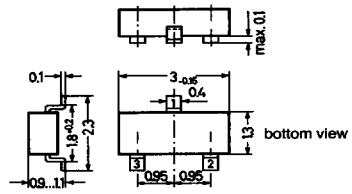
BCW61, BCX71

T-29-15

PNP Silicon Epitaxial Planar Transistor
for switching and AF amplifier applications.

Especially suited for automatic insertion in thick- and thin-film circuits.
The transistors BCW61 are subdivided into the groups A, B, C and D, the transistors BCX71 into the groups G, H, J and K according to their current gain. As complementary types the NPN transistors BCW60 and BCX70 are recommended.
Normally the pinconfiguration of these types is the following: 1 = Collector, 2 = Base, 3 = Emitter. All types are also available with the pinconfiguration 1 = Collector, 2 = Emitter, 3 = Base. The type designation is then BCW61R resp. BCX71R.



Plastic package 23A3
according to DIN 41869 (≈ TO-236)
The case is impervious to light

Weight approximately 0.01 g
Dimensions in mm

Marking code

Type	Marking
BCW61A	BA
BCW61B	BB
BCW61C	BC
BCW61D	BD
BCW61RA	BO
BWC61RB	BP
BCW61RC	BR
BCW61RD	BS

Marking code

Type	Marking
BCX71G	BG
BCX71H	BH
BCX71J	BJ
BCX71K	BK
BCX71RG	BU
BCX71RH	BW
BCX71RJ	BX
BCX71RK	BY

Absolute Maximum Ratings

		Symbol	Value	Unit
Collector Emitter Voltage	**BCW61**	$-V_{CES}$	32	V
	BCX71	$-V_{CES}$	45	V
Collector Emitter Voltage	**BCW61**	$-V_{CEO}$	32	V
	BCX71	$-V_{CEO}$	45	V
Emitter Base Voltage		$-V_{EBO}$	5	V
Collector Current		$-I_C$	200	mA
Base Current		$-I_B$	50	mA
Power Dissipation at T_{SB} = 50 °C		P_{tot}	310[1)]	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_S	−65 to +150	°C

[1)] Ceramic Substrate 0.7 mm; 2.5 cm^2 area

Characteristics at T_{amb} = 25 °C

		Symbol	Min.	Typ.	Max.	Unit
h-Parameters at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz						
Current Gain	**Group A, G**	h_{fe}	–	200	–	–
	B, H	h_{fe}	–	260	–	–
	C, J	h_{fe}	–	330	–	–
	D, K	h_{fe}	–	520	–	–
Input Impedance	**Group A, G**	h_{ie}	1.6	2.7	4.5	kΩ
	B, H	h_{ie}	2.5	3.6	6	kΩ
	C, J	h_{ie}	3.2	4.5	8.5	kΩ
	D, K	h_{ie}	4.5	7.5	12	kΩ
Output Admittance	**Group A, G**	h_{oe}	–	18	30	μS
	B, H	h_{oe}	–	24	50	μS
	C, J	h_{oe}	–	30	60	μS
	D, K	h_{oe}	–	50	100	μS
Reverse Voltage Transfer Ratio	**Group A, G**	h_{re}	–	$1.5 \cdot 10^{-4}$	–	–
	B, H	h_{re}	–	$2 \cdot 10^{-4}$	–	–
	C, J	h_{re}	–	$2 \cdot 10^{-4}$	–	–
	D, K	h_{re}	–	$3 \cdot 10^{-4}$	–	–
DC Current Gain						
at $-V_{CE}$ = 5 V, $-I_C$ = 10 μA	**Group A, G**	h_{FE}	–	140	–	–
	B, H	h_{FE}	30	200	–	–
	C, J	h_{FE}	40	270	–	–
	D, K	h_{FE}	100	340	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	**Group A, G**	h_{FE}	120	170	220	–
	B, H	h_{FE}	180	250	310	–
	C, J	h_{FE}	250	350	460	–
	D, K	h_{FE}	380	500	630	–
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA	**Group A, G**	h_{FE}	60	–	–	–
	B, H	h_{FE}	80	–	–	–
	C, J	h_{FE}	100	–	–	–
	D, K	h_{FE}	110	–	–	–
Thermal Resistance Junction to Substrate Backside		R_{thSB}	–	–	320[1]	K/W
Thermal Resistance Junction to Ambient		R_{thA}	–	–	450	K/W
Collector Saturation Voltage						
at $-I_C$ = 10 mA, $-I_B$ = 0.25 mA		$-V_{CEsat}$	–	120	250	mV
at $-I_C$ = 50 mA, $-I_B$ = 1.25 mA		$-V_{CEsat}$	–	250	500	mV
Base Saturation Voltage						
at $-I_C$ = 10 mA, $-I_B$ = 0.25 mA		$-V_{BEsat}$	–	700	850	mV
at $-I_C$ = 50 mA, $-I_B$ = 1.25 mA		$-V_{BEsat}$	–	800	1050	mV
Base Emitter Voltage						
at $-V_{CE}$ = 5 V, $-I_C$ = 10 μA		$-V_{BE}$	–	550	–	mV
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA		$-V_{BE}$	600	650	750	mV
at $-V_{CE}$ = 1 V, $-I_C$ = 50 mA		$-V_{BE}$	–	720	–	mV
Collector Cutoff Current						
at $-V_{CE}$ = 32 V	**BCW61**	$-I_{CES}$	–	–	20	nA
at $-V_{CE}$ = 32 V, T_{amb} = 150 °C		$-I_{CES}$	–	–	20	μA
at $-V_{CE}$ = 45 V	**BCX71**	$-I_{CES}$	–	–	20	nA
at $-V_{CE}$ = 45 V, T_{amb} = 150 °C		$-I_{CES}$	–	–	20	μA
Emitter Cutoff Current		$-I_{EBO}$	–	–	20	nA
at $-V_{EB}$ = 4 V						
Collector Emitter Breakdown Voltage						
at $-I_C$ = 2 mA	**BCW61**	$-U_{(BR)CEO}$	32	–	–	V
	BCX71	$-U_{(BR)CEO}$	45	–	–	V

