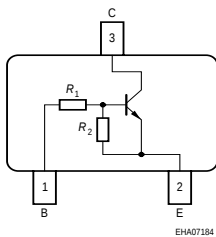


## NPN Silicon Digital Transistor

- Built in bias resistor ( $R_1 = 4.7 \text{ k}\Omega$ ,  $R_2 = 4.7 \text{ k}\Omega$ )
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type   | Marking         | Pin Configuration |     |     | Package |
|--------|-----------------|-------------------|-----|-----|---------|
| BCR512 | XF <sub>s</sub> | 1=B               | 2=E | 3=C | SOT23   |

### 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                                            | $V_{i(rev)}$ | 10          |                  |
| Collector current                                                | $I_C$        | 500         | mA               |
| Total power dissipation-<br>$T_S \leq 79 \text{ }^\circ\text{C}$ | $P_{tot}$    | 330         | mW               |
| Junction temperature                                             | $T_j$        | 150         | $^\circ\text{C}$ |
| Storage temperature                                              | $T_{stg}$    | -65 ... 150 |                  |

### Thermal Resistance

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

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

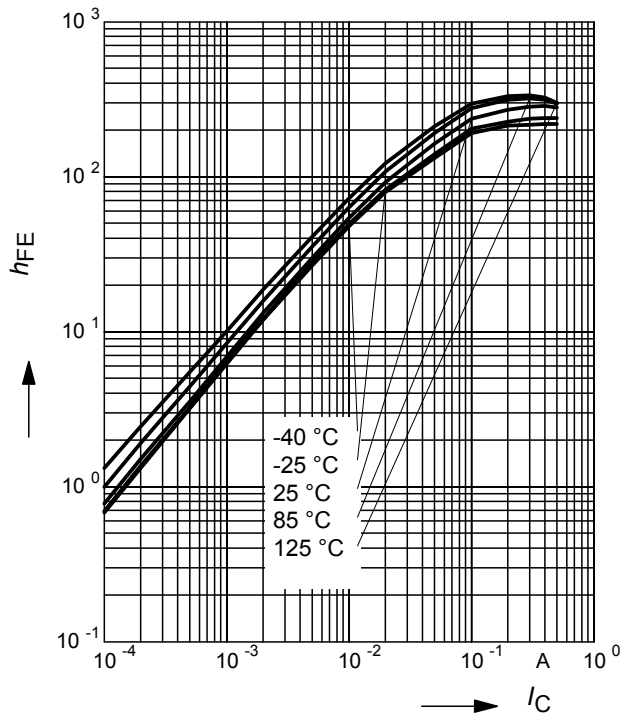
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                             | Symbol                      | Values |      |      | Unit |
|-------------------------------------------------------------------------------------------------------|-----------------------------|--------|------|------|------|
|                                                                                                       |                             | min.   | typ. | max. |      |
| DC Characteristics                                                                                    |                             |        |      |      |      |
| Collector-emitter breakdown voltage<br>$I_C = 100\ \mu\text{A}$ , $I_B = 0$                           | $V_{(\text{BR})\text{CEO}}$ | 50     | -    | -    | V    |
| Collector-base breakdown voltage<br>$I_C = 10\ \mu\text{A}$ , $I_E = 0$                               | $V_{(\text{BR})\text{CBO}}$ | 50     | -    | -    |      |
| Collector-base cutoff current<br>$V_{\text{CB}} = 50\ \text{V}$ , $I_E = 0$                           | $I_{\text{CBO}}$            | -      | -    | 100  | nA   |
| Emitter-base cutoff current<br>$V_{\text{EB}} = 10\ \text{V}$ , $I_C = 0$                             | $I_{\text{EBO}}$            | -      | -    | 1.61 | mA   |
| DC current gain-<br>$I_C = 50\ \text{mA}$ , $V_{\text{CE}} = 5\ \text{V}$                             | $h_{\text{FE}}$             | 60     | -    | -    | -    |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 50\ \text{mA}$ , $I_B = 2.5\ \text{mA}$  | $V_{\text{CEsat}}$          | -      | -    | 0.3  | V    |
| Input off voltage<br>$I_C = 100\ \mu\text{A}$ , $V_{\text{CE}} = 5\ \text{V}$                         | $V_{\text{i(off)}}$         | 0.6    | -    | 1.5  |      |
| Input on voltage<br>$I_C = 10\ \text{mA}$ , $V_{\text{CE}} = 0.3\ \text{V}$                           | $V_{\text{i(on)}}$          | 1      | -    | 2.2  |      |
| Input resistor                                                                                        | $R_1$                       | 3.2    | 4.7  | 6.2  | kΩ   |
| Resistor ratio                                                                                        | $R_1/R_2$                   | 0.9    | 1    | 1.1  | -    |
| AC Characteristics                                                                                    |                             |        |      |      |      |
| Transition frequency<br>$I_C = 50\ \text{mA}$ , $V_{\text{CE}} = 5\ \text{V}$ , $f = 100\ \text{MHz}$ | $f_{\text{T}}$              | -      | 100  | -    | MHz  |

