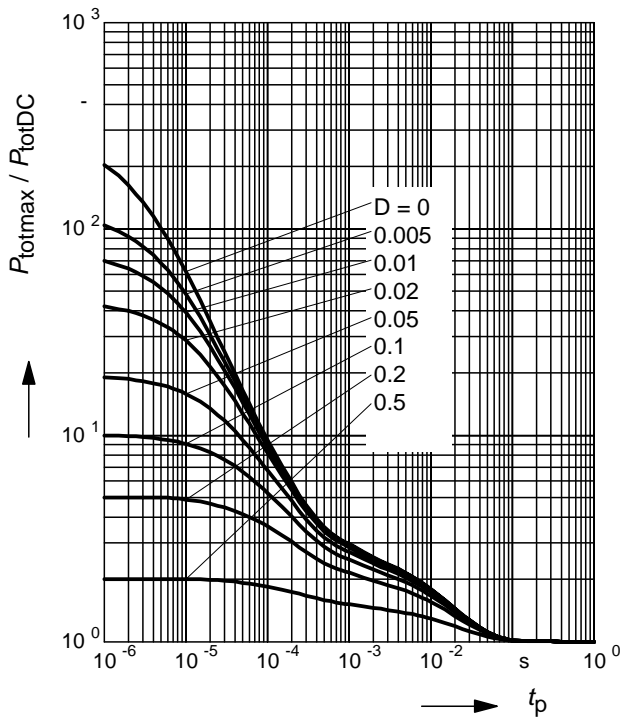
BCR142W



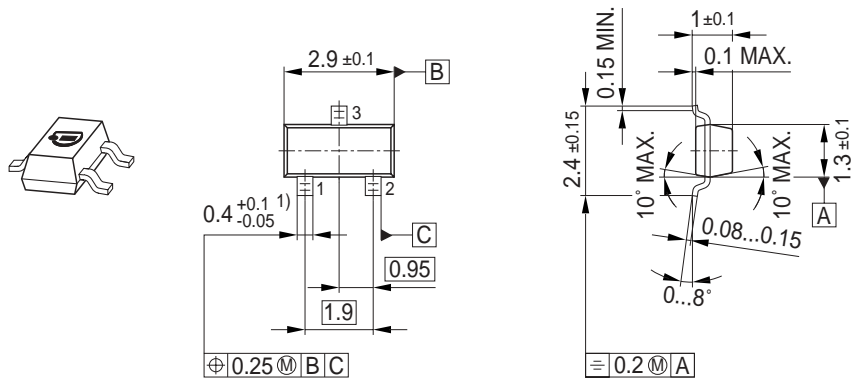
Permissible Pulse Load

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

BCR142W

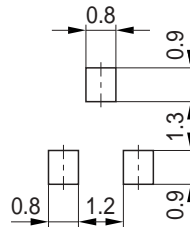


Package Outline

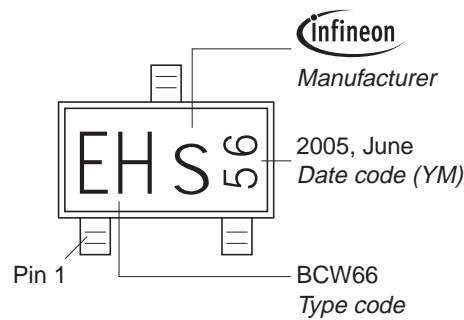


1) Lead width can be 0.6 max. in dambar area

Foot Print

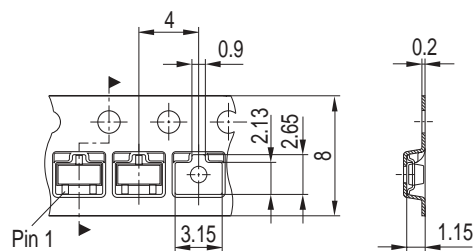


Marking Layout (Example)

