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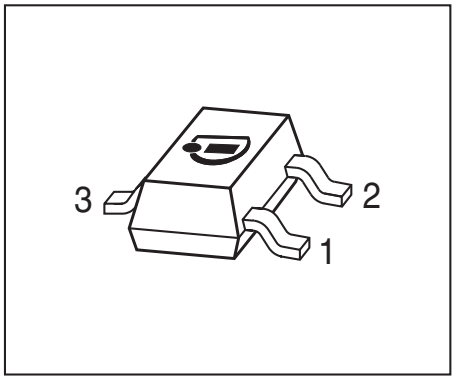
## NPN Silicon AF Transistor




- Low collector-emitter saturation voltage
- Complementary type:
  SMBTA 56 / MMBTA56 (PNP)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

| Type | Marking | Pin Configuration | | | Package |
|---|---|---|---|---|---|
| SMBTA06/MMBTA06 | s1G | 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, $t_p \leq 10$ ms | $I_{CM}$ | 1 | A |
| Base current | $I_B$ | 100 | mA |
| Peak base current | $I_{BM}$ | 200 | |
| Total power dissipation-<br>$T_S \leq 79$ °C | $P_{tot}$ | 330 | mW |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature | $T_{stg}$ | -65 ... 150 | |

**Thermal Resistance**

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction - soldering point[1)] | $R_{thJS}$ | ≤ 215 | K/W |

[1]For calculation of $R_{thJA}$ please refer to Application Note AN077 (Thermal Resistance Calculation)

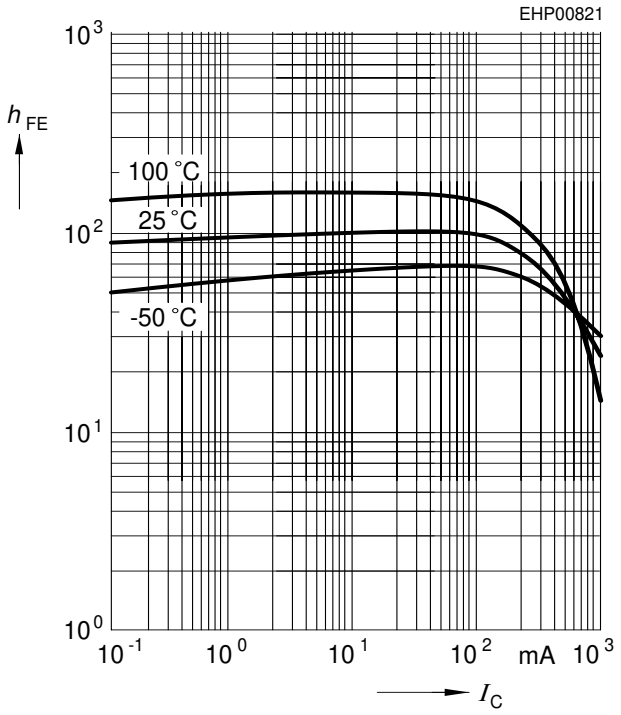
**Electrical Characteristics** at $T_A$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Collector-emitter breakdown voltage<br>$I_C$ = 1 mA, $I_B$ = 0 | $V_{(BR)CEO}$ | 80 | - | - | V |
| Collector-base breakdown voltage<br>$I_C$ = 100 µA, $I_E$ = 0 | $V_{(BR)CBO}$ | 80 | - | - | |
| Emitter-base breakdown voltage<br>$I_E$ = 10 µA, $I_C$ = 0 | $V_{(BR)EBO}$ | 4 | - | - | |
| Collector-base cutoff current<br>$V_{CB}$ = 80 V, $I_E$ = 0<br>$V_{CB}$ = 80 V, $I_E$ = 0 , $T_A$ = 150 °C | $I_{CBO}$ | <br>-<br>- | <br>-<br>- | <br>0.1<br>20 | µA |
| Collector-emitter cutoff current<br>$V_{CE}$ = 60 V, $I_B$ = 0 | $I_{CEO}$ | - | - | 100 | nA |
| DC current gain[1)]<br>$I_C$ = 10 mA, $V_{CE}$ = 1 V<br>$I_C$ = 100 mA, $V_{CE}$ = 1 V | $h_{FE}$ | <br>100<br>100 | <br>-<br>- | <br>-<br>- | - |
| Collector-emitter saturation voltage[1)]<br>$I_C$ = 100 mA, $I_B$ = 10 mA | $V_{CEsat}$ | - | - | 0.25 | V |
| Base-emitter voltage[1)]<br>$I_C$ = 100 mA, $V_{CE}$ = 1 V | $V_{BE(ON)}$ | - | - | 1.2 | |
| **AC Characteristics** | | | | | |
| Transition frequency<br>$I_C$ = 20 mA, $V_{CE}$ = 5 V, $f$ = 20 MHz | $f_T$ | - | 100 | - | MHz |
| Collector-base capacitance<br>$V_{CB}$ = 10 V, $f$ = 1 MHz | $C_{cb}$ | - | 7 | - | pF |

