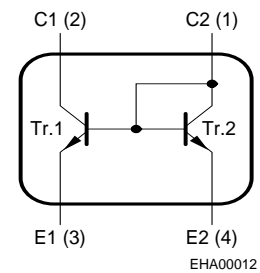
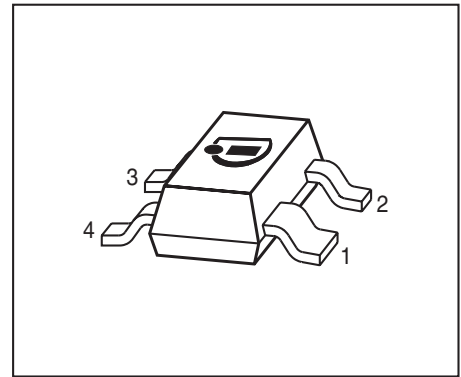


NPN Silicon Double Transistor

- To be used as a current mirror
- Good thermal coupling and V_{BE} matching
- High current gain
- Low collector-emitter saturation voltage
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



EHA00012

| Type | Marking | Pin Configuration | | | | Package |
|--------|---------|-------------------|--------|--------|--------|---------|
| BCV61B | 1Ks | 1 = C2 | 2 = C1 | 3 = E1 | 4 = E2 | SOT143 |
| BCV61C | 1Ls | 1 = C2 | 2 = C1 | 3 = E1 | 4 = E2 | SOT143 |

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------|-------------|------|
| Collector-emitter voltage (transistor T1) | V_{CEO} | 30 | V |
| Collector-base voltage (open emitter) (transistor T1) | V_{CBO} | 30 | |
| Emitter-base voltage | V_{EBS} | 6 | |
| DC collector current | I_C | 100 | mA |
| Peak collector current, $t_p < 10$ ms | I_{CM} | 200 | |
| Base peak current (transistor T1) | I_{BM} | 200 | |
| Total power dissipation, $T_S = 99$ °C | P_{tot} | 300 | mW |
| Junction temperature | T_j | 150 | °C |
| Storage temperature | T_{stg} | -65 ... 150 | |

Thermal Resistance

| | | | |
|--|------------|------|-----|
| Junction - soldering point ¹⁾ | R_{thJS} | ≤170 | K/W |
|--|------------|------|-----|

¹⁾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 of T1 | | | | | |
| Collector-emitter breakdown voltage $I_C = 10\text{ mA}, I_B = 0$ | $V_{(BR)CEO}$ | 30 | - | - | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}, I_E = 0$ | $V_{(BR)CBO}$ | 30 | - | - | |
| Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}, I_C = 0$ | $V_{(BR)EBO}$ | 6 | - | - | |
| Collector cutoff current $V_{CB} = 30\text{ V}, I_E = 0$ | I_{CBO} | - | - | 15 | nA |
| Collector cutoff current $V_{CB} = 30\text{ V}, I_E = 0, T_A = 150^\circ\text{C}$ | I_{CBO} | - | - | 5 | μA |
| DC current gain ¹⁾ $I_C = 0.1\text{ mA}, V_{CE} = 5\text{ V}$ | h_{FE} | 100 | - | - | - |
| DC current gain ¹⁾ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, \text{BCV61B}$ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}, \text{BCV61C}$ | h_{FE} | 200 420 | 290 520 | 450 800 | |
| 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 | 250 600 | 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 - | 700 770 | |