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

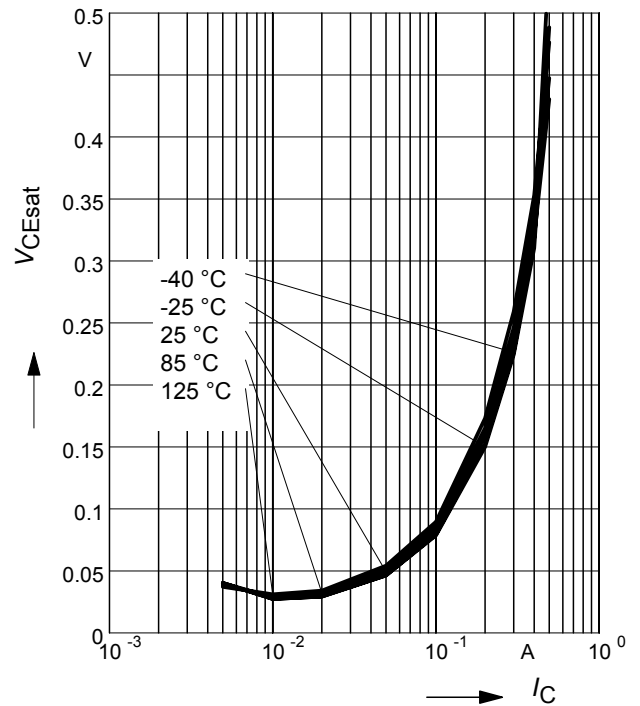
### DC current gain $h_{FE} = f(I_C)$

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



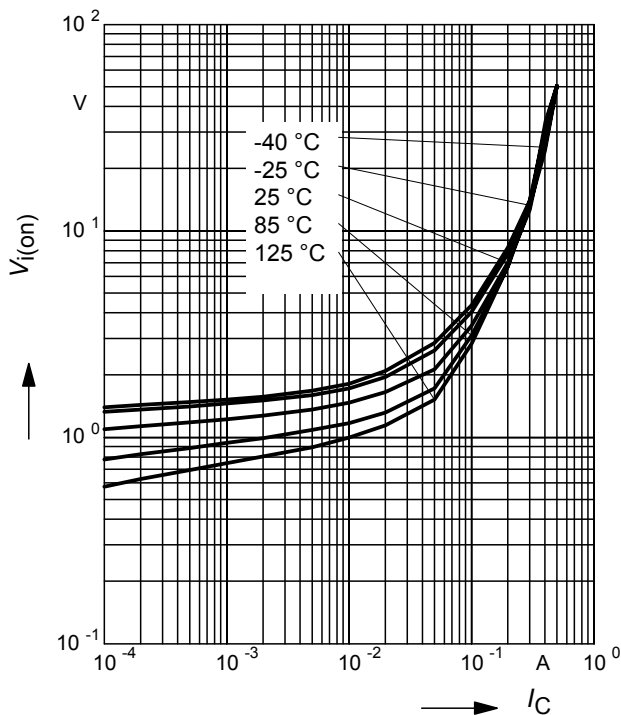
### Collector-emitter saturation voltage

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



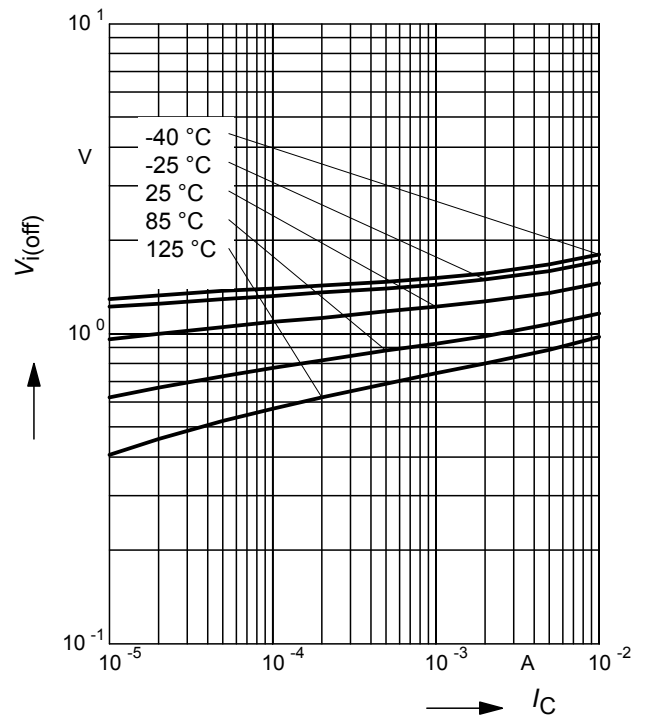
### Input on Voltage $V_{i(on)} = f(I_C)$

