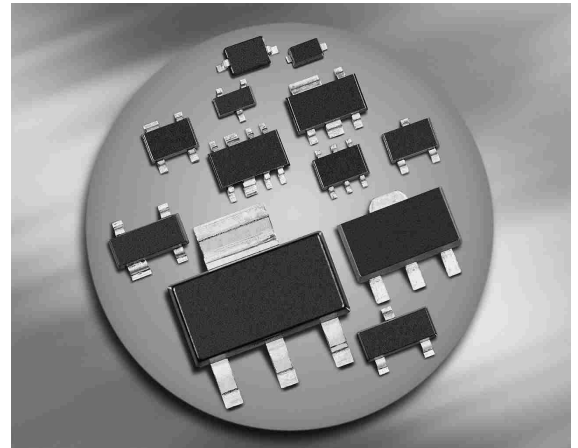
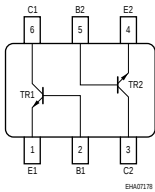


### NPN Silicon AF Transistor Arrays

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated transistors with good matching in one package
- BC846S / U, BC847S: For orientation in reel see package information below
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



**BC846S**  
**BC846U**  
**BC847S**



| Type   | Marking | Pin Configuration |      |      |      |      |      | Package |
|--------|---------|-------------------|------|------|------|------|------|---------|
| BC846S | 1Ds     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363  |
| BC846U | 1Ds     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SC74    |
| BC847S | 1Cs     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363  |

**Maximum Ratings**

| Parameter                                                                                  | Symbol    | Value       | Unit |
|--------------------------------------------------------------------------------------------|-----------|-------------|------|
| Collector-emitter voltage<br>BC846S/U<br>BC847S                                            | $V_{CEO}$ | 65<br>45    | V    |
| Collector-base voltage<br>BC846S/U<br>BC847S                                               | $V_{CBO}$ | 80<br>50    |      |
| Emitter-base voltage                                                                       | $V_{EBO}$ | 6           |      |
| 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, BC846S, BC847S<br>$T_S \leq 118$ °C, BC846U | $P_{tot}$ | 250<br>250  | mW   |
| Junction temperature                                                                       | $T_j$     | 150         |      |
| Storage temperature                                                                        | $T_{stg}$ | -65 ... 150 |      |

**Thermal Resistance**

| Parameter                                                            | Symbol     | Value                    | Unit |
|----------------------------------------------------------------------|------------|--------------------------|------|
| Junction - soldering point <sup>1)</sup><br>BC846S, BC847S<br>BC847U | $R_{thJS}$ | $\leq 140$<br>$\leq 130$ | K/W  |

