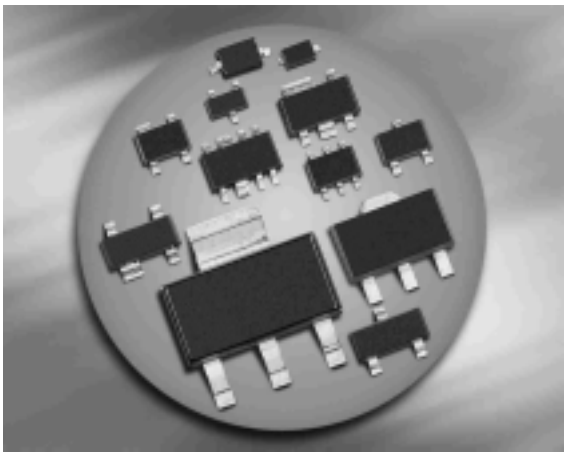
# THE DATASHEET OF

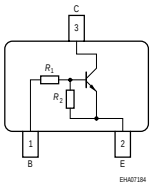
# BCR 146T E6327

**NPN Silicon Digital Transistor**

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ($R_1$=47kΩ, $R_2$=22kΩ)



**BCR146/F/L3**
**BCR146T/W**




| Type | Marking | Pin Configuration | | | | | | Package |
|---|---|---|---|---|---|---|---|---|
| BCR146 | WLs | 1=B | 2=E | 3=C | - | - | - | SOT23 |
| BCR146F | WLs | 1=B | 2=E | 3=C | - | - | - | TSFP-3 |
| BCR146L3 | WL | 1=B | 2=E | 3=C | - | - | - | TSLP-3-4 |
| BCR146T | WL | 1=B | 2=E | 3=C | - | - | - | SC75 |
| BCR146W | WLs | 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 | $V_{i(fwd)}$ | 80 | |
| Input reverse voltage | $V_{i(rev)}$ | 10 | |
| Collector current | $I_C$ | 70 | mA |
| Total power dissipation- | $P_{tot}$ | | mW |
| BCR146, $T_S \leq 102°C$ | | 200 | |
| BCR146F, $T_S \leq 128°C$ | | 250 | |
| BCR146L3, $T_S \leq 135°C$ | | 250 | |
| BCR146T, $T_S \leq 109°C$ | | 250 | |
| BCR146W, $T_S \leq 124°C$ | | 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 |
| BCR146 | | ≤ 240 | |
| BCR146F | | ≤ 90 | |
| BCR146L3 | | ≤ 60 | |
| BCR146T | | ≤ 165 | |
| BCR146W | | ≤ 105 | |

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

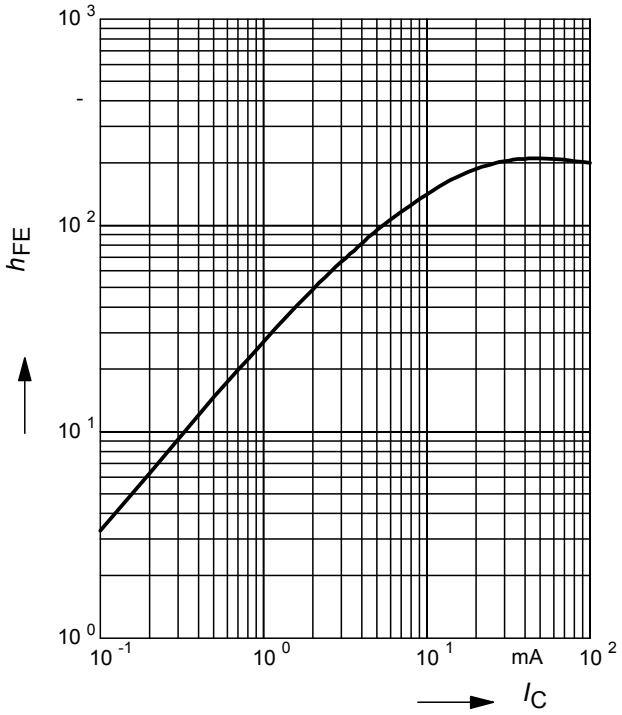
**Electrical Characteristics** at $T_A$ = 25°C, unless otherwise specified

| 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 | $I_{EBO}$ | - | - | 220 | µA |
| DC current gain[1)]<br>$I_C$ = 5 mA, $V_{CE}$ = 5 V | $h_{FE}$ | 50 | - | - | - |
| 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 | $V_{i(off)}$ | 1.2 | - | 2.6 | |
| Input on voltage<br>$I_C$ = 2 mA, $V_{CE}$ = 0.3 V | $V_{i(on)}$ | 1.5 | - | 4 | |
| Input resistor | $R_1$ | 32 | 47 | 62 | kΩ |
| Resistor ratio | $R_1/R_2$ | 1.92 | 2.14 | 2.36 | - |
| **AC Characteristics** | | | | | |
| Transition frequency<br>$I_C$ = 10 mA, $V_{CE}$ = 5 V, $f$ = 100 MHz | $f_T$ | - | 150 | - | MHz |
| Collector-base capacitance<br>$V_{CB}$ = 10 V, $f$ = 1 MHz | $C_{cb}$ | - | 3 | - | pF |

