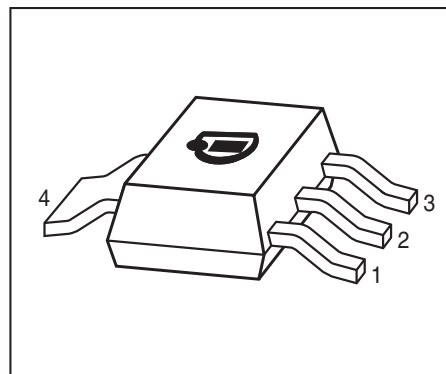


## PNP Silicon AF Power Transistors

- For AF driver and output stages
- High collector current
- High current gain
- Low collector-emitter saturation voltage
- Complementary types: BDP947, BDP949  
BDP953 (NPN)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type   | Marking | Pin Configuration |     |     |     |   |   | Package |
|--------|---------|-------------------|-----|-----|-----|---|---|---------|
| BDP948 | BDP948  | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BDP950 | BDP950  | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |
| BDP954 | BCP954  | 1=B               | 2=C | 3=E | 4=C | - | - | SOT223  |

**Maximum Ratings**

| Parameter                                               | Symbol    | Value           | Unit |
|---------------------------------------------------------|-----------|-----------------|------|
| Collector-emitter voltage<br>BDP948<br>BDP950<br>BDP954 | $V_{CEO}$ | 45<br>60<br>100 | V    |
| Collector-base voltage<br>BDP948<br>BDP950<br>BDP954    | $V_{CBO}$ | 45<br>60<br>120 |      |
| Emitter-base voltage                                    | $V_{EBO}$ | 5               |      |
| Collector current                                       | $I_C$     | 3               |      |
| Peak collector current, $t_p \leq 10$ ms                | $I_{CM}$  | 5               |      |
| Base current                                            | $I_B$     | 200             | mA   |
| Peak base current                                       | $I_{BM}$  | 500             |      |
| Total power dissipation-<br>$T_S \leq 100$ °C           | $P_{tot}$ | 5               | W    |
| Junction temperature                                    | $T_j$     | 150             | °C   |
| Storage temperature                                     | $T_{stg}$ | -65 ... 150     |      |