<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

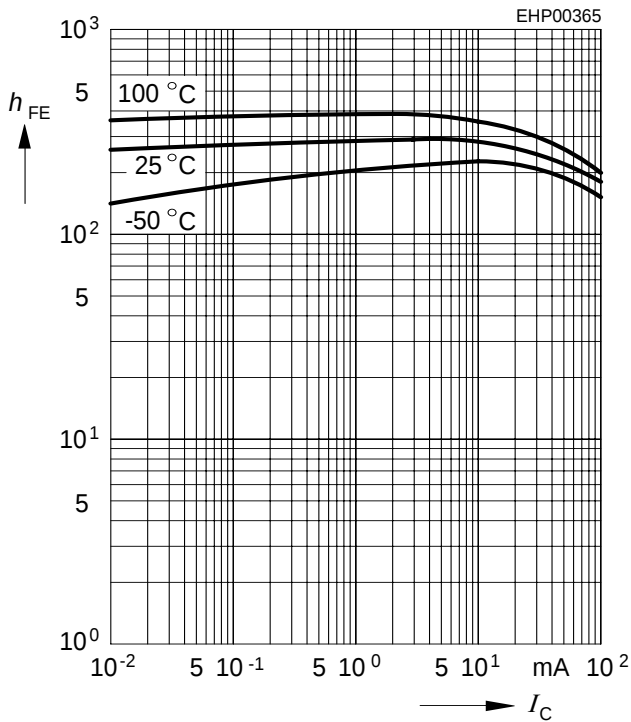
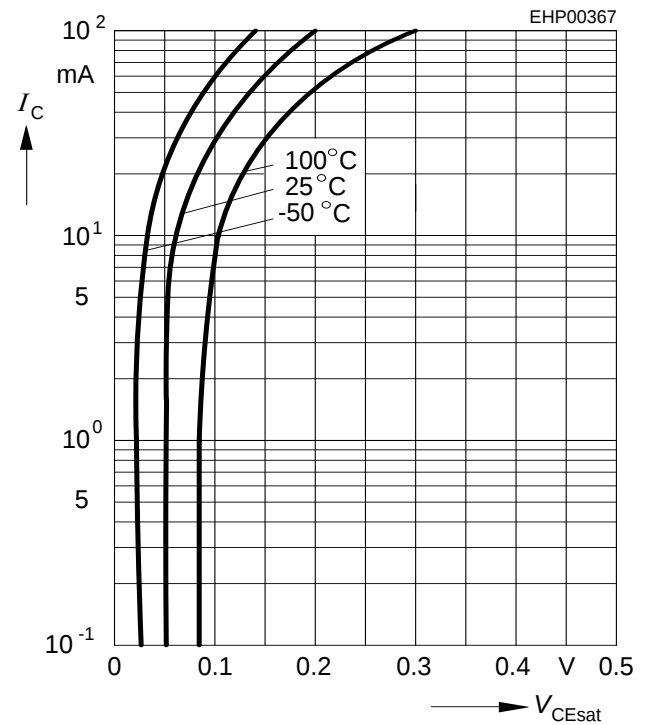
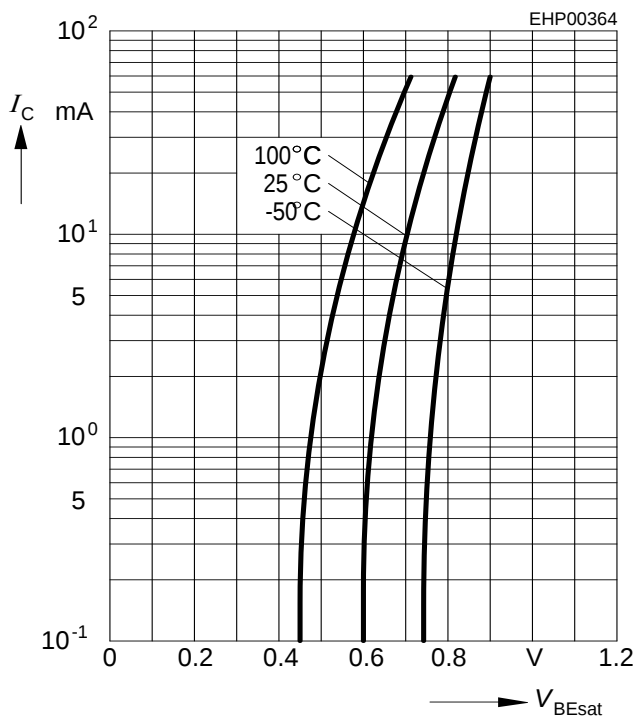
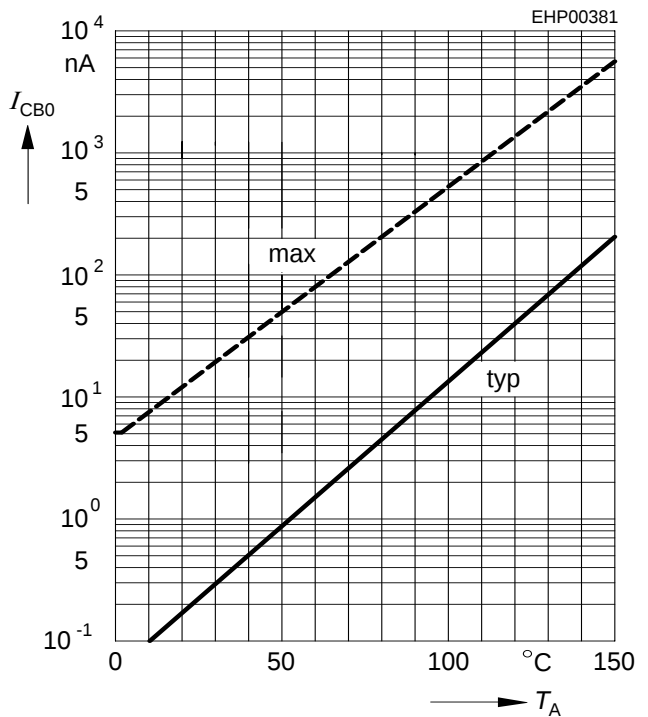
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                                                                         | Symbol        | Values   |            |            | Unit          |
|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|------------|------------|---------------|
|                                                                                                                                                   |               | min.     | typ.       | max.       |               |
| DC Characteristics                                                                                                                                |               |          |            |            |               |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BC846S/U<br>$I_C = 10\text{ mA}$ , $I_B = 0$ , BC847S                   | $V_{(BR)CEO}$ | -<br>-   | 65<br>45   | -<br>-     | V             |
| Collector-base breakdown voltage<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BC846S/U<br>$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ , BC847S    | $V_{(BR)CBO}$ | -<br>-   | 80<br>50   | -<br>-     |               |
| Emitter-base breakdown voltage<br>$I_E = 1\text{ }\mu\text{A}$ , $I_C = 0$                                                                        | $V_{(BR)EBO}$ | -        | 6          | -          |               |
| Collector-base cutoff current<br>$V_{CB} = 45\text{ V}$ , $I_E = 0$<br>$V_{CB} = 30\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^\circ\text{C}$     | $I_{CBO}$     | -<br>-   | -<br>-     | 0.015<br>5 | $\mu\text{A}$ |
| DC current gain-<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>450   | -             |
| 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>-   | 90<br>200  | 250<br>600 | 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>900 | -<br>-     |               |
| Base-emitter voltage <sup>1)</sup><br>$I_C = 2\text{ mA}$ , $V_{CE} = 5\text{ V}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$                 | $V_{BE(ON)}$  | 580<br>- | 660<br>-   | 700<br>770 |               |

