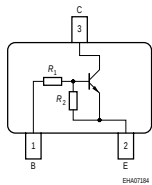


## NPN Silicon Digital Transistors

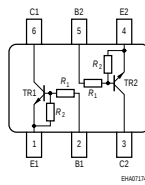
- Switching circuit, inverter circuit, driver circuit
- Built in bias resistor ( $R_1 = 1\text{ k}\Omega$ ,  $R_2 = 10\text{ k}\Omega$ )
- BCR523U: Two (galvanic) internal isolated transistors with good matching in one package
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



### BCR523



### BCR523U



| Type    | Marking | Pin Configuration |      |      |      |      |      | Package |
|---------|---------|-------------------|------|------|------|------|------|---------|
| BCR523  | XGs     | 1=B               | 2=E  | 3=C  | -    | -    | -    | SOT23   |
| BCR523U | XGs     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SC74    |

## Maximum Ratings

| Parameter                          | Symbol       | Value       | Unit |
|------------------------------------|--------------|-------------|------|
| Collector-emitter voltage          | $V_{CEO}$    | 50          | V    |
| Collector-base voltage             | $V_{CBO}$    | 50          |      |
| Input forward voltage              | $V_{i(fwd)}$ | 12          |      |
| Input reverse voltage              | $V_{i(rev)}$ | 5           |      |
| Collector current                  | $I_C$        | 500         | mA   |
| Total power dissipation-           | $P_{tot}$    |             | mW   |
| $T_S \leq 79\text{ °C}$ , BCR523   |              | 330         |      |
| $T_S \leq 115\text{ °C}$ , BCR523U |              | 330         |      |
| Junction temperature               | $T_j$        | 150         | °C   |
| Storage temperature                | $T_{stg}$    | -65 ... 150 |      |

**Thermal Resistance**

| Parameter                                | Symbol     | Value      | Unit |
|------------------------------------------|------------|------------|------|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ |            | K/W  |
| BCR523                                   |            | $\leq 215$ |      |
| BCR523U                                  |            | $\leq 105$ |      |

**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<br>$I_C = 100 \mu\text{A}$ , $I_B = 0$                           | $V_{(BR)CEO}$ | 50   | -   | -    | V          |
| Collector-base breakdown voltage<br>$I_C = 10 \mu\text{A}$ , $I_E = 0$                               | $V_{(BR)CBO}$ | 50   | -   | -    |            |
| Collector-base cutoff current<br>$V_{CB} = 50 \text{ V}$ , $I_E = 0$                                 | $I_{CBO}$     | -    | -   | 100  | nA         |
| Emitter-base cutoff current<br>$V_{EB} = 5 \text{ V}$ , $I_C = 0$                                    | $I_{EBO}$     | -    | -   | 0.72 | mA         |
| DC current gain-<br>$I_C = 50 \text{ mA}$ , $V_{CE} = 5 \text{ V}$                                   | $h_{FE}$      | 70   | -   | -    | -          |
| Collector-emitter saturation voltage <sup>2)</sup><br>$I_C = 50 \text{ mA}$ , $I_B = 2.5 \text{ mA}$ | $V_{CEsat}$   | -    | -   | 0.3  | V          |
| Input off voltage<br>$I_C = 100 \mu\text{A}$ , $V_{CE} = 5 \text{ V}$                                | $V_{i(off)}$  | 0.3  | -   | 1    |            |
| Input on voltage<br>$I_C = 10 \text{ mA}$ , $V_{CE} = 0.3 \text{ V}$                                 | $V_{i(on)}$   | 0.4  | -   | 1.4  |            |
| Input resistor                                                                                       | $R_1$         | 0.7  | 1   | 1.3  | k $\Omega$ |
| Resistor ratio                                                                                       | $R_1/R_2$     | 0.09 | 0.1 | 0.11 | -          |