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



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

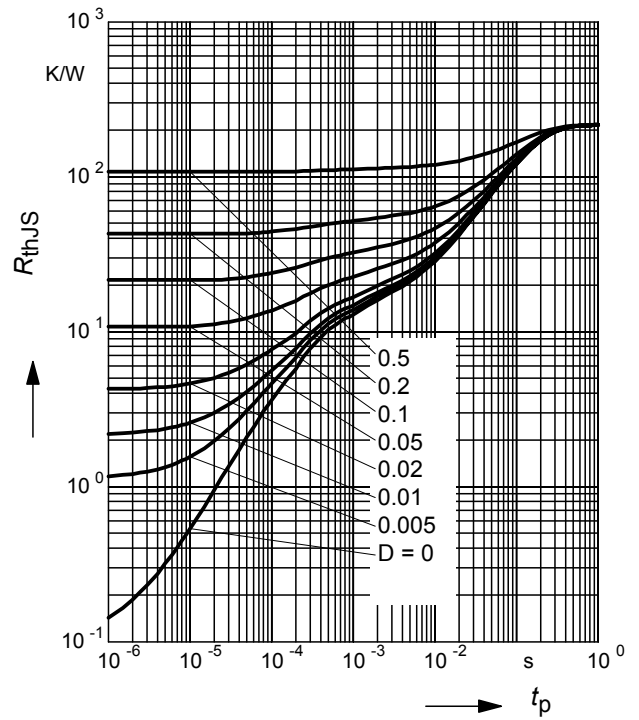
$V_{CE} = 5 \text{ V}$  (common emitter configuration)



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



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

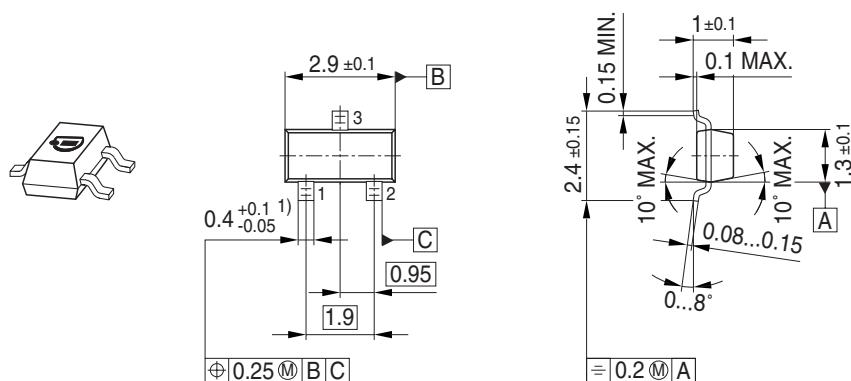


**Permissible Pulse Load**

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

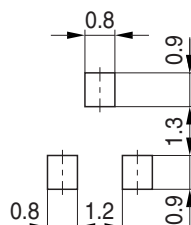


## Package Outline

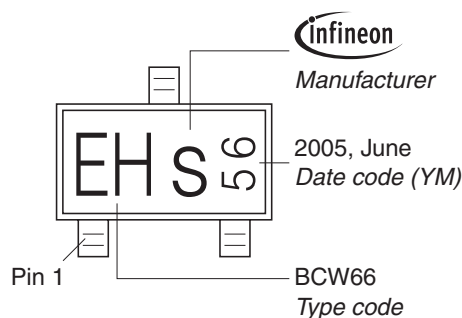


1) Lead width can be 0.6 max. in dambar area

## Foot Print

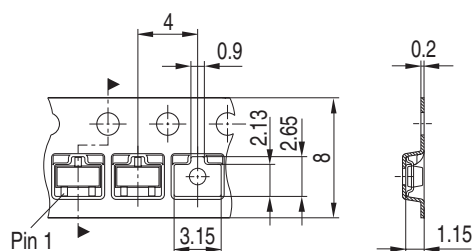


## Marking Layout (Example)



## Standard Packing

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



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