

NPN Silicon AF Transistor

- For general AF applications
- High collector current
- High current gain
- Low collector-emitter saturation voltage
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



| Type | Marking | Pin Configuration | | | | | | Package |
|------------|---------|-------------------|-------|-------|---|---|---|---------|
| | | 1 = B | 2 = E | 3 = C | - | - | - | |
| BC817K-16 | 6As | 1 = B | 2 = E | 3 = C | - | - | - | SOT23 |
| BC817K-16W | 6As | 1 = B | 2 = E | 3 = C | - | - | - | SOT323 |
| BC817K-25 | 6Bs | 1 = B | 2 = E | 3 = C | - | - | - | SOT23 |
| BC817K-25W | 6Bs | 1 = B | 2 = E | 3 = C | - | - | - | SOT323 |
| BC817K-40 | 6Cs | 1 = B | 2 = E | 3 = C | - | - | - | SOT23 |
| BC817K-40W | 6Cs | 1 = B | 2 = E | 3 = C | - | - | - | SOT323 |
| BC818K-16W | 6Es | 1 = B | 2 = E | 3 = C | - | - | - | SOT323 |
| BC818K-40 | 6Gs | 1 = B | 2 = E | 3 = C | - | - | - | SOT23 |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------|-------------|------|
| Collector-emitter voltage BC817... BC818... | V_{CEO} | 45 25 | V |
| Collector-base voltage BC817... BC818... | V_{CBO} | 50 30 | |
| Emitter-base voltage | V_{EBO} | 5 | |
| Collector current | I_C | 500 | mA |
| Peak collector current | I_{CM} | 1000 | |
| Base current | I_B | 100 | |
| Peak base current | I_{BM} | 200 | |
| Total power dissipation- $T_S \leq 115\text{ °C}$, BC817K, BC818K $T_S \leq 130\text{ °C}$, BC817KW, BC818KW | P_{tot} | 500 250 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -65 ... 150 | |

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--|------------|------------------------|------|
| Junction - soldering point ¹⁾ BC817K, BC818K BC817KW, BC818KW | R_{thJS} | ≤ 70 ≤ 80 | 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 $I_C = 10\text{ mA}$, $I_B = 0$, BC817... $I_C = 10\text{ mA}$, $I_B = 0$, BC818... | $V_{(BR)CEO}$ | 45 25 | - - | - - | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC817... $I_C = 10\text{ }\mu\text{A}$, $I_E = 0$, BC818... | $V_{(BR)CBO}$ | 50 30 | - - | - - | - |
| Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}$, $I_C = 0$ | $V_{(BR)EBO}$ | 5 | - | - | V |
| Collector-base cutoff current $V_{CB} = 25\text{ V}$, $I_E = 0$ $V_{CB} = 25\text{ V}$, $I_E = 0$, $T_A = 150^\circ\text{C}$ | I_{CBO} | - - | - - | 0.1 50 | μA |
| Emitter-base cutoff current $V_{EB} = 4\text{ V}$, $I_C = 0$ | I_{EBO} | - | - | 100 | nA |
| DC current gain ¹⁾ $I_C = 100\text{ mA}$, $V_{CE} = 1\text{ V}$, h_{FE} -grp.16 $I_C = 100\text{ mA}$, $V_{CE} = 1\text{ V}$, h_{FE} -grp.25 $I_C = 100\text{ mA}$, $V_{CE} = 1\text{ V}$, h_{FE} -grp.40 $I_C = 500\text{ mA}$, $V_{CE} = 1\text{ V}$, all h_{FE} -grps. | h_{FE} | 100 160 250 40 | 160 250 350 - | 250 400 630 - | - |
| Collector-emitter saturation voltage ¹⁾ $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$ | V_{CEsat} | - | - | 0.7 | V |
| Base emitter saturation voltage ¹⁾ $I_C = 500\text{ mA}$, $I_B = 50\text{ mA}$ | V_{BEsat} | - | - | 1.2 | |

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 $I_C = 50\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$ | f_T | - | 170 | - | MHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$ | C_{cb} | - | 3 | - | pF |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}, f = 1\text{ MHz}$ | C_{eb} | - | 40 | - | |

