

**PNP Silicon AF Transistor Arrays**

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated transistor with good matching in one package
- BC856S / U, BC857S: For orientation in reel see package information below
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101


**BC856S/U  
BC857S**


| Type   | Marking | Pin Configuration |      |      |      |      |      | Package |
|--------|---------|-------------------|------|------|------|------|------|---------|
|        |         | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 |         |
| BC856S | 3Ds     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363  |
| BC856U | 3Ds     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SC74    |
| BC857S | 3Cs     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363  |

**Maximum Ratings**

| Parameter  | Symbol    | Value       | Unit |
|--|-----------|-------------|------|
| Collector-emitter voltage<br>BC856S/U<br>BC857S  | $V_{CEO}$ | 65<br>45    | -    |
| Collector-base voltage<br>BC856S, BC856U<br>BC857S   | $V_{CBO}$ | 80<br>50    | V    |
| Emitter-base voltage   | $V_{EBO}$ | 5           |      |
| Collector current  | $I_C$     | 100         | mA   |
| Peak collector current, $t_p \leq 10$ ms   | $I_{CM}$  | 200         |      |
| Total power dissipation-<br>$T_S \leq 115$ °C, BC856S<br>$T_S \leq 118$ °C, BC856U, BC857U | $P_{tot}$ | 250<br>250  | -    |
| Junction temperature   | $T_j$     | 150         | °C   |
| Storage temperature  | $T_{stg}$ | -65 ... 150 |      |

**Thermal Resistance**

| Parameter  | Symbol     | Value                    | Unit |
|--|------------|--------------------------|------|
| Junction - soldering point <sup>1)</sup><br>BC856S, BC857S<br>BC856U | $R_{thJS}$ | $\leq 140$<br>$\leq 130$ | 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.       |               |
| <b>DC Characteristics</b>   |               |          |            |            |               |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BC856S/U<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BC857S                   | $V_{(BR)CEO}$ | 65<br>45 | -<br>-     | -<br>-     | -             |
| Collector-base breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BC856S/U<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BC857S    | $V_{(BR)CBO}$ | 80<br>50 | -<br>-     | -<br>-     | -             |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$   | $V_{(BR)EBO}$ | 5        | -          | -          | V             |
| 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>-     | 0.015<br>5 | $\mu\text{A}$ |
| DC current gain <sup>1)</sup><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 voltage <sup>1)</sup><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>-   | 75<br>250  | 300<br>650 | mV            |
| Base emitter saturation voltage <sup>1)</sup><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>850 | -<br>-     | -             |
| Base-emitter voltage <sup>1)</sup><br>$I_C = 2\text{ mA}$ , $V_{CE} = 5\text{ V}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$                 | $V_{BE(ON)}$  | 600<br>- | 650<br>-   | 750<br>820 | mV            |

<sup>1)</sup>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. |               |
| <b>AC Characteristics</b>   |           |        |      |      |               |
| 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>$V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$  | $C_{cb}$  | -      | 1.5  | -    | pF            |
| Emitter-base capacitance<br>$V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}$   | $C_{eb}$  | -      | 8    | -    |               |
| Short-circuit input impedance<br>$I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 1 \text{ kHz}$  | $h_{11e}$ | -      | 4.5  | -    | k $\Omega$    |
| Open-circuit reverse voltage transf. ratio<br>$I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 1 \text{ kHz}$                               | $h_{12e}$ | -      | 2    | -    | $10^{-4}$     |
| 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   | -    | $\mu\text{S}$ |
| Noise figure<br>$I_C = 200 \mu\text{A}, V_{CE} = 5 \text{ V}, f = 1 \text{ kHz},$<br>$\Delta f = 200 \text{ Hz}, R_S = 2 \text{ k}\Omega$ | $F$       | -      | -    | 10   | dB            |

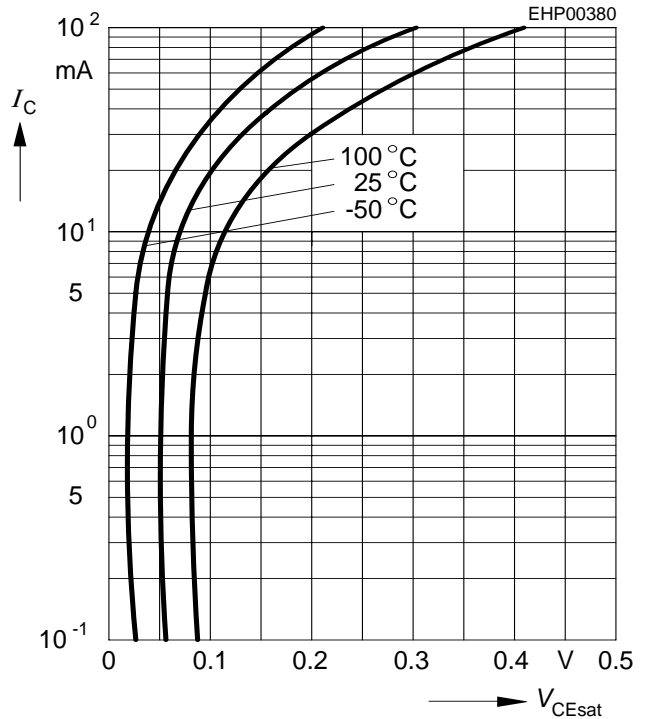
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 5\text{ V}$



