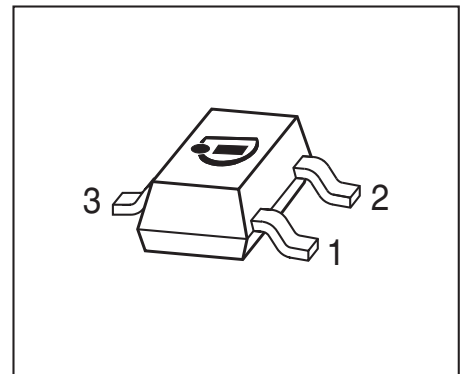


**PNP Silicon AF Transistor**

- High breakdown voltage
- Low collector-emitter saturation voltage
- Complementary type: SMBTA06 / MMBTA06(NPN)



| Type             | Marking | Pin Configuration |     |     | Package |
|------------------|---------|-------------------|-----|-----|---------|
| SMBTA56/ MMBTA56 | s2G     | 1=B               | 2=E | 3=C | SOT23   |

**Maximum Ratings**

| Parameter                                               | Symbol    | Value       | Unit             |
|---------------------------------------------------------|-----------|-------------|------------------|
| Collector-emitter voltage                               | $V_{CEO}$ | 80          | V                |
| Collector-base voltage                                  | $V_{CBO}$ | 80          |                  |
| Emitter-base voltage                                    | $V_{EBO}$ | 4           |                  |
| Collector current                                       | $I_C$     | 500         | mA               |
| Peak collector current                                  | $I_{CM}$  | 1           | A                |
| Base current                                            | $I_B$     | 100         | mA               |
| Peak base current                                       | $I_{BM}$  | 200         |                  |
| Total power dissipation-<br>$T_S \leq 79^\circ\text{C}$ | $P_{tot}$ | 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 Thermal Resistance

**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>$I_C = 1\text{ mA}, I_B = 0$                                                                  | $V_{(BR)CEO}$ | 80         | -      | -         | V             |
| Collector-base breakdown voltage<br>$I_C = 100\text{ }\mu\text{A}, I_E = 0$                                                          | $V_{(BR)CBO}$ | 80         | -      | -         |               |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}, I_C = 0$                                                             | $V_{(BR)EBO}$ | 4          | -      | -         |               |
| Collector-base cutoff current<br>$V_{CB} = 80\text{ V}, I_E = 0$<br>$V_{CB} = 80\text{ V}, I_E = 0, T_A = 150\text{ }^\circ\text{C}$ | $I_{CBO}$     | -<br>-     | -<br>- | 0.1<br>20 | $\mu\text{A}$ |
| Collector-emitter cutoff current<br>$V_{CE} = 60\text{ V}, I_B = 0$                                                                  | $I_{CEO}$     | -          | -      | 0.1       |               |
| DC current gain <sup>1)</sup><br>$I_C = 10\text{ mA}, V_{CE} = 1\text{ V}$<br>$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}$             | $h_{FE}$      | 100<br>100 | -<br>- | -<br>-    | -             |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 100\text{ mA}, I_B = 10\text{ mA}$                                      | $V_{CEsat}$   | -          | -      | 0.25      | V             |
| Base-emitter voltage <sup>1)</sup><br>$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}$                                                     | $V_{BE(ON)}$  | -          | -      | 1.2       |               |