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

$V_{CE} = 1\text{ V}$

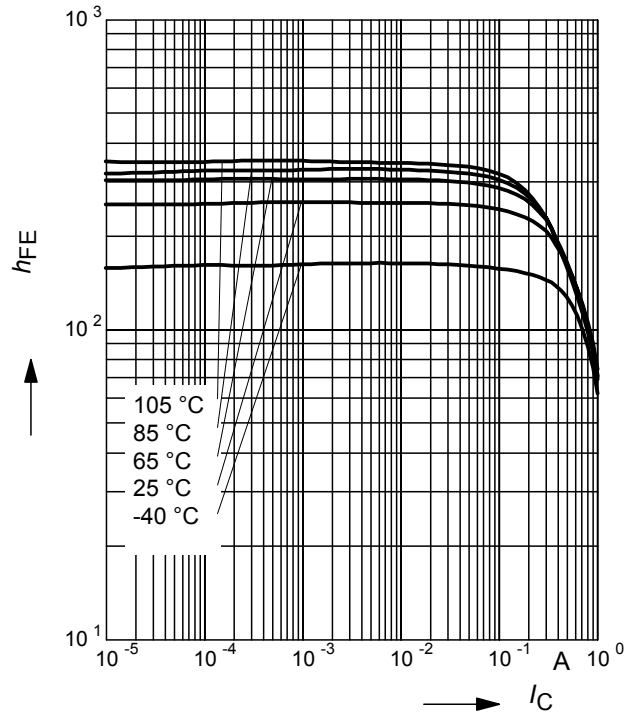
$h_{FE}\text{-grp.16}$



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

$V_{CE} = 1\text{ V}$

$h_{FE}\text{-grp.25}$



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

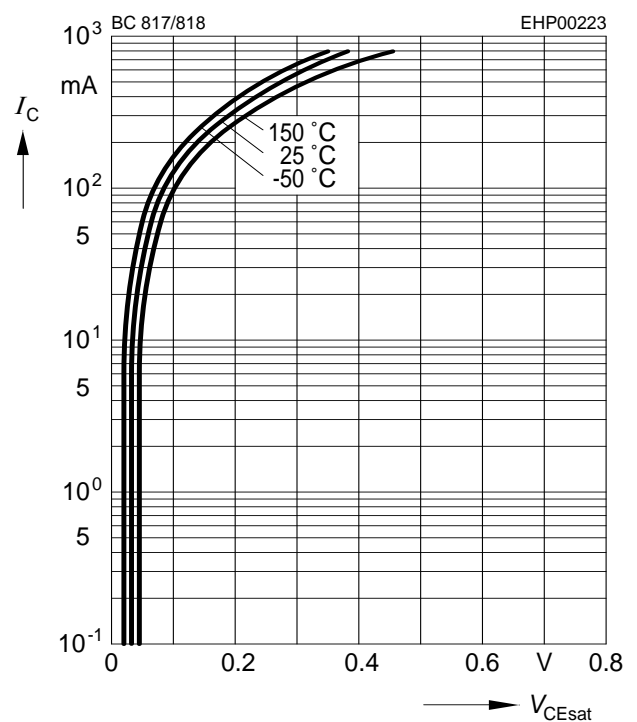
$V_{CE} = 1\text{ V}$

$h_{FE}\text{-grp.40}$



Collector-emitter saturation voltage

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



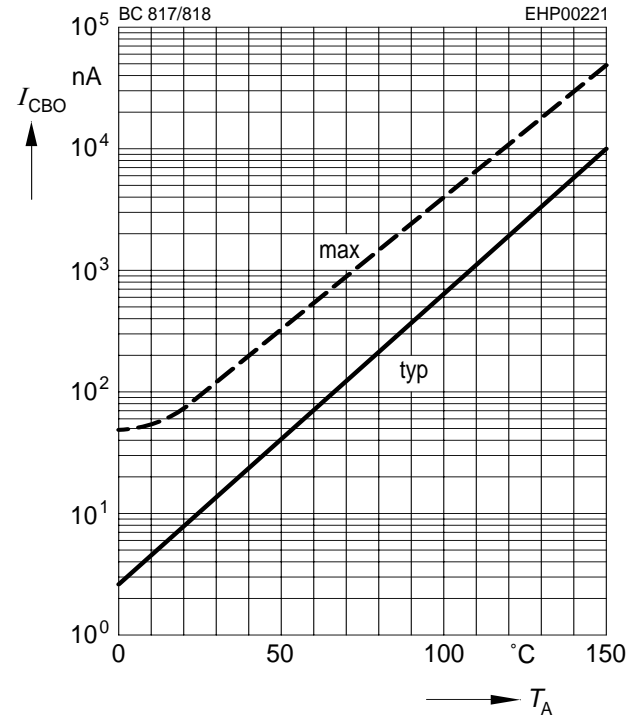
Base-emitter saturation voltage