[1] Ceramic Substrate 0.7 mm; 2.5 cm^2 area

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Characteristics, continuation

	Symbol	Min.	Typ.	Max.	Unit
Emitter Base Breakdown Voltage at $-I_E = 1\ \mu A$	$-U_{(BR)EBO}$	5	–	–	V
Gain Bandwidth Product at $-V_{CE} = 5$ V, $-I_C = 10$ mA, f = 100 MHz	f_T	–	180	–	MHz
Collector Base Capacitance at $-V_{CB} = 10$ V, f = 1 MHz	C_{CBO}	–	–	6	pF
Emitter Base Capacitance at $-V_{EB} = 0.5$ V, f = 1 MHz	C_{EBO}	–	11	–	pF
Noise Figure at $-V_{CE} = 5$ V, $-I_C = 200\ \mu A$, $R_G = 2\ k\Omega$, f = 1 kHz, $\triangle f = 200$ Hz	F	–	2	6	dB
Switching Times (see Fig. 1) at $-I_C = 10$ mA, $-I_{B1} = I_{B2} = 1$ mA					
Delay Time	t_d	–	35	–	ns
Rise Time	t_r	–	50	–	ns
Turn-On Time	$t_d + t_r$	–	85	150	ns
Storage Time	t_s	–	400	–	ns
Fall Time	t_f	–	80	–	ns
Turn-Off Time	$t_s + t_f$	–	480	800	ns

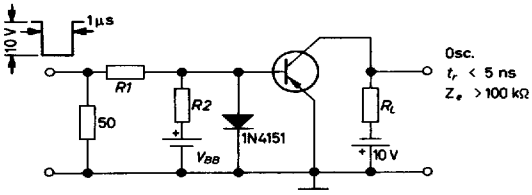
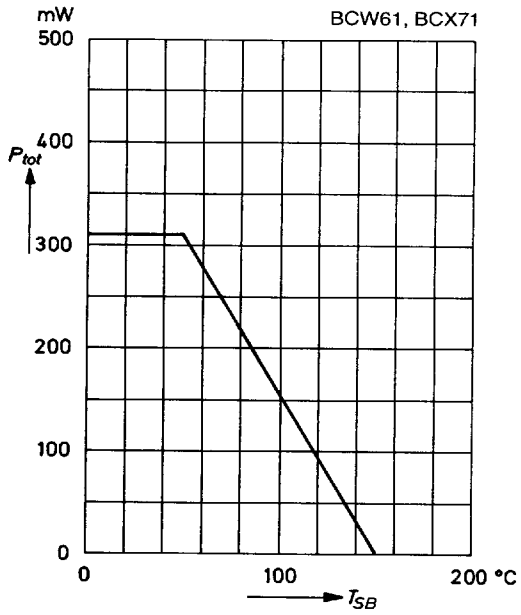


