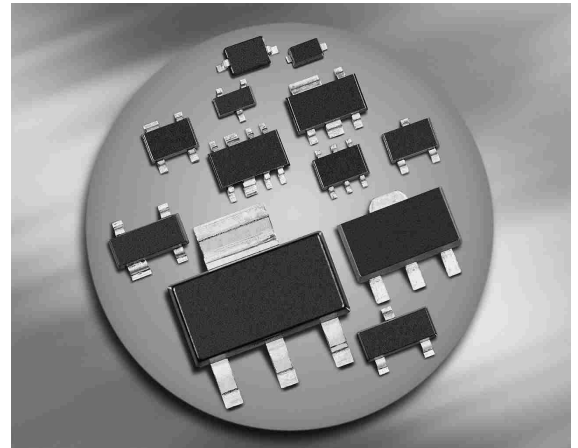


## NPN Silicon AF Transistors

- For AF driver and output stages
- High collector current
- Low collector-emitter saturation voltage
- Complementary types: BCP51...BCP53 (PNP)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type     | Marking | Pin Configuration |     |     |     |   |   | Package |
|----------|---------|-------------------|-----|-----|-----|---|---|---------|
| BCP54    | *       | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BCP54-16 | *       | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BCP55    | *       | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BCP55-16 | *       | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BCP56-10 | *       | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BCP56-16 | *       | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |

\* Marking is the same as the type-name

**Maximum Ratings**

| Parameter                                                | Symbol    | Value       | Unit             |
|----------------------------------------------------------|-----------|-------------|------------------|
| Collector-emitter voltage                                | $V_{CEO}$ |             | V                |
| BCP54                                                    |           | 45          |                  |
| BCP55                                                    |           | 60          |                  |
| BCP56                                                    |           | 80          |                  |
| Collector-base voltage                                   | $V_{CBO}$ |             |                  |
| BCP54                                                    |           | 45          |                  |
| BCP55                                                    |           | 60          |                  |
| BCP56                                                    |           | 100         |                  |
| Emitter-base voltage                                     | $V_{EBO}$ | 5           |                  |
| Collector current                                        | $I_C$     | 1           | A                |
| Peak collector current, $t_p \leq 10$ ms                 | $I_{CM}$  | 1.5         |                  |
| Base current                                             | $I_B$     | 100         | mA               |
| Peak base current                                        | $I_{BM}$  | 200         |                  |
| Total power dissipation-<br>$T_S \leq 120^\circ\text{C}$ | $P_{tot}$ | 2           | W                |
| 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> | $R_{thJS}$ | $\leq 15$ | 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>$I_C = 10\text{ mA}$ , $I_B = 0$ , BCP54...<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BCP55...<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BCP56-10, -16                                                                                                                                           | $V_{(BR)CEO}$ | 45<br>60<br>80              | -<br>-<br>-               | -<br>-<br>-                 | V    |
| Collector-base breakdown voltage<br>$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ , BCP54...<br>$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ , BCP55...<br>$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ , BCP56-10, -16                                                                                                                | $V_{(BR)CBO}$ | 45<br>60<br>100             | -<br>-<br>-               | -<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>$V_{CB} = 30\text{ V}$ , $I_E = 0$<br>$V_{CB} = 30\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^{\circ}\text{C}$                                                                                                                                                                                 | $I_{CBO}$     | -<br>-                      | -<br>-                    | 0.1<br>20                   |      |
| DC current gain <sup>1)</sup><br>$I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$<br>$I_C = 150\text{ mA}$ , $V_{CE} = 2\text{ V}$ , BCP54/BCP55<br>$I_C = 150\text{ mA}$ , $V_{CE} = 2\text{ V}$ , BCP56-10<br>$I_C = 150\text{ mA}$ , $V_{CE} = 2\text{ V}$ , BCP54-16...BCP56-16<br>$I_C = 500\text{ mA}$ , $V_{CE} = 2\text{ V}$ | $h_{FE}$      | 25<br>40<br>63<br>100<br>25 | -<br>-<br>100<br>160<br>- | -<br>250<br>160<br>250<br>- | -    |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$                                                                                                                                                                                                                              | $V_{CEsat}$   | -                           | -                         | 0.5                         | V    |
| Base-emitter voltage <sup>1)</sup><br>$I_C = 500\text{ mA}$ , $V_{CE} = 2\text{ V}$                                                                                                                                                                                                                                             | $V_{BE(ON)}$  | -                           | -                         | 1                           |      |

