

**NPN Silicon AF Transistor**

- For general AF applications
- High collector current
- High current gain
- Low collector-emitter saturation voltage
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type       | Marking | Pin Configuration |       |       |   |   |   | Package |
|------------|---------|-------------------|-------|-------|---|---|---|---------|
| BC817K-16  | 6As     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT23   |
| BC817K-16W | 6As     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT323  |
| BC817K-25  | 6Bs     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT23   |
| BC817K-25W | 6Bs     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT323  |
| BC817K-40  | 6Cs     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT23   |
| BC817K-40W | 6Cs     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT323  |
| BC818K-16W | 6Es     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT323  |
| BC818K-40  | 6Gs     | 1 = B             | 2 = E | 3 = C | - | - | - | SOT23   |

**Maximum Ratings**

| Parameter                                                                                                            | Symbol    | Value       | Unit |
|----------------------------------------------------------------------------------------------------------------------|-----------|-------------|------|
| Collector-emitter voltage<br>BC817...<br>BC818...                                                                    | $V_{CEO}$ | 45<br>25    | V    |
| Collector-base voltage<br>BC817...<br>BC818...                                                                       | $V_{CBO}$ | 50<br>30    |      |
| Emitter-base voltage                                                                                                 | $V_{EBO}$ | 5           |      |
| Collector current                                                                                                    | $I_C$     | 500         | mA   |
| Peak collector current                                                                                               | $I_{CM}$  | 1000        |      |
| Base current                                                                                                         | $I_B$     | 100         |      |
| Peak base current                                                                                                    | $I_{BM}$  | 200         |      |
| Total power dissipation-<br>$T_S \leq 115\text{ °C}$ , BC817K, BC818K<br>$T_S \leq 130\text{ °C}$ , BC817KW, BC818KW | $P_{tot}$ | 500<br>250  | mW   |
| Junction temperature                                                                                                 | $T_j$     | 150         | °C   |
| Storage temperature                                                                                                  | $T_{stg}$ | -65 ... 150 |      |

**Thermal Resistance**

| Parameter                                                                      | Symbol     | Value                  | Unit |
|--------------------------------------------------------------------------------|------------|------------------------|------|
| Junction - soldering point <sup>1)</sup><br>BC817K, BC818K<br>BC817KW, BC818KW | $R_{thJS}$ | $\leq 70$<br>$\leq 80$ | 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>$I_C = 10\text{ mA}$ , $I_B = 0$ , BC817...<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BC818...                                                                                                                                                                                                        | $V_{(BR)CEO}$ | 45<br>25                | -<br>-                 | -<br>-                 | V             |
| Collector-base breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BC817...<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BC818...                                                                                                                                                                                         | $V_{(BR)CBO}$ | 50<br>30                | -<br>-                 | -<br>-                 | -             |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$                                                                                                                                                                                                                                                              | $V_{(BR)EBO}$ | 5                       | -                      | -                      | V             |
| Collector-base cutoff current<br>$V_{CB} = 25\text{ V}$ , $I_E = 0$<br>$V_{CB} = 25\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^{\circ}\text{C}$                                                                                                                                                                                          | $I_{CBO}$     | -<br>-                  | -<br>-                 | 0.1<br>50              | $\mu\text{A}$ |
| Emitter-base cutoff current<br>$V_{EB} = 4\text{ V}$ , $I_C = 0$                                                                                                                                                                                                                                                                         | $I_{EBO}$     | -                       | -                      | 100                    | nA            |
| DC current gain <sup>1)</sup><br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.16}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.25}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.40}$<br>$I_C = 500\text{ mA}$ , $V_{CE} = 1\text{ V}$ , all $h_{FE}\text{-grps.}$ | $h_{FE}$      | 100<br>160<br>250<br>40 | 160<br>250<br>350<br>- | 250<br>400<br>630<br>- | -             |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$                                                                                                                                                                                                                                       | $V_{CEsat}$   | -                       | -                      | 0.7                    | V             |
| Base emitter saturation voltage <sup>1)</sup><br>$I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$                                                                                                                                                                                                                                            | $V_{BEsat}$   | -                       | -                      | 1.2                    |               |

