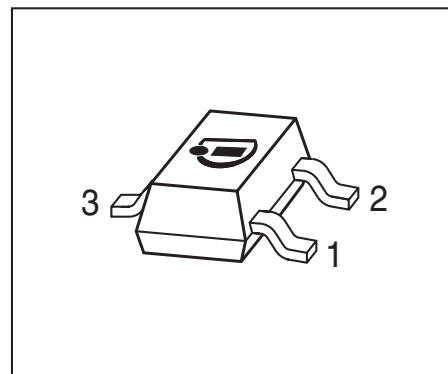


## PNP Silicon AF Transistors

- For general AF applications
- High current gain
- Low collector-emitter saturation voltage
- Complementary types: BCW66... (NPN)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type   | Marking | Pin Configuration |     |     | Package |
|--------|---------|-------------------|-----|-----|---------|
| BCW67A | DAs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW67B | DBs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW67C | DCs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW68F | DFs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW68G | DGs     | 1=B               | 2=E | 3=C | SOT23   |
| BCW68H | DHs     | 1=B               | 2=E | 3=C | SOT23   |

**Maximum Ratings**

| Parameter                                            | Symbol    | Value       | Unit             |
|------------------------------------------------------|-----------|-------------|------------------|
| Collector-emitter voltage<br>BCW67<br>BCW68          | $V_{CEO}$ | 32<br>45    | V                |
| Collector-base voltage<br>BCW67<br>BCW68             | $V_{CBO}$ | 45<br>60    |                  |
| 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, $T_S \leq 79^\circ\text{C}$ | $P_{tot}$ | 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>$I_C = 10\text{ mA}$ , $I_B = 0$ , BCW67<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BCW68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $V_{(BR)CEO}$ | 32<br>45                                                                   | -<br>-                                                         | -<br>-                                                         | V             |
| Collector-base breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BCW67<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BCW68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | $V_{(BR)CBO}$ | 45<br>60                                                                   | -<br>-                                                         | -<br>-                                                         |               |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $V_{(BR)EBO}$ | 5                                                                          | -                                                              | -                                                              |               |
| Collector-base cutoff current<br>$V_{CB} = 32\text{ V}$ , $I_E = 0$<br>$V_{CB} = 45\text{ V}$ , $I_E = 0$<br>$V_{CB} = 32\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^{\circ}\text{C}$ ; BCW67<br>$V_{CB} = 45\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^{\circ}\text{C}$ ; BCW68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | $I_{CBO}$     | -<br>-<br>-<br>-                                                           | -<br>-<br>-<br>-                                               | 0.02<br>0.02<br>20<br>20                                       | $\mu\text{A}$ |
| Emitter-base cutoff current<br>$V_{EB} = 4\text{ V}$ , $I_C = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $I_{EBO}$     | -                                                                          | -                                                              | 20                                                             | nA            |
| DC current gain <sup>1)</sup><br>$I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 10\text{ V}$ , $h_{FE}\text{-grp.A/F}$<br>$I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 10\text{ V}$ , $h_{FE}\text{-grp.B/G}$<br>$I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 10\text{ V}$ , $h_{FE}\text{-grp.C/H}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.A/F}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.B/G}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.C/H}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.A/F}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.B/G}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$ , $h_{FE}\text{-grp.C/H}$<br>$I_C = 500\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $h_{FE}\text{-grp.A/F}$<br>$I_C = 500\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $h_{FE}\text{-grp.B/G}$<br>$I_C = 500\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $h_{FE}\text{-grp.C/H}$ | $h_{FE}$      | 35<br>50<br>80<br>75<br>120<br>180<br>100<br>160<br>250<br>35<br>60<br>100 | -<br>-<br>-<br>-<br>-<br>-<br>160<br>250<br>350<br>-<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>250<br>400<br>630<br>-<br>-<br>- | -             |

**DC Electrical Characteristics**

| Parameter                                                                                                                                                                            | Symbol                    | Values |        |            | Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------|--------|------------|------|
|                                                                                                                                                                                      |                           | min.   | typ.   | max.       |      |
| Characteristics                                                                                                                                                                      |                           |        |        |            |      |
| Collector-emitter saturation voltage <sup>1)</sup><br><i>I</i> <sub>C</sub> = 100 mA, <i>I</i> <sub>B</sub> = 10 mA<br><i>I</i> <sub>C</sub> = 500 mA, <i>I</i> <sub>B</sub> = 50 mA | <i>V</i> <sub>CEsat</sub> | -<br>- | -<br>- | 0.3<br>0.7 | V    |
| Base emitter saturation voltage <sup>1)</sup><br><i>I</i> <sub>C</sub> = 100 mA, <i>I</i> <sub>B</sub> = 10 mA<br><i>I</i> <sub>C</sub> = 500 mA, <i>I</i> <sub>B</sub> = 50 mA      | <i>V</i> <sub>BEsat</sub> | -<br>- | -<br>- | 1.25<br>2  |      |

