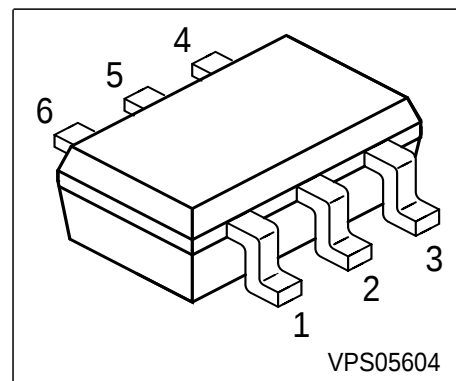
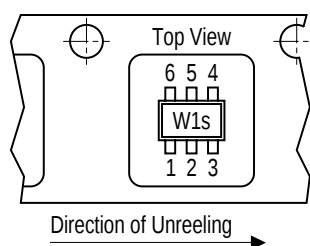


## NPN/PNP Silicon AF Transistor Array

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated NPN/PNP Transistors in one package



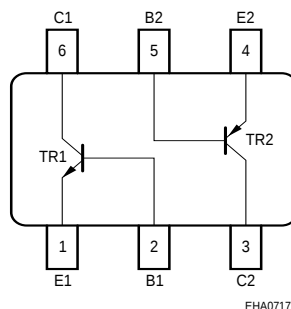
### Tape loading orientation



Marking on SOT-363 package (for example W1s) corresponds to pin 1 of device

Position in tape: pin 1 opposite of feed hole side

EHA07193



EHA07177

| Type    | Marking | Pin Configuration |      |      |      |      |      | Package |
|---------|---------|-------------------|------|------|------|------|------|---------|
| BC847PN | 1Ps     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363  |

### Maximum Ratings

| Parameter                                          | Symbol    | Value       | Unit             |
|----------------------------------------------------|-----------|-------------|------------------|
| Collector-emitter voltage                          | $V_{CEO}$ | 45          | V                |
| Collector-base voltage                             | $V_{CBO}$ | 50          |                  |
| Collector-emitter voltage                          | $V_{CES}$ | 50          | V                |
| Emitter-base voltage                               | $V_{EBO}$ | 5           | V                |
| DC collector current                               | $I_C$     | 100         | mA               |
| Peak collector current                             | $I_{CM}$  | 200         |                  |
| Total power dissipation, $T_S = 115^\circ\text{C}$ | $P_{tot}$ | 250         | mW               |
| Junction temperature                               | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage temperature                                | $T_{stg}$ | -65 ... 150 |                  |

### Thermal Resistance

|                                          |            |            |     |
|------------------------------------------|------------|------------|-----|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | $\leq 140$ | 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

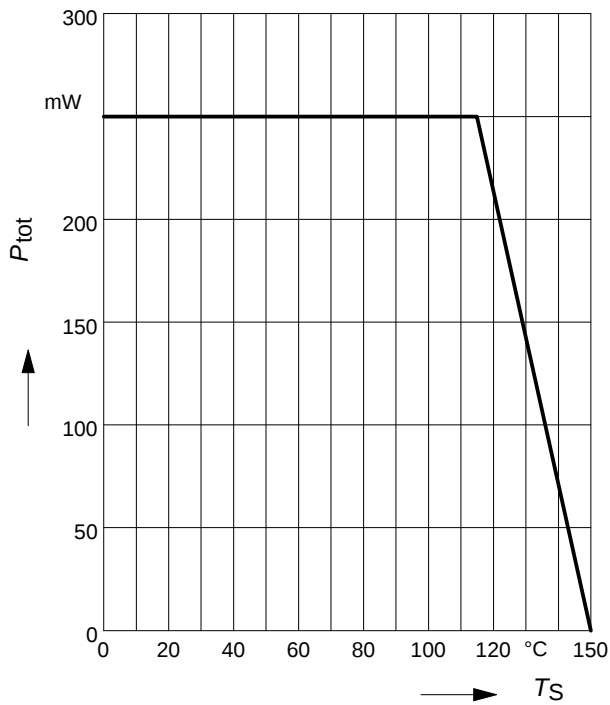
| Parameter                                                                                                                             | Symbol        | Values   |            |            | Unit          |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|------------|------------|---------------|
|                                                                                                                                       |               | min.     | typ.       | max.       |               |
| DC Characteristics per Transistor                                                                                                     |               |          |            |            |               |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ mA}$ , $I_B = 0$                                                               | $V_{(BR)CEO}$ | 45       | -          | -          | V             |
| Collector-base breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$                                                         | $V_{(BR)CBO}$ | 50       | -          | -          |               |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}$ , $V_{BE} = 0$                                                   | $V_{(BR)CES}$ | 50       | -          | -          |               |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$                                                           | $V_{(BR)EBO}$ | 5        | -          | -          |               |
| Collector cutoff current<br>$V_{CB} = 30\text{ V}$ , $I_E = 0$                                                                        | $I_{CBO}$     | -        | -          | 15         | nA            |
| Collector cutoff current<br>$V_{CB} = 30\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^{\circ}\text{C}$                                  | $I_{CBO}$     | -        | -          | 5          | $\mu\text{A}$ |
| DC current gain 1)<br>$I_C = 10\text{ }\mu\text{A}$ , $V_{CE} = 5\text{ V}$<br>$I_C = 2\text{ mA}$ , $V_{CE} = 5\text{ V}$            | $h_{FE}$      | -<br>200 | 250<br>290 | -<br>630   | -             |
| Collector-emitter saturation voltage1)<br>$I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$<br>$I_C = 100\text{ mA}$ , $I_B = 5\text{ mA}$ | $V_{CEsat}$   | -<br>-   | 90<br>200  | 300<br>650 | mV            |
| Base-emitter saturation voltage 1)<br>$I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$<br>$I_C = 100\text{ mA}$ , $I_B = 5\text{ mA}$     | $V_{BEsat}$   | -<br>-   | 700<br>900 | -<br>-     | mV            |
| Base-emitter voltage 1)<br>$I_C = 2\text{ mA}$ , $V_{CE} = 5\text{ V}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$                | $V_{BE(ON)}$  | 580<br>- | 660<br>-   | 750<br>820 |               |