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

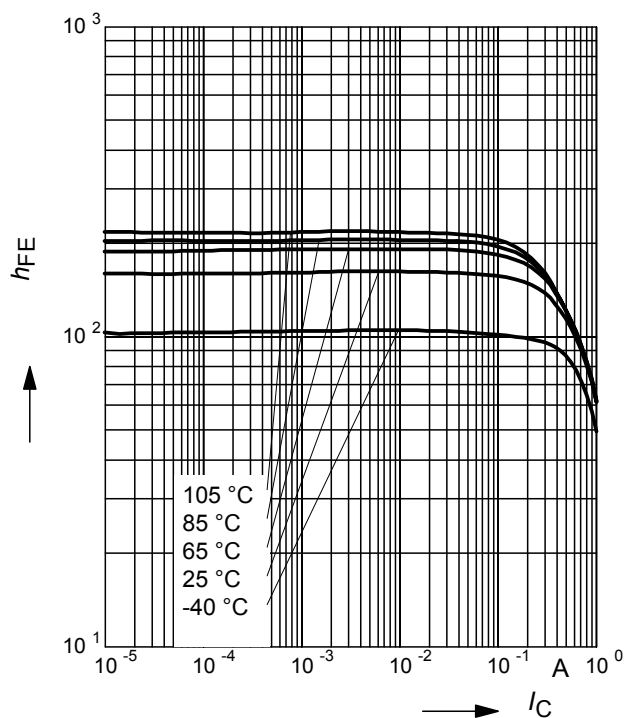
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                   | Symbol   | Values |      |      | Unit |
|---------------------------------------------------------------------------------------------|----------|--------|------|------|------|
|                                                                                             |          | min.   | typ. | max. |      |
| AC Characteristics                                                                          |          |        |      |      |      |
| Transition frequency<br>$I_C = 50\text{ mA}$ , $V_{CE} = 5\text{ V}$ , $f = 100\text{ MHz}$ | $f_T$    | -      | 170  | -    | MHz  |
| Collector-base capacitance<br>$V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$                   | $C_{cb}$ | -      | 3    | -    | pF   |
| Emitter-base capacitance<br>$V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$                    | $C_{eb}$ | -      | 40   | -    |      |