[1]Pulse test: t < 300µs; D < 2%

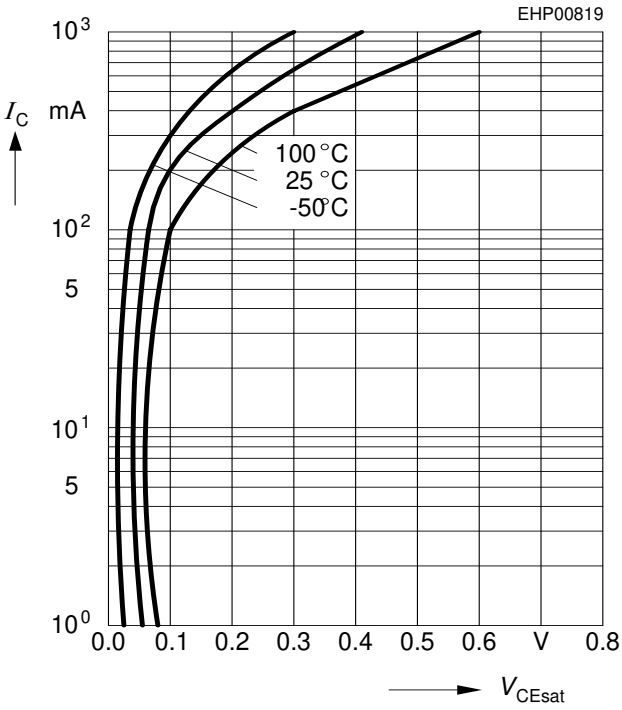
**DC current gain $h_{FE} = f(I_C)$**

$V_{CE}$ = 1 V



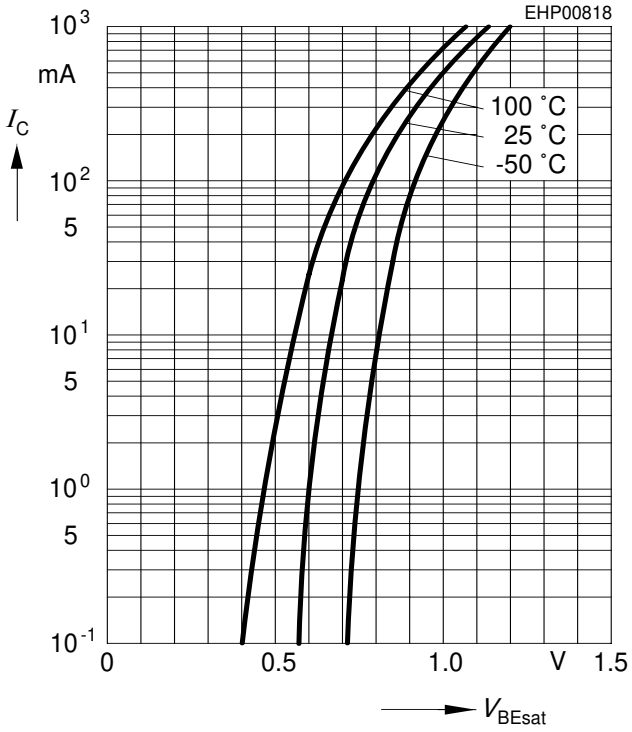

**Collector-emitter saturation voltage**

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



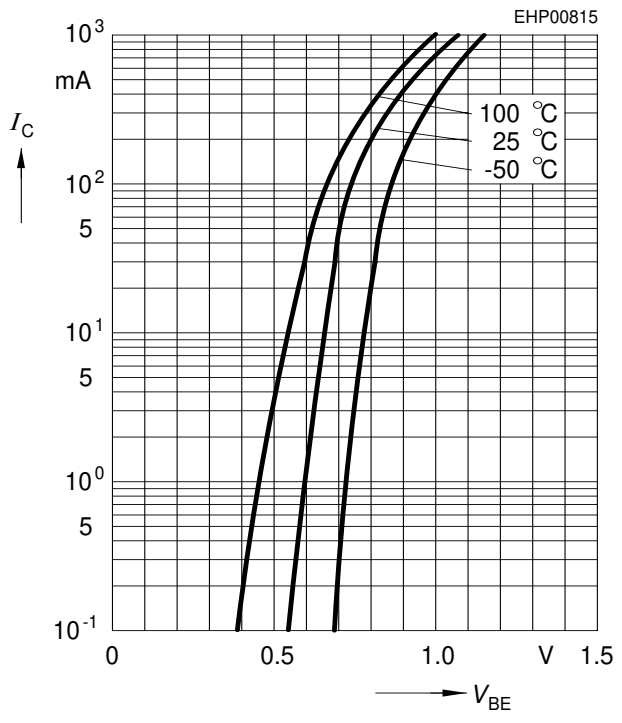