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

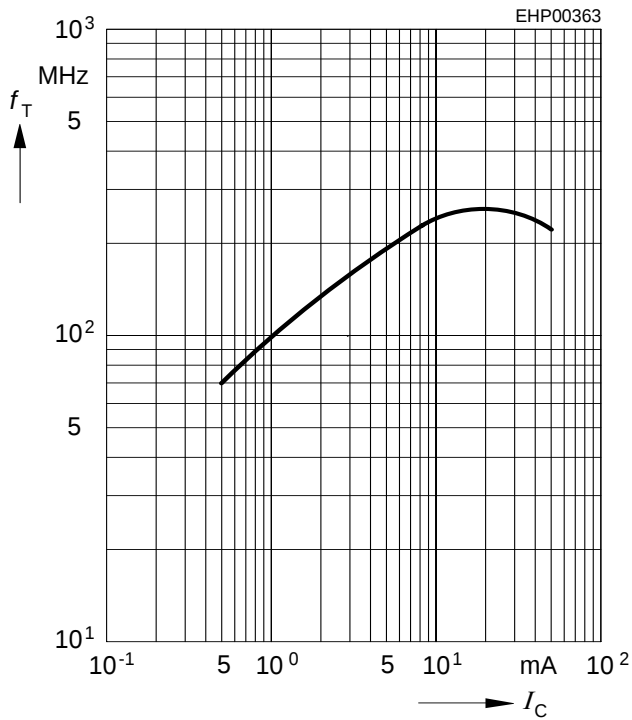
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                                                                | Symbol    | Values |      |      | Unit             |
|------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------|------|------|------------------|
|                                                                                                                                          |           | min.   | typ. | max. |                  |
| AC Characteristics                                                                                                                       |           |        |      |      |                  |
| 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>$V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$                                                                | $C_{cb}$  | -      | 0.95 | -    | pF               |
| Emitter-base capacitance<br>$V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$                                                                 | $C_{eb}$  | -      | 9    | -    |                  |
| 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               |
| Noise figure<br>$I_C = 200\text{ μA}$ , $V_{CE} = 5\text{ V}$ , $f = 1\text{ kHz}$ ,<br>$\Delta f = 200\text{ Hz}$ , $R_S = 2\text{ kΩ}$ | $F$       | -      | -    | 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  $I_{CBO} = f(T_A)$** 
 $V_{CBO} = 30 \text{ V}$ 