¹⁾Puls test: $t \leq 300\text{ }\mu\text{s}, D = 2\%$

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

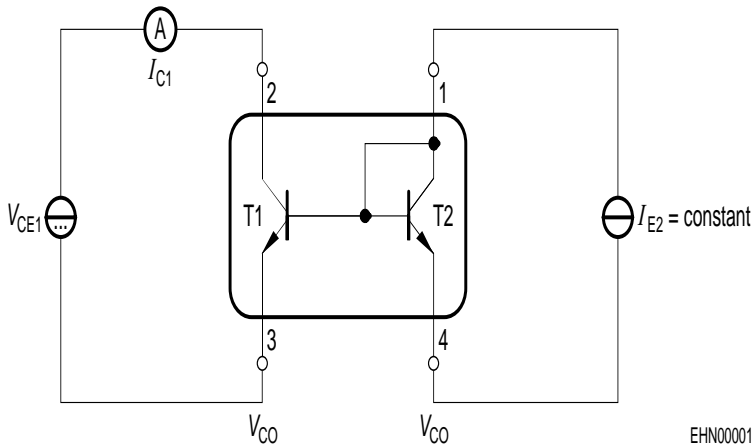
| Parameter | Symbol | Values | | | Unit |
|---|-------------------|-----------------|-------------|-----------------|------|
| | | min. | typ. | max. | |
| Characteristics | | | | | |
| Base-emitter forward voltage $I_E = 10 \mu\text{A}$ $I_E = 250 \text{ mA}$ | V_{BES} | 0.4 - | - - | - 1.8 | V |
| Matching of transistor T1 and transistor T2 at $I_{E2} = 0.5\text{mA}$ and $V_{\text{CE1}} = 5\text{V}$ $T_A = 25^\circ\text{C}$ $T_A = 150^\circ\text{C}$ | I_{C1} / I_{C2} | - 0.7 0.7 | - - - | - 1.3 1.3 | - |
| Thermal coupling of transistor T1 and transistor T2 1) T1: $V_{\text{CE}} = 5\text{V}$ Maximum current of thermal stability of I_{C1} | I_{E2} | - | 5 | - | mA |

AC characteristics for transistor T1

| | | | | | |
|--|-----------------|-----|------|-----|---------------|
| Transition frequency $I_C = 10 \text{ mA}$, $V_{\text{CE}} = 5 \text{ V}$, $f = 100 \text{ MHz}$ | f_T | - | 250 | - | MHz |
| Collector-base capacitance $V_{\text{CB}} = 10 \text{ V}$, $f = 1 \text{ MHz}$ | C_{cb} | - | 0.95 | - | pF |
| Emitter-base capacitance $V_{\text{EB}} = 0.5 \text{ V}$, $f = 1 \text{ MHz}$ | C_{eb} | - | 9 | - | |
| Noise figure $I_C = 200 \mu\text{A}$, $V_{\text{CE}} = 5 \text{ V}$, $R_S = 2 \text{ k}\Omega$, $f = 1 \text{ kHz}$, $\Delta f = 200 \text{ Hz}$ | F | - | 2 | - | dB |
| Short-circuit input impedance $I_C = 1 \text{ mA}$, $V_{\text{CE}} = 10 \text{ V}$, $f = 1 \text{ kHz}$ | h_{11e} | - | 4.5 | - | k Ω |
| Open-circuit reverse voltage transf.ratio $I_C = 1 \text{ mA}$, $V_{\text{CE}} = 10 \text{ V}$, $f = 1 \text{ kHz}$ | h_{12e} | - | 2 | - | 10^{-4} |
| Short-circuit forward current transf.ratio $I_C = 1 \text{ mA}$, $V_{\text{CE}} = 10 \text{ V}$, $f = 1 \text{ kHz}$ | h_{21e} | 100 | - | 900 | - |
| Open-circuit output admittance $I_C = 1 \text{ mA}$, $V_{\text{CE}} = 10 \text{ V}$, $f = 1 \text{ kHz}$ | h_{22e} | - | 30 | - | μS |

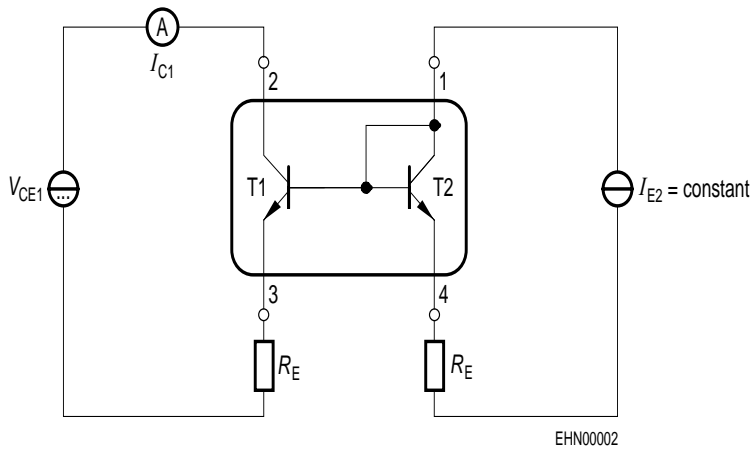
1) Witout emitter resistor. Device mounted on alumina 15mm x 16.5mm x 0.7mm