**Base-emitter saturation voltage**

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



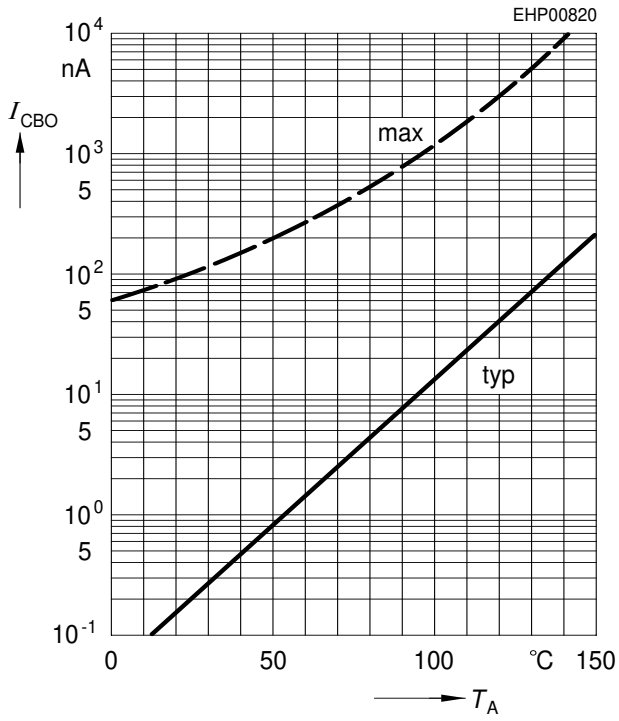

**Collector current $I_C = f(V_{BE})$**

$V_{CE}$ = 1V



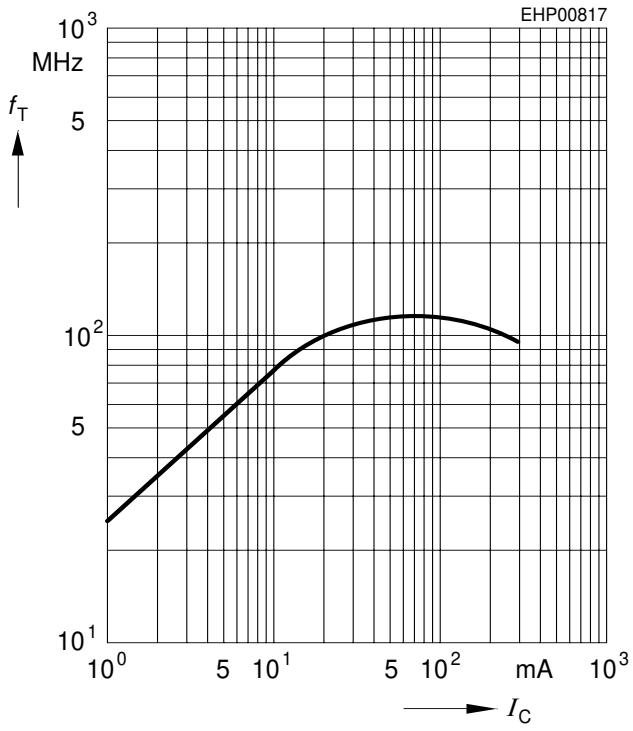
**Collector cutoff current** $I_{CBO} = f(T_A)$