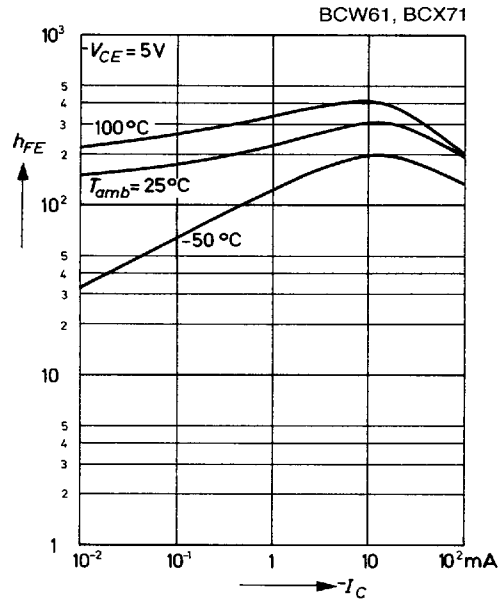
Fig. 1:
Test circuit for switching times

Admissible power dissipation versus temperature of substrate backside

Ceramic substrate 0.7 mm; 2.5 cm² area.

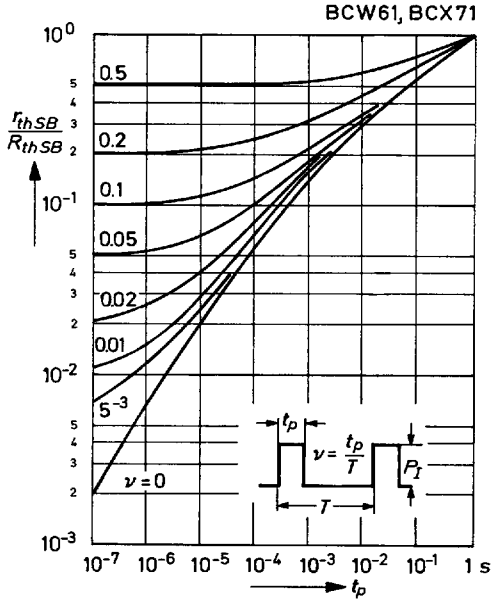


DC current gain versus collector current

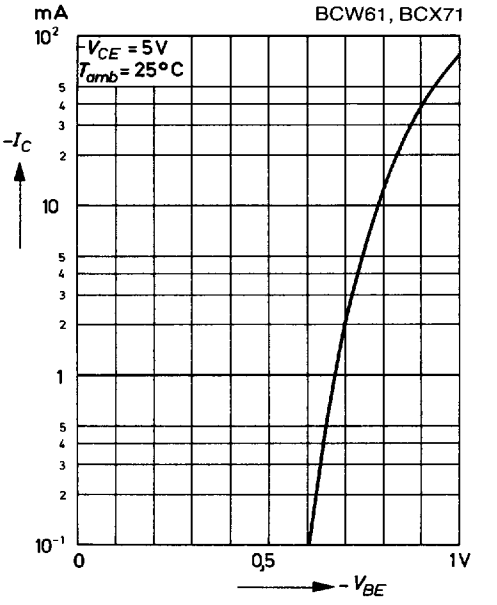


Pulse thermal resistance versus pulse duration (normalized)

Ceramic Substrate 0.7 mm; 2.5 cm² area.



