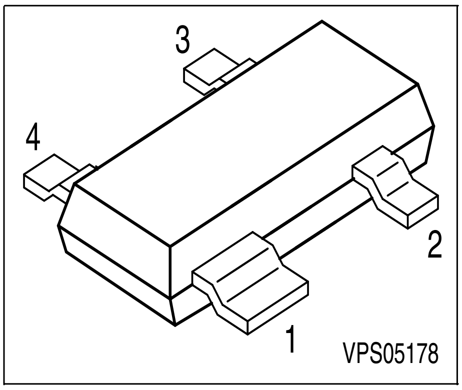
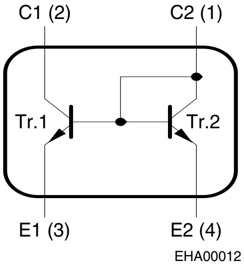
NPN Silicon Double Transistor



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



Type	Marking	Pin Configuration				Package
BCV 61A	1Js	1 = C2	2 = C1	3 = E1	4 = E2	SOT-143
BCV 61B	1Ks	1 = C2	2 = C1	3 = E1	4 = E2	SOT-143
BCV 61C	1Ls	1 = C2	2 = C1	3 = E1	4 = E2	SOT-143

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	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 ambient [1]	R_{thJA}	≤240	K/W
Junction - soldering point	R_{thJS}	≤170	

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1) Package mounted on pcb 40mm x 40mm x 1.5mm / 6cm^2 Cu

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics of T1					
Collector-emitter breakdown voltage I_C = 10 mA, I_B = 0	$V_{(BR)CEO}$	30	-	-	V
Collector-base breakdown voltage I_C = 10 µA, I_B = 0	$V_{(BR)CBO}$	30	-	-	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	6	-	-	
Collector cutoff current V_{CB} = 30 V, I_E = 0	I_{CBO}	-	-	15	nA
Collector cutoff current V_{CB} = 30 V, I_E = 0 , T_A = 150 °C	I_{CBO}	-	-	5	µA
DC current gain 1) I_C = 0.1 mA, V_{CE} = 5 V	h_{FE}	100	-	-	-
DC current gain 1)	h_{FE}				
I_C = 2 mA, V_{CE} = 5 V BCV 61A		110	180	220	
BCV 61B		200	290	450	
BCV 61C		420	520	800	
Collector-emitter saturation voltage1)	V_{CEsat}				mV
I_C = 10 mA, I_B = 0.5 mA		-	90	250	
I_C = 100 mA, I_B = 5 mA		-	200	600	
Base-emitter saturation voltage 1)	V_{BEsat}				
I_C = 10 mA, I_B = 0.5 mA		-	700	-	
I_C = 100 mA, I_B = 5 mA		-	900	-	
Base-emitter voltage 1)	$V_{BE(ON)}$				
I_C = 2 mA, V_{CE} = 5 V		580	660	700	
I_C = 10 mA, V_{CE} = 5 V		-	-	770	

1) Pulse test: t ≤ 300µs, D = 2%

Electrical Characteristics at T_A = 25°C, unless otherwise specified.

Parameter	**Symbol**	**Values**			**Unit**
		min.	**typ.**	**max.**	
Characteristics					
Base-emitter forward voltage	V_{BES}				V
I_E = 10 µA		0.4	-	-	
I_E = 250 mA		-	-	1.8	
Matching of transistor T1 and transistor T2	I_{C1} / I_{C2}				-
at I_{E2} = 0.5mA and V_{CE1} = 5V		-	-	-	
T_A = 25 °C		0.7	-	1.3	
T_A = 150 °C		0.7	-	1.3	
Thermal coupling of transistor T1 and transistor T2 [1] T1: V_{CE} = 5V Maximum current of thermal stability of I_{C1}	I_{E2}	-	5	-	mA
AC characteristics for transistor T1					
Transition frequency I_C = 10 mA, V_{CE} = 5 V, f = 100 MHz	f_T	-	250	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	3	-	pF
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	8	-	
Noise figure I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ, f = 1 kHz, Δ f = 200 Hz	F	-	2	-	dB
Short-circuit input impedance I_C = 1 mA, V_{CE} = 10 V, f = 1 kHz	h_{11e}	-	4.5	-	kΩ
Open-circuit reverse voltage transf.ratio I_C = 1 mA, V_{CE} = 10 V, f = 1 kHz	h_{12e}	-	2	-	10^{-4}
Short-circuit forward current transf.ratio I_C = 1 mA, V_{CE} = 10 V, f = 1 kHz	h_{21e}	100	-	900	-
Open-circuit output admittance I_C = 1 mA, V_{CE} = 10 V, f = 1 kHz	h_{22e}	-	30	-	µS

