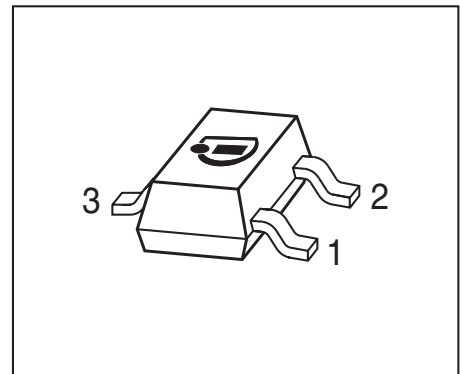


## NPN Silicon AF Transistors

- For general AF applications
- High current gain
- Low collector-emitter saturation voltage
- Complementary type: BCW68 (PNP)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type    | Marking | Pin Configuration |     |     | Package |
|---------|---------|-------------------|-----|-----|---------|
| BCW66KF | EFs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW66KG | EGs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW66KH | EHs     | 1=B               | 2=E | 3=C | SOT23   |

### Maximum Ratings

| Parameter                                     | Symbol    | Value       | Unit |
|-----------------------------------------------|-----------|-------------|------|
| Collector-emitter voltage                     | $V_{CEO}$ | 45          | V    |
| Collector-base voltage                        | $V_{CBO}$ | 75          |      |
| Emitter-base voltage                          | $V_{EBO}$ | 5           |      |
| Collector current                             | $I_C$     | 800         | mA   |
| Peak collector current, $t_p \leq 10$ ms      | $I_{CM}$  | 1           | A    |
| Base current                                  | $I_B$     | 100         | mA   |
| Peak base current                             | $I_{BM}$  | 200         |      |
| Total power dissipation-<br>$T_S \leq 115$ °C | $P_{tot}$ | 500         | 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> | $R_{thJS}$ | $\leq 70$ | K/W  |

**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>$I_C = 10\text{ mA}, I_B = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $V_{(BR)CEO}$ | 45                                          | -                                     | -                                     | V             |
| Collector-base breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}, I_E = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $V_{(BR)CBO}$ | 75                                          | -                                     | -                                     |               |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}, I_C = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $V_{(BR)EBO}$ | 5                                           | -                                     | -                                     |               |
| Collector-base cutoff current<br>$V_{CB} = 45\text{ V}, I_E = 0$<br>$V_{CB} = 45\text{ V}, I_E = 0, T_A = 150\text{ }^\circ\text{C}$                                                                                                                                                                                                                                                                                                                                                                                                                                        | $I_{CBO}$     | -<br>-                                      | -<br>-                                | 0.02<br>20                            | $\mu\text{A}$ |
| Emitter-base cutoff current<br>$V_{EB} = 5\text{ V}, I_C = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | $I_{EBO}$     | -                                           | -                                     | 20                                    | nA            |
| DC current gain <sup>2)</sup><br>$I_C = 100\text{ }\mu\text{A} - 10\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.F}$<br>$I_C = 100\text{ }\mu\text{A} - 10\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.G}$<br>$I_C = 100\text{ }\mu\text{A} - 10\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.H}$<br>$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.F}$<br>$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.G}$<br>$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.H}$<br>$I_C = 500\text{ mA}, V_{CE} = 1\text{ V}, \text{hFE-grp.F, G, H}$ | $h_{FE}$      | 75<br>110<br>180<br>100<br>160<br>250<br>40 | -<br>-<br>-<br>160<br>250<br>350<br>- | -<br>-<br>-<br>250<br>400<br>630<br>- | -             |
| Collector-emitter saturation voltage <sup>2)</sup><br>$I_C = 100\text{ mA}, I_B = 10\text{ mA}$<br>$I_C = 500\text{ mA}, I_B = 50\text{ mA}$                                                                                                                                                                                                                                                                                                                                                                                                                                | $V_{CEsat}$   | -<br>-                                      | -<br>-                                | 0.3<br>0.45                           | V             |
| Base emitter saturation voltage <sup>2)</sup><br>$I_C = 100\text{ mA}, I_B = 10\text{ mA}$<br>$I_C = 500\text{ mA}, I_B = 50\text{ mA}$                                                                                                                                                                                                                                                                                                                                                                                                                                     | $V_{BEsat}$   | -<br>-                                      | -<br>-                                | 1.25<br>1.25                          |               |