**AC Characteristics**

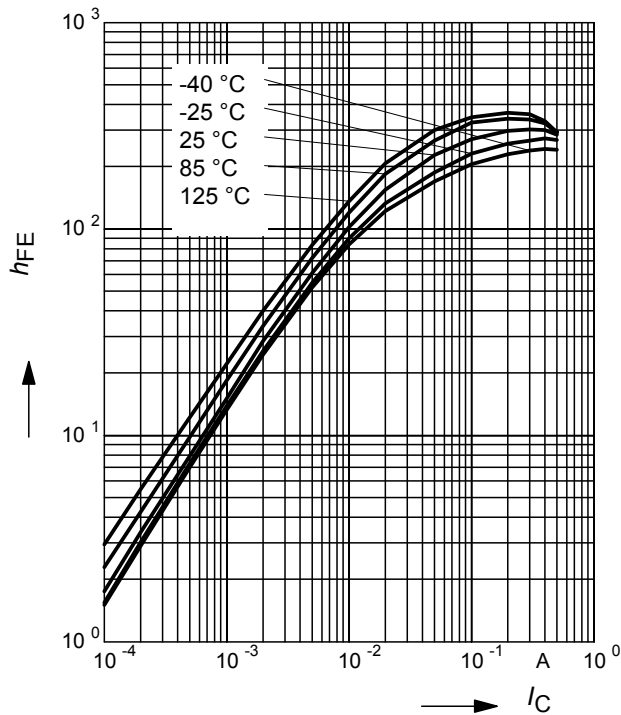
|                                                                                                |       |   |     |   |     |
|------------------------------------------------------------------------------------------------|-------|---|-----|---|-----|
| Transition frequency<br>$I_C = 50 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ , $f = 100 \text{ MHz}$ | $f_T$ | - | 100 | - | MHz |
|------------------------------------------------------------------------------------------------|-------|---|-----|---|-----|

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

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

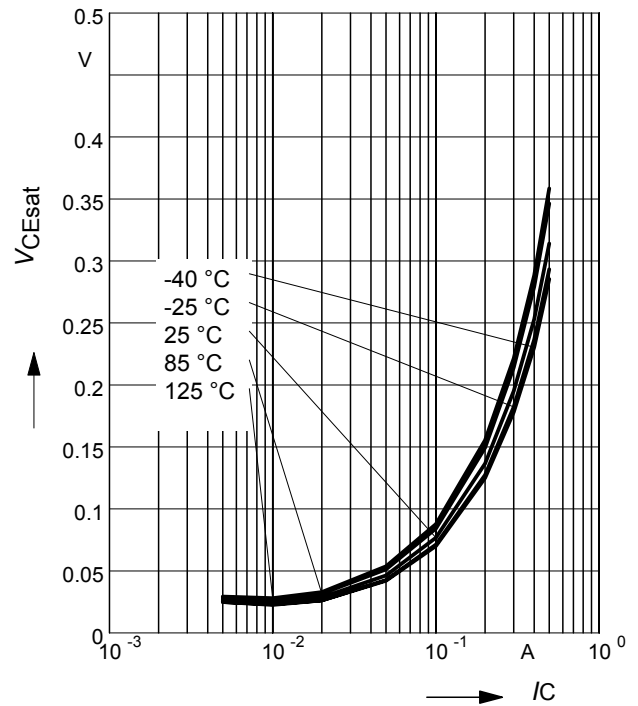
### DC current gain $h_{FE} = f(I_C)$

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



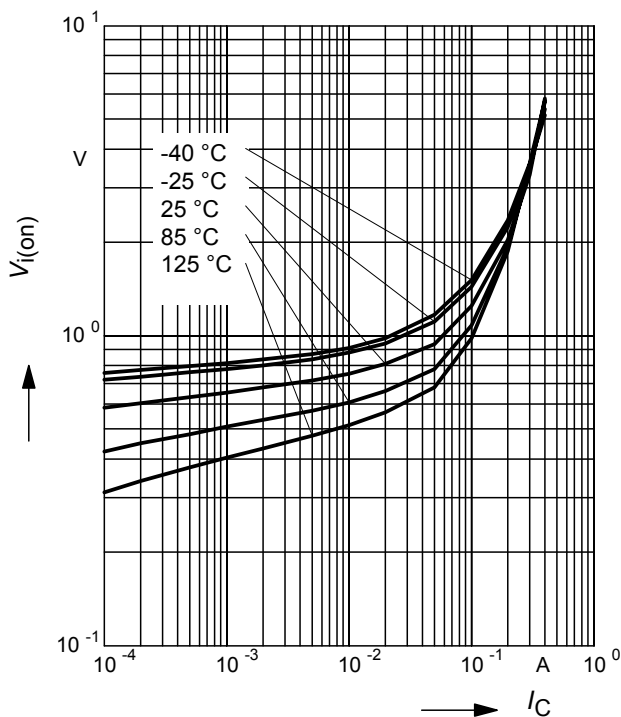
### Collector-emitter saturation voltage

