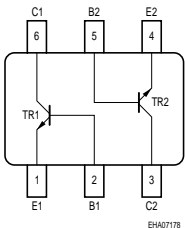
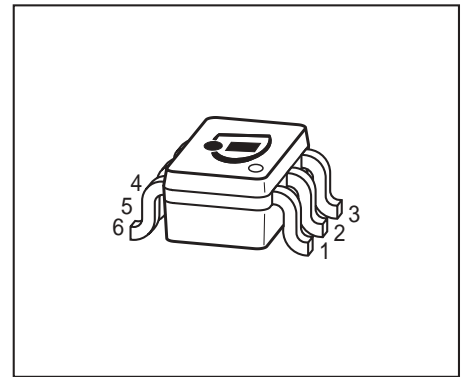


NPN Silicon AF Transistor Array

- Precision matched transistor pair: $\Delta I_C \leq 10\%$
- For current mirror applications
- Low collector-emitter saturation voltage
- Two (galvanic) internal isolated Transistors
- Complementary type: BCM856S
- BCM846S: For orientation in reel see package information below
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101



| Type | Marking | Pin Configuration | | | | | Package |
|---------|---------|-------------------|------|------|------|------|---------|
| | | 1=E1 | 2=B1 | 3=C2 | 4=E2 | 5=B2 | |
| BCM846S | 1Ms | | | | | | SOT363 |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|-----------|-------------|------|
| Collector-emitter voltage | V_{CEO} | 65 | V |
| Collector-emitter voltage | V_{CES} | 80 | |
| Collector-base voltage | V_{CBO} | 80 | |
| Emitter-base voltage | V_{EBO} | 6 | |
| Collector current | I_C | 100 | mA |
| Peak collector current | I_{CM} | 200 | |
| Total power dissipation- $T_S = 115\text{ °C}$ | P_{tot} | 250 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -65 ... 150 | |

¹Pb-containing package may be available upon special request

Thermal Resistance

| Parameter | Symbol | Value | Unit |
|--|------------|-------|------|
| Junction - soldering point ¹⁾ | R_{thJS} | 140 | K/W |

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 $I_C = 10\text{ mA}, I_B = 0\text{ A}$ | $V_{(BR)CEO}$ | 65 | - | - | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}, I_E = 0\text{ A}$ | $V_{(BR)CBO}$ | 80 | - | - | |
| Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}, V_{BE} = 0\text{ A}$ | $V_{(BR)CES}$ | 80 | - | - | |
| Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}, I_C = 0\text{ A}$ | $V_{(BR)EBO}$ | 6 | - | - | |
| Collector-base cutoff current $V_{CB} = 30\text{ V}, I_E = 0\text{ A}$ $V_{CB} = 30\text{ V}, I_E = 0\text{ A}, T_A = 150\text{ }^\circ\text{C}$ | I_{CBO} | - | - | 0.015 5 | μA |
| DC current gain ⁻²⁾ $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ | h_{FE} | - 200 | 250 290 | - 450 | - |
| Collector-emitter saturation voltage ²⁾ $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}, I_B = 5\text{ mA}$ | V_{CEsat} | - - | 90 200 | 300 650 | mV |
| Base emitter saturation voltage ²⁾ $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}, I_B = 5\text{ mA}$ | V_{BEsat} | - - | 700 900 | - - | |
| Base-emitter voltage ⁻²⁾ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 5\text{ V}$ | $V_{BE(ON)}$ | 580 - | 660 - | 700 770 | |
| Matching $I_B = 1\text{ }\mu\text{A}, V_{CE1} = V_{CE2} = 1.0\text{ V}$ $I_B = 100\text{ }\mu\text{A}, V_{CE1} = V_{CE2} = 1.0\text{ V}$ | ΔI_C | -10 -10 | - - | 10 10 | % |