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

$V_{CE} = 1 \text{ V}$

$h_{FE}\text{-grp.16}$



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

$V_{CE} = 1 \text{ V}$

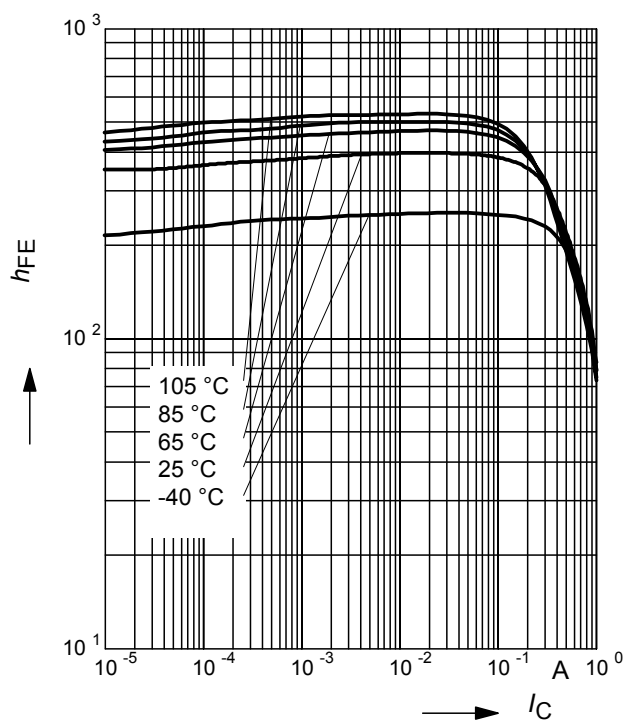
$h_{FE}\text{-grp.25}$



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

$V_{CE} = 1 \text{ V}$

$h_{FE}\text{-grp.40}$



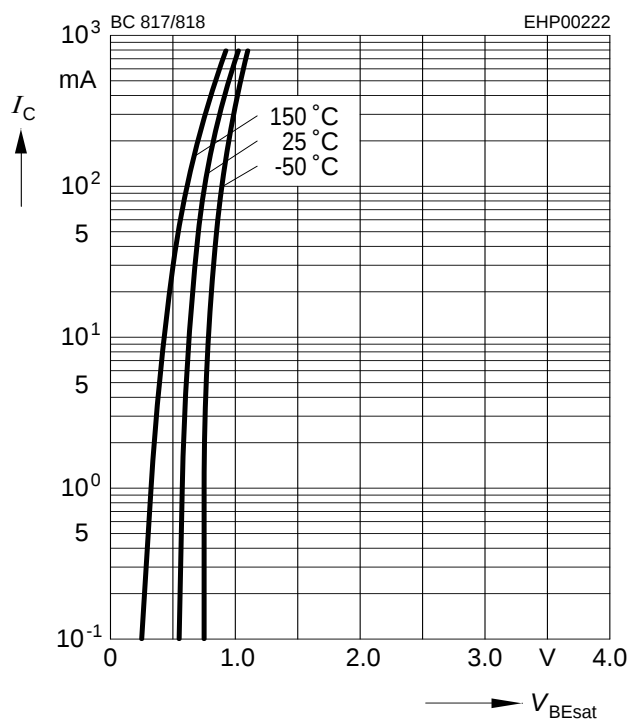
### Collector-emitter saturation voltage

$I_C = f(V_{CEsat}), h_{FE} = 10$



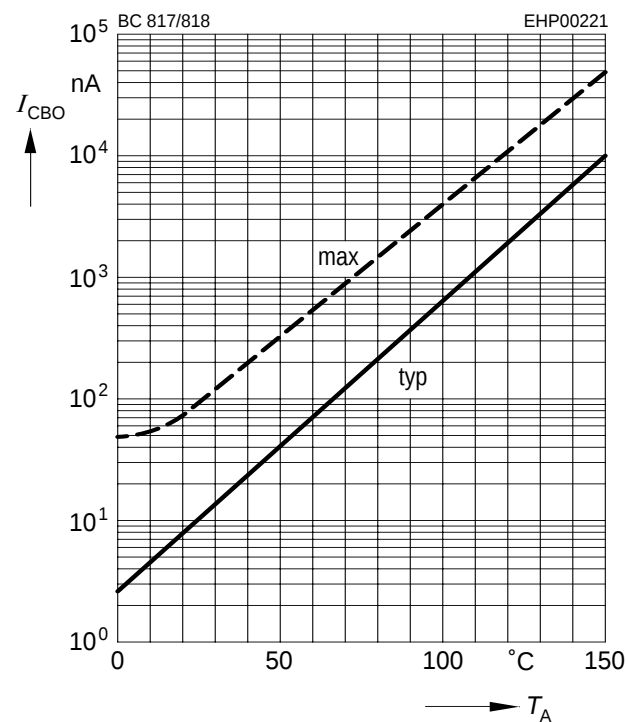
### Base-emitter saturation voltage

$$I_C = f(V_{BEsat}), h_{FE} = 10$$



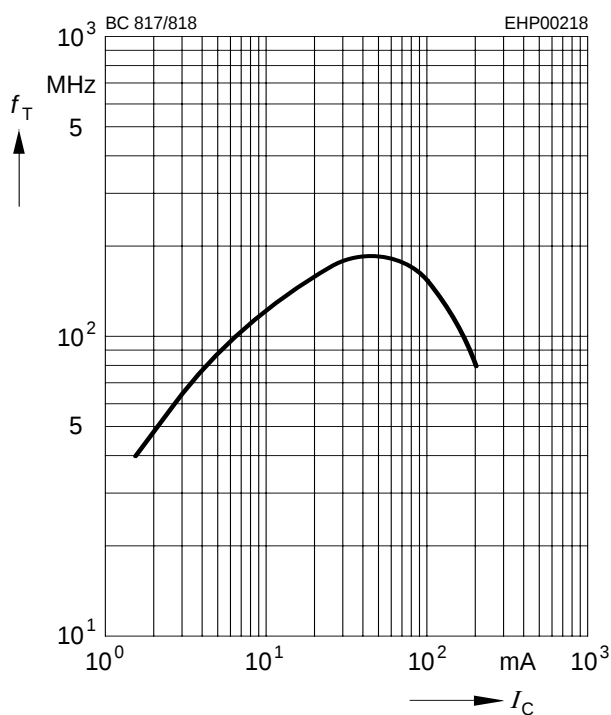
### Collector cutoff current $I_{CBO} = f(T_A)$