[1]Pulse test: t < 300µs; D < 2%

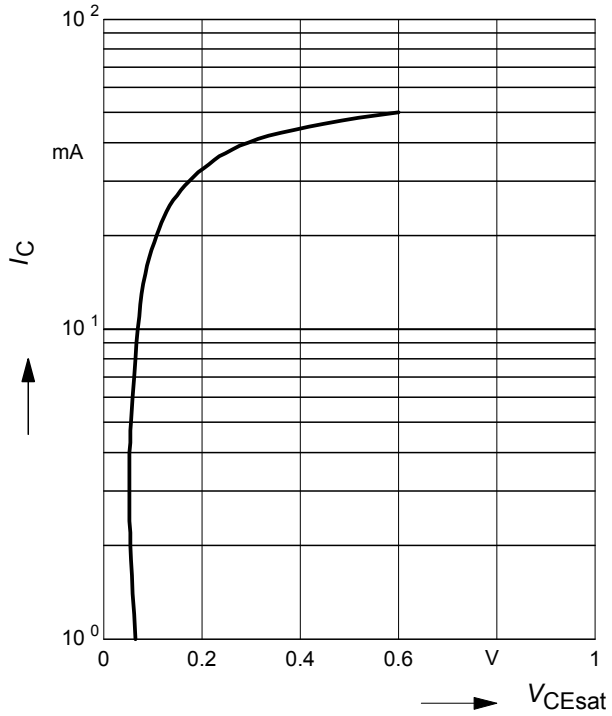
**DC current gain** $h_{FE} = f(I_C)$

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



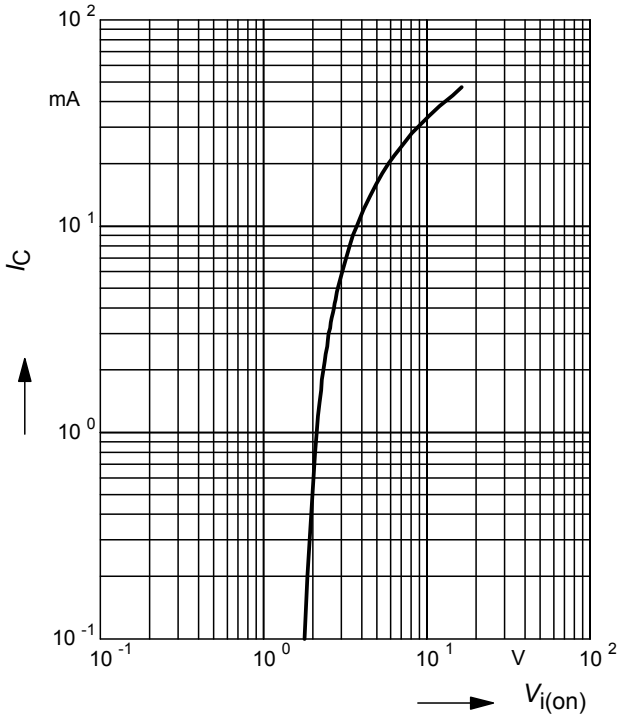

**Collector-emitter saturation voltage**

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



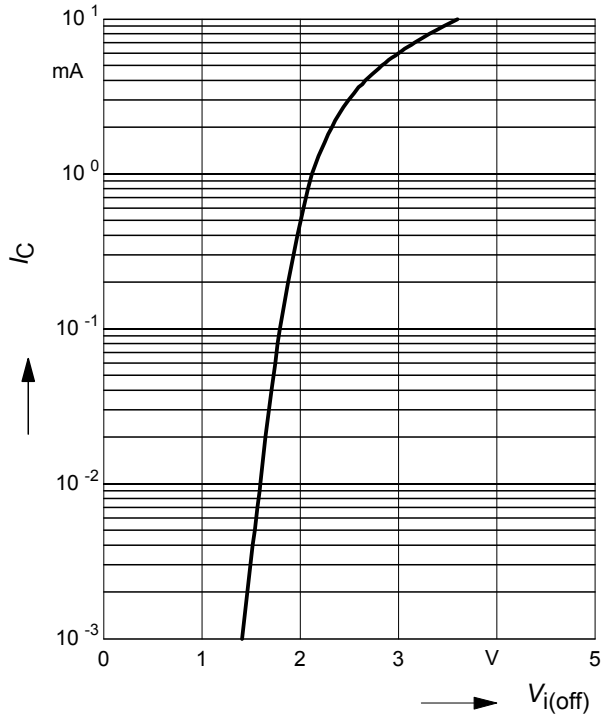