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

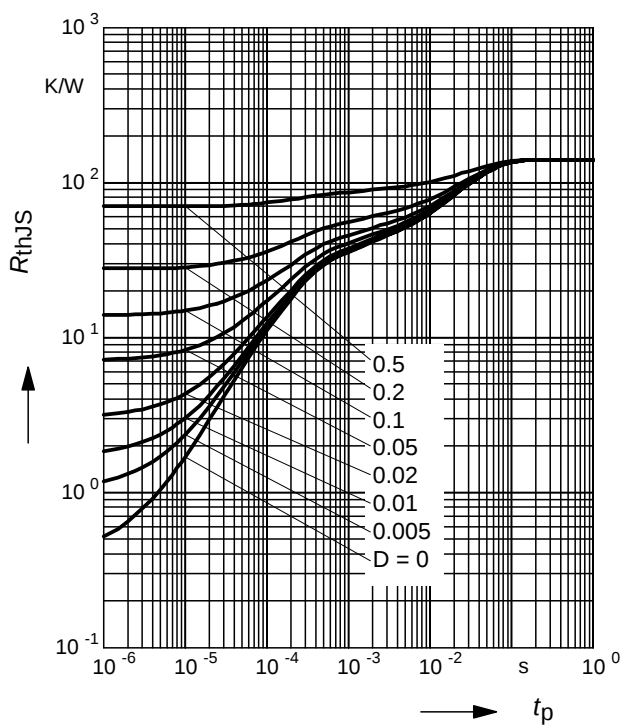
**Electrical Characteristics** at  $T_A=25^{\circ}\text{C}$ , unless otherwise specified

| Parameter                                                                                                         | Symbol    | Values |      |      | Unit             |
|-------------------------------------------------------------------------------------------------------------------|-----------|--------|------|------|------------------|
|                                                                                                                   |           | min.   | typ. | max. |                  |
| AC Characteristics per Transistor                                                                                 |           |        |      |      |                  |
| Transition frequency<br>$I_C = 20 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ , $f = 100 \text{ MHz}$                    | $f_T$     | -      | 250  | -    | MHz              |
| Collector-base capacitance<br>$V_{CB} = 10 \text{ V}$ , $f = 1 \text{ MHz}$                                       | $C_{cb}$  | -      | 2    | -    | pF               |
| Emitter-base capacitance<br>$V_{EB} = 0.5 \text{ V}$ , $f = 1 \text{ MHz}$                                        | $C_{eb}$  | -      | 10   | -    |                  |
| Short-circuit input impedance<br>$I_C = 2 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ , $f = 1 \text{ kHz}$              | $h_{11e}$ | -      | 4.5  | -    | kΩ               |
| Open-circuit reverse voltage transf.ratio<br>$I_C = 2 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ , $f = 1 \text{ kHz}$  | $h_{12e}$ | -      | 2    | -    | 10 <sup>-4</sup> |
| Short-circuit forward current transf.ratio<br>$I_C = 2 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ , $f = 1 \text{ kHz}$ | $h_{21e}$ | -      | 330  | -    | -                |
| Open-circuit output admittance<br>$I_C = 2 \text{ mA}$ , $V_{CE} = 5 \text{ V}$ , $f = 1 \text{ kHz}$             | $h_{22e}$ | -      | 30   | -    | μS               |