¹For calculation of R_{thJA} please refer to Application Note Thermal Resistance

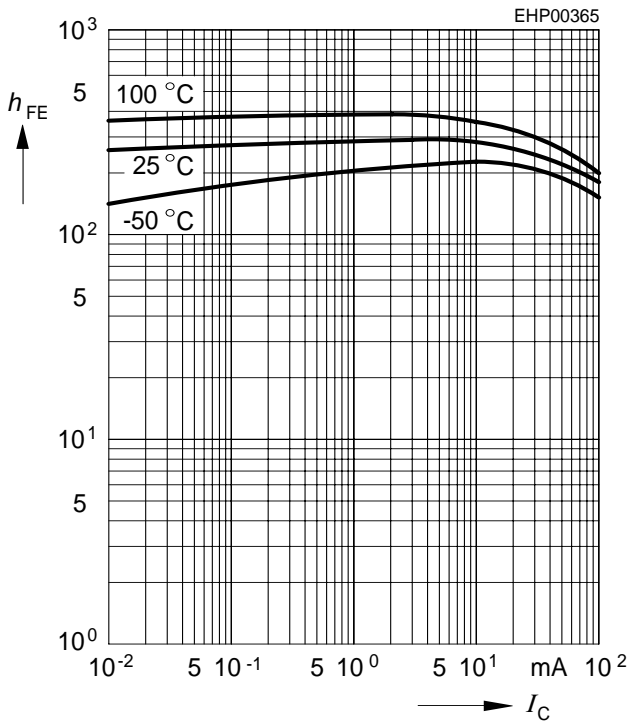
²Puls test: $t < 300\mu\text{s}; D < 2\%$

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

| Parameter | Symbol | Values | | | Unit |
|--|-----------|--------|------|------|---------------|
| | | min. | typ. | max. | |
| AC Characteristics | | | | | |
| Transition frequency $I_C = 20\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$ | f_T | - | 250 | - | MHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$ | C_{cb} | - | 0.95 | - | pF |
| Emitter-base capacitance $V_{EB} = 0.5\text{ V}, f = 1\text{ MHz}$ | C_{eb} | - | 9 | - | |
| Short-circuit input impedance $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$ | h_{11e} | - | 4.5 | - | $k\Omega$ |
| Open-circuit reverse voltage transf. ratio $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, f = 1\text{ kHz}$ | 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 |
| Noise figure $I_C = 200\text{ }\mu\text{A}, V_{CE} = 5\text{ V}, f = 1\text{ kHz},$ $\Delta f = 200\text{ Hz}, R_S = 2\text{ k}\Omega$ | F | - | - | 10 | dB |

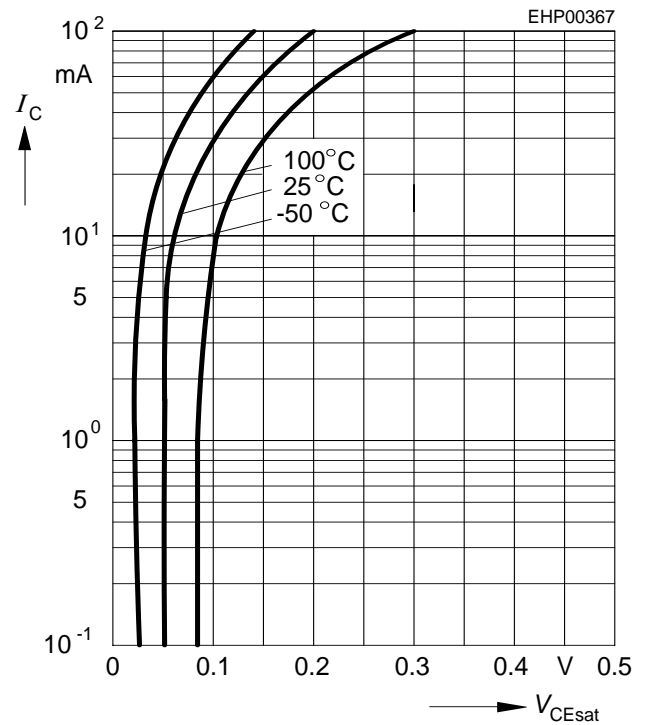
DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 5V$