**Input on Voltage** $V_{i(on)} = f(I_C)$

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

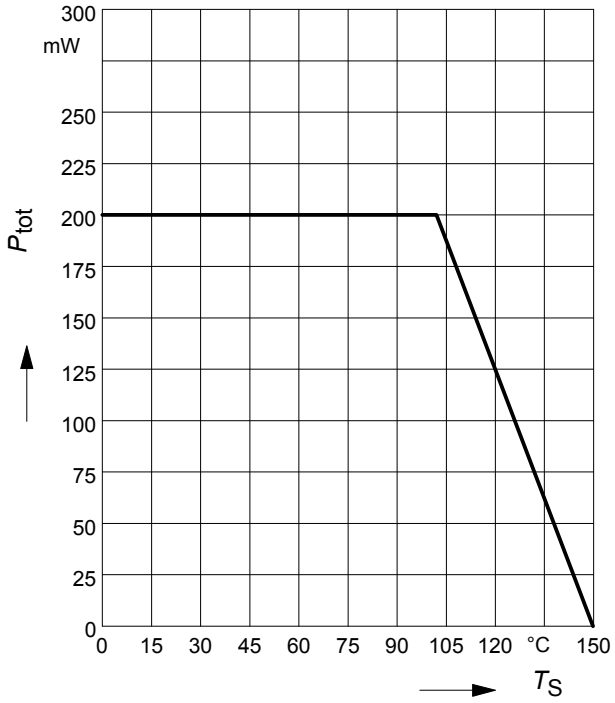



**Input off voltage** $V_{i(off)} = f(I_C)$

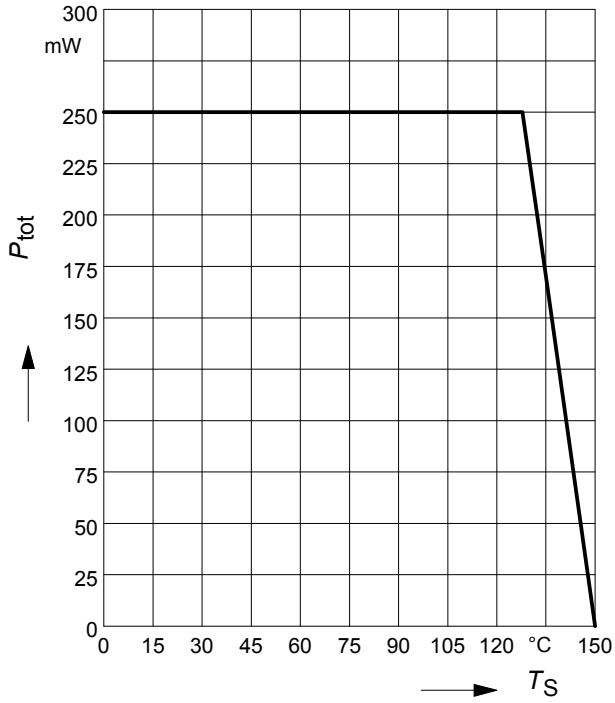
$V_{CE}$ = 5V (common emitter configuration)



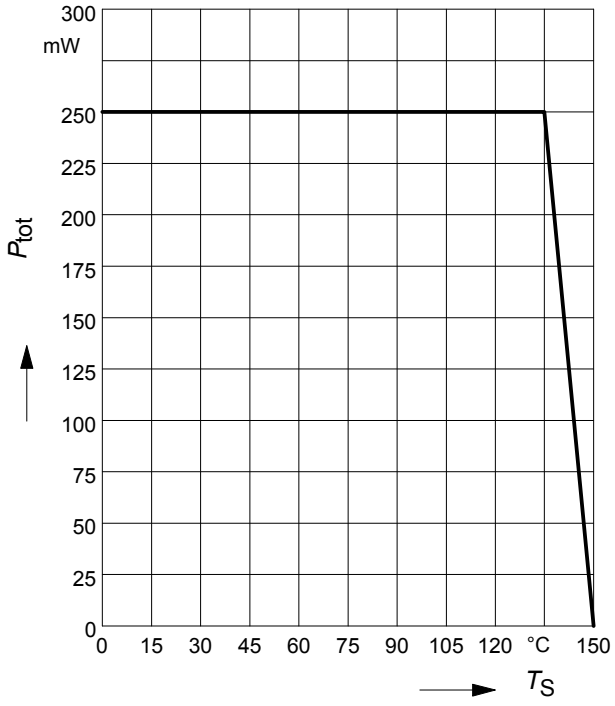
**Total power dissipation $P_{tot} = f(T_S)$**
BCR146