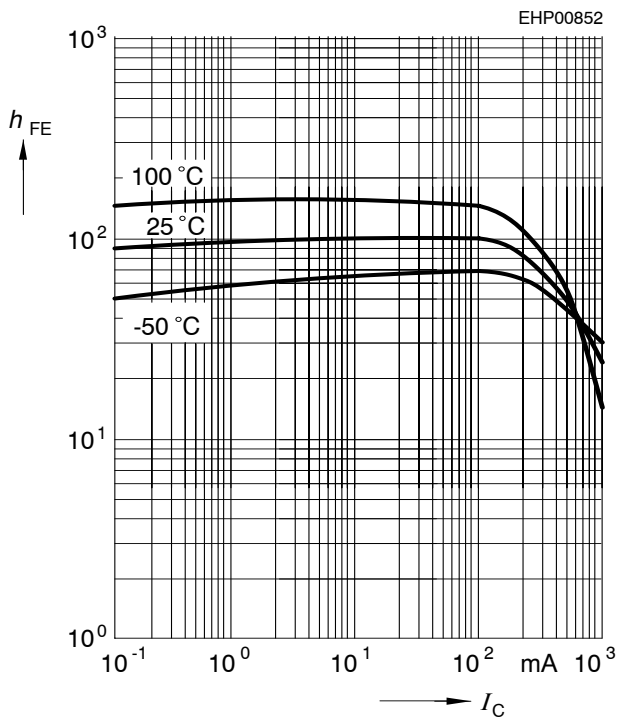
**AC Characteristics**

|                                                                                      |          |   |     |   |     |
|--------------------------------------------------------------------------------------|----------|---|-----|---|-----|
| Transition frequency<br>$I_C = 20\text{ mA}, V_{CE} = 5\text{ V}, f = 20\text{ MHz}$ | $f_T$    | - | 100 | - | MHz |
| Collector-base capacitance<br>$V_{CB} = 10\text{ V}, f = 1\text{ MHz}$               | $C_{cb}$ | - | 7   | - | pF  |

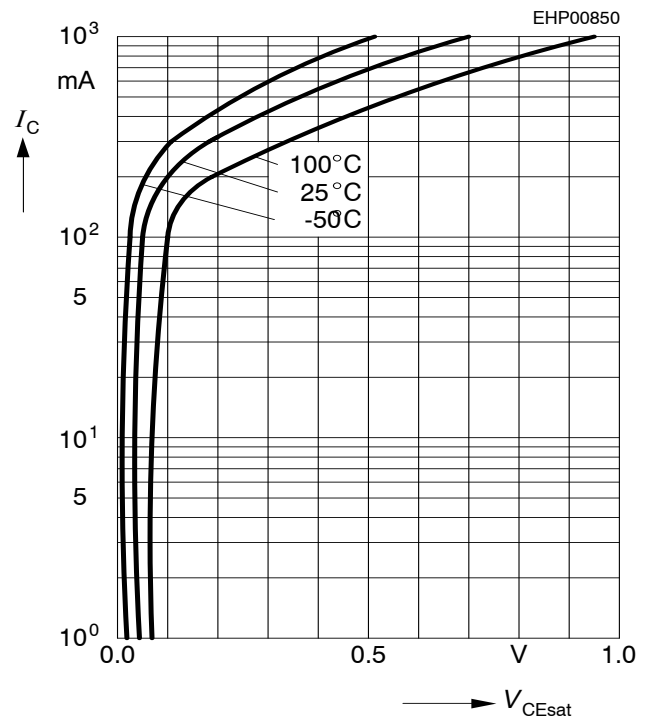
<sup>1)</sup>Pulse test:  $t < 300\mu\text{s}$ ;  $D < 2\%$