**Thermal Resistance**

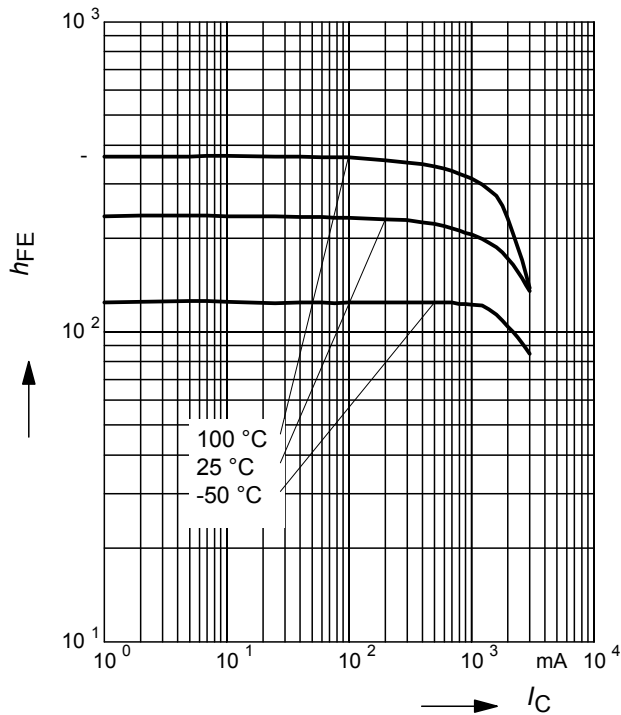
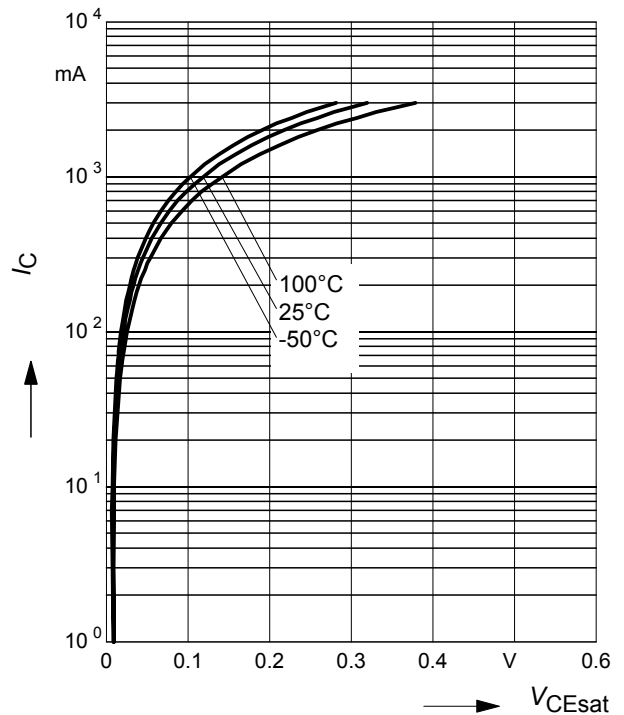
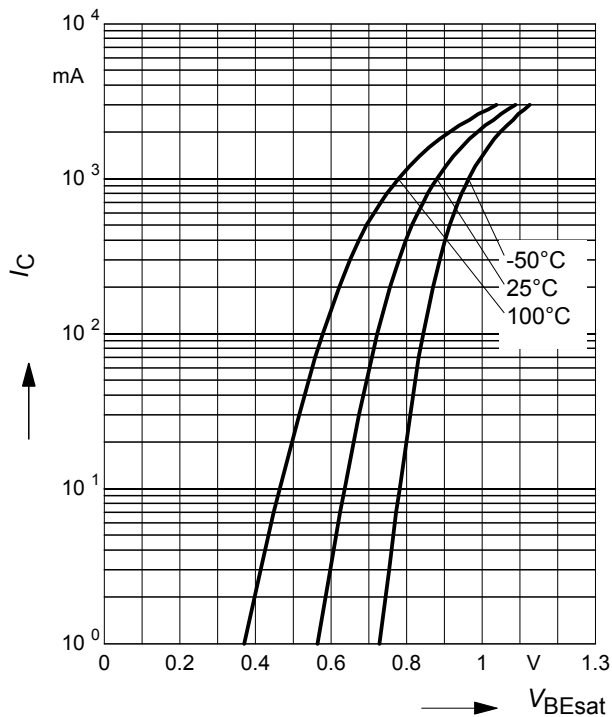
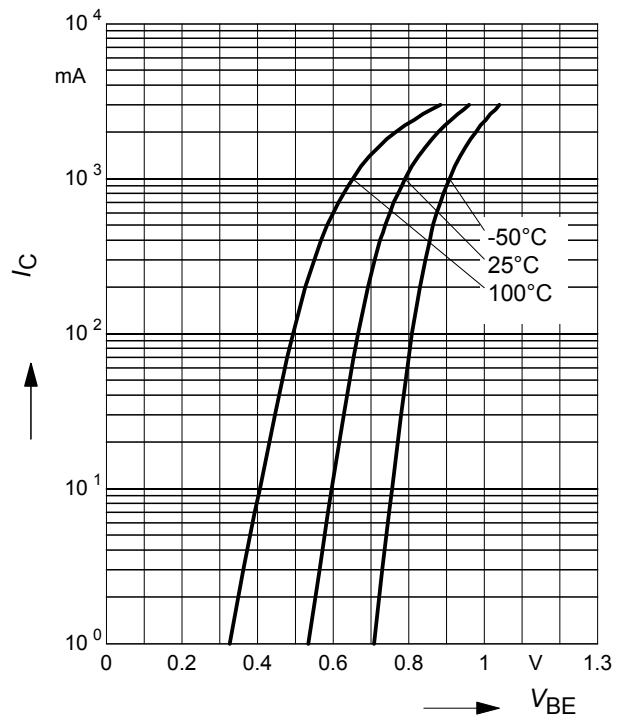
| Parameter                                | Symbol     | Value     | Unit |
|------------------------------------------|------------|-----------|------|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | $\leq 10$ | K/W  |