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



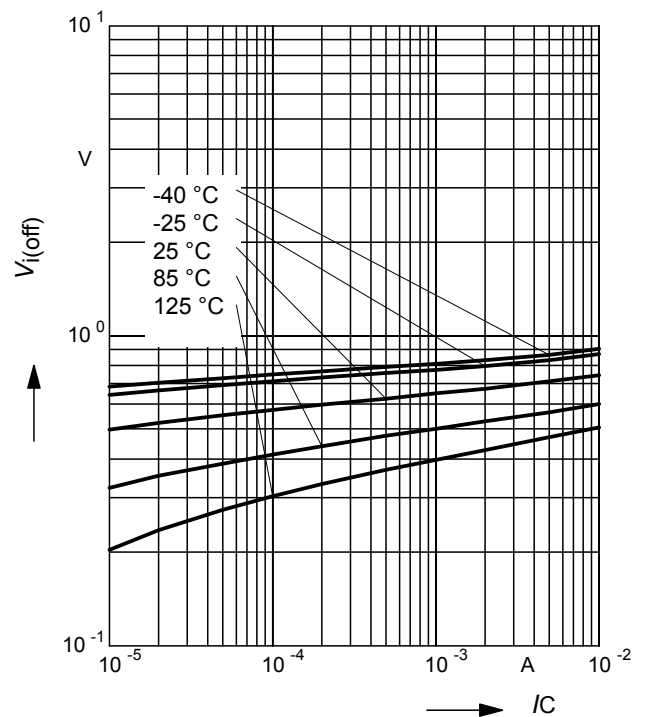
### Input on Voltage $V_{i(on)} = f(I_C)$

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



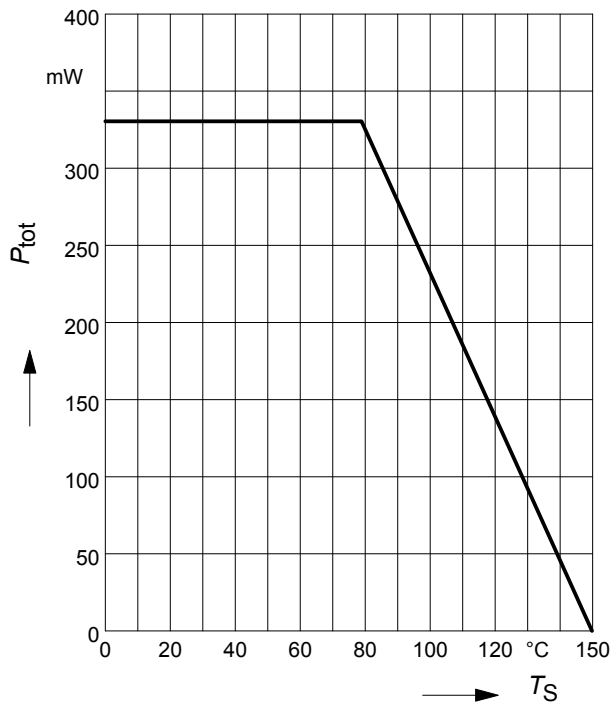
### Input off voltage $V_{i(off)} = f(I_C)$

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



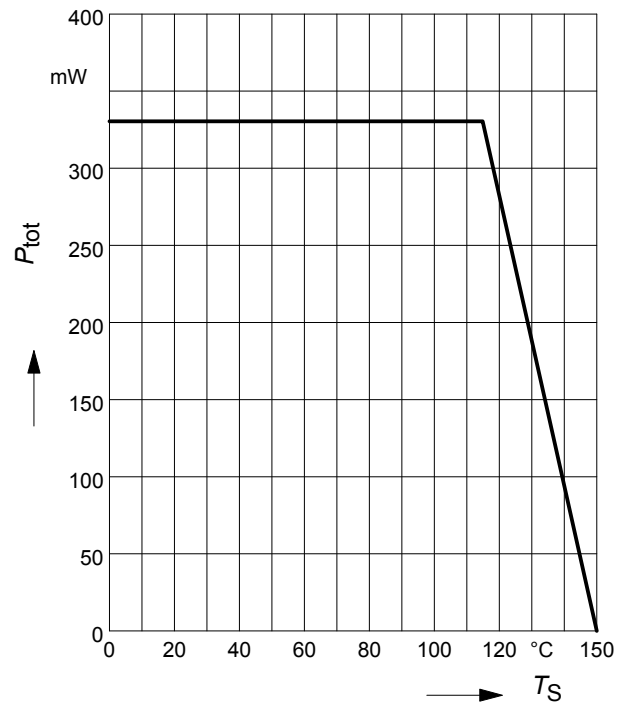
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR523