**Collector-emitter saturation voltage**

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



**Base-emitter saturation voltage**

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



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

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



Transition frequency  $f_T = f(I_C)$

$V_{CE} = 5\text{ V}$



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

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



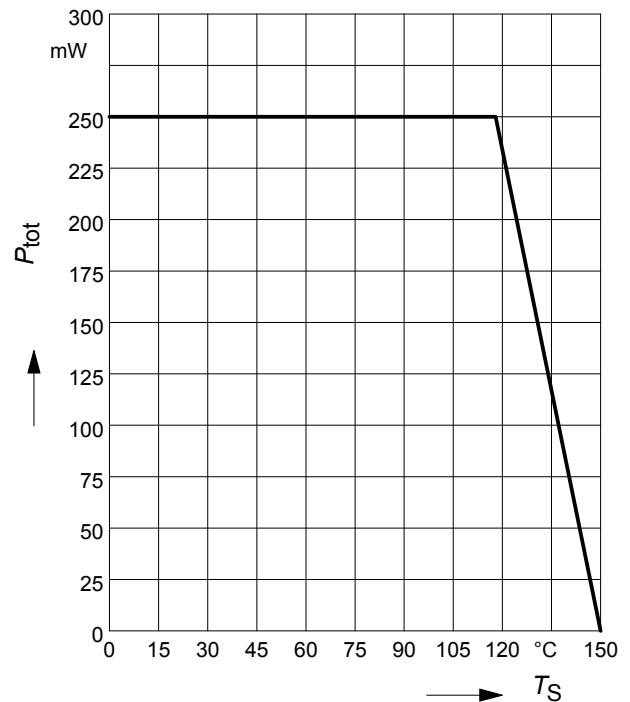
Total power dissipation  $P_{tot} = f(T_S)$

BC856S, BC857S



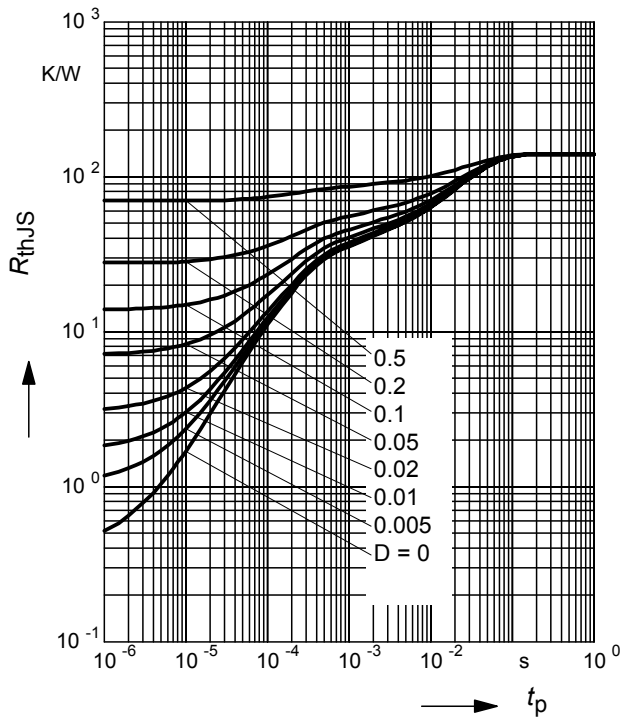
Total power dissipation  $P_{tot} = f(T_S)$