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

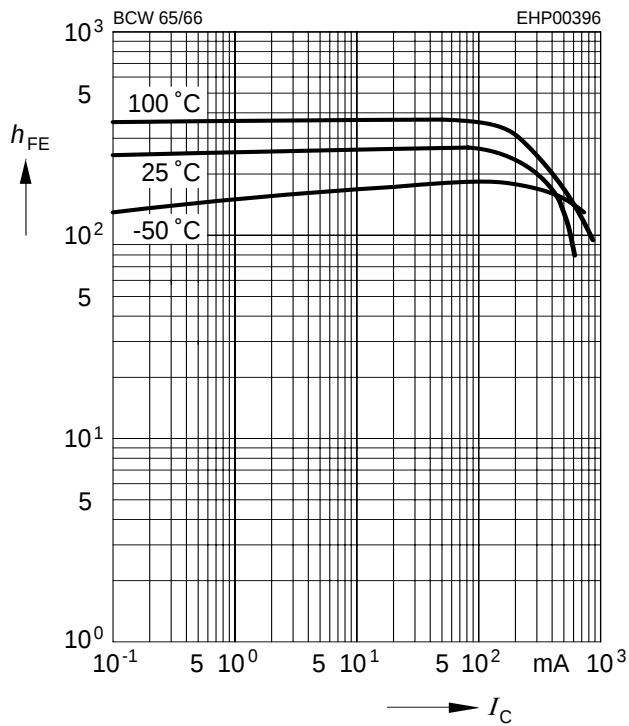
<sup>2</sup>Pulse test:  $t < 300\mu\text{s}; D < 2\%$

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

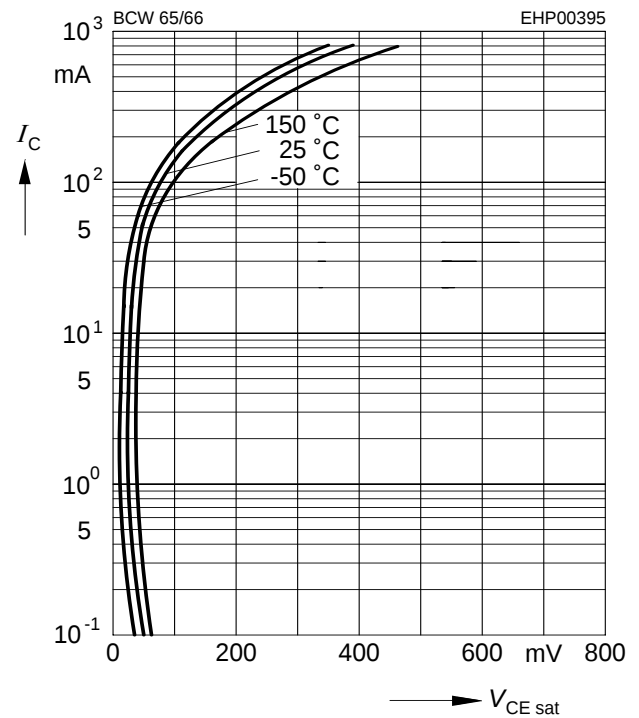
| Parameter                                                                                  | Symbol   | Values |      |      | Unit |
|--------------------------------------------------------------------------------------------|----------|--------|------|------|------|
|                                                                                            |          | min.   | typ. | max. |      |
| AC Characteristics                                                                         |          |        |      |      |      |
| Transition frequency<br>$I_C = 50\text{ mA}$ , $V_{CE} = 5\text{ V}$ , $f = 20\text{ MHz}$ | $f_T$    | -      | 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  $h_{FE} = f(I_C)$** 