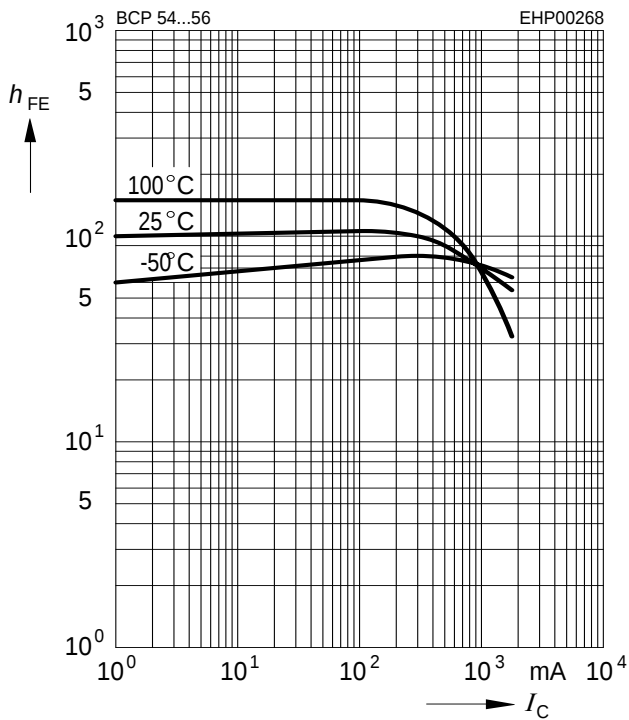
### AC Characteristics

|                                                                                              |       |   |     |   |     |
|----------------------------------------------------------------------------------------------|-------|---|-----|---|-----|
| Transition frequency<br>$I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 100\text{ MHz}$ | $f_T$ | - | 100 | - | MHz |
|----------------------------------------------------------------------------------------------|-------|---|-----|---|-----|

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

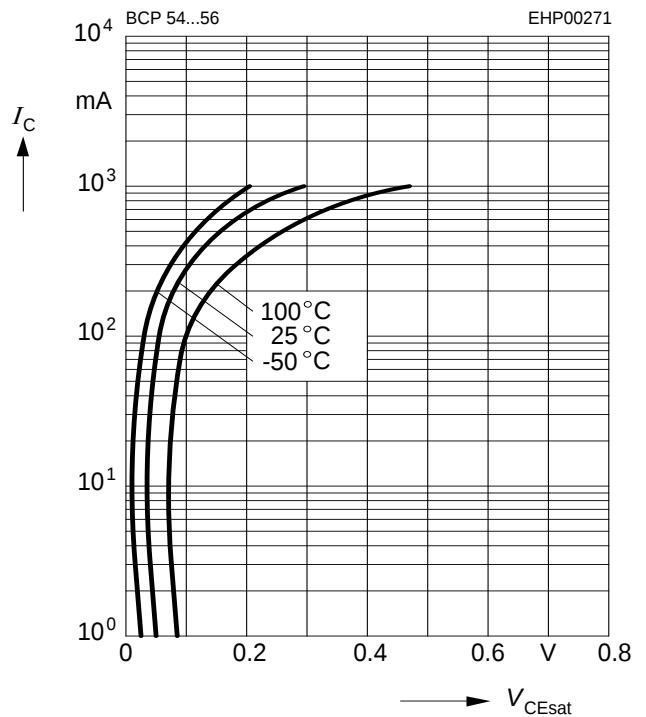
### DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 2 \text{ V}$