Test circuit for current matching



Note: Voltage drop at contacts: $V_{CO} < 2/3 V_T = 16\text{mV}$

Characteristic for determination of V_{CE1} at specified R_E range with I_{E2} as parameter under condition of $I_{C1}/I_{E2} = 1.3$

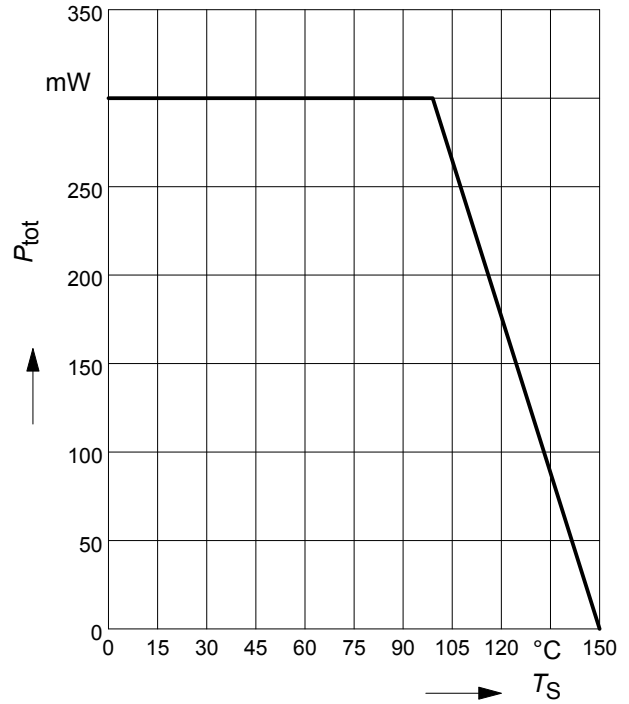
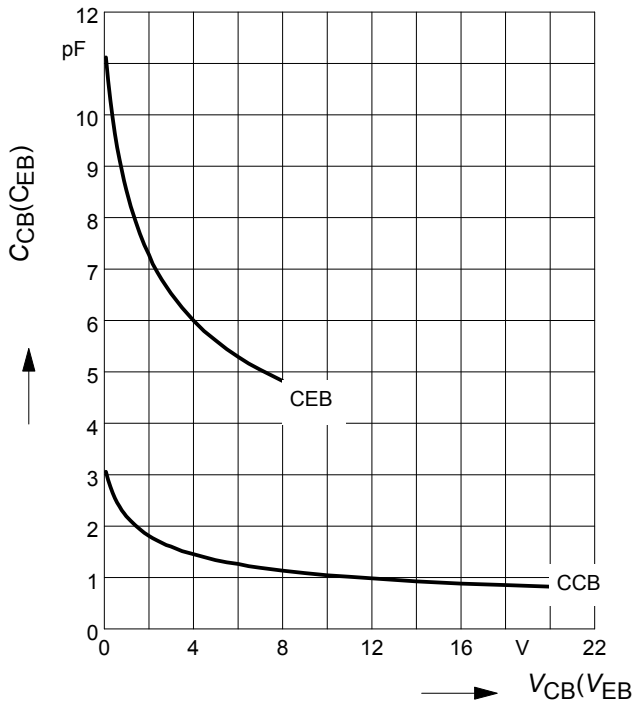