$V_{CBO}$ = 80 V



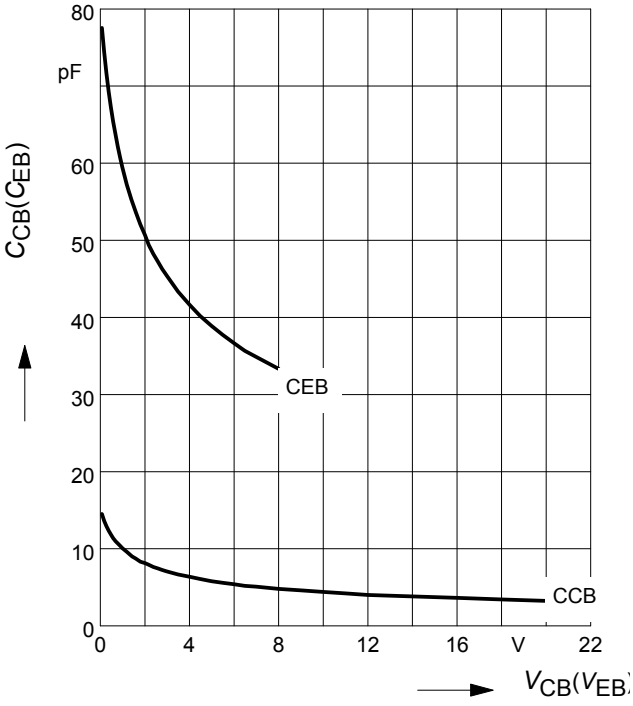

**Transition frequency** $f_T = f(I_C)$

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

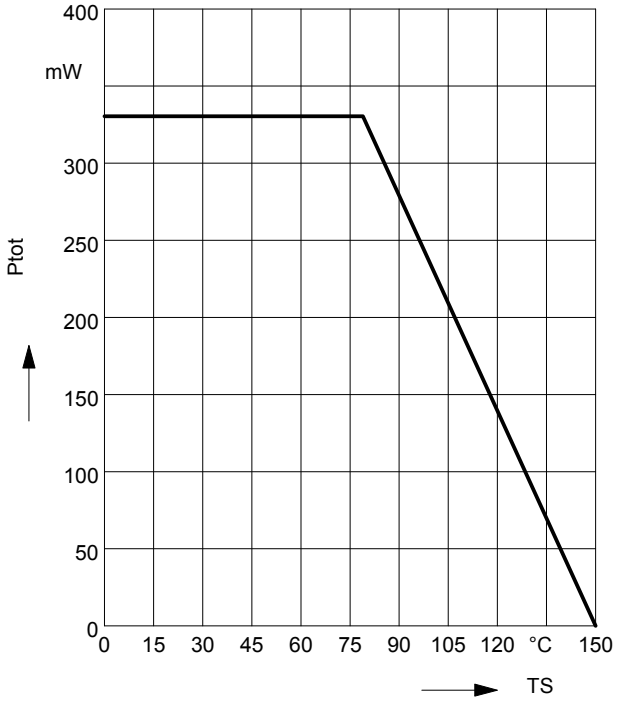



**Collector-base capacitance** $C_{cb} = f(V_{CB})$

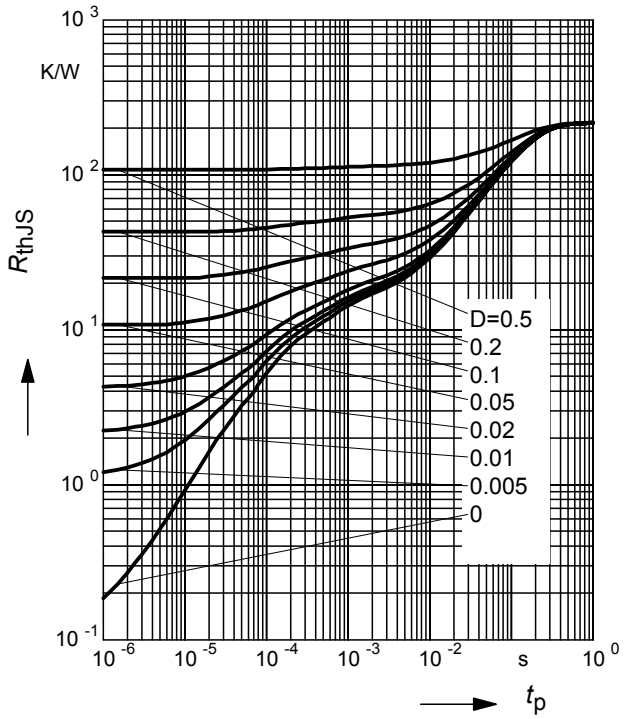
**Emitter-base capacitance** $C_{eb} = f(V_{EB})$