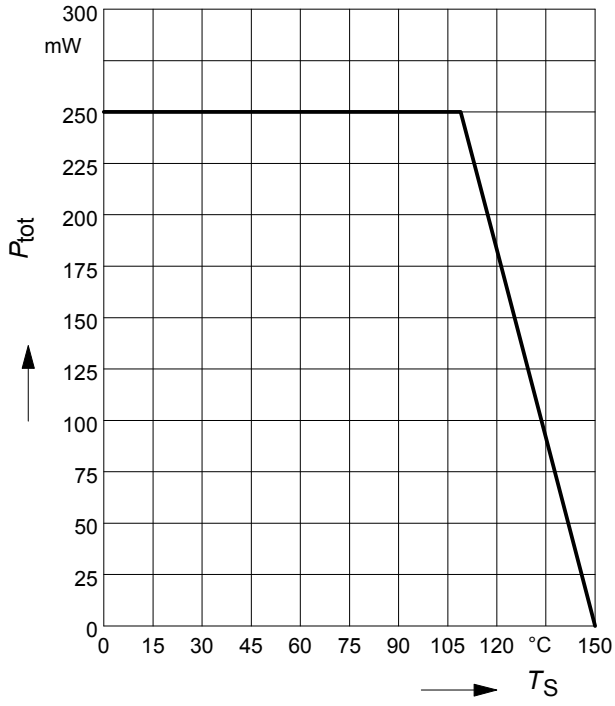

**Total power dissipation $P_{tot} = f(T_S)$**
BCR146F




**Total power dissipation $P_{tot} = f(T_S)$**
BCR146L3

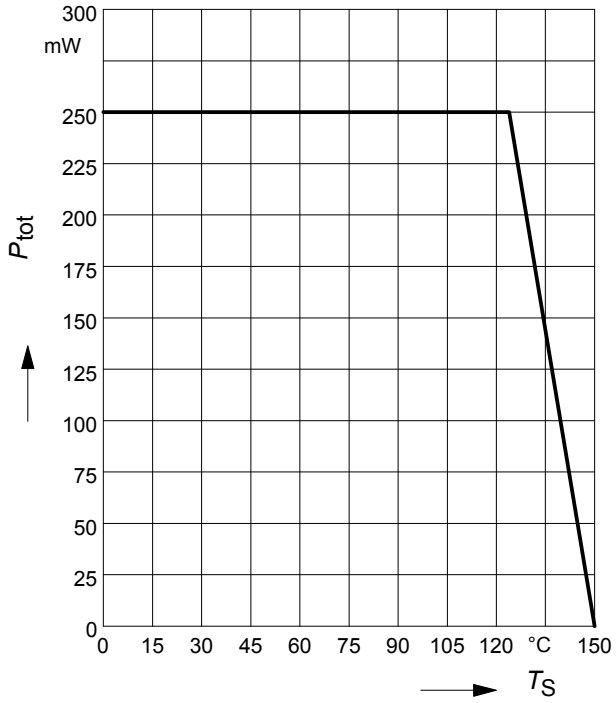



**Total power dissipation $P_{tot} = f(T_S)$**
BCR146T



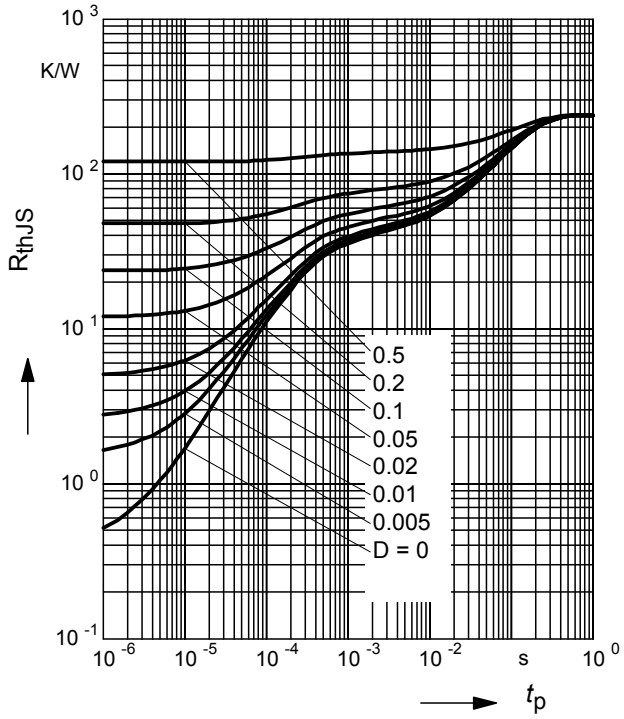
**Total power dissipation $P_{tot} = f(T_S)$**