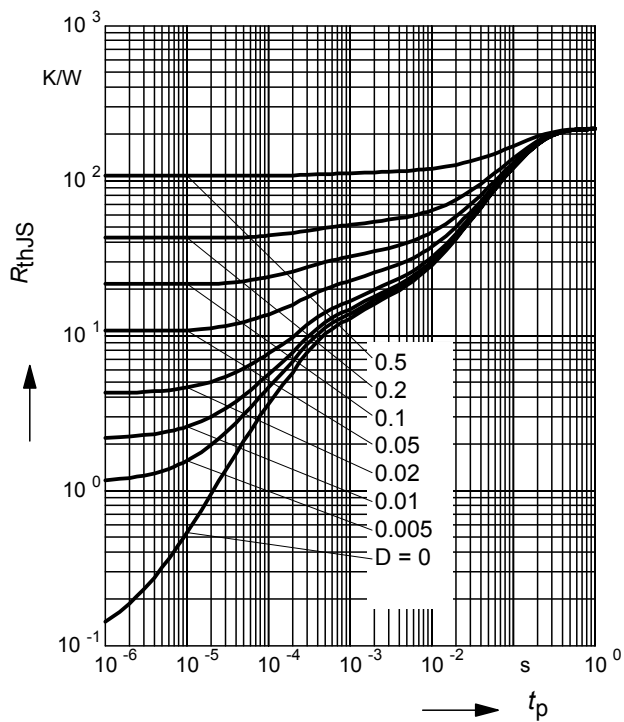
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR523U



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

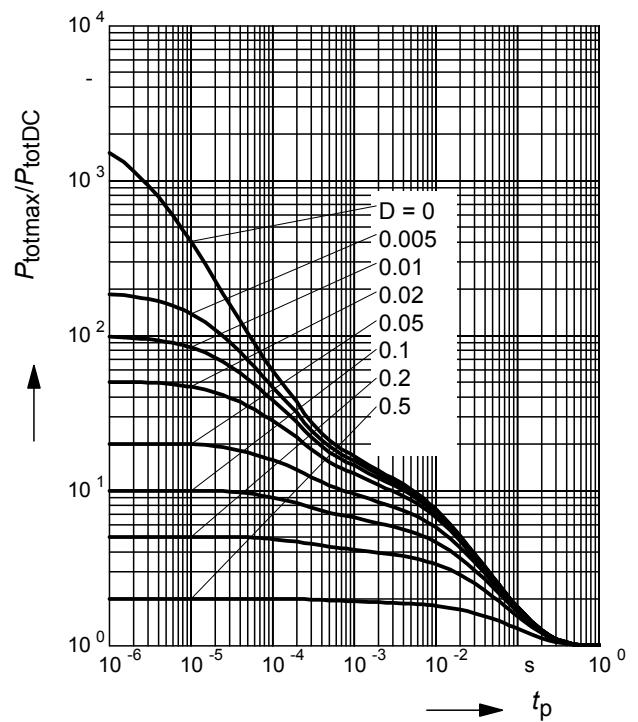
BCR523



**Permissible Pulse Load**

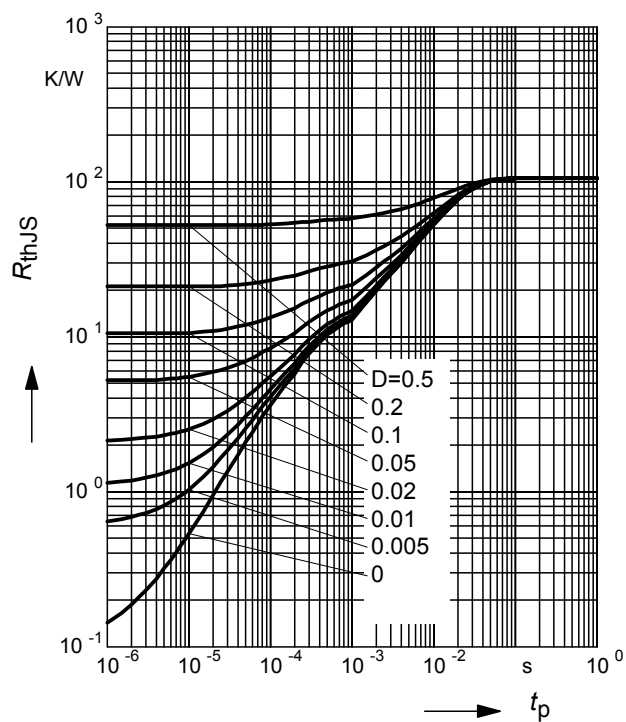
$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$