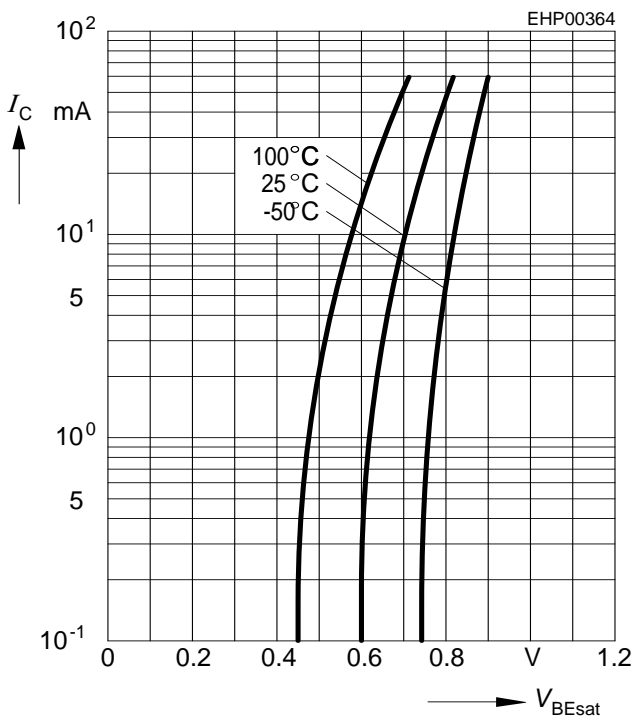
Collector-emitter saturation voltage

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



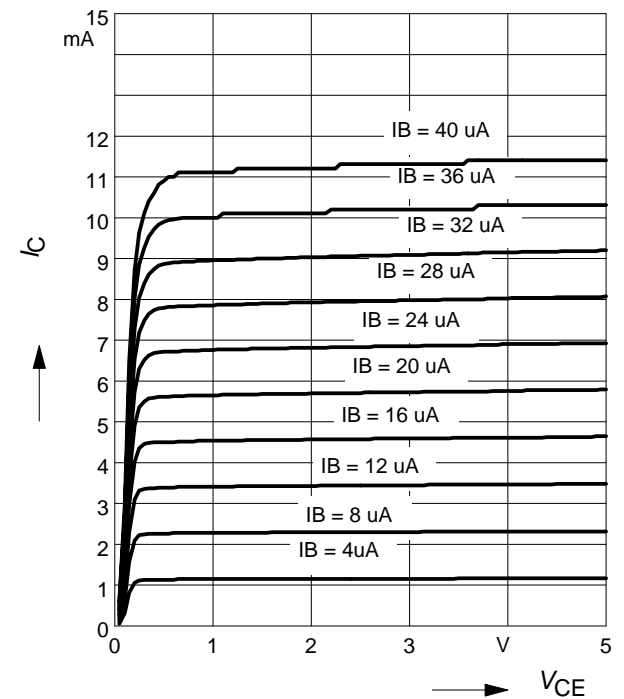
Base-emitter saturation voltage

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

