

NPN/PNP Silicon AF Transistor Arrays

- For AF input stage and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated NPN/PNP transistor in one package
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



BC846PN
BC846UPN
BC847PN



| Type | Marking | Pin Configuration | | | | | | Package |
|----------|---------|-------------------|------|------|------|------|------|---------|
| BC846PN | 1Os | 1=E1 | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363 |
| BC846UPN | 1Os | 1=E1 | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SC74 |
| BC847PN | 1Ps | 1=E1 | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SOT363 |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|------------------------------------------------------------------------------------------------------------------------|-----------|-------------|------|
| Collector-emitter voltage BC846PN/UPN BC847PN | V_{CEO} | 65 45 | V |
| Collector-emitter voltage BC846PN/UPN BC847PN | V_{CES} | 80 50 | |
| Collector-base voltage BC846PN/UPN BC847PN | V_{CBO} | 80 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- $T_S \leq 115^\circ\text{C}$, BC846PN, BC847PN $T_S \leq 118^\circ\text{C}$, BC846UPN | P_{tot} | 250 250 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -65 ... 150 | |

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--------------------------------------------------------------------------|------------|--------------------------|------|
| Junction - soldering point ¹⁾ BC846PN, BC847PN BC846UPN | R_{thJS} | ≤ 140 ≤ 130 | K/W |

¹For 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 $I_C = 10\text{ mA}$, $I_B = 0$, BC846PN/UPN $I_C = 10\text{ mA}$, $I_B = 0$, BC847PN | $V_{(BR)CEO}$ | 65 45 | - - | - - | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC846PN/UPN $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC847PN | $V_{(BR)CBO}$ | 80 50 | - - | - - | |
| Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $V_{BE} = 0$, BC846PN/UPN $I_C = 10\text{ }\mu\text{A}$, $V_{BE} = 0$, BC847PN | $V_{(BR)CES}$ | 80 50 | - - | - - | |
| Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$, $I_C = 0$ | $V_{(BR)EBO}$ | 6 | - | - | |
| Collector-base cutoff current $V_{CB} = 50\text{ V}$, $I_E = 0$ $V_{CB} = 30\text{ V}$, $I_E = 0$, $T_A = 150^\circ\text{C}$ | I_{CBO} | - - | - - | 0.015 5 | μA |
| DC current gain- $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ | h_{FE} | - 200 | 250 290 | - 450 | - |
| Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$ | V_{CEsat} | - - | 90 200 | 300 650 | mV |
| Base emitter saturation voltage ⁻¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$ | V_{BEsat} | - - | 700 900 | - - | |
| Base-emitter voltage ⁻¹⁾ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$ | $V_{BE(ON)}$ | 580 - | 660 - | 750 820 | |

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 | | | | | |
| Transition frequency $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 100\text{ MHz}$ | f_T | - | 250 | - | MHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$ | C_{cb} | - | 1.5 | - | pF |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$ | C_{eb} | - | 8 | - | |
| Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{11e} | - | 4.5 | - | k Ω |
| Open-circuit reverse voltage transf. ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{12e} | - | 2 | - | 10^{-4} |
| Short-circuit forward current transf. ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{21e} | - | 330 | - | - |
| Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{22e} | - | 30 | - | μS |

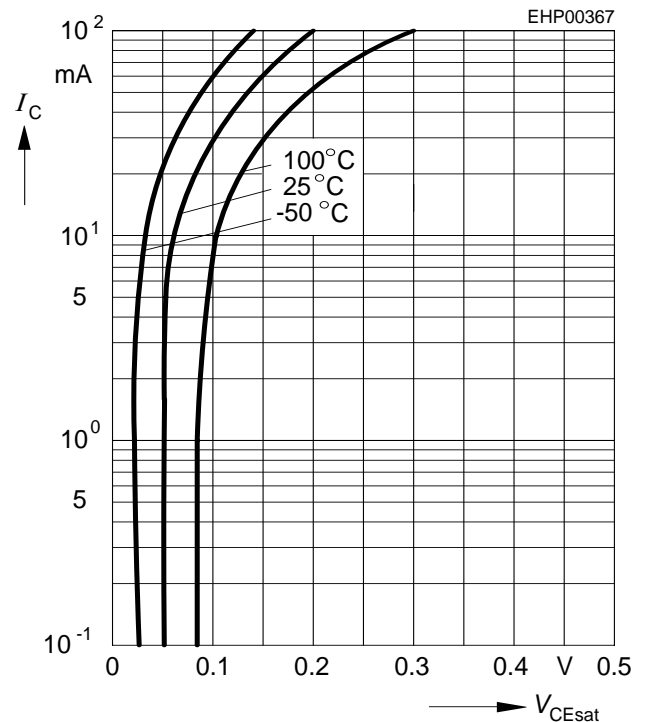
DC current gain $h_{FE} = f(I_C)$

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



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 $f_T = f(I_C)$

$V_{CE} = 5\text{ V}, f = 100\text{ MHz}$



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

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



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

BC846PN, BC847PN



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

BC846UPN



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

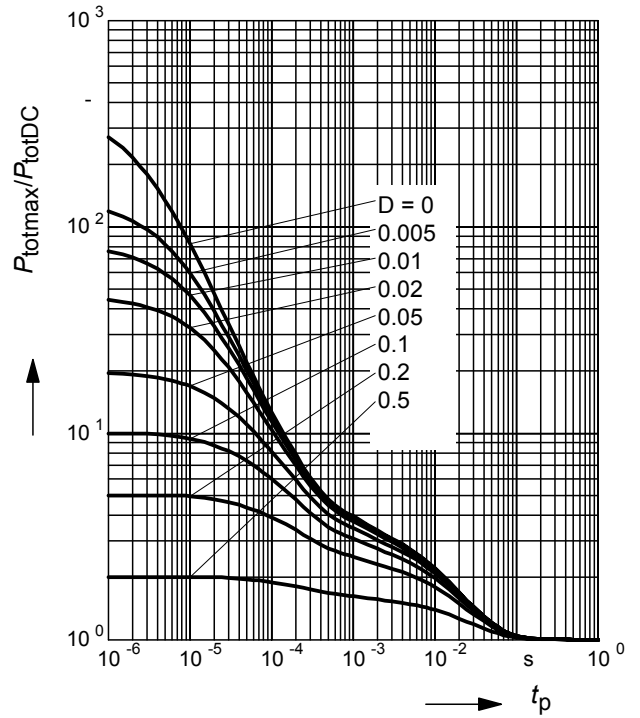
BC846PN, BC847PN



Permissible Pulse Load

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

BC846PN, BC847PN



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

BC846UPN



Permissible Pulse Load

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

BC846UPN



Package Outline



Foot Print



Marking Layout (Example)

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



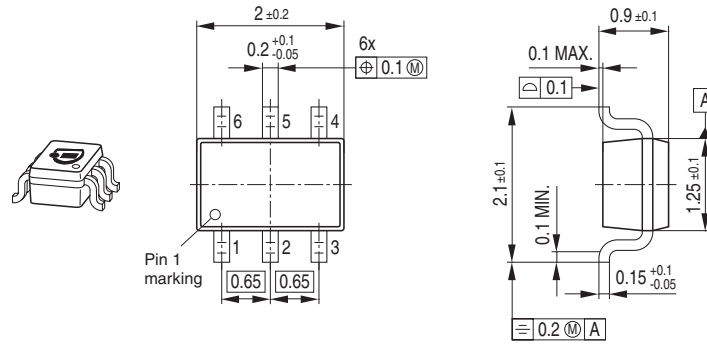
Standard Packing

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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