BCR523



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

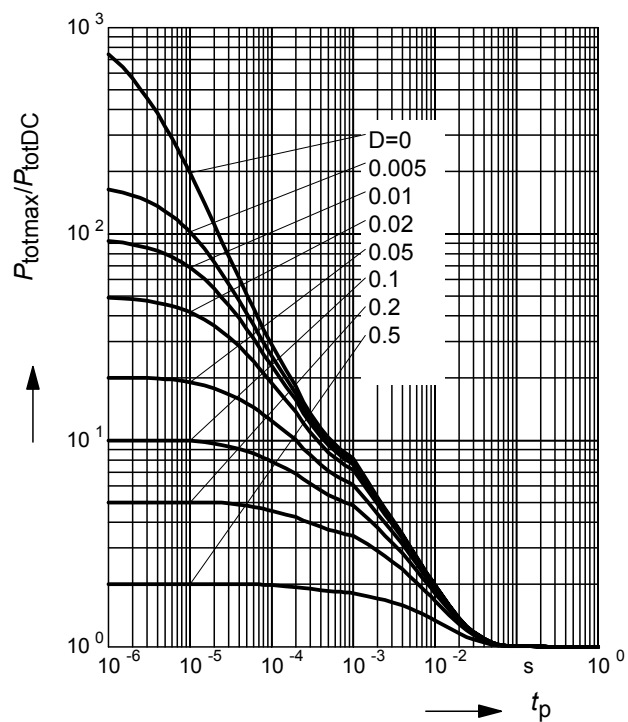
BCR523U



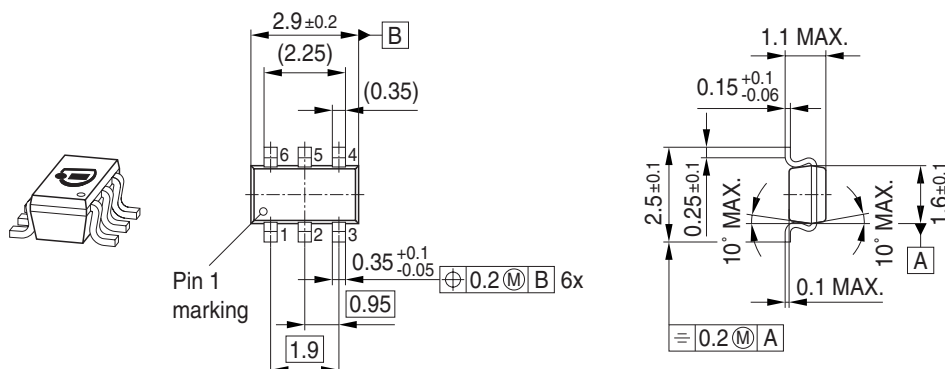
# Permissible Pulse Load

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

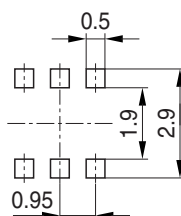
BCR523U



## Package Outline

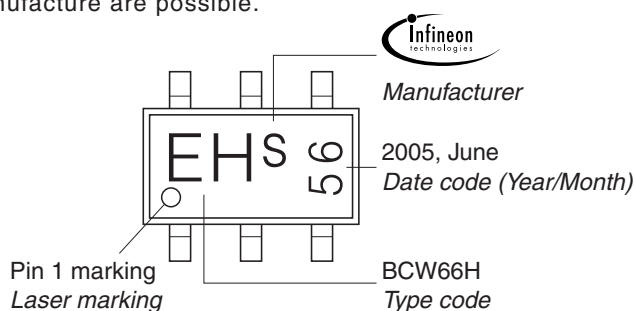


## Foot Print



## Marking Layout (Example)

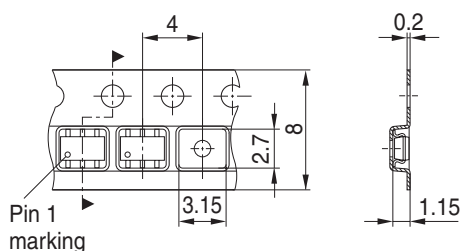
Small variations in positioning of Date code, Type code and Manufacture are possible.



## 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.

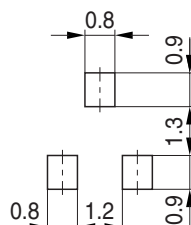


## Package Outline

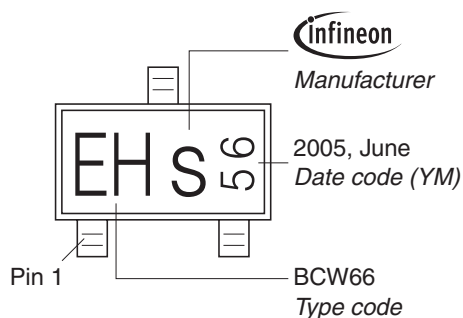


1) Lead width can be 0.6 max. in dambar area

## Foot Print



## Marking Layout (Example)



## Standard Packing

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



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