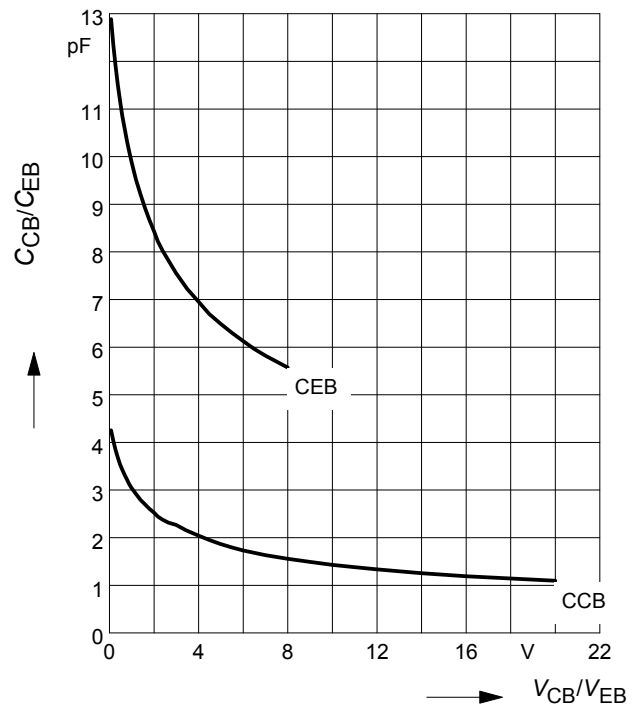
**Transition frequency  $f_T = f(I_C)$**

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



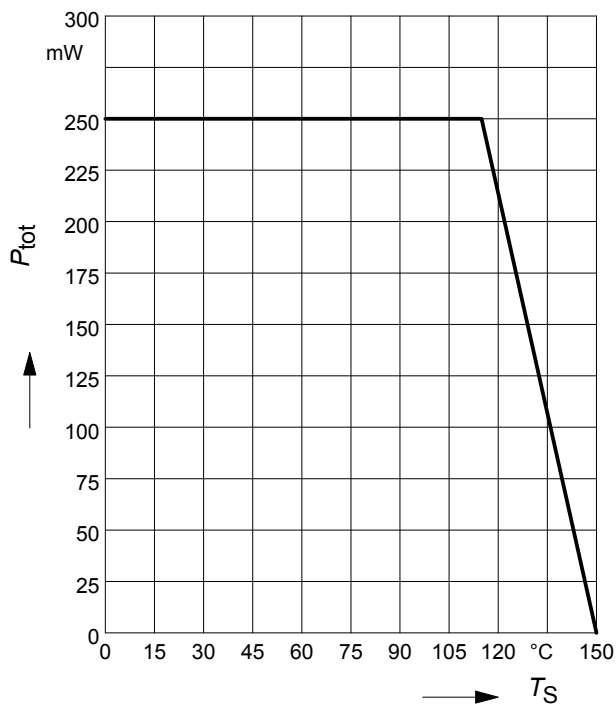
**Collector-base capacitance  $C_{cb} = f(V_{CB})$**