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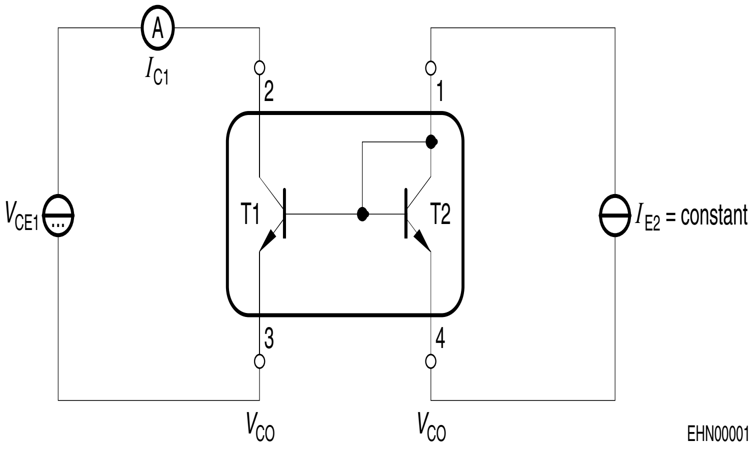
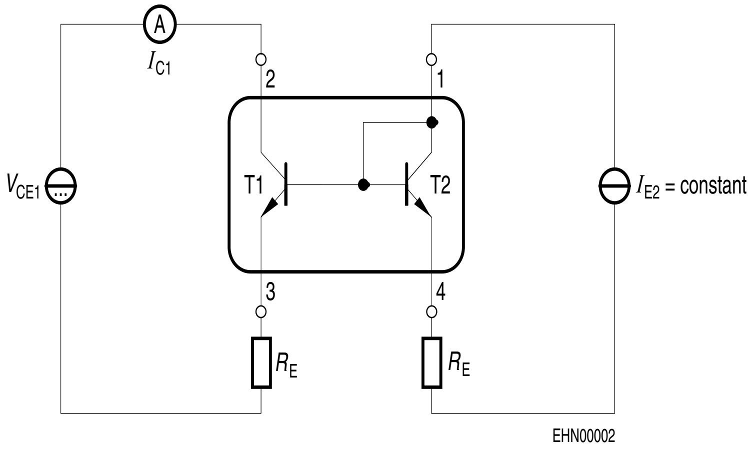
1) Witout emitter resistor. Device mounted on alumina 15mm x 16.5mm x 0.7mm

Test circuit for current matching



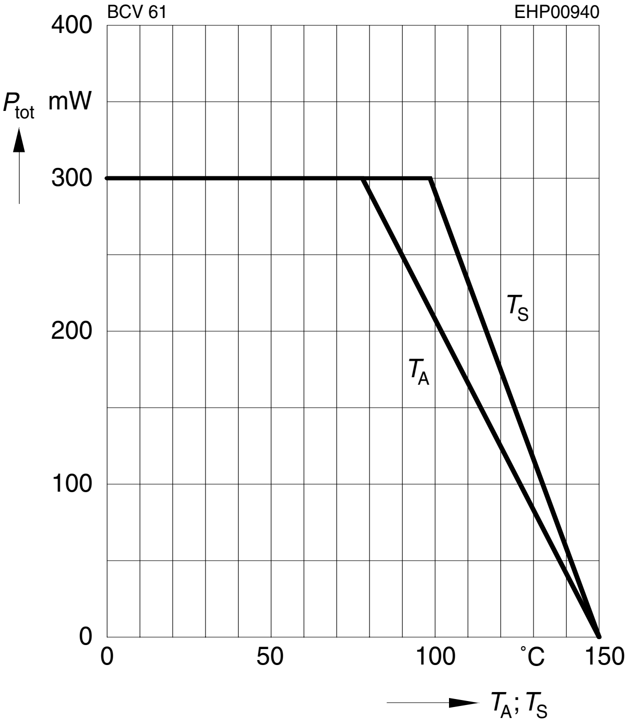
Note: Voltage drop at contacts: $V_{CO} < 2/3\ V_T$ = 16mV

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