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

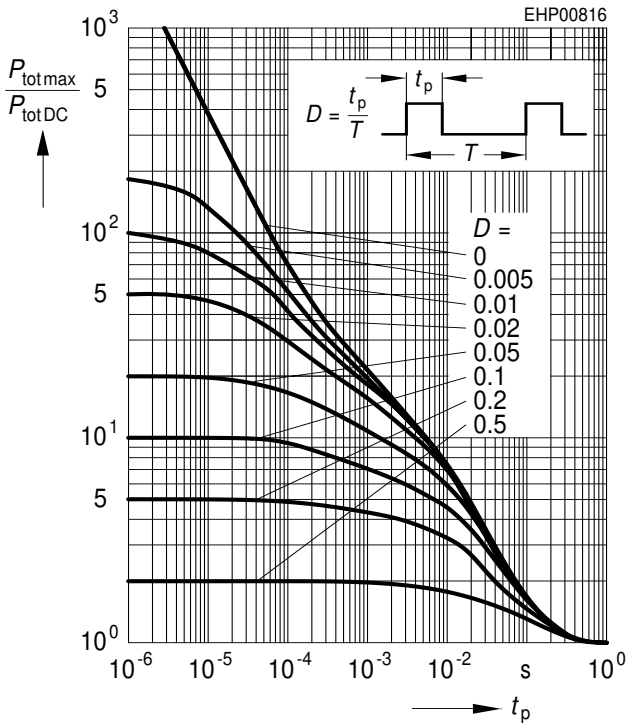


**Permissible Pulse Load $R_{thJS} = f(t_p)$**

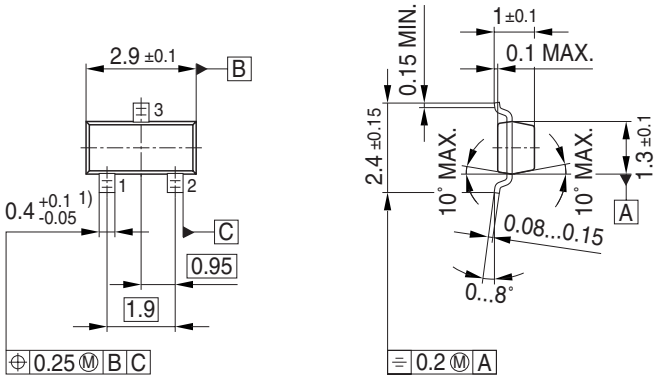



**Permissible Pulse Load**

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

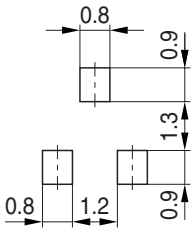


## Package Outline

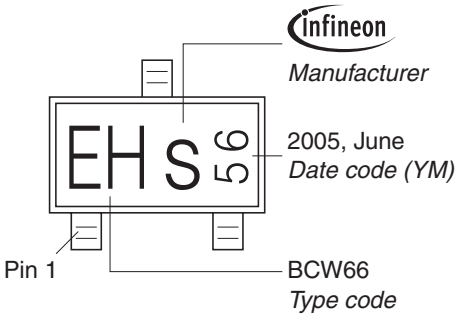



1) Lead width can be 0.6 max. in dambar area

## Foot Print

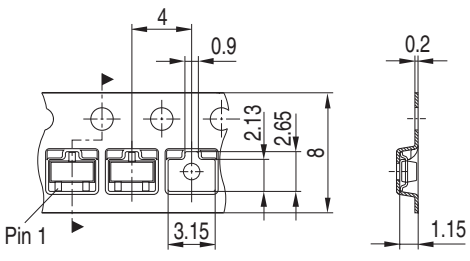



## Marking Layout (Example)




## Standard Packing

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



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