

BCX70

SOT23 NPN SILICON PLANAR SMALL SIGNAL TRANSISTOR

ISSUE 2 – FEBRUARY 95

BCX70

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	45			V	$I_C=2\text{mA}$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_{EBO}=1\mu\text{A}$
Collector-Emitter Cut-off Current	I_{CES}	20			nA	$V_{CES}=45\text{V}$
		20			μA	$V_{CES}=45\text{V}$, $T_{amb}=150^{\circ}\text{C}$
Emitter-Base Cut-Off Current	I_{EBO}	20			nA	$V_{EBO}=4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	0.12	0.12	0.35	V	$I_C=10\text{mA}$, $I_B=0.25\text{mA}$
		0.20	0.20	0.55	V	$I_C=50\text{mA}$, $I_B=1.25\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.60	0.70	0.85	V	$I_C=10\text{mA}$, $I_B=0.25\text{mA}$
		0.70	0.83	1.05	V	$I_C=50\text{mA}$, $I_B=1.25\text{mA}$
Base - Emitter Voltage	V_{BE}	0.52	0.65	0.75	V	$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		0.55	0.78	0.78	V	$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
Static Forward Current Transfer Ratio	h_{FE}	120	170	220		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		50				$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
BCX70H	h_{FE}	20	145	310		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		180	250			$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
BCX70J	h_{FE}	40	220	460		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		250	350			$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
BCX70K	h_{FE}	100	300	630		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		380	500			$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
Transition Frequency	f_T	125	250		MHz	$I_C=10\text{mA}$, $V_{CE}=5\text{V}$, $f=100\text{MHz}$
						$V_{EBO}=0.5\text{V}$, $f=1\text{MHz}$
Emitter-Base Capacitance	C_{ebo}		8		pF	$V_{CBO}=10\text{V}$, $f=1\text{MHz}$
Collector-Base Capacitance	C_{cbo}		2	4.5	pF	$I_C=0.2\text{mA}$, $V_{CE}=5\text{V}$, $R_G=2\text{k}\Omega$, $f=1\text{KH}$
Noise Figure	N		6		dB	$\Delta f=200\text{Hz}$
Switching times:	t_d t_r t_{on} t_s t_f t_{off}		35		ns	$I_C=10\text{mA}$, $I_B=10:1:1\text{mA}$ $R_1=5\text{K}\Omega$, $R_2=5\text{K}\Omega$, $V_{BB}=3.6\text{V}$, $R_L=990\Omega$
			50		ns	
			85	150	ns	
			400		ns	
			80		ns	
			480	800	ns	

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle
Spice parameter data is available upon request for this device

PARTMARKING DETAIL – BCX70G – AG

- BCX70H – AH
- BCX70J – AJ
- BCX70K – AK
- BCX70GR – AW
- BCX70HR – 9P
- BCX70JR – AX
- BCX70KR – P9

COMPLEMENTARY TYPE – BCX71

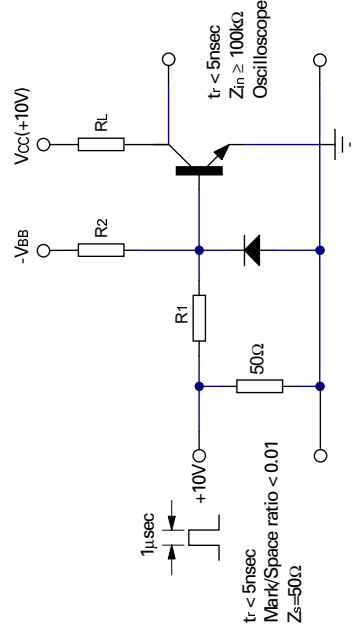
ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Emitter Voltage	V_{CES}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	200	mA
Base Current	I_B	50	mA
Power Dissipation at $T_{amb}=25^{\circ}\text{C}$	P_{TOT}	330	mW
Operating and Storage Temperature Range	tj:stg	-55 to +150	$^{\circ}\text{C}$

