

MICRO ELECTRONICS

BC107,8,9
BC167,8,9
BC237,8,9
BC317,8,9

THE ABOVE TYPES ARE NPN SILICON PLANAR EPITAXIