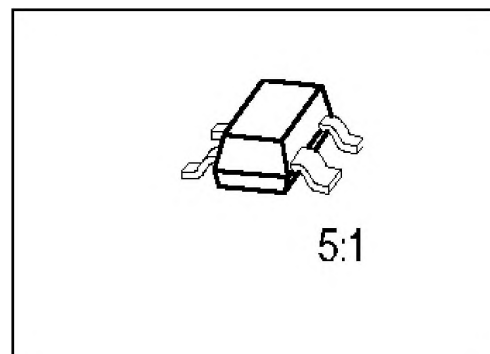


## NPN Silicon Double Transistors

BCV 61

### Preliminary Data

- To be used as a current mirror
- Good thermal coupling and  $V_{BE}$  matching
- High current gain
- Low emitter-saturation voltage



Type	Marking	Ordering Code (tape and reel)	Pin Configuration	Package <sup>1)</sup>
BCV 61 A BCV 61 B BCV 61 C	1Js 1Ks 1Ls	Q62702-C2155 Q62702-C2156 Q62702-C2157		SOT-143

### Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage (transistor T1)	$V_{CE0}$	30	V
Collector-base voltage (open emitter) (transistor T1)	$V_{CB0}$	30	
Emitter-base voltage	$V_{EBS}$	6	
Collector current	$I_C$	100	mA
Collector peak current	$I_{CM}$	200	
Base peak current (transistor T1)	$I_{BM}$	200	
Total power dissipation, $T_s \leq 99 \text{ }^\circ\text{C}^2)$	$P_{tot}$	300	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	- 65 ... + 150	

### Thermal Resistance

Junction - ambient <sup>2)</sup>	$R_{th JA}$	$\leq 240$	K/W
Junction - soldering point	$R_{th JS}$	$\leq 170$	

1) For detailed information see chapter Package Outlines.

2) Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm<sup>2</sup> Cu.

## Electrical Characteristics

at  $T_A = 25\text{ °C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

### DC characteristics for transistor T1

Collector-emitter breakdown voltage $I_C = 10\text{ mA}, I_B = 0$	$V_{(BR)CE0}$	30	–	–	V
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}, I_B = 0$	$V_{(BR)CB0}$	30	–	–	
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}, I_C = 0$	$V_{(BR)EBS}$	6	–	–	
Collector-base cutoff current $V_{CE} = 30\text{ V}, I_E = 0$ $V_{CB} = 30\text{ V}, I_E = 0, T_A = 150\text{ °C}$	$I_{CB0}$	–	–	15	nA
DC current gain <sup>1)</sup> $I_C = 0.1\text{ mA}, V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$	$h_{FE}$	100	–	–	–
BCV 61 A		110	180	220	
BCV 61 B		200	290	450	
BCV 61 C		420	520	800	
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}, I_B = 5\text{ mA}$	$V_{CEsat}$	–	90	250	mV
		–	200	600	
Base-emitter saturation voltage <sup>1)</sup> $I_C = 10\text{ mA}, I_C = 0.5\text{ mA}$ $I_C = 100\text{ mA}, I_C = 5\text{ mA}$	$V_{BEsat}$	–	700	–	
		–	900	–	
Base-emitter voltage $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 5\text{ V}$	$V_{BE}$	580	660	700	
		–	–	770	

<sup>1)</sup> Pulse test conditions:  $t \leq 300\text{ }\mu\text{s}, D = 2\text{ %}$ .

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC characteristics for transistor T2**

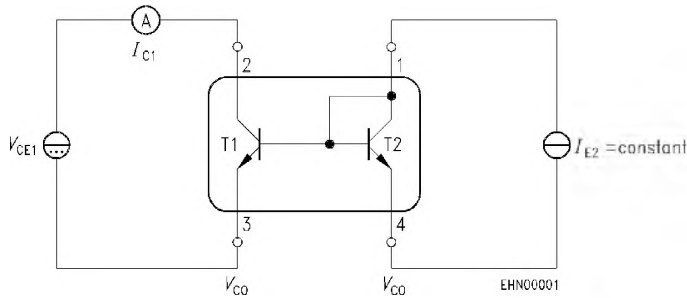
Base-emitter forward voltage $I_E = 10\text{ }\mu\text{A}$ $I_E = 250\text{ mA}$	$V_{BES}$	0.4 –	– –	– 1.8	V
Matching of transistor T1 and transistor T2 at $I_{E2} = 0.5\text{ mA}$ and $V_{CE1} = 5\text{ V}$ $T_A = 25\text{ }^\circ\text{C}$ $T_A = 150\text{ }^\circ\text{C}$	$I_{C1} / I_{C2}$ $I_{C1} / I_{C2}$	0.7 0.7	– –	1.3 1.3	–
Thermal coupling of transistor T1 and transistor T2 <sup>1)</sup> T1: $V_{CE} = 5\text{ V}$ Maximum current for thermal stability of $I_{C1}$	$I_{E2}$	–	5	–	mA

**AC characteristics for transistor T1**

Transition frequency $I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ V}$ , $f = 100\text{ MHz}$	$f_T$	–	250	–	MHz
Collector-base capacitance $V_{CB} = 10\text{ V}$ , $I_C = i_c = 0$ , $f = 1\text{ MHz}$	$C_{cb}$	–	3	–	pF
Input capacitance $V_{EB} = 0.5\text{ V}$ , $I_C = i_c = 0$ , $f = 1\text{ MHz}$	$C_{ibo}$	–	8	–	
Noise figure $I_C = 200\text{ }\mu\text{A}$ , $V_{CE} = 5\text{ V}$ , $R_S = 2\text{ k}\Omega$ $f = 1\text{ kHz}$ , $B = 200\text{ Hz}$	$F$	–	2	–	dB
Input impedance $I_C = 1\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1\text{ kHz}$	$h_{11e}$	–	4.5	–	$\text{k}\Omega$
Open-circuit reverse voltage transfer ratio $I_C = 1\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1\text{ kHz}$	$h_{12e}$	–	2	–	$10^{-4}$
Short-circuit forward current transfer ratio $I_C = 1\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1\text{ kHz}$	$h_{21e}$	100	–	900	–
Open-circuit output admittance $I_C = 1\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 1\text{ kHz}$	$h_{22e}$	–	30	–	$\mu\text{S}$

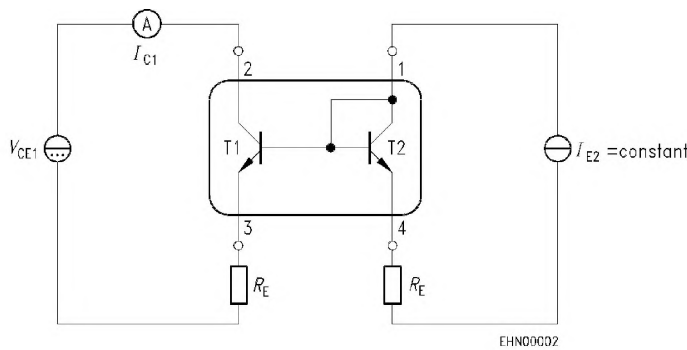
1) Without emitter resistor. Device mounted on alumina 15 mm × 16.5 mm × 0.7 mm.

**Test circuit for current matching**



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

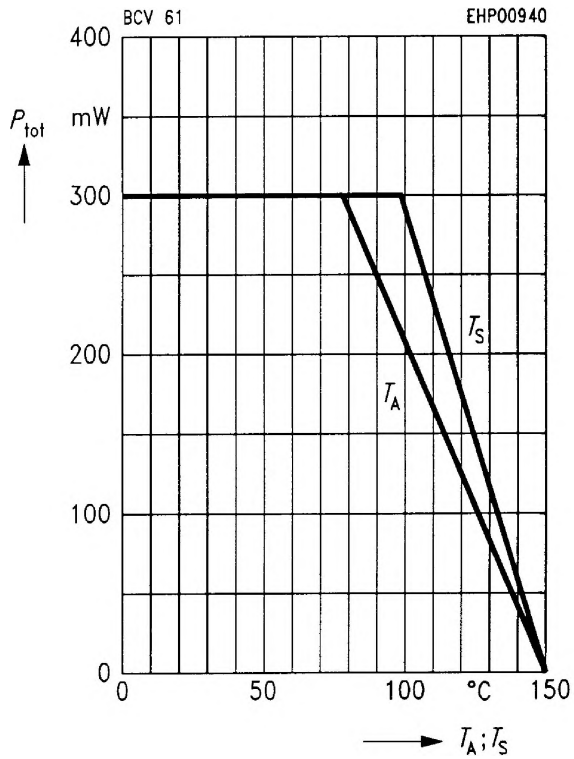
**Characteristic for determination of  $V_{CE1}$  at specified  $R_E$  range with  $I_{E2}$  as parameter under condition of  $I_{C1} / I_{E2} = 1.3$**



Note: BCV 61 with emitter resistors

### Total power dissipation $P_{tot} = f(T_A^*; T_S)$

\* Package mounted on epoxy



### Permissible pulse load $P_{tot max}/P_{tot DC} = f(t_p)$