BCR146W




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

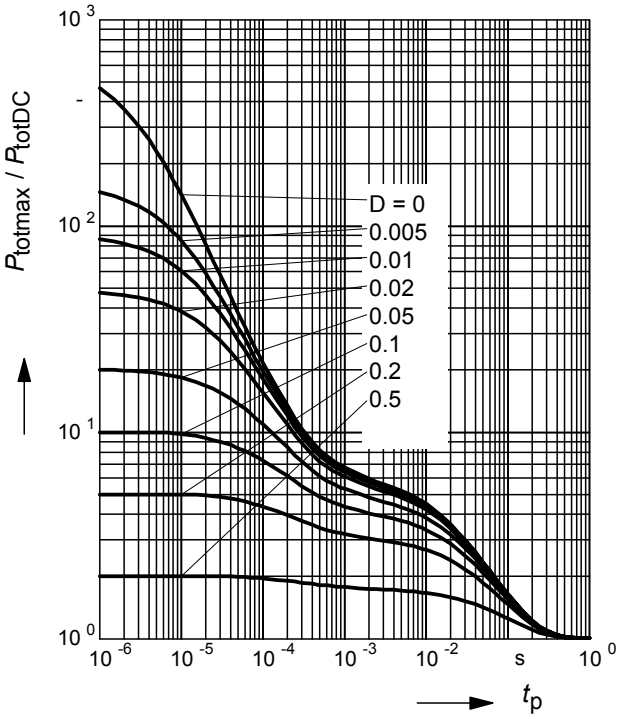
BCR146




**Permissible Pulse Load**

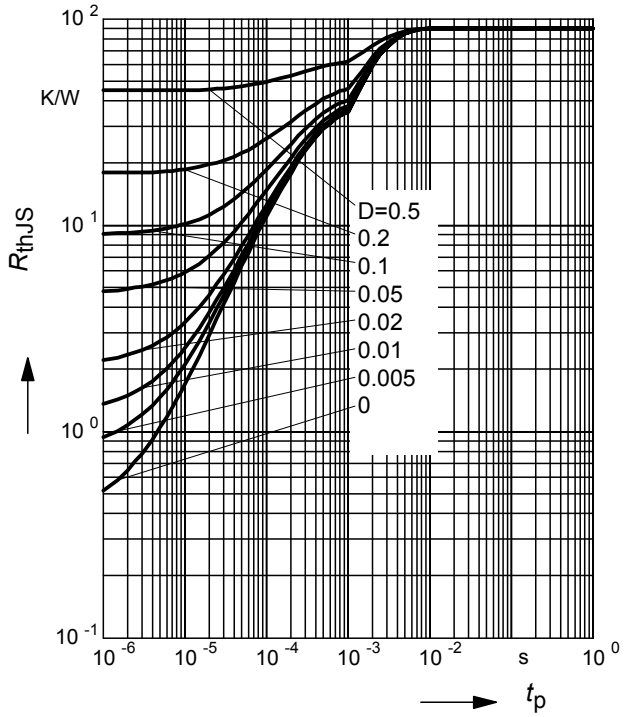
**$P_{totmax}/P_{totDC} = f(t_p)$**

BCR146



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

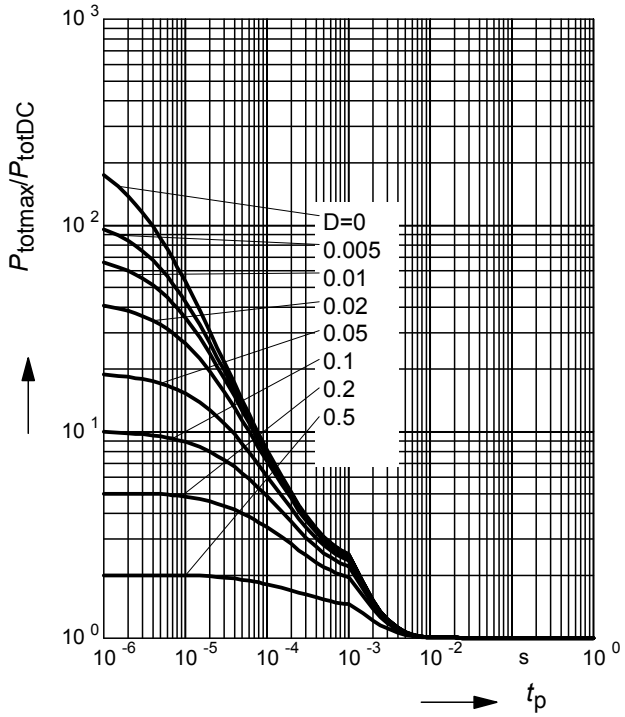
BCR146F




**Permissible Pulse Load**

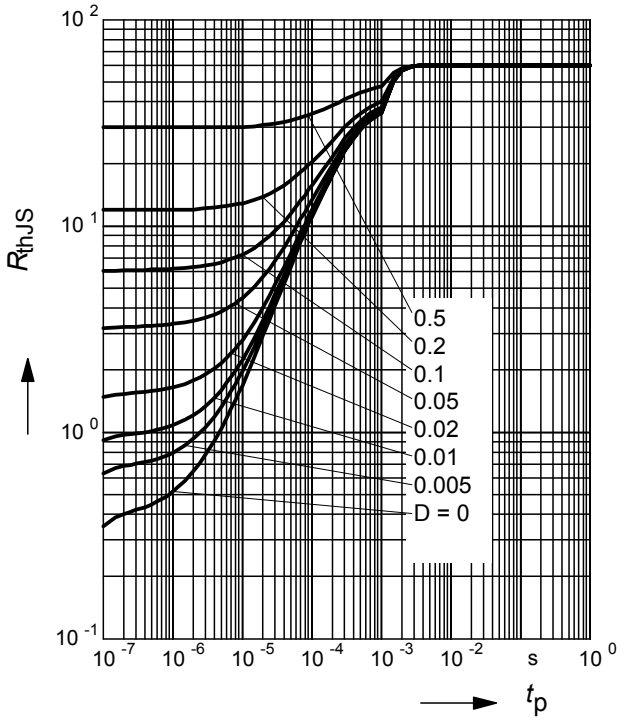
$P_{totmax}/P_{totDC} = f(t_p)$

BCR146F




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

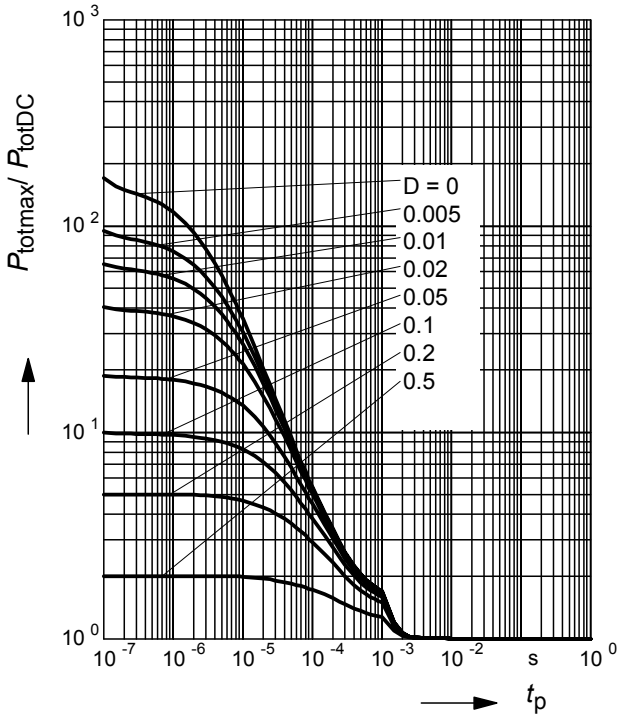
BCR146L3




**Permissible Pulse Load**

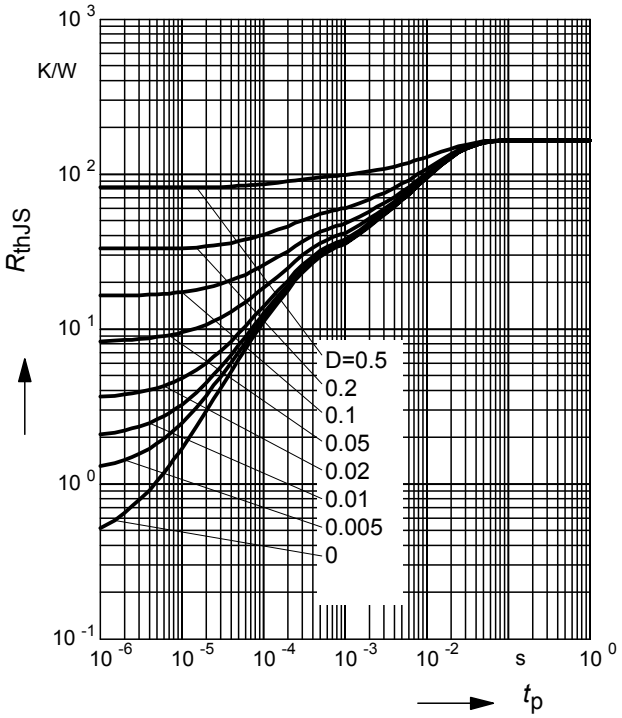
$P_{totmax}/P_{totDC} = f(t_p)$

BCR146L3



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

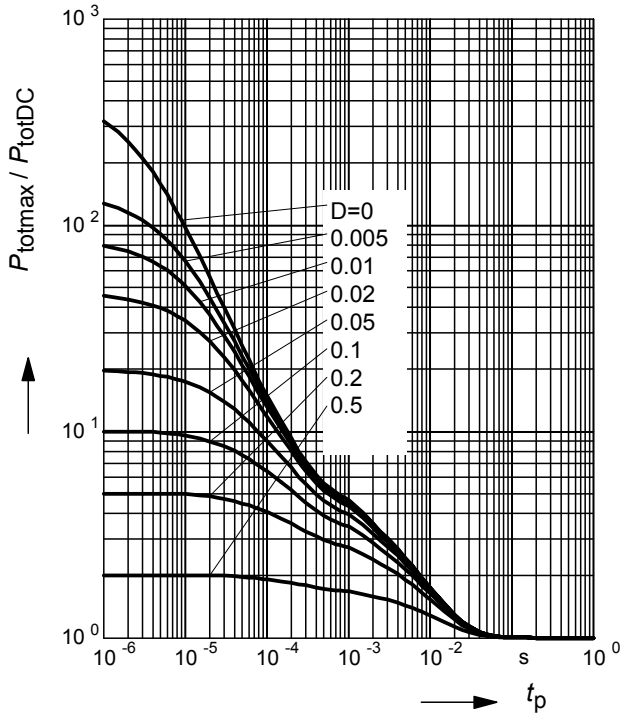
BCR146T




**Permissible Pulse Load**

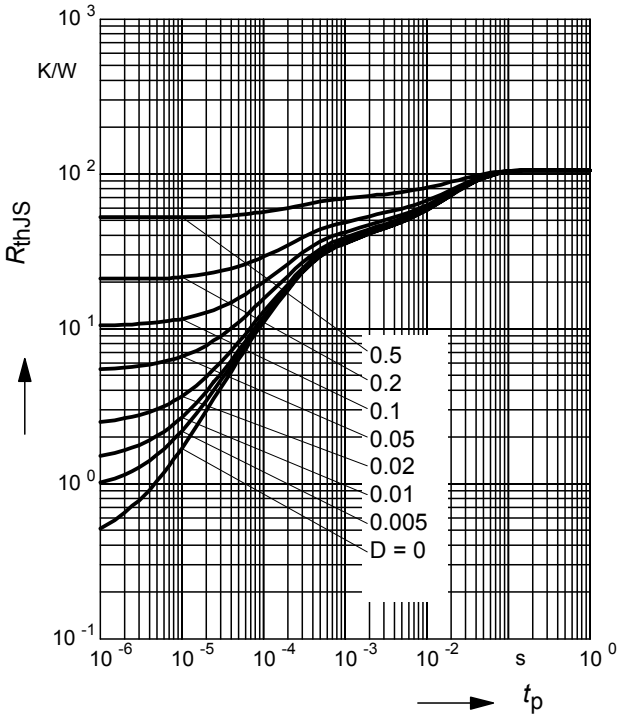
$P_{totmax}/P_{totDC} = f(t_p)$

BCR146T