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



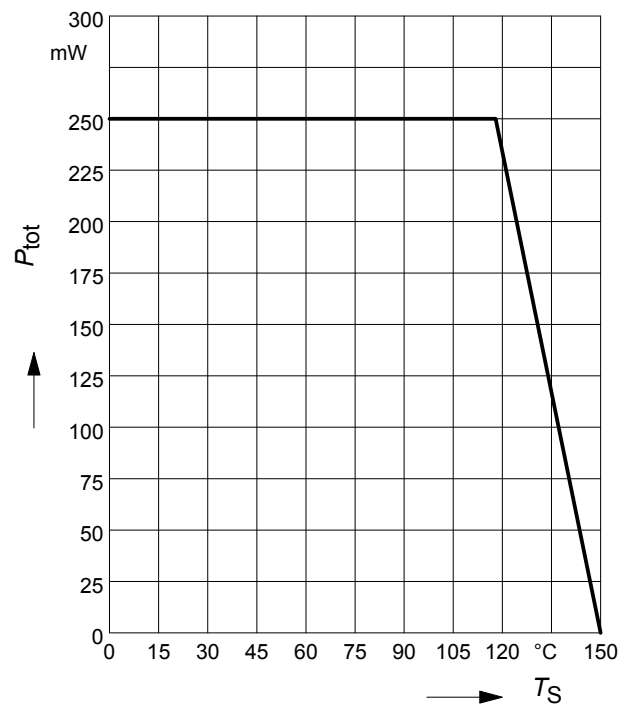
**Total power dissipation  $P_{tot} = f(T_S)$**

BC846S, BC847S



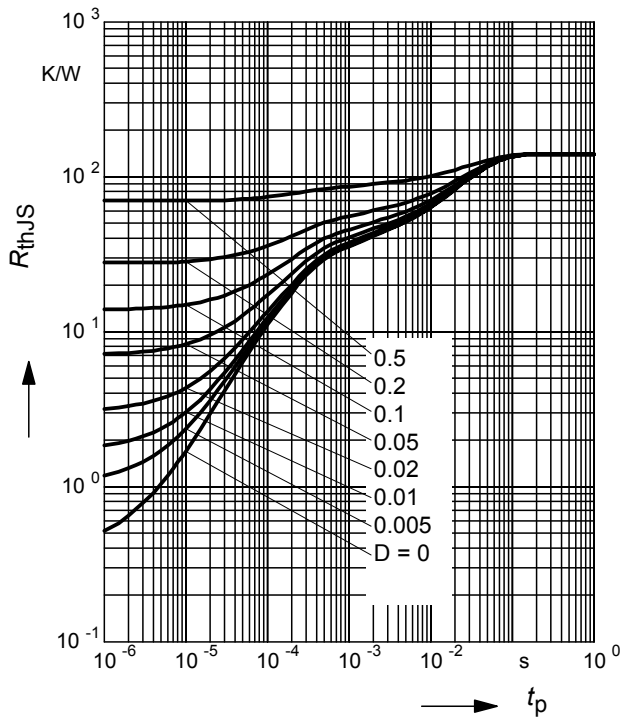
**Total power dissipation  $P_{tot} = f(T_S)$**

BC846U



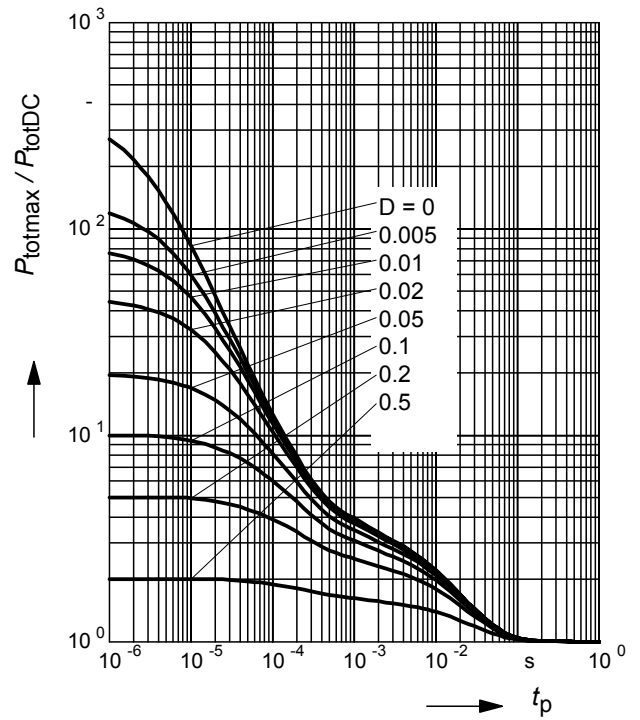
**Permissible Pulse Load  $R_{thJS} = f(t_p)$** 