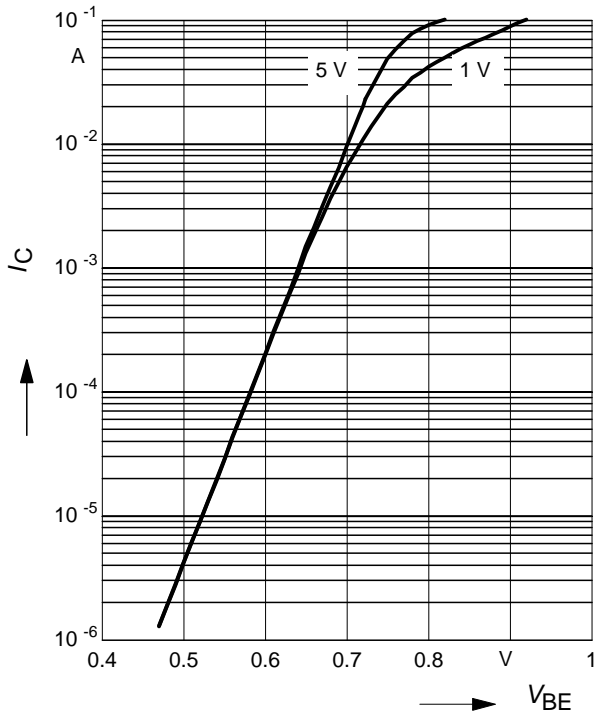


Output characteristics $I_C = f(V_{CE})$,

$I_B = \text{parameter}$

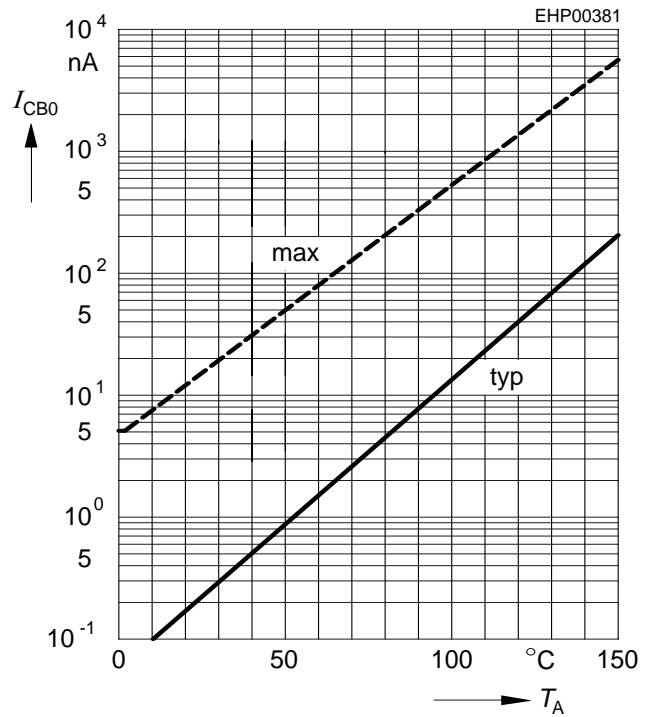


Collector current $I_C = f(V_{BE})$



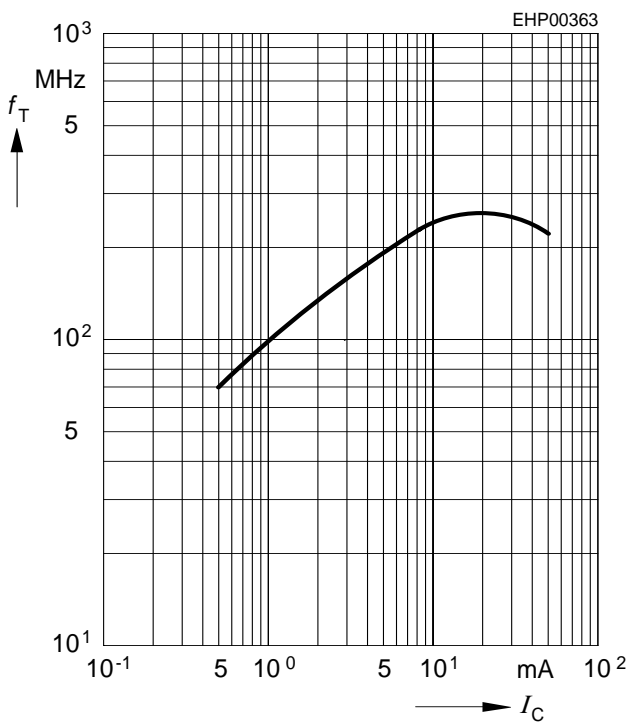
Collector cutoff current $I_{CBO} = f(T_A)$