BC856U



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

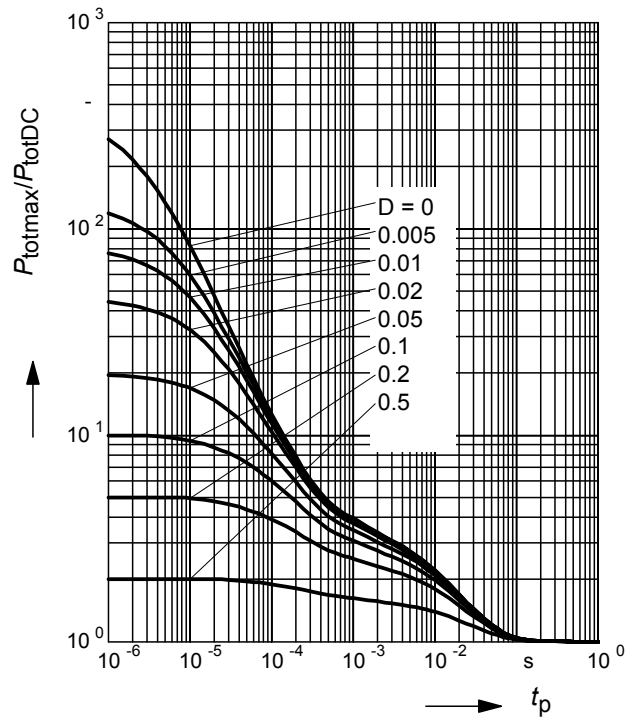
BC856S; BC857S



**Permissible Pulse Load**

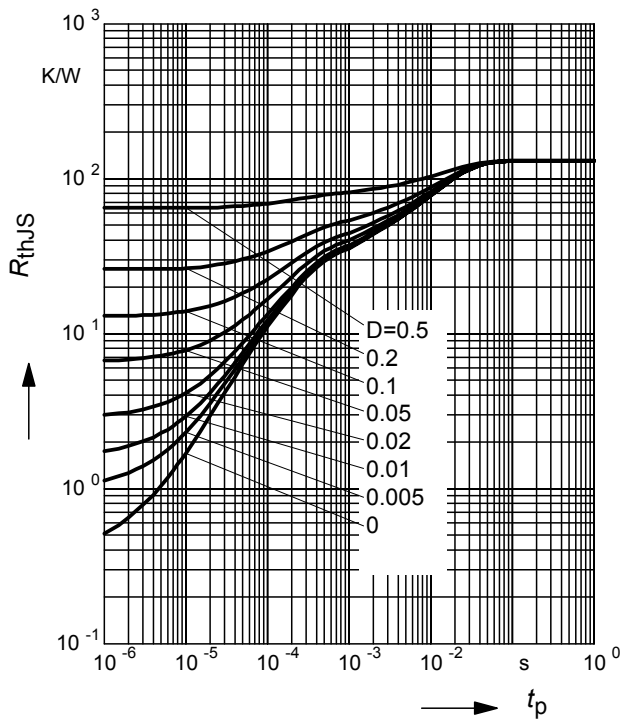
$P_{totmax}/P_{totDC} = f(t_p)$

BC856S, BC857S



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

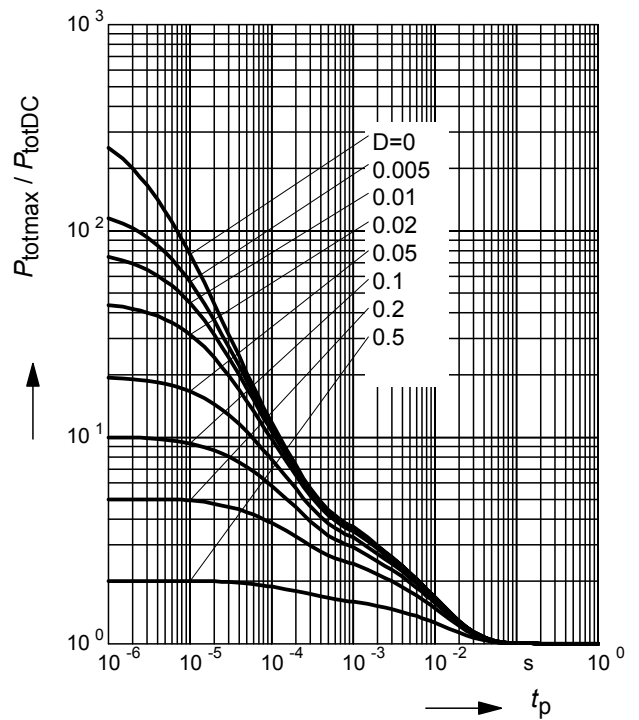
BC856U



**Permissible Pulse Load**

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

BC856U



Package Outline



Foot Print



Marking Layout (Example)

Small variations in positioning of Date code, Type code and Manufacture are possible.



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.





Package Outline



Foot Print



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**Edition 2009-11-16**

**Published by  
Infineon Technologies AG  
81726 Munich, Germany**

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