<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

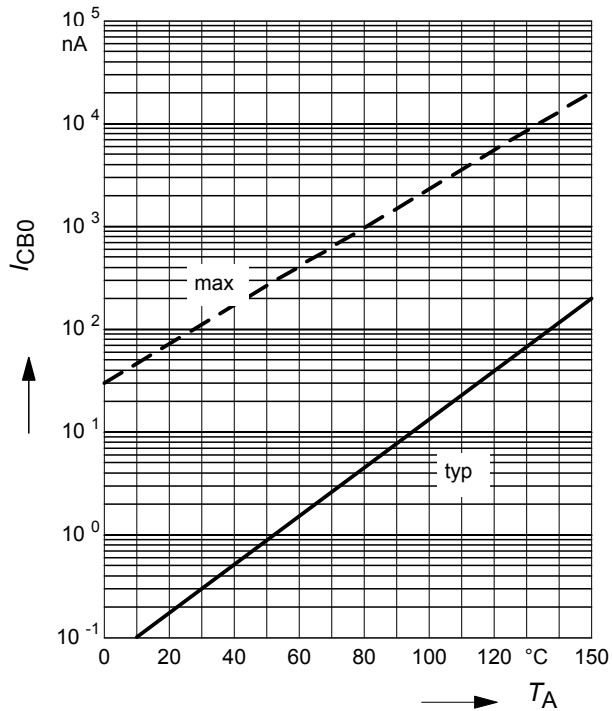
| Parameter                                                                                                                                                                                                                                          | Symbol        | Values               |                  |                    | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|------------------|--------------------|------|
|                                                                                                                                                                                                                                                    |               | min.                 | typ.             | max.               |      |
| DC Characteristics                                                                                                                                                                                                                                 |               |                      |                  |                    |      |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BDP948<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BDP950<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BDP954                                                                         | $V_{(BR)CEO}$ | 45<br>60<br>100      | -<br>-<br>-      | -<br>-<br>-        | V    |
| Collector-base breakdown voltage<br>$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ , BDP948<br>$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ , BDP950<br>$I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ , BDP954                                              | $V_{(BR)CBO}$ | 45<br>60<br>120      | -<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>$V_{CB} = 45\text{ V}$ , $I_E = 0$<br>$V_{CB} = 45\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^{\circ}\text{C}$                                                                                                    | $I_{CBO}$     | -<br>-               | -<br>-           | 0.1<br>20          |      |
| Emitter-base cutoff current<br>$V_{EB} = 4\text{ V}$ , $I_C = 0$                                                                                                                                                                                   | $I_{EBO}$     | -                    | -                | 100                | nA   |
| DC current gain <sup>1)</sup><br>$I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$<br>$I_C = 500\text{ mA}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 1\text{ A}$ , $V_{CE} = 2\text{ V}$ BDP948,BDP950<br>BDP954<br>$I_C = 1\text{ A}$ , $V_{CE} = 2\text{ V}$ | $h_{FE}$      | 25<br>85<br>50<br>15 | -<br>-<br>-<br>- | -<br>475<br>-<br>- | -    |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 2\text{ A}$ , $I_B = 0.2\text{ A}$                                                                                                                                                    | $V_{CEsat}$   | -                    | -                | 0.5                | V    |
| Base emitter saturation voltage <sup>1)</sup><br>$I_C = 2\text{ A}$ , $I_B = 0.2\text{ A}$                                                                                                                                                         | $V_{BEsat}$   | -                    | -                | 1.3                |      |
| AC Characteristics                                                                                                                                                                                                                                 |               |                      |                  |                    |      |
| Transition frequency<br>$I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 100\text{ MHz}$                                                                                                                                                       | $f_T$         | -                    | 100              | -                  | MHz  |
| Collector-base capacitance<br>$V_{CB} = 10\text{ V}$ , $f = 100\text{ MHz}$                                                                                                                                                                        | $C_{cb}$      | -                    | 40               | -                  | pF   |

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

**Collector current  $I_C = f(V_{BE})$** 
 $V_{CE} = 2 \text{ V}$ 


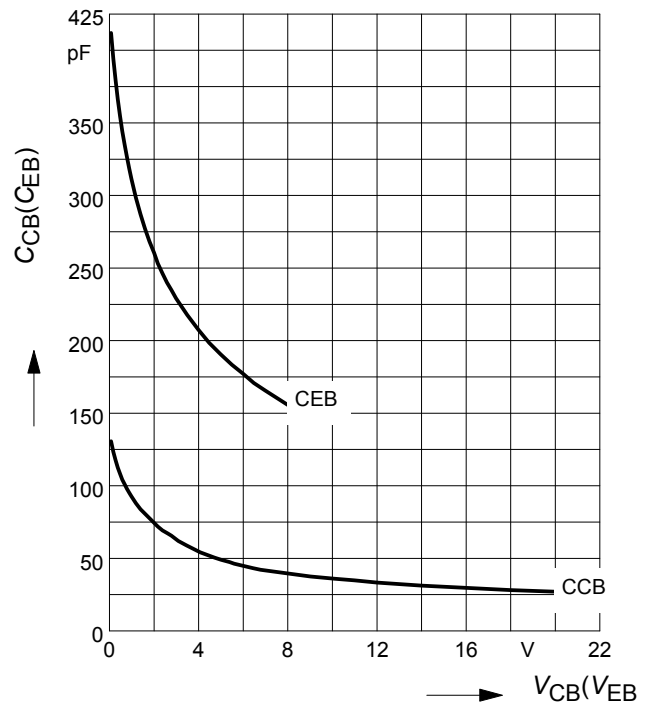
**Collector cutoff current  $I_{CBO} = f(T_A)$**