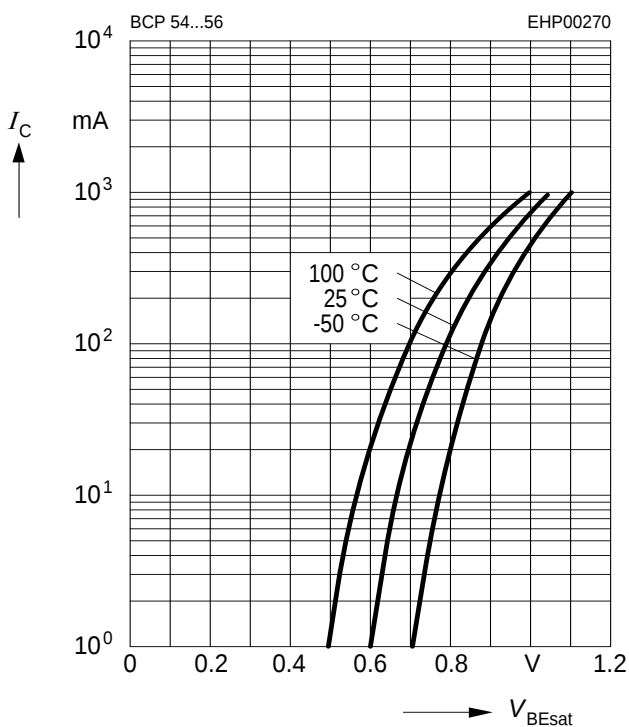
### Collector-emitter saturation voltage

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



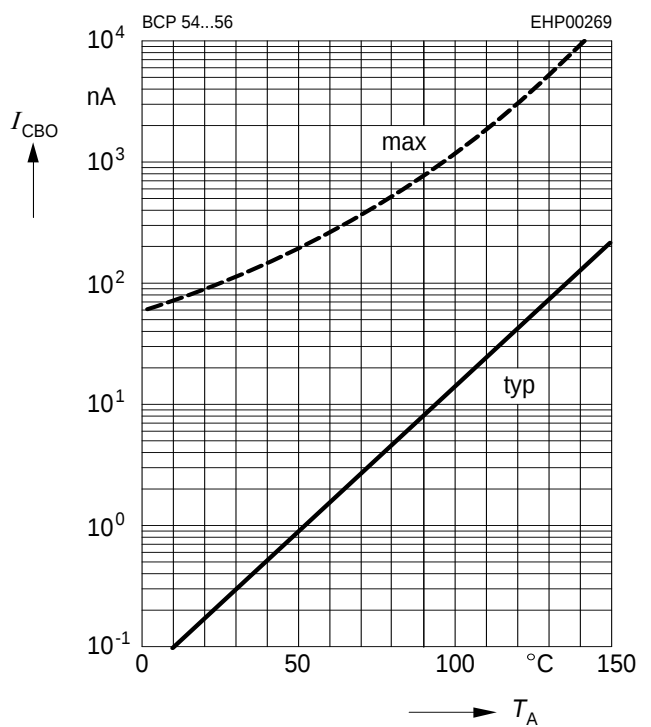
### Base-emitter saturation voltage

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



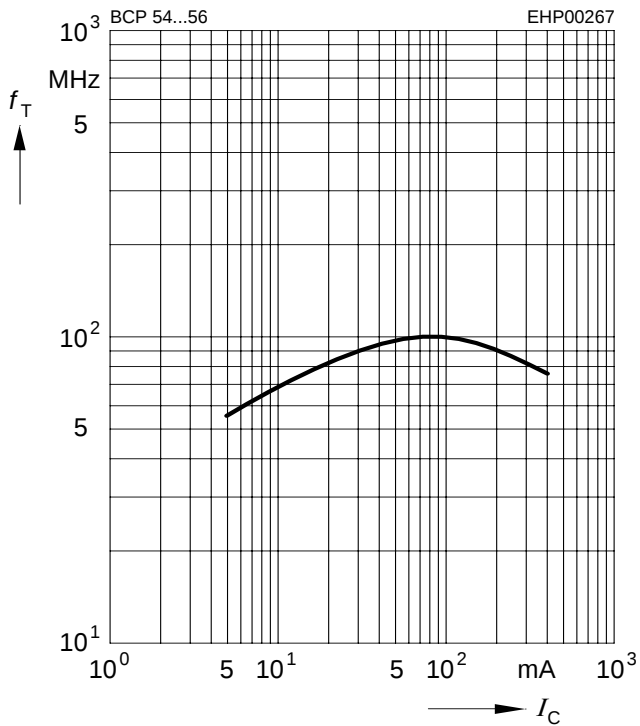
### Collector cutoff current $I_{CBO} = f(T_A)$