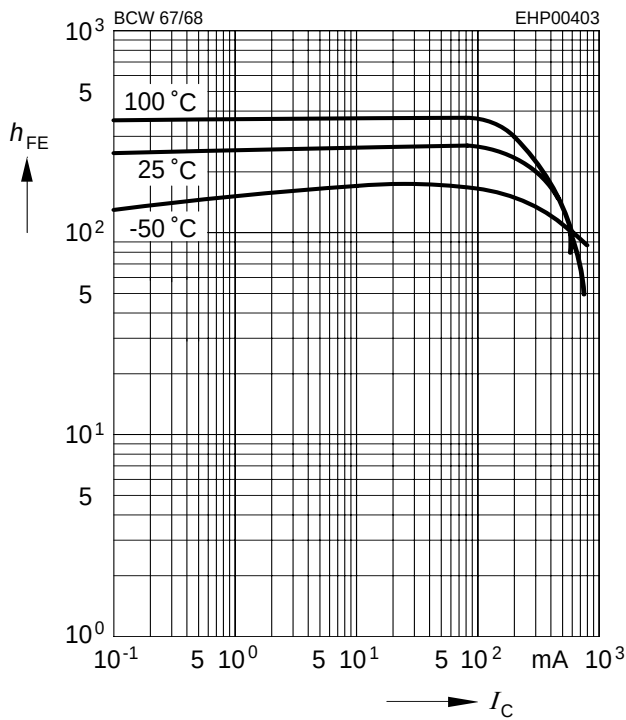
**AC Characteristics**

|                                                                                         |          |   |     |   |     |
|-----------------------------------------------------------------------------------------|----------|---|-----|---|-----|
| Transition frequency<br>$I_C = 50 \text{ mA}, V_{CE} = 5 \text{ V}, f = 20 \text{ MHz}$ | $f_T$    | - | 200 | - | MHz |
| Collector-base capacitance<br>$V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$                | $C_{cb}$ | - | 6   | - | pF  |
| Emitter-base capacitance<br>$V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}$                 | $C_{eb}$ | - | 60  | - |     |

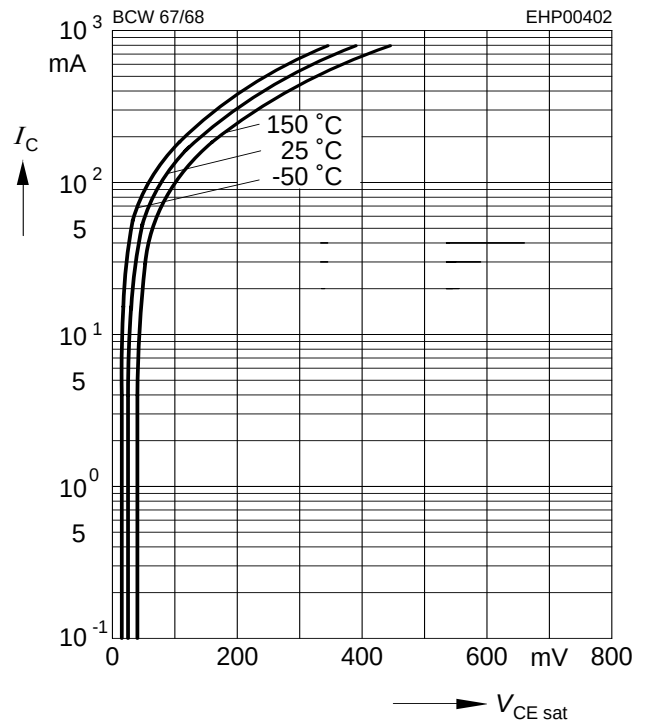
<sup>1)</sup>Pulse test:  $t < 300 \mu\text{s}$ ;  $D < 2\%$