Collector current versus base emitter voltage



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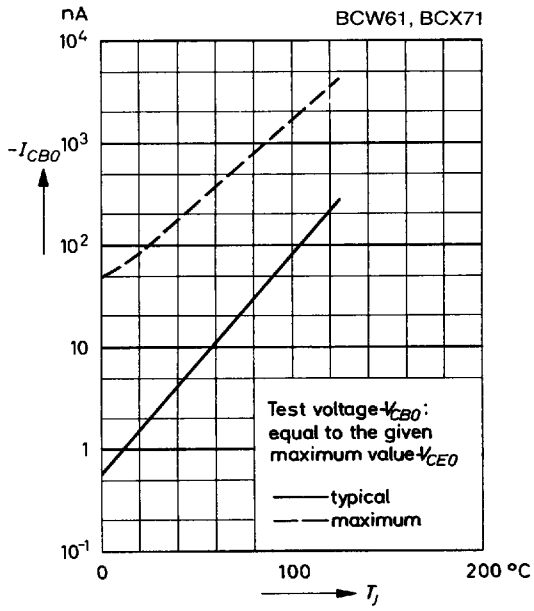
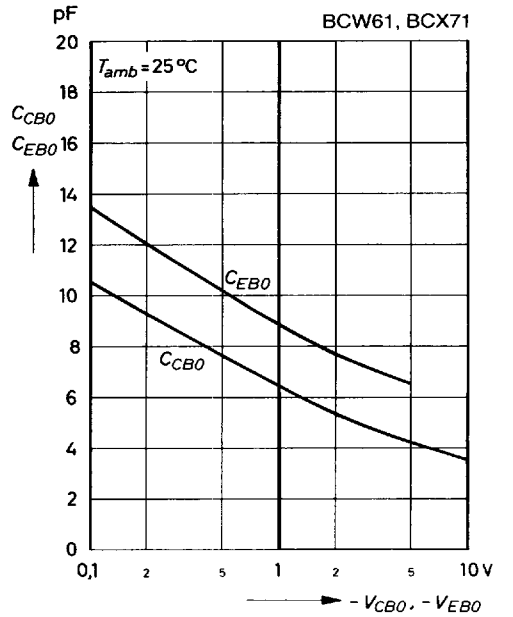
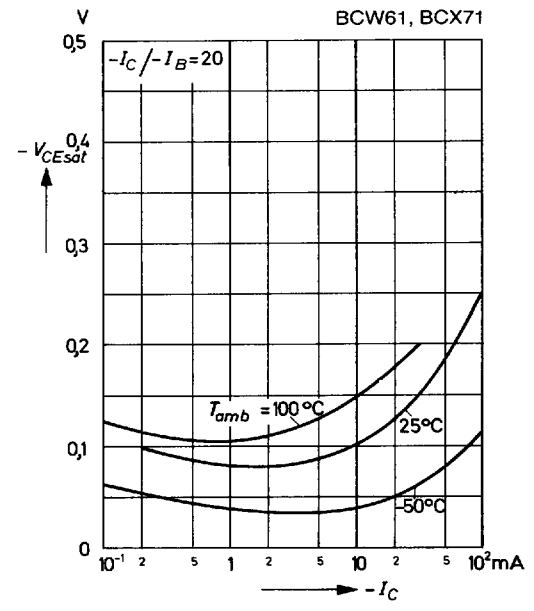
Collector cutoff current versus junction temperature



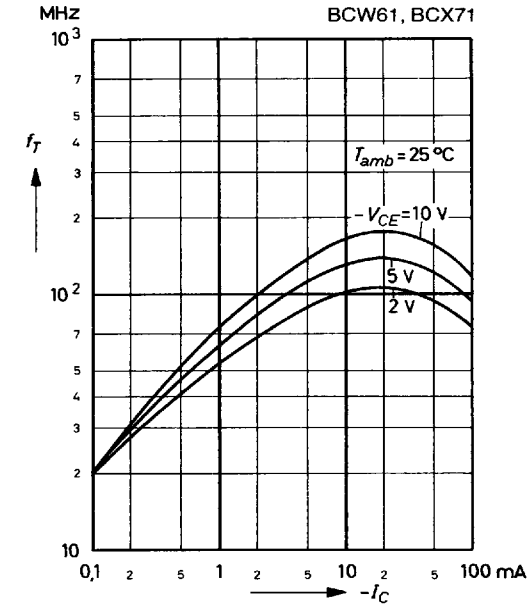
Collector base capacitance, Emitter base capacitance versus reverse bias voltage



Collector saturation voltage versus collector current



Gain bandwidth product versus collector current



Relative h-parameters versus collector current