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

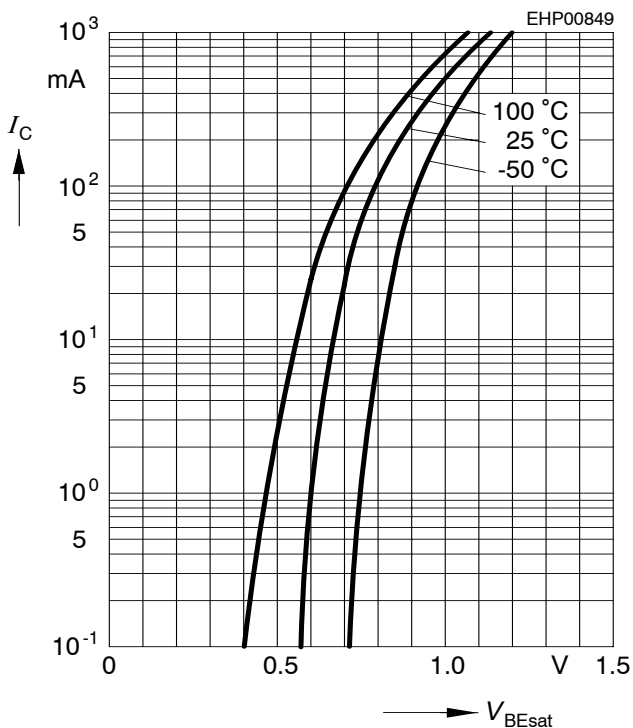
$$V_{CE} = 1 \text{ V}$$


**Collector-emitter saturation voltage**

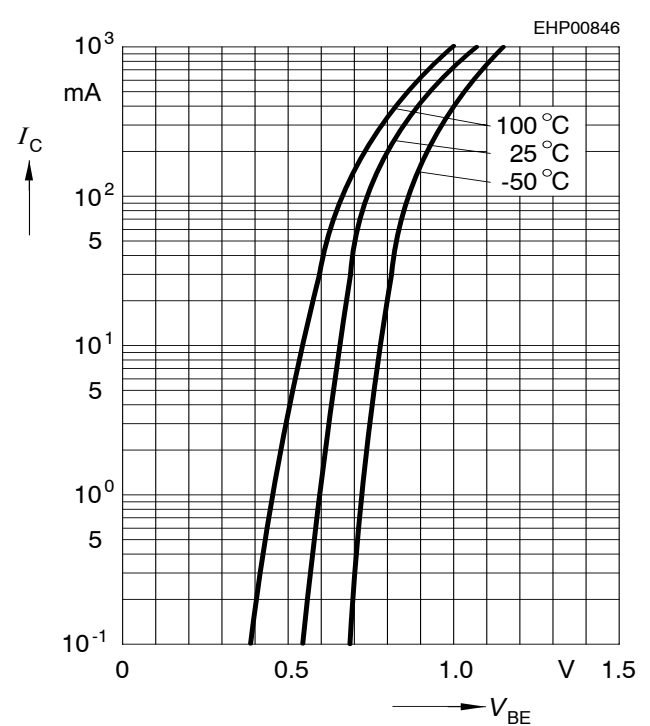
$$I_C = f(V_{CEsat}), h_{FE} = 10$$


**Base-emitter saturation voltage**

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

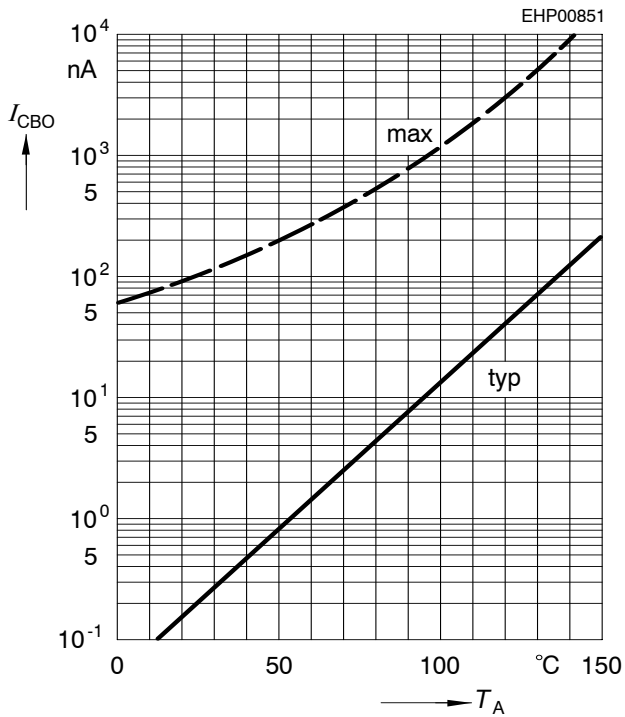

**Collector current  $I_C = f(V_{BE})$** 

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



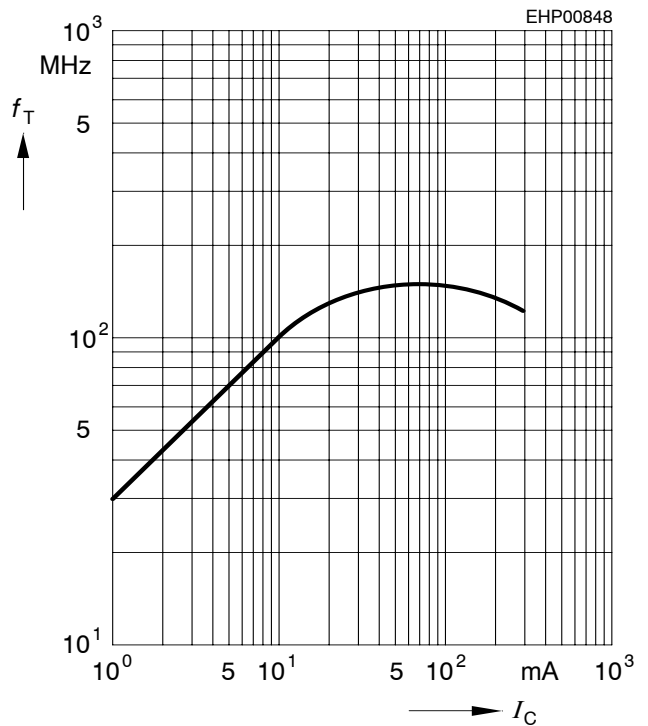
**Collector cutoff current**  $I_{CBO} = f(T_A)$