$V_{CBO} = 30 V$



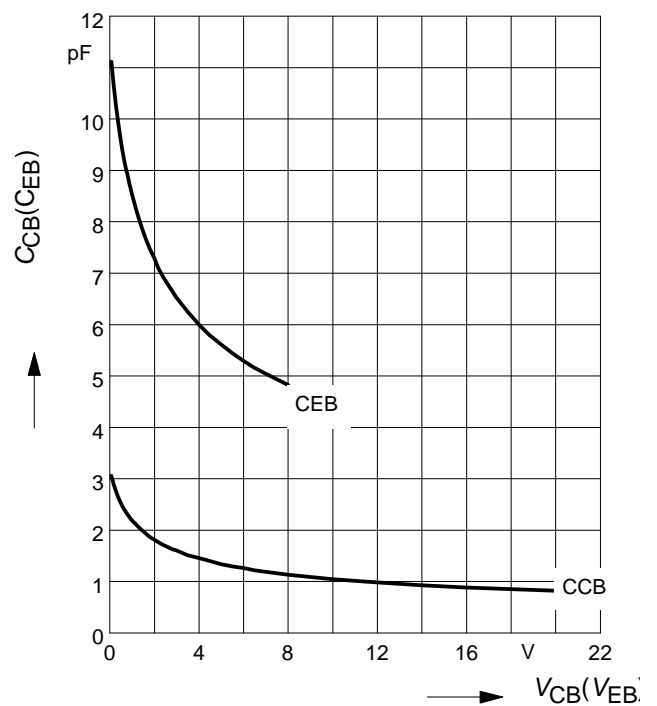
Transition frequency $f_T = f(I_C)$

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

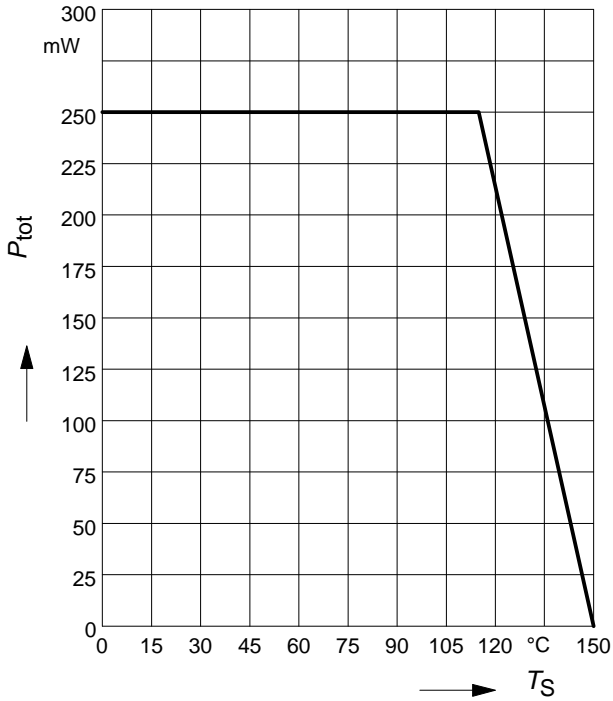


Collector-base capacitance $C_{cb} = f(V_{CB})$

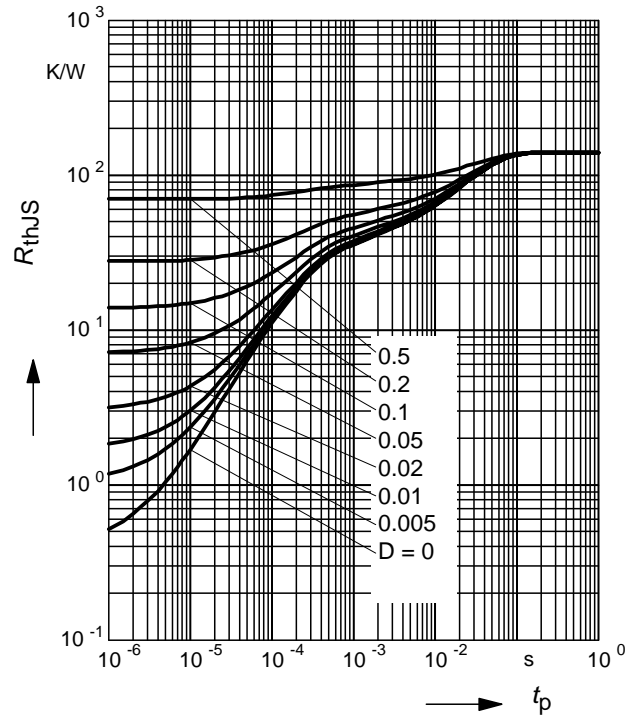
Emitter-base capacitance $C_{eb} = f(V_{EB})$