BC846S, BC847S

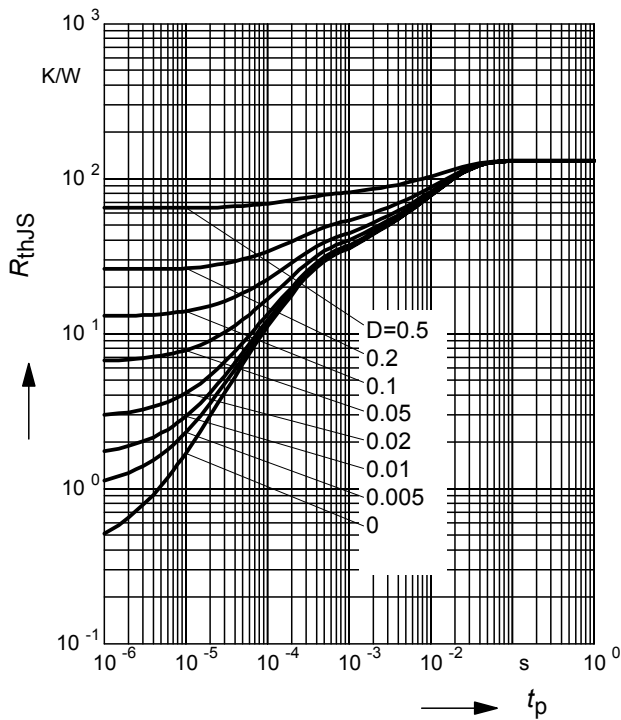

**Permissible Pulse Load**

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

BC846S, BC847S

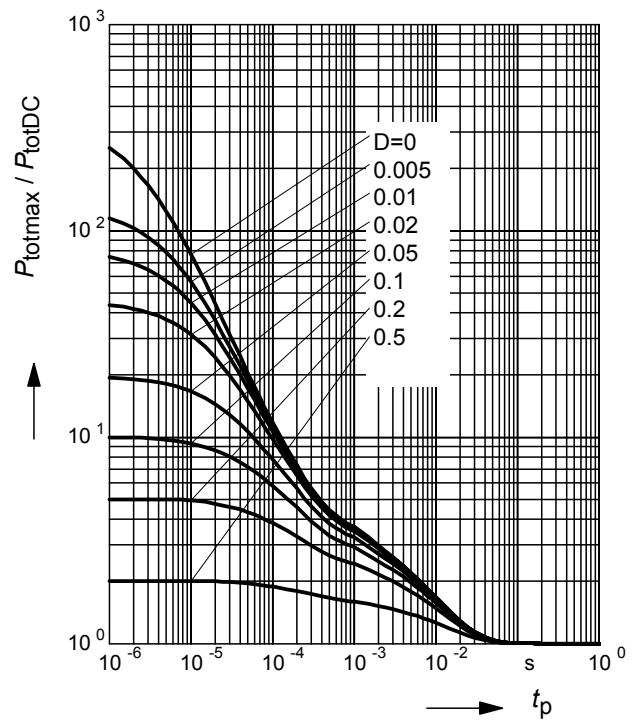

**Permissible Puls Load  $R_{thJS} = f(t_p)$** 

BC846U

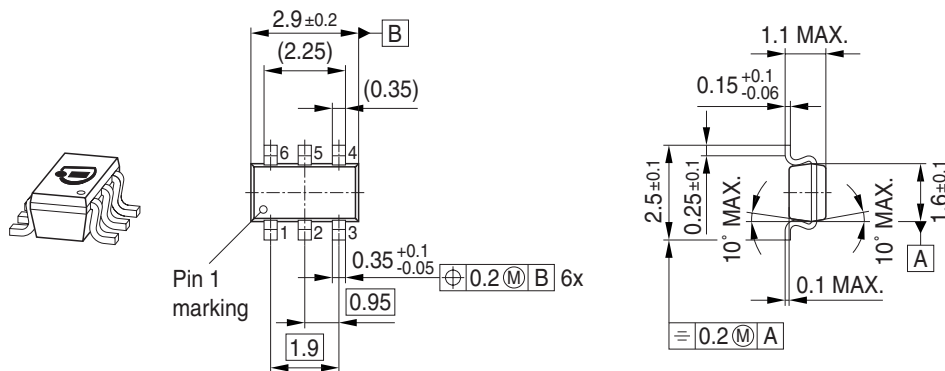

**Permissible Pulse Load**

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

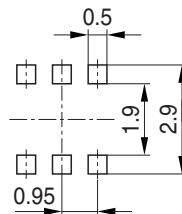
BC846U



## Package Outline

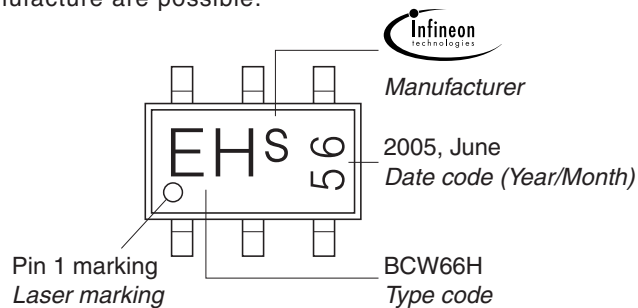


## Foot Print



## Marking Layout (Example)

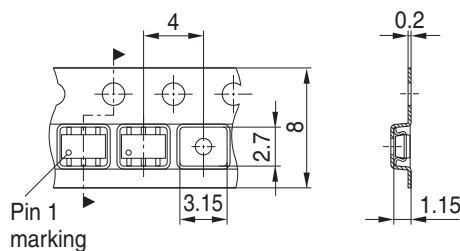
Small variations in positioning of  