Note: BCV61 with emitter resistors

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

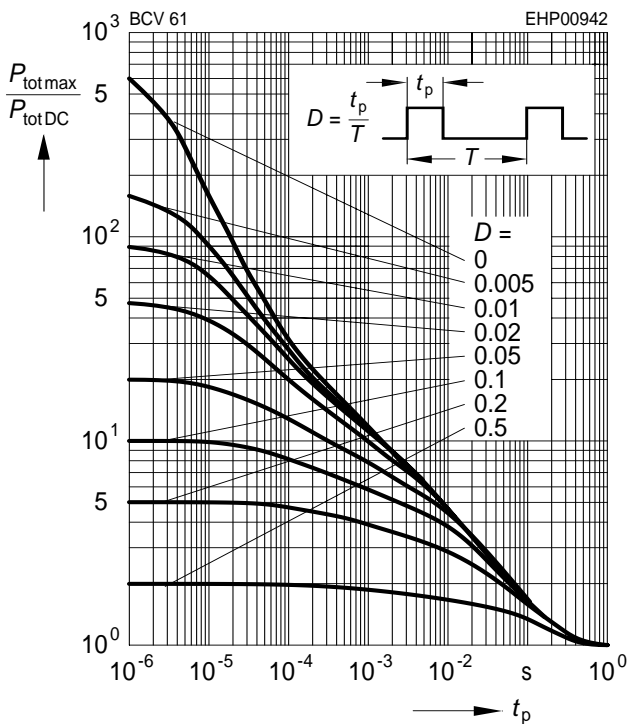
Emitter-base capacitance $C_{eb} = f(V_{EB})$

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

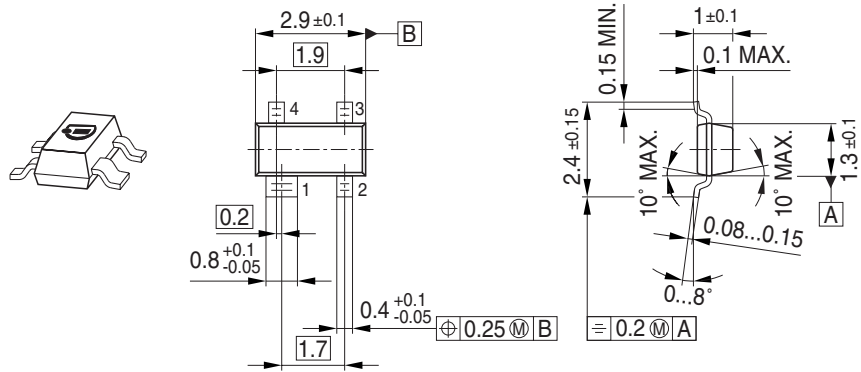


Permissible pulse load

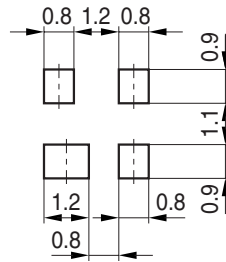
$P_{totmax} / P_{totDC} = f(t_p)$



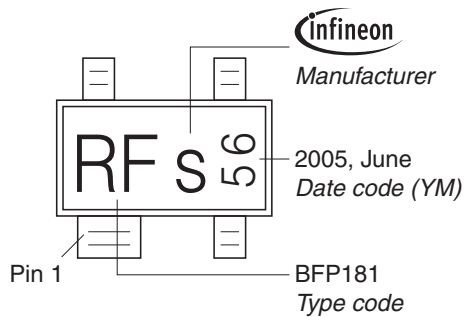
Package Outline



Foot Print

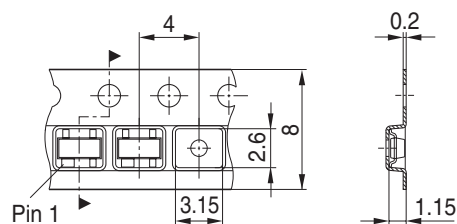


Marking Layout (Example)



Standard Packing

Reel ϕ 180 mm = 3.000 Pieces/Reel
 Reel ϕ 330 mm = 10.000 Pieces/Reel



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