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

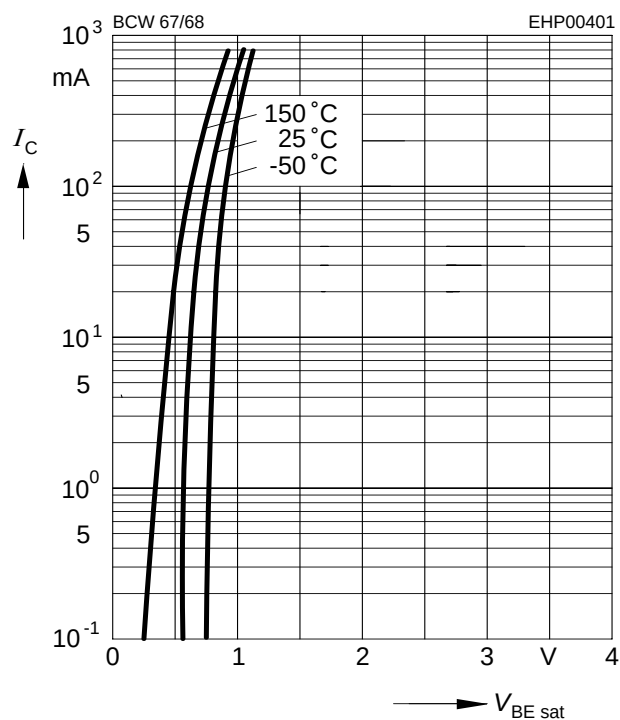
$$V_{CE} = 1 \text{ V}$$


**Collector-emitter saturation voltage**

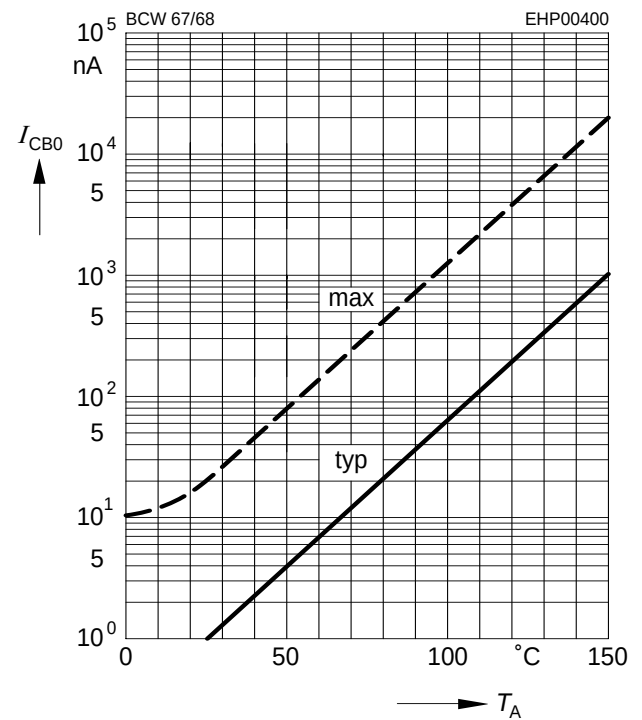
$$I_C = f(V_{CEsat}), h_{FE} = 10$$


**Base-emitter saturation voltage**

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

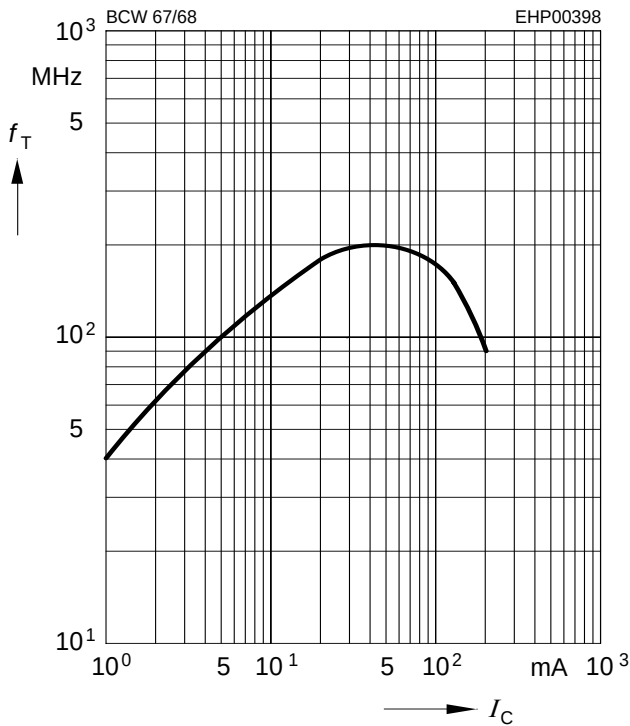

**Collector cutoff current  $I_{CBO} = f(T_A)$** 

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



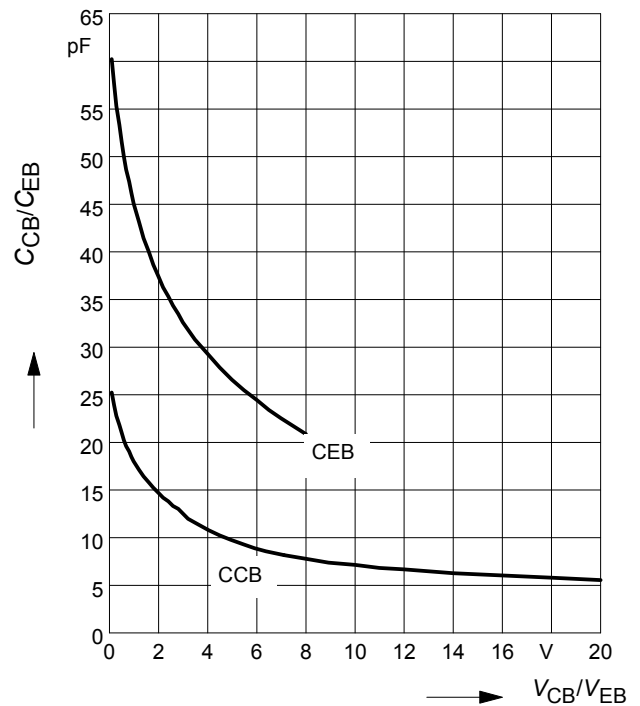
**Transition frequency  $f_T = f(I_C)$**

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



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