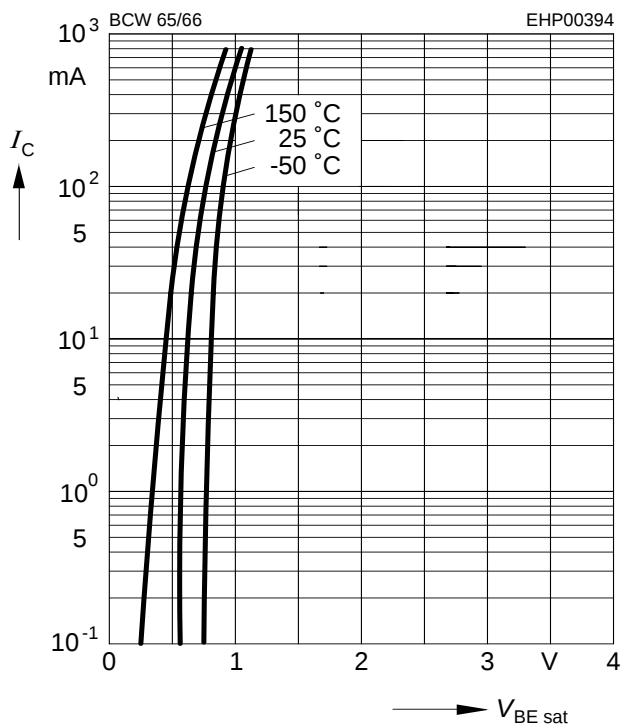
$$V_{CE} = 1 \text{ V}$$


**Collector-emitter saturation voltage**

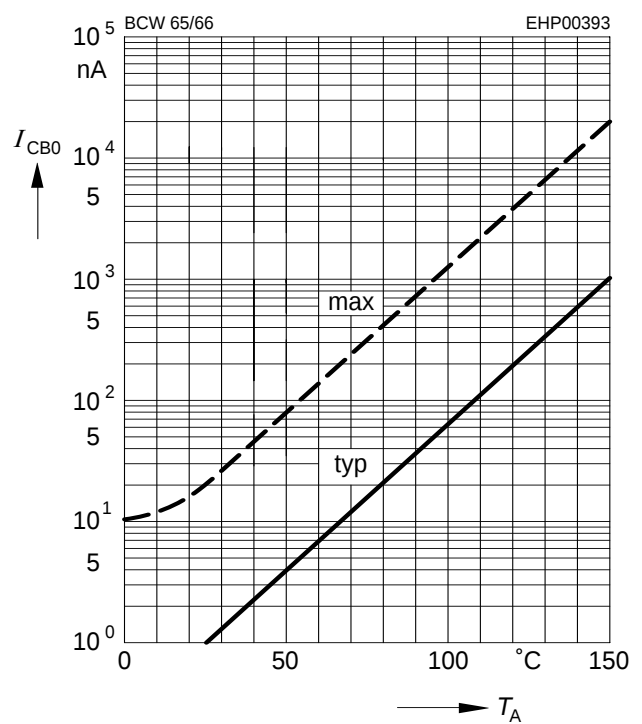
$$I_C = f(V_{CEsat}), h_{FE} = 10$$


**Base-emitter saturation voltage**