$V_{CBO} = 30 \text{ V}$

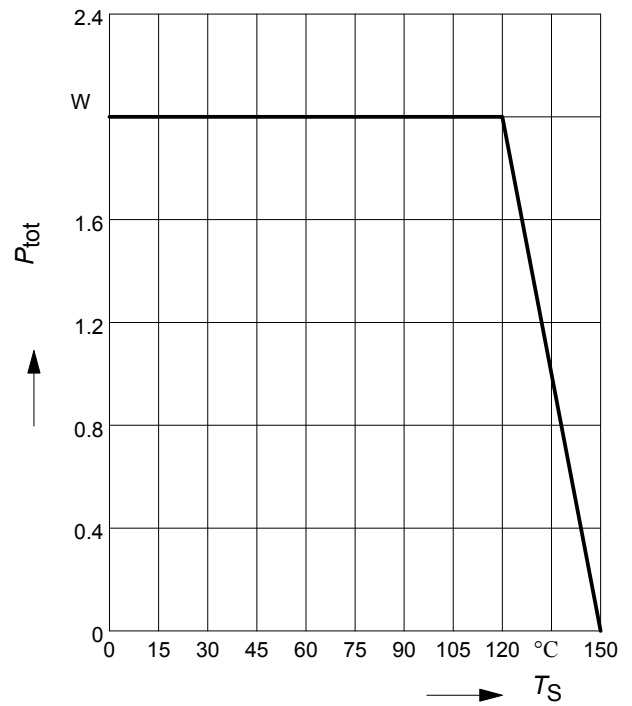


Transition frequency  $f_T = f(I_C)$

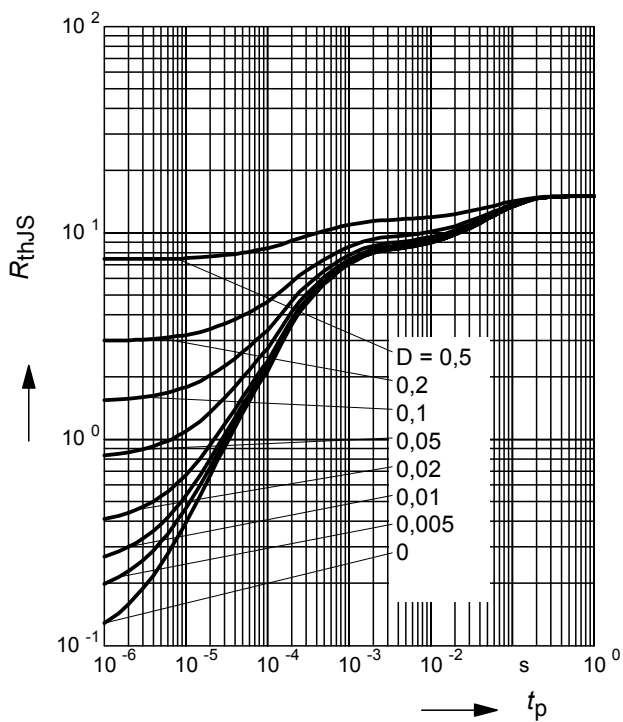
$V_{CE} = 10 \text{ V}$



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

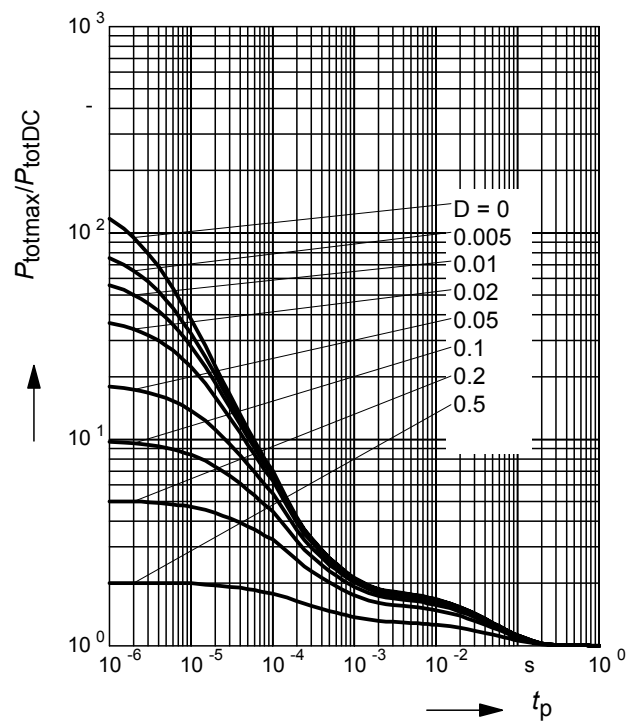


Permissible Pulse Load  $R_{thJS} = f(t_p)$

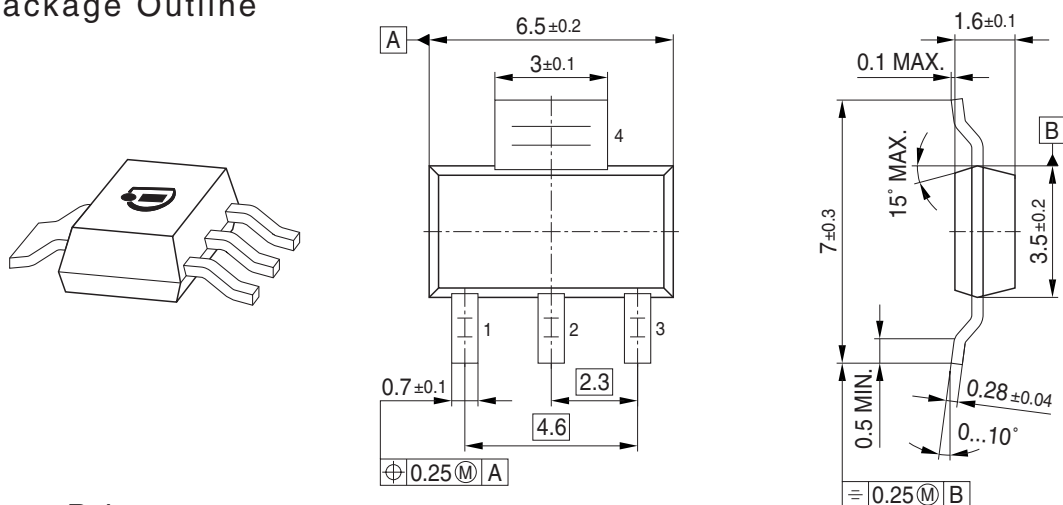


Permissible Pulse Load