$V_{CB} = 45 \text{ V}$

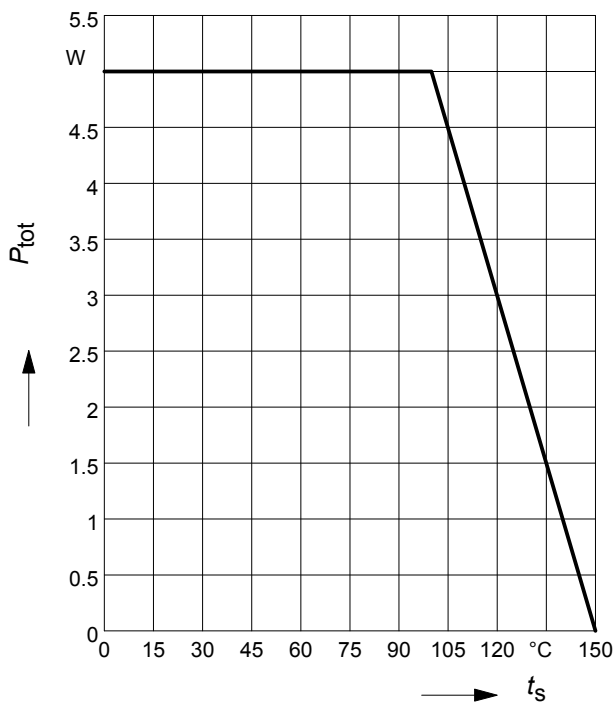


**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

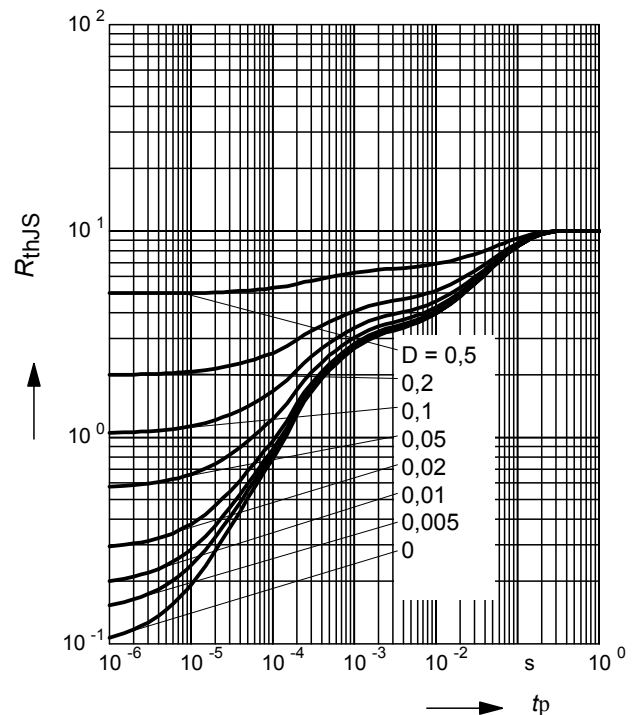
**Emitter-base capacitance  $C_{eb} = f(V_{EB})$**