$$V_{CBO} = 25 \text{ V}$$



### Transition frequency $f_T = f(I_C)$

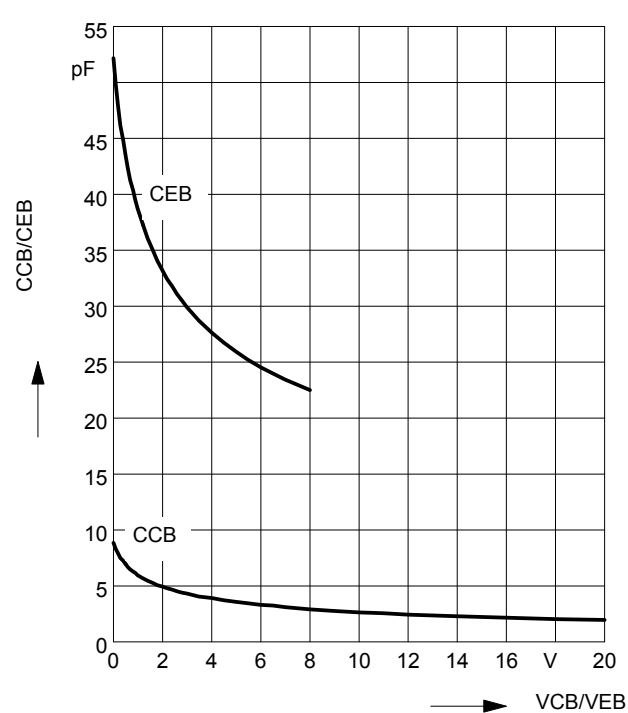
$$V_{CE} = \text{parameter in V}, f = 2 \text{ GHz}$$



### Collector-base capacitance $C_{cb} = f(V_{CB})$

$$\text{Emitter-base capacitance } C_{eb} = f(V_{EB})$$

BC817K, BC818K



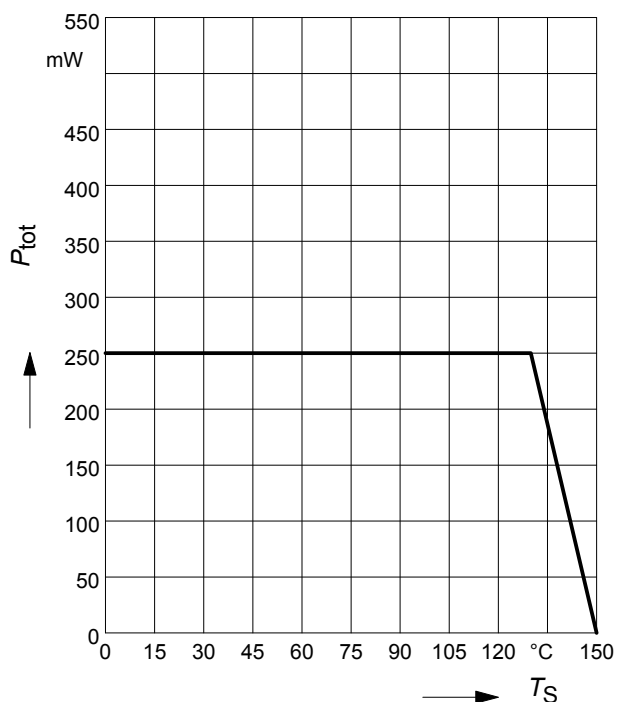
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BC817K, BC818K



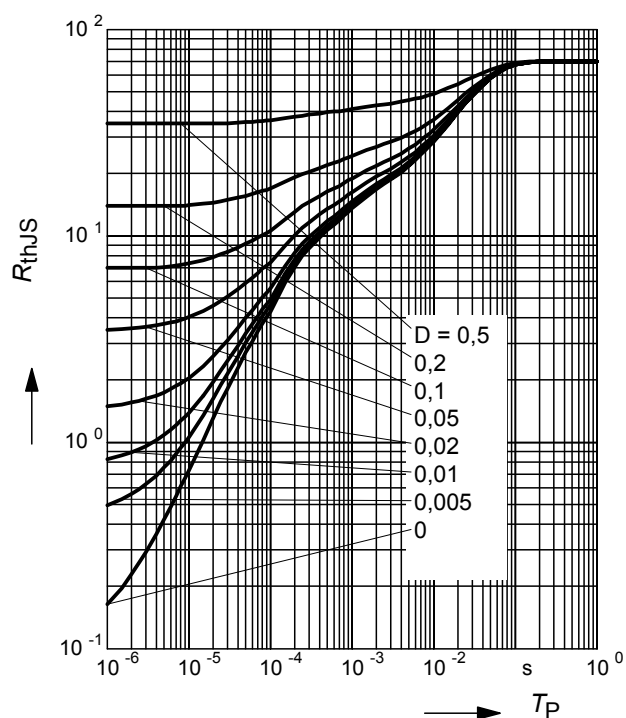
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BC817KW, BC818KW