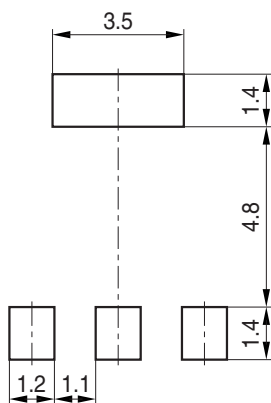
$P_{totmax}/P_{totDC} = f(t_p)$



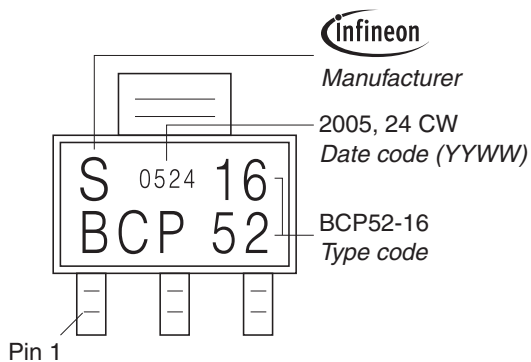
## Package Outline



## Foot Print

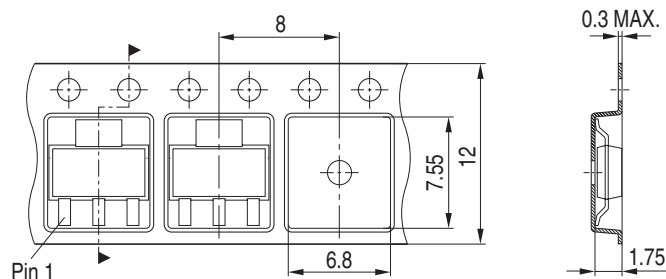


## Marking Layout (Example)



## Packing

Reel  $\varnothing 180 \text{ mm}$  = 1.000 Pieces/Reel  
 Reel  $\varnothing 330 \text{ mm}$  = 4.000 Pieces/Reel



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