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

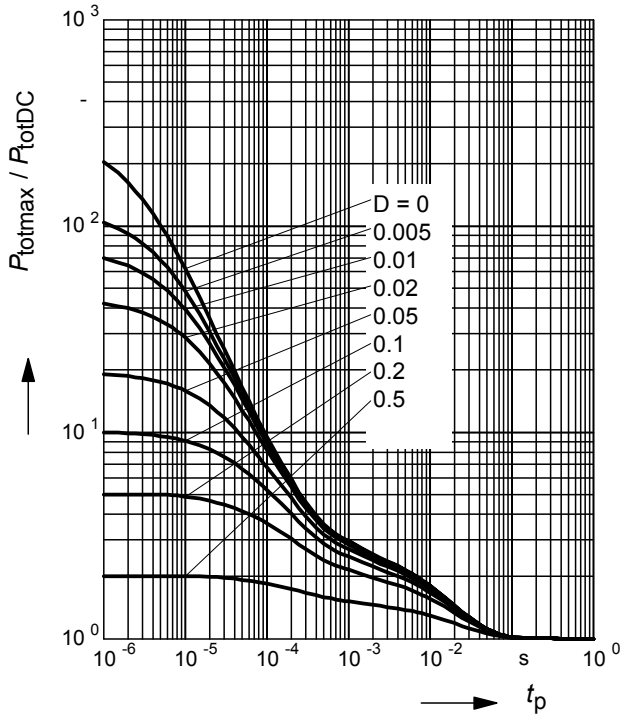
BCR146W



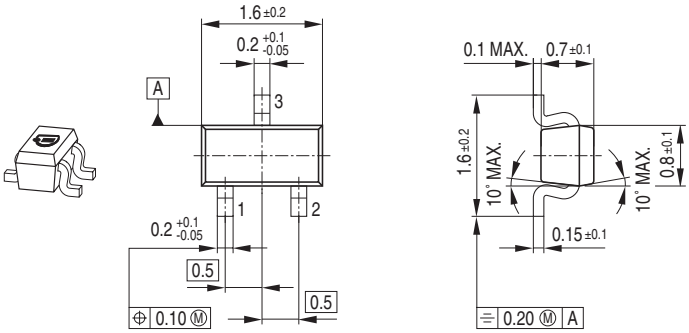

**Permissible Pulse Load**

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

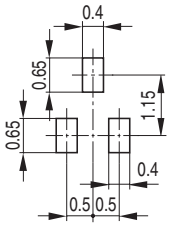
BCR146W



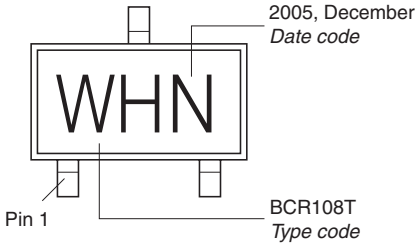
## Package Outline




## Foot Print

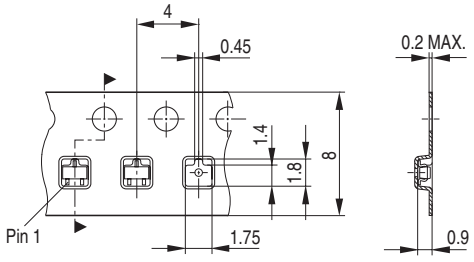



## Marking Layout (Example)




## Standard Packing

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

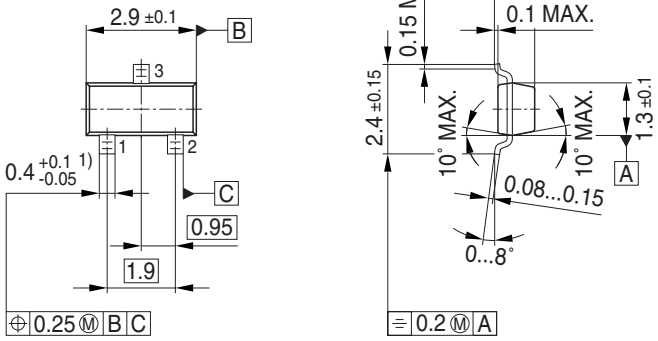


## Date Code marking for discrete packages with one digit (SCD80, SC79, SC75[1]) CES-Code

| Month | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | a | p | A | P | a | p | A | P | a | p | A | P |
| 02 | b | q | B | Q | b | q | B | Q | b | q | B | Q |
| 03 | c | r | C | R | c | r | C | R | c | r | C | R |
| 04 | d | s | D | S | d | s | D | S | d | s | D | S |