$V_{CB} = 80 \text{ V}$



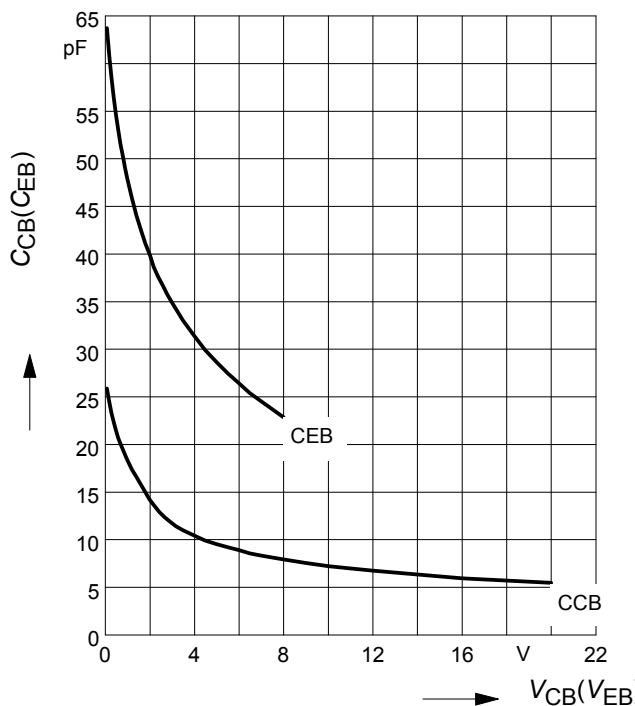
**Transition frequency**  $f_T = f(I_C)$

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

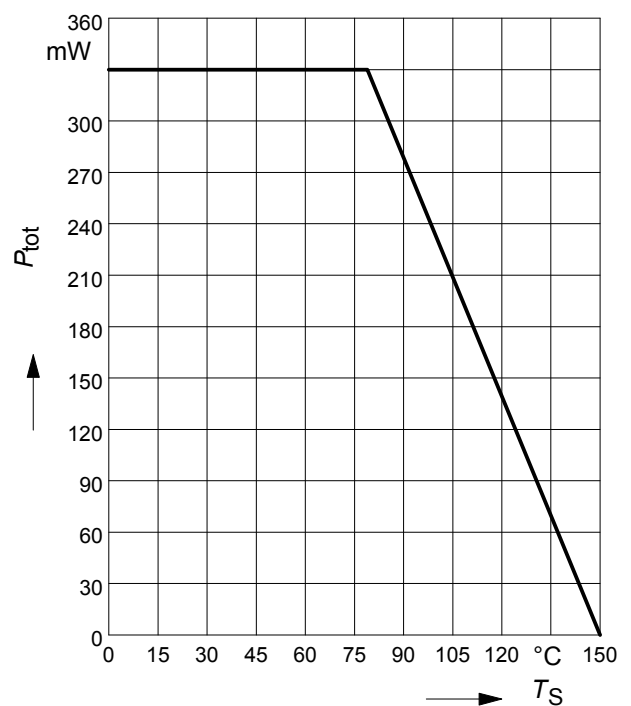


**Collector-base capacitance**  $C_{cb} = f(V_{CB})$

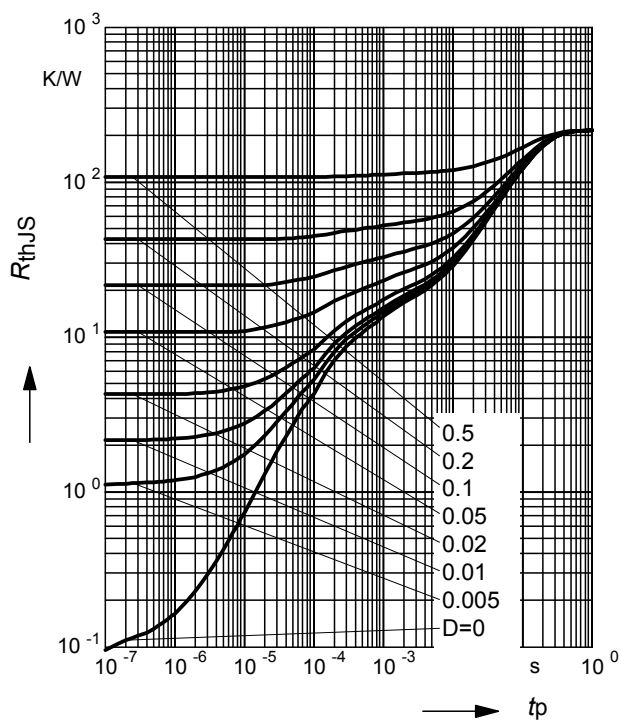
**Emitter-base capacitance**  $C_{eb} = f(V_{EB})$