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

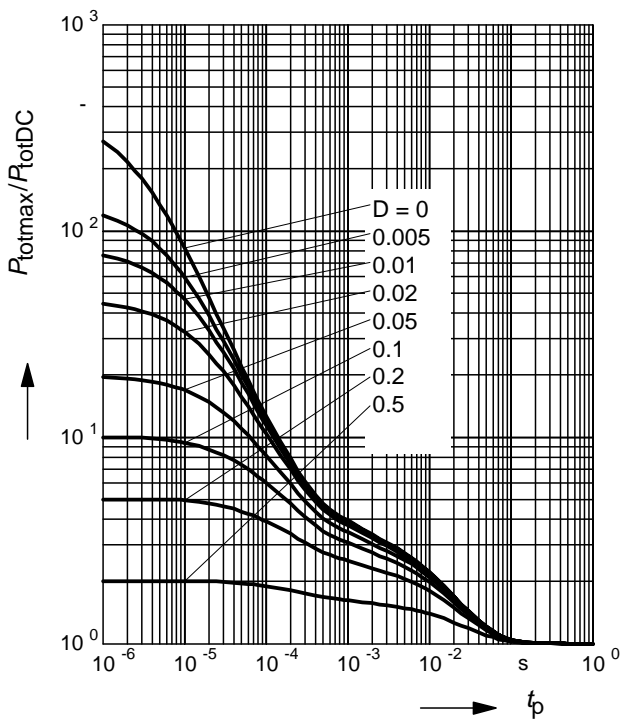


Permissible Pulse Load $R_{thJS} = f(t_p)$



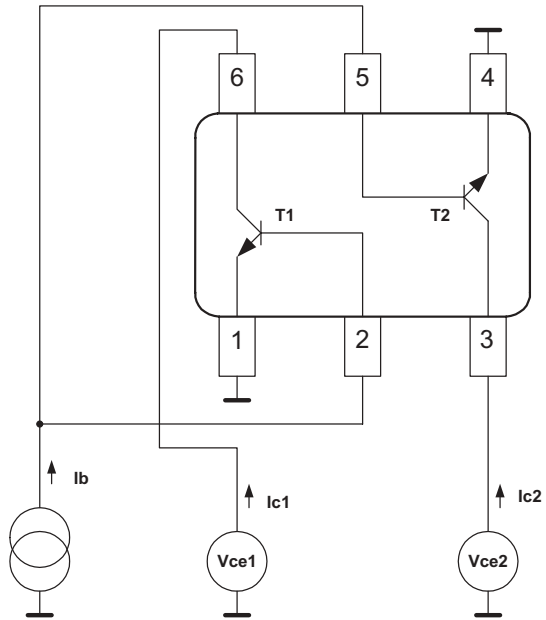
Permissible Pulse Load

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

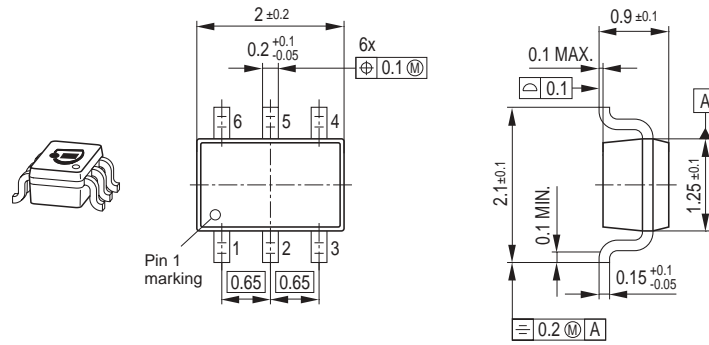


Definition of matching

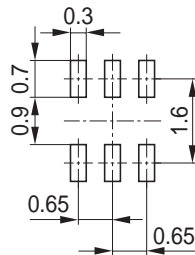
$$\Delta I_C = (I_{C2} - I_{C1}) / I_{C1}$$



Package Outline

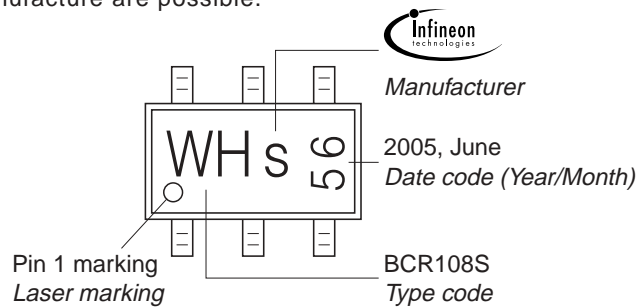


Foot Print



Marking Layout (Example)

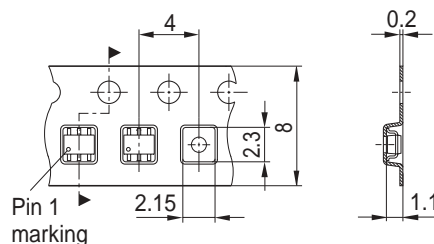
Small variations in positioning of Date code, Type code and Manufacture are possible.



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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