| 05 | e | t | E | T | e | t | E | T | e | t | E | T |
| 06 | f | u | F | U | f | u | F | U | f | u | F | U |
| 07 | g | v | G | V | g | v | G | V | g | v | G | V |
| 08 | h | x | H | X | h | x | H | X | h | x | H | X |
| 09 | j | y | J | Y | j | y | J | Y | j | y | J | Y |
| 10 | k | z | K | Z | k | z | K | Z | k | z | K | Z |
| 11 | l | 2 | L | 4 | l | 2 | L | 4 | l | 2 | L | 4 |
| 12 | n | 3 | N | 5 | n | 3 | N | 5 | n | 3 | N | 5 |

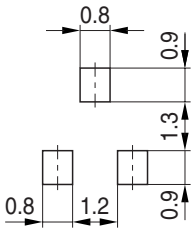
1) New Marking Layout for SC75, implemented at October 2005.

## Package Outline

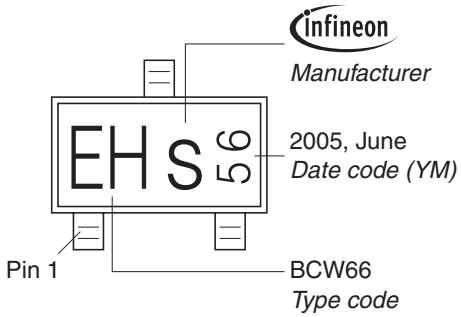



1) Lead width can be 0.6 max. in dambar area

## Foot Print

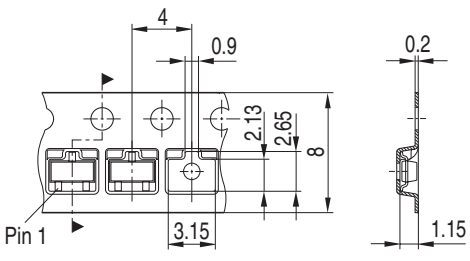



## Marking Layout (Example)

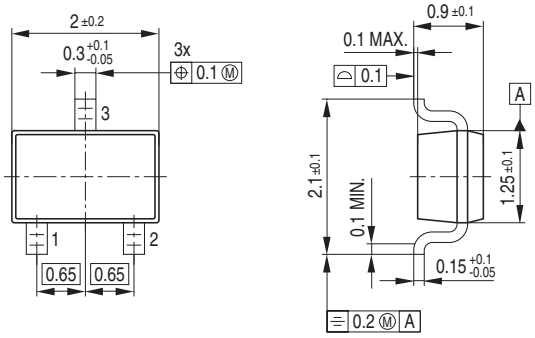



## Standard Packing

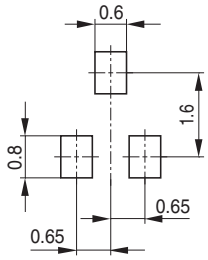
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