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

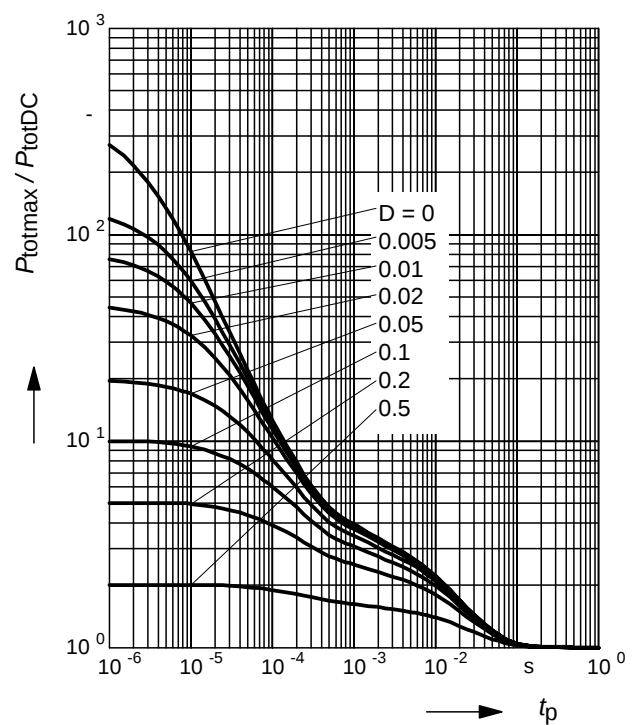


**Permissible Pulse Load  $R_{\text{thJS}} = f(t_p)$**



**Permissible Pulse Load**

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

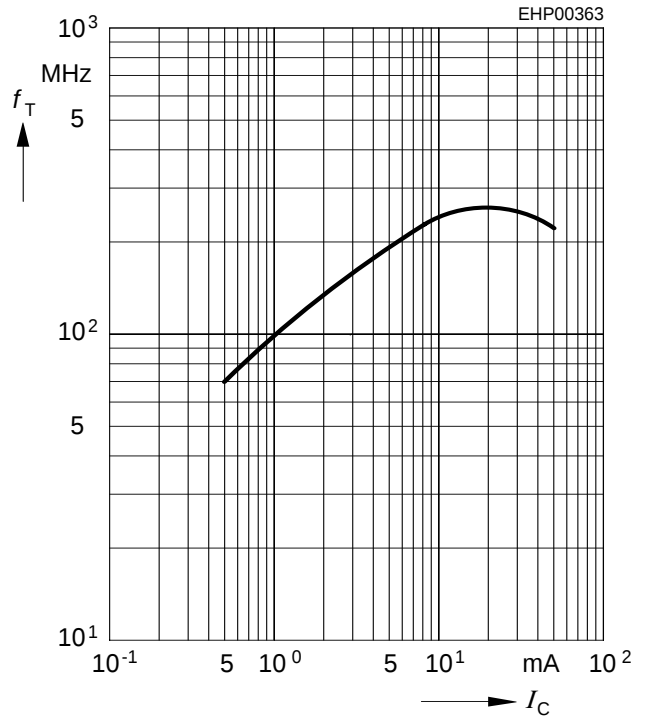
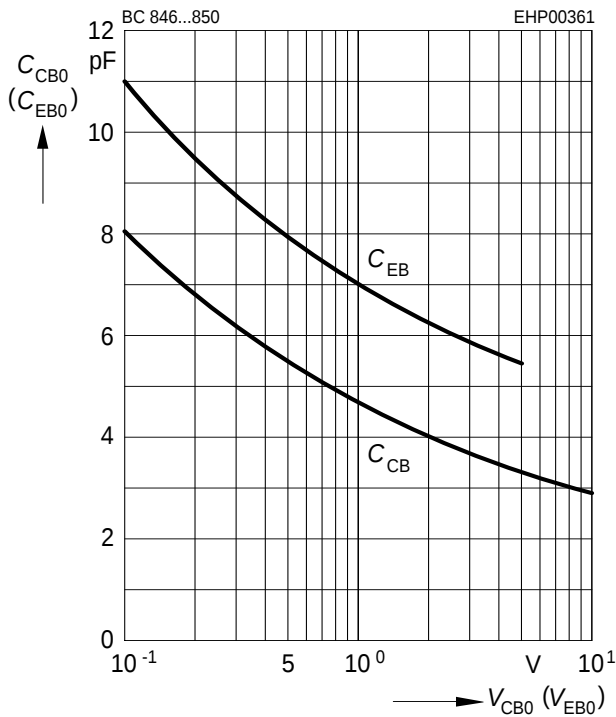