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



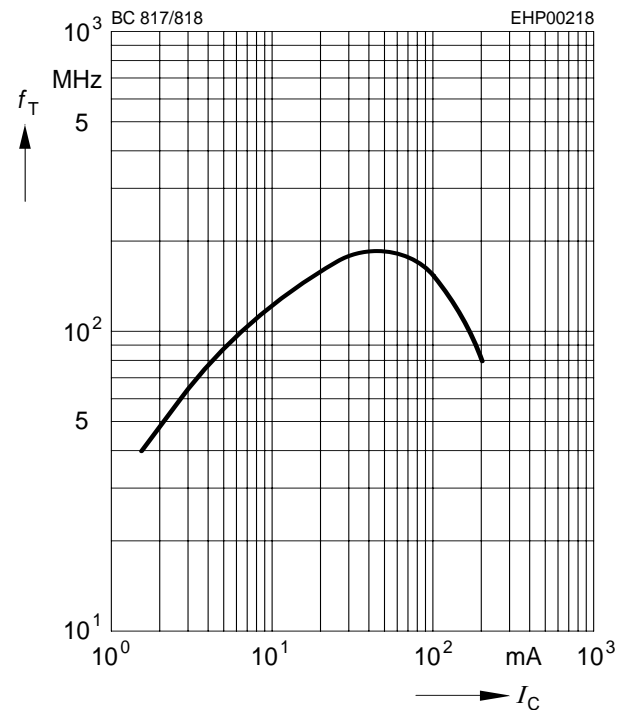
Collector cutoff current $I_{CBO} = f(T_A)$

$V_{CBO} = 25 V$



Transition frequency $f_T = f(I_C)$

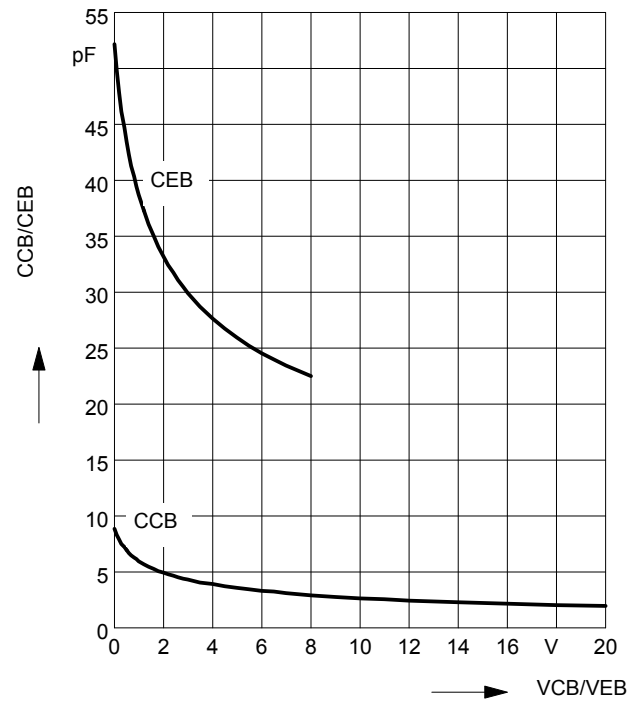
$V_{CE} = \text{parameter in V}, f = 2 \text{ GHz}$



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

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

BC817K, BC818K



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

BC817K, BC818K



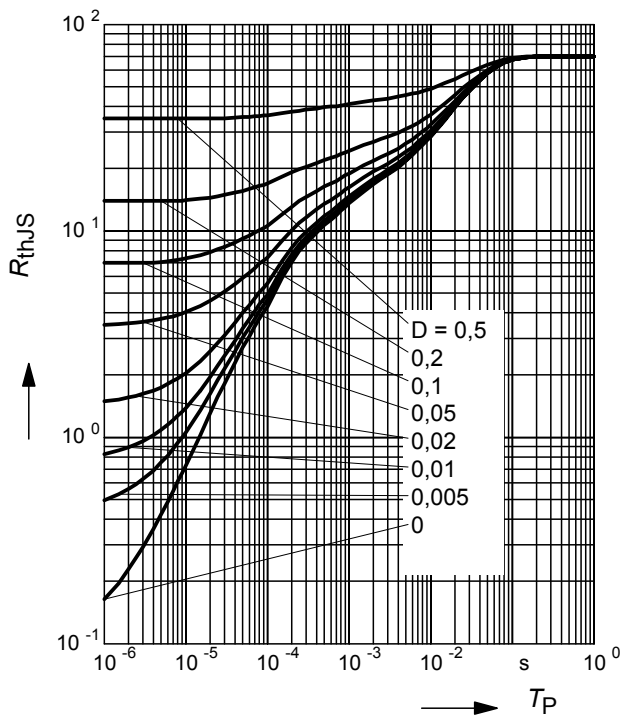
Total power dissipation $P_{tot} = f(T_S)$