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

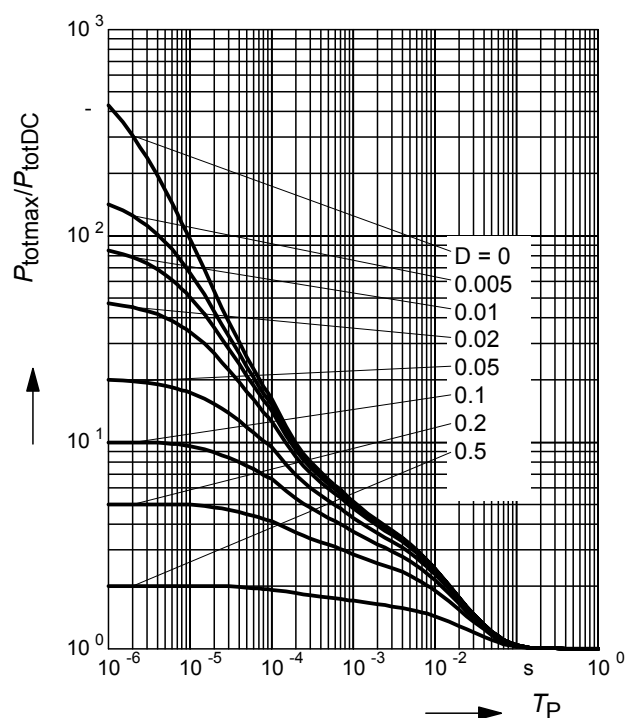
BC817K, BC818K



**Permissible Pulse Load**

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

BC817K, BC818K



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

BC817KW, BC818KW



# Permissible Pulse Load

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

BC817KW, BC818KW



## Package Outline

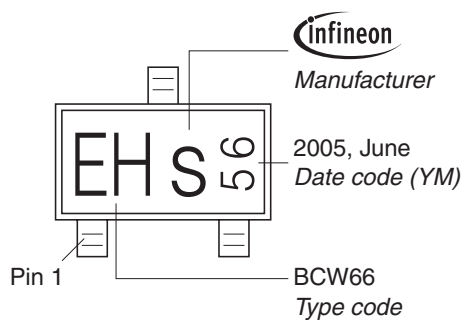


1) Lead width can be 0.6 max. in dambar area

## Foot Print



## Marking Layout (Example)



## Standard Packing

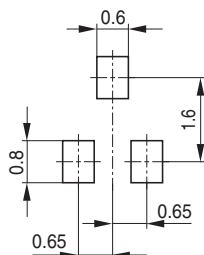
Reel ø180 mm = 3.000 Pieces/Reel  
Reel ø330 mm = 10.000 Pieces/Reel



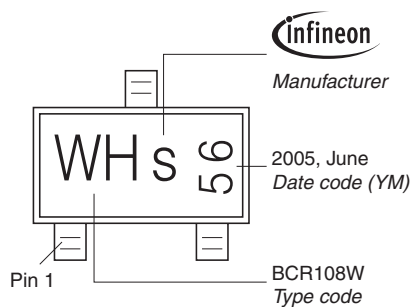
## Package Outline



## Foot Print

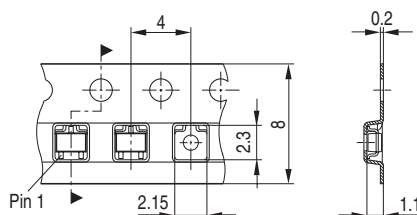


## Marking Layout (Example)



## Standard Packing

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



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