Collector-base capacitance  $C_{CB} = f(V_{CBO})$

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

Transition frequency  $f_T = f(I_C)$

$V_{CE} = 5V$

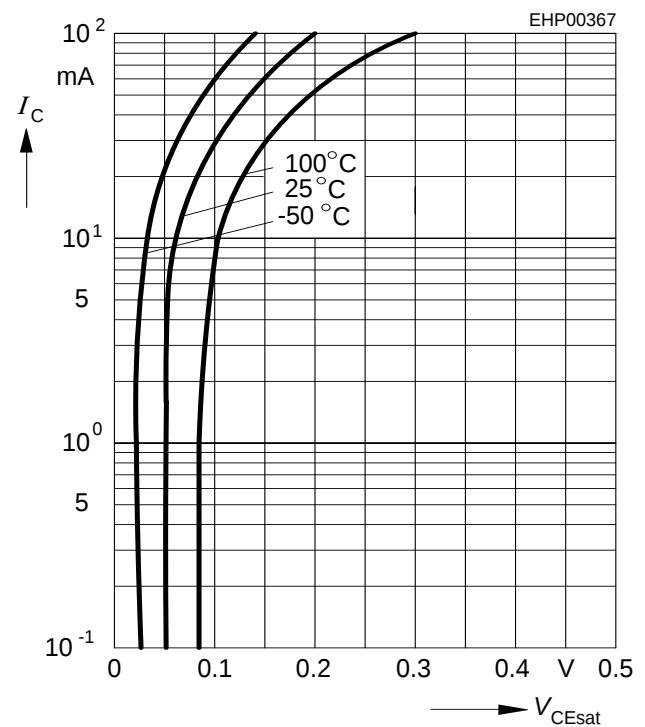
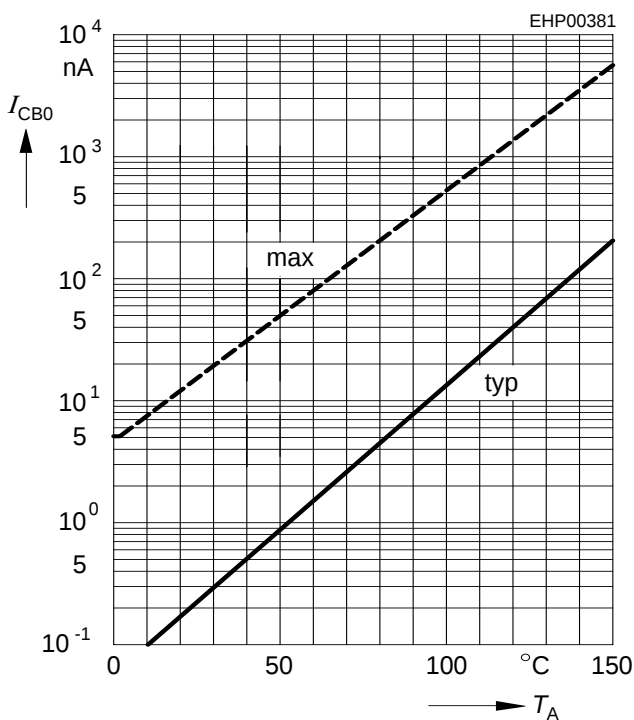