BC817KW, BC818KW



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

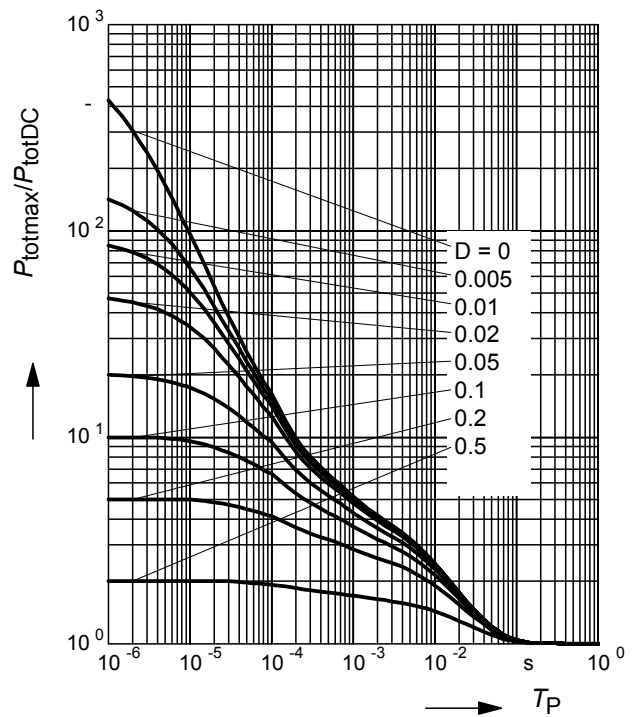
BC817K, BC818K



Permissible Pulse Load

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

BC817K, BC818K



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

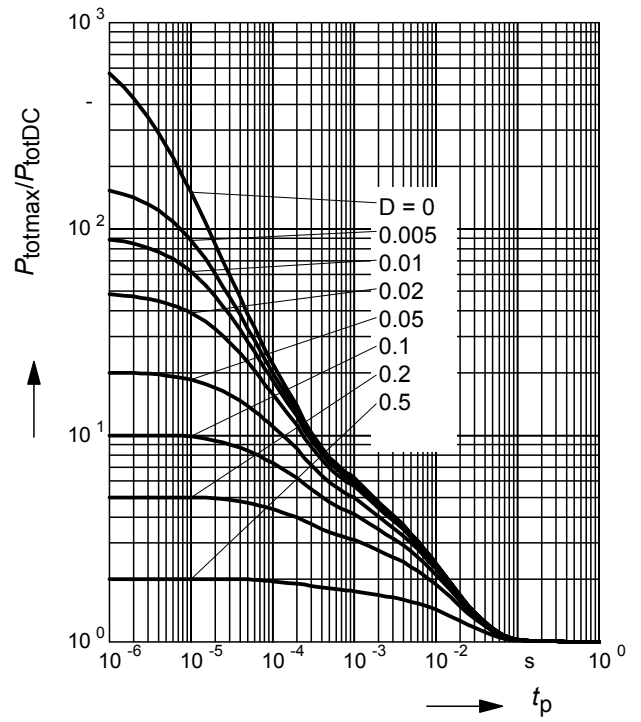
BC817KW, BC818KW



Permissible Pulse Load

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

BC817KW, BC818KW



Package Outline



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

Foot Print



Marking Layout (Example)



Standard Packing

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



Package Outline



Foot Print

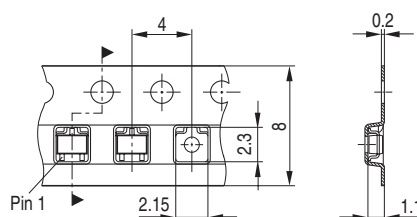


Marking Layout (Example)



Standard Packing

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



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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331