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

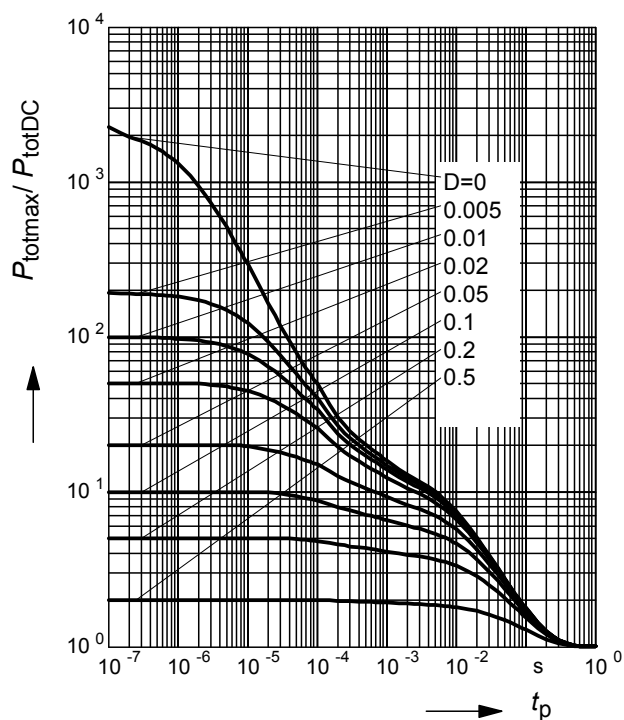


**Permissible Pulse Load**  $R_{thJS} = f(t_p)$

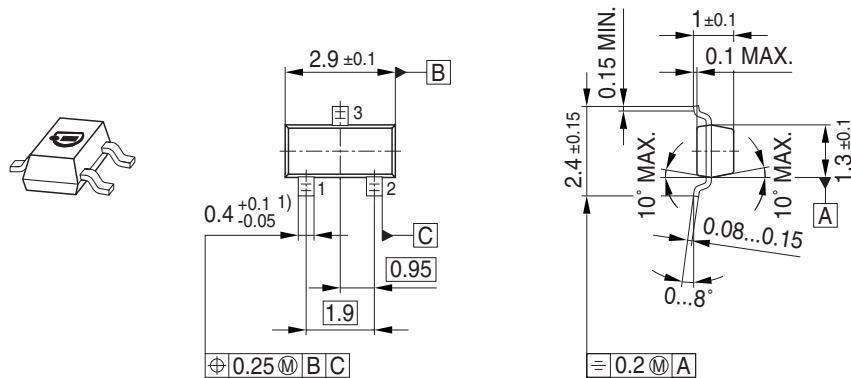


**Permissible Pulse Load**

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

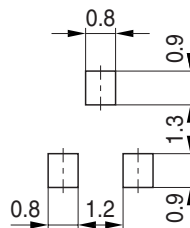


## Package Outline

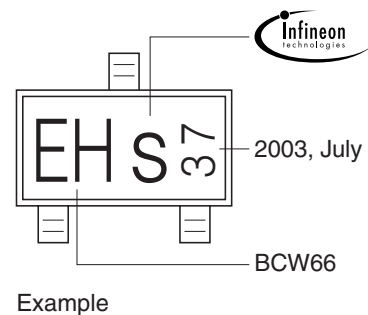
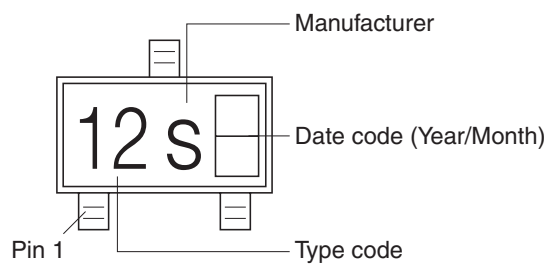


1) Lead width can be 0.6 max. in dambar area

## Foot Print

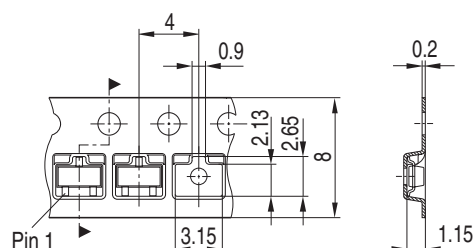


## Marking Layout



## Standard Packing

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



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