FOUR TERMINAL NETWORK DATA ($I_C=2\text{mA}$, $V_{CE}=5\text{V}$, $f=1\text{kHz}$)

	h_{FE} Group G		h_{FE} Group H		h_{FE} Group J		h_{FE} Group K	
	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Max.
h_{11e}	1.6	2.7	2.5	3.6	4.5	8.5	4.5	12
h_{12e}		1.5		2			3	10^{-4}
h_{21e}		200		260		330		520
h_{22e}		18		24		30		100

SWITCHING CIRCUIT



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PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
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Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5			V	$I_{EBO}=1\mu\text{A}$
Collector-Emitter Cut-off Current	I_{CES}	20			nA	$V_{CES}=45\text{V}$
		20			μA	$V_{CES}=45\text{V}$, $T_{amb}=150^{\circ}\text{C}$
Emitter-Base Cut-Off Current	I_{EBO}	20			nA	$V_{EBO}=4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	0.12	0.12	0.35	V	$I_C=10\text{mA}$, $I_B=0.25\text{mA}$
		0.20	0.20	0.55	V	$I_C=50\text{mA}$, $I_B=1.25\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	0.60	0.70	0.85	V	$I_C=10\text{mA}$, $I_B=0.25\text{mA}$
		0.70	0.83	1.05	V	$I_C=50\text{mA}$, $I_B=1.25\text{mA}$
Base - Emitter Voltage	V_{BE}	0.52	0.65	0.75	V	$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		0.65	0.75	0.85	V	$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
		0.78	0.85	1.05	V	$I_C=50\text{mA}$, $V_{CE}=1\text{V}$
Static Forward Current Transfer Ratio	h_{FE}	120	170	220		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		50	170	220		$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
BCX70H	h_{FE}	20	145	310		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		180	250	310		$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
		70	250	310		$I_C=50\text{mA}$, $V_{CE}=1\text{V}$
BCX70J	h_{FE}	40	220	460		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		250	350	460		$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
BCX70K	h_{FE}	100	300	630		$I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$
		380	500	630		$I_C=2\text{mA}$, $V_{CE}=5\text{V}$
		100	500	630		$I_C=50\text{mA}$, $V_{CE}=1\text{V}$
Transition Frequency	f_T	125	250		MHz	$I_C=10\text{mA}$, $V_{CE}=5\text{V}$, $f=100\text{MHz}$
Emitter-Base Capacitance	C_{ebo}		8		pF	$V_{EBO}=0.5\text{V}$, $f=1\text{MHz}$
Collector-Base Capacitance	C_{cbo}			4.5	pF	$V_{CBO}=10\text{V}$, $f=1\text{MHz}$
Noise Figure	N		2	6	dB	$I_C=0.2\text{mA}$, $V_{CE}=5\text{V}$, $R_G=2\text{K}\Omega$, $f=1\text{KH}$, $\Delta f=200\text{Hz}$
Switching times:	t_d t_r t_{on} t_s t_f t_{off}	35			ns	$I_C=10\text{mA}$, $I_B=10:1:1\text{mA}$, $R_1=5\text{K}\Omega$, $R_2=5\text{K}\Omega$, $V_{BB}=3.6\text{V}$, $R_L=990\Omega$
		50			ns	
		85	150		ns	
		400			ns	
		400			ns	
		80	800		ns	

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COMPLEMENTARY TYPE – BCX71

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	VALUE	UNIT
Collector-Emitter Voltage	V_{CES}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Continuous Collector Current	I_C	200	mA
Base Current	I_B	50	mA
Power Dissipation at $T_{amb}=25^{\circ}\text{C}$	P_{TOT}	330	mW
Operating and Storage Temperature Range	t_j :stg	-55 to +150	$^{\circ}\text{C}$

FOUR TERMINAL NETWORK DATA ($I_C=2\text{mA}$, $V_{CE}=5\text{V}$, $f=1\text{kHz}$)

	h_{FE} Group G		h_{FE} Group H		h_{FE} Group J		h_{FE} Group K	
	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Max.
h_{11e}	1.6	2.7	2.5	3.6	4.5	8.5	4.5	12
h_{12e}	1.5		2		2		3	10^{-4}
h_{21e}	200	260	24	260	330	520		
h_{22e}	18	30	50	24	30	60	50	100

SWITCHING CIRCUIT