Date code, Type code and Manufacture are possible.



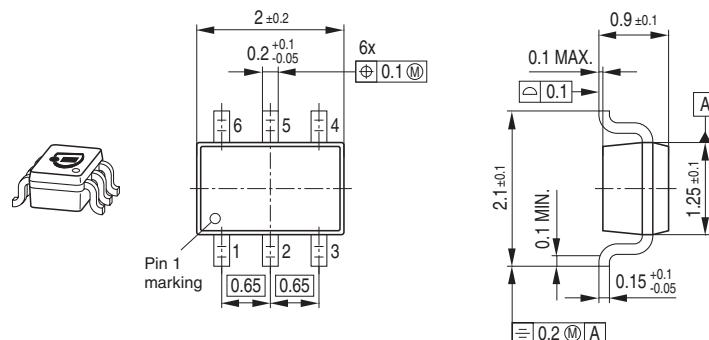
## Standard Packing

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

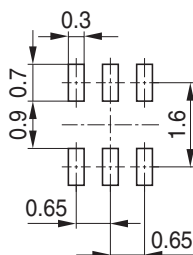
For symmetric types no defined Pin 1 orientation in reel.



## Package Outline

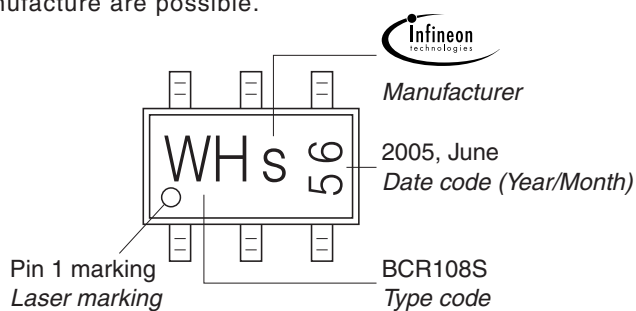


## Foot Print



## Marking Layout (Example)

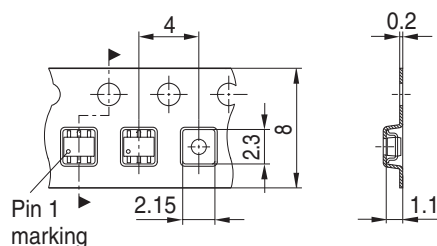
Small variations in positioning of Date code, Type code and Manufacture are possible.



## 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.



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