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

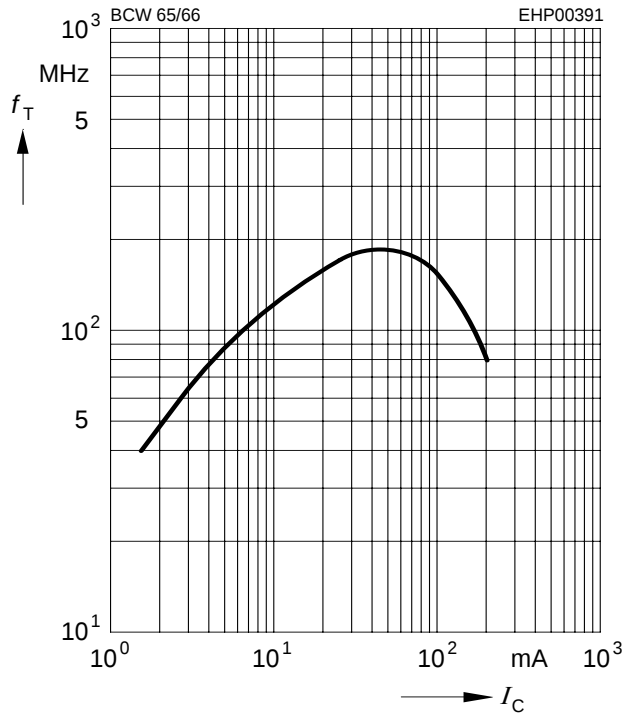

**Collector cutoff current  $I_{CBO} = f(T_A)$** 

$$V_{CB} = V_{CEmax}$$



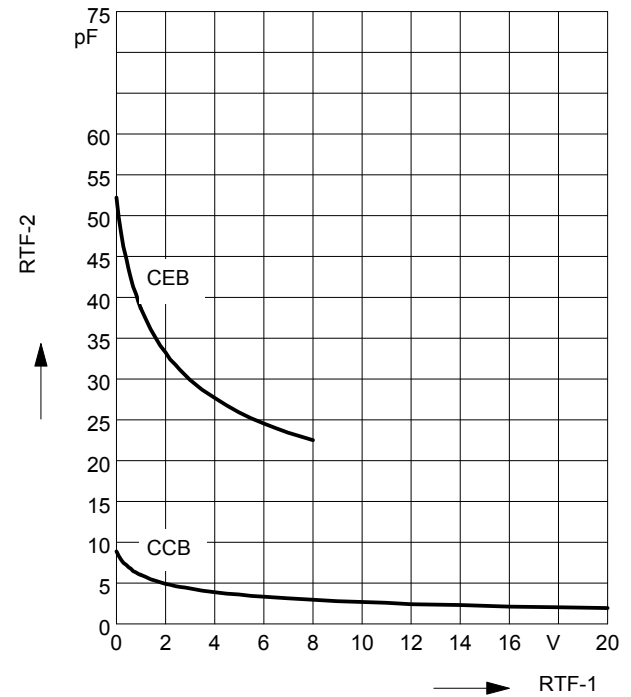
**Transition frequency  $f_T = f(I_C)$**