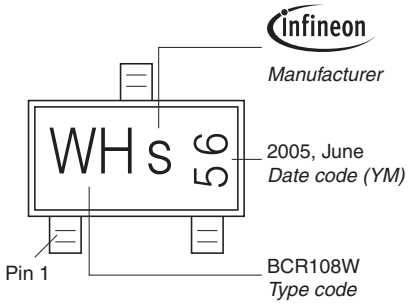
## Package Outline




## Foot Print

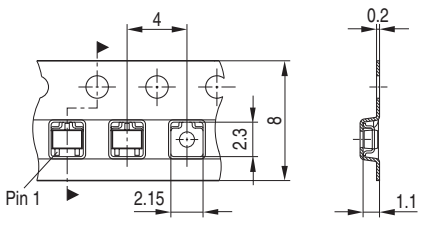



## Marking Layout (Example)

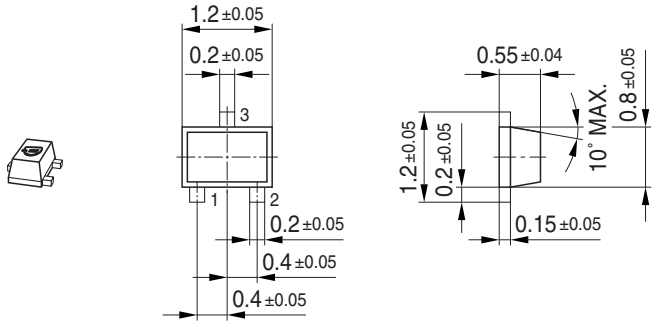



## Standard Packing

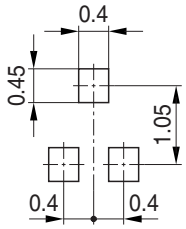
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



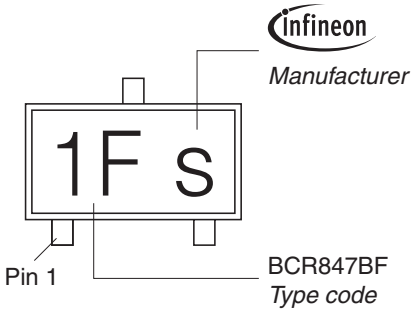
## Package Outline




## Foot Print

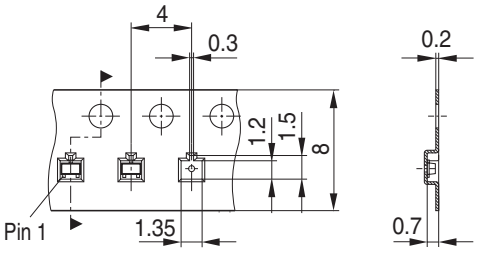



## Marking Layout (Example)

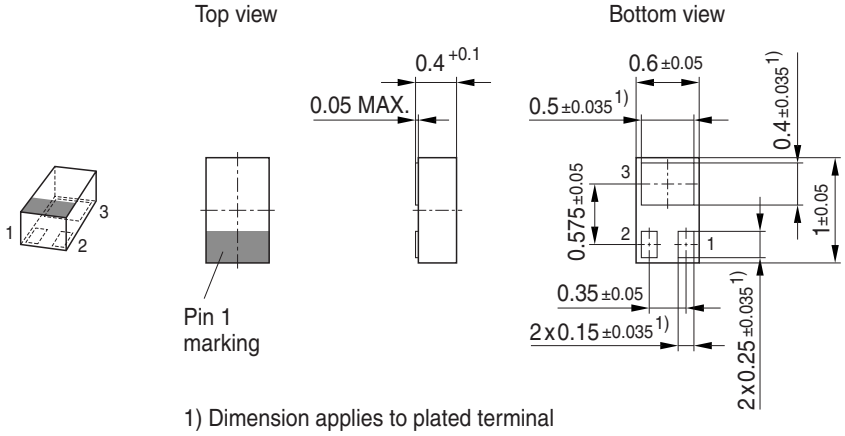



## Standard Packing

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



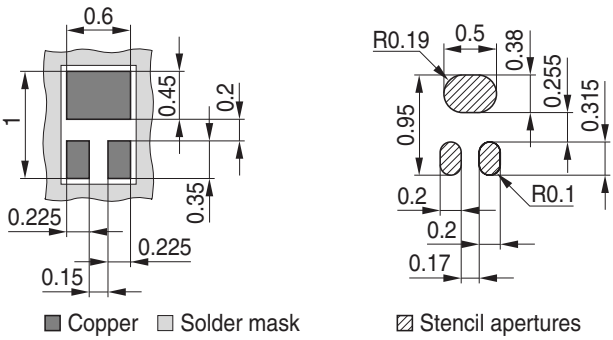
## Package Outline



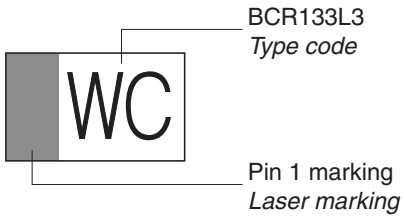

1) Dimension applies to plated terminal

## Foot Print

For board assembly information please refer to Infineon website "Packages"

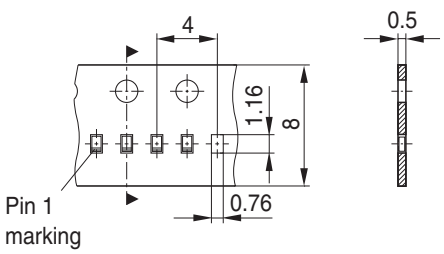



## Marking Layout




## Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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**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.

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