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

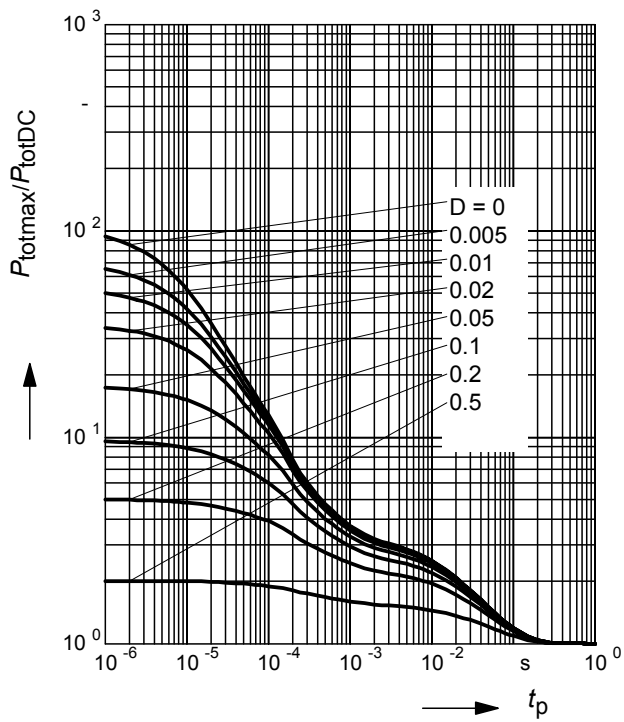


**Permissible Pulse Load  $R_{thJS} = f(t_p)$**

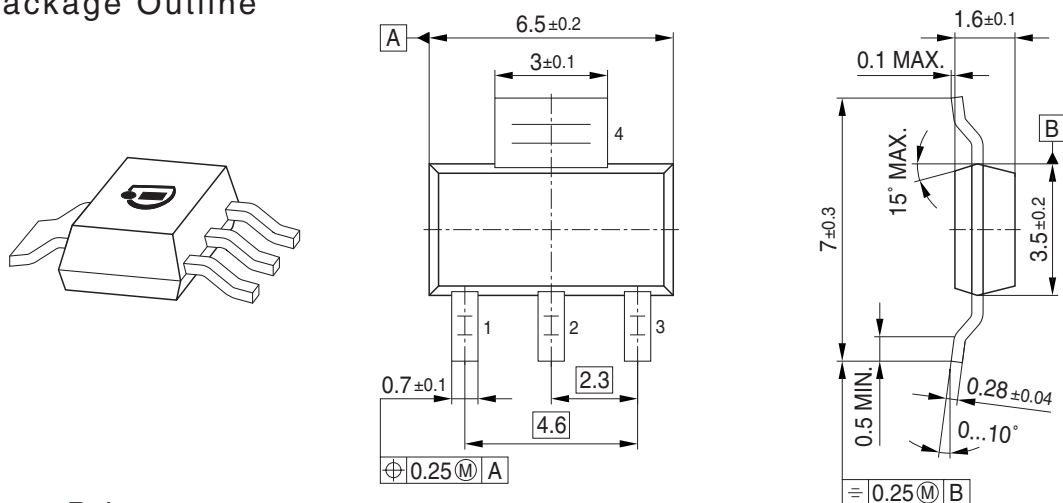


## Permissible Pulse Load

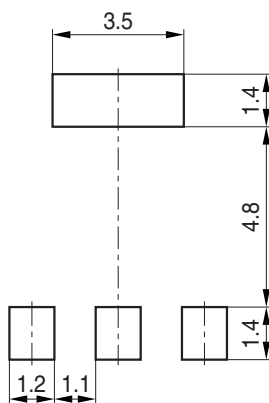
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$



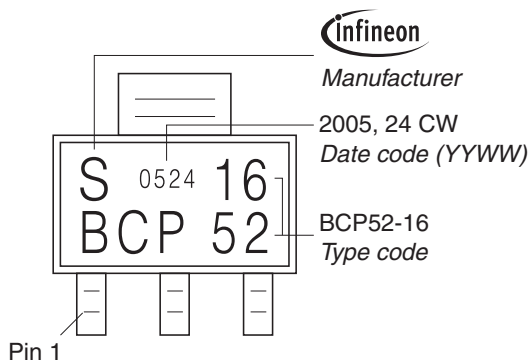
## Package Outline



## Foot Print

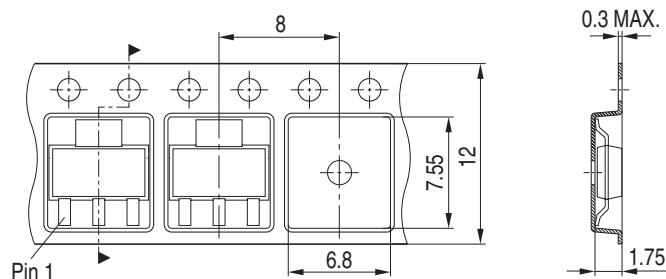


## Marking Layout (Example)



## Packing

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



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