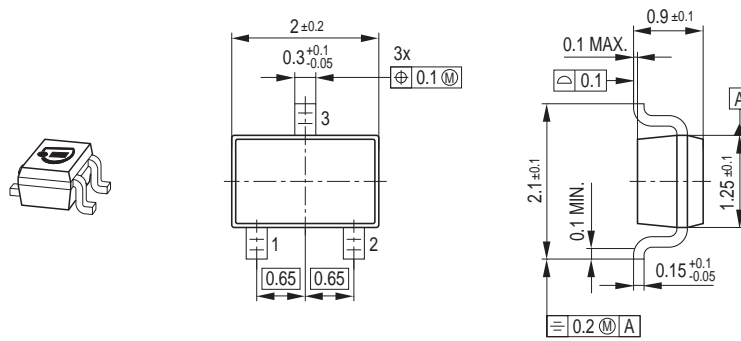


Standard Packing

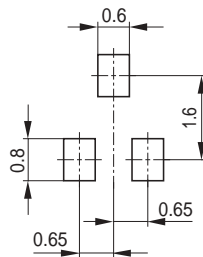
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



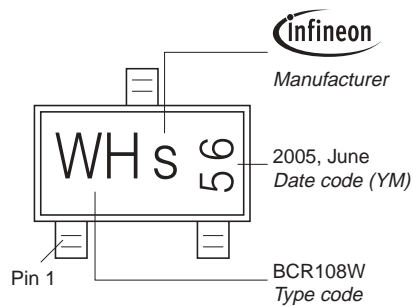
Package Outline



Foot Print

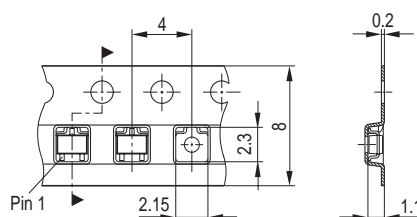


Marking Layout (Example)

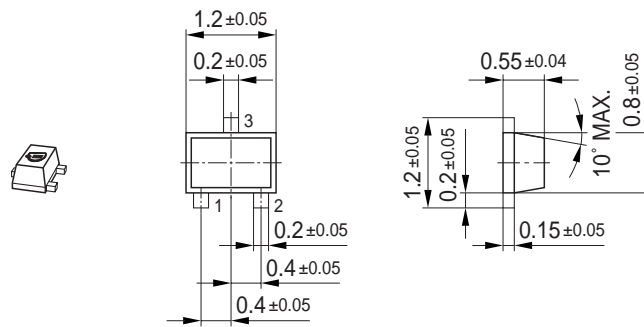


Standard Packing

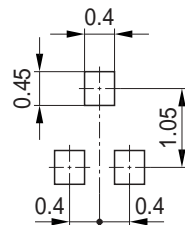
Reel $\varnothing 180$ mm = 3.000 Pieces/Reel
 Reel $\varnothing 330$ mm = 10.000 Pieces/Reel



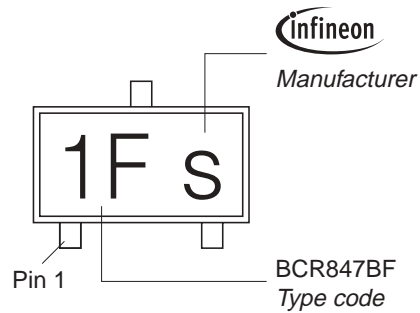
Package Outline



Foot Print

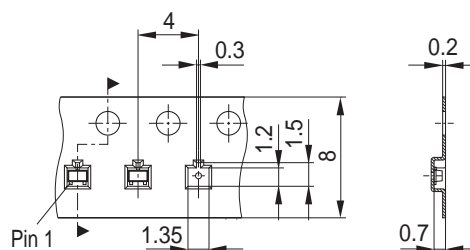


Marking Layout (Example)



Standard Packing

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



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