$V_{CE} = 5 \text{ V}$

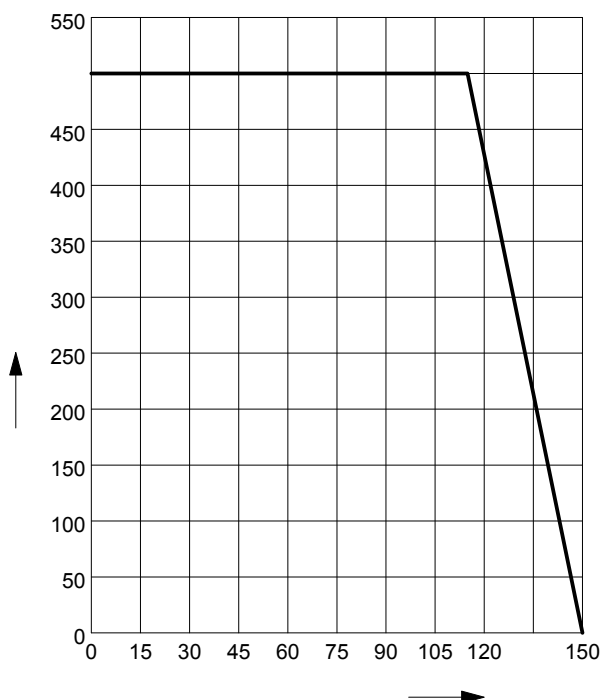


**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

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

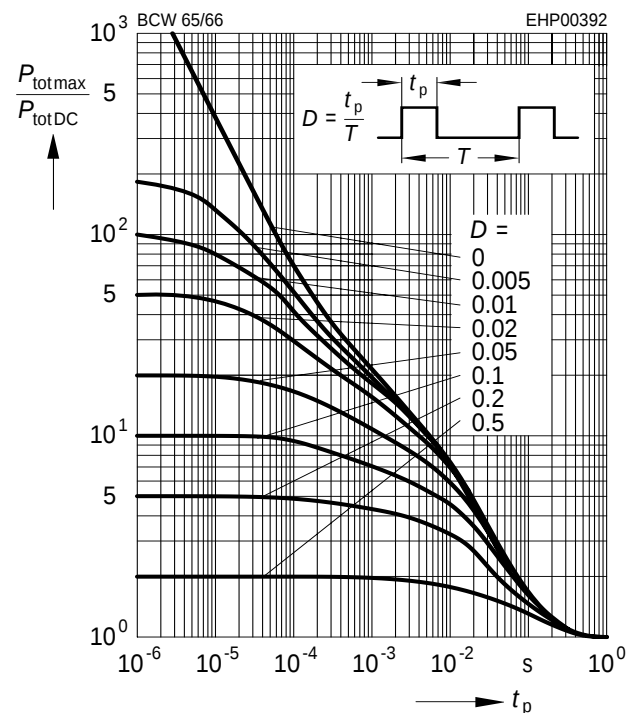


**Total power dissipation  $P_{tot} = f(T_S)$**

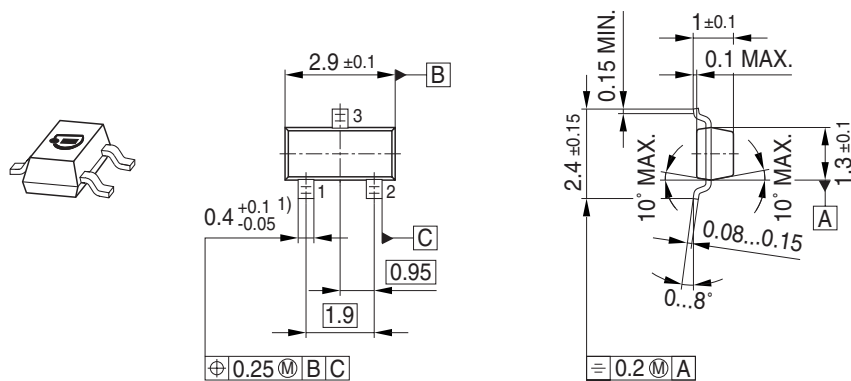


**Permissible Pulse Load**

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

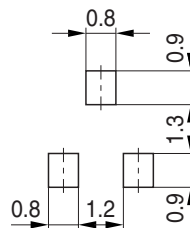


## Package Outline

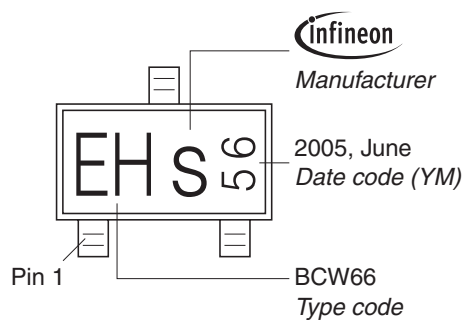


1) Lead width can be 0.6 max. in dambar area

## Foot Print

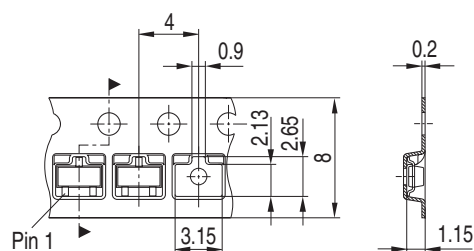


## Marking Layout (Example)



## Standard Packing

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



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