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

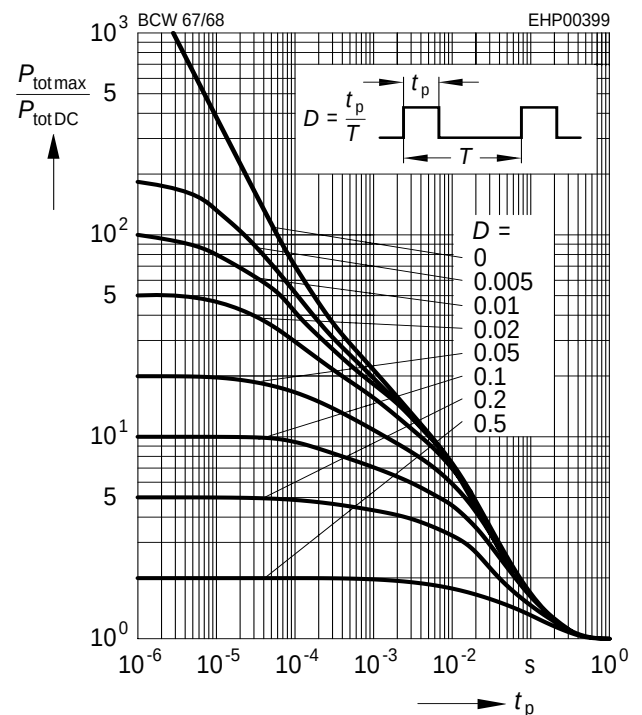


**Total power dissipation  $P_{tot} = f(T_S)$**

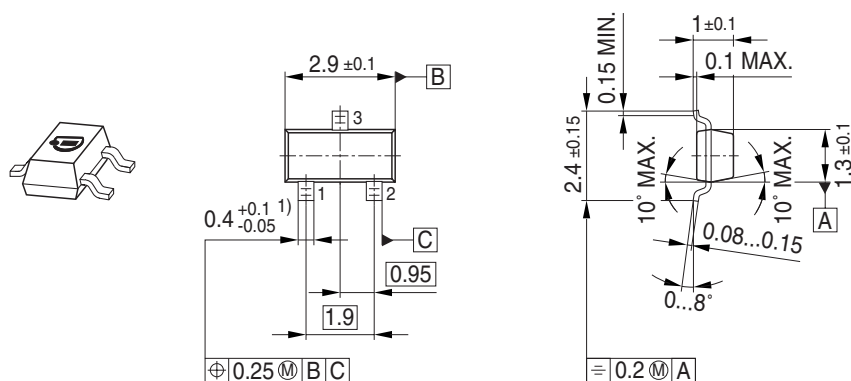


**Permissible Pulse Load**

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

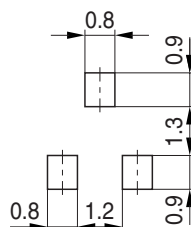


## Package Outline

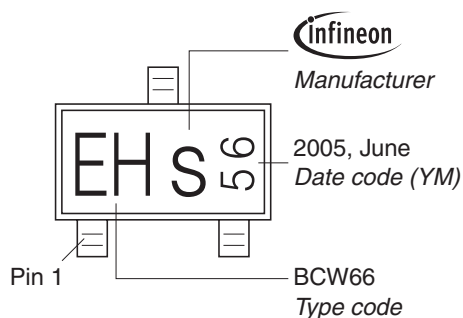


1) Lead width can be 0.6 max. in dambar area

## Foot Print

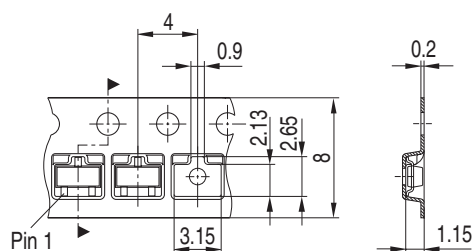


## Marking Layout (Example)



## Standard Packing

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



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