Collector cutoff current  $I_{CBO} = f(T_A)$

$V_{CB} = 30V$

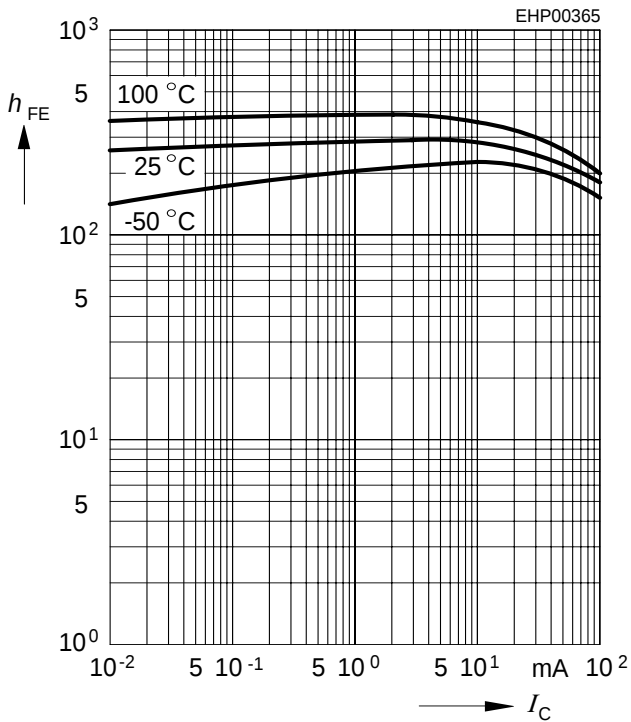
Collector-emitter saturation voltage

$I_C = f(V_{CEsat}), h_{FE} = 20$



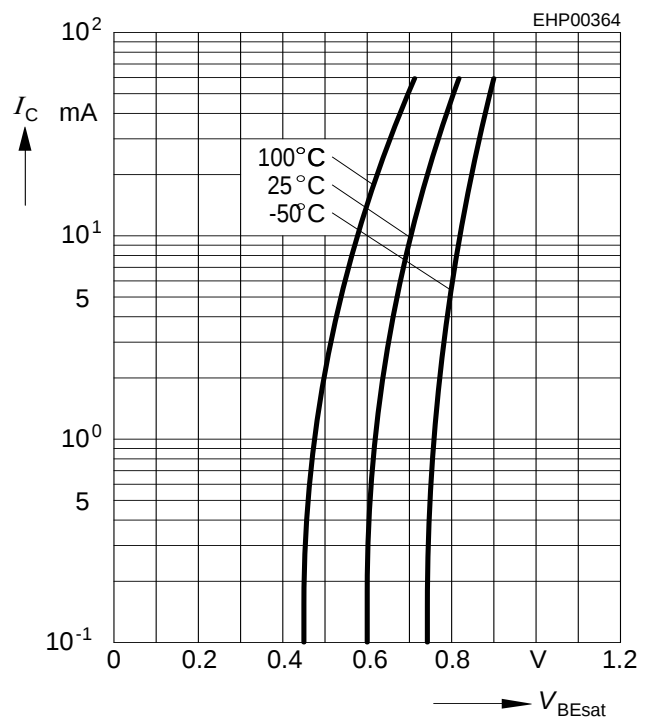
### DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 5V$



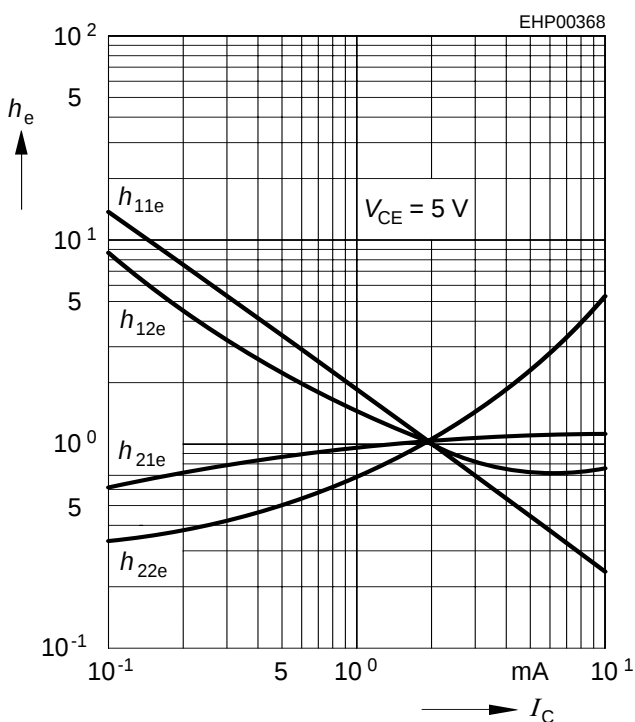
### Base-emitter saturation voltage

$I_C = f(V_{BEsat}), h_{FE} = 20$



### h parameter $h_e = f(I_C)$ normalized

$V_{CE} = 5V$



### h parameter $h_e = f(V_{CE})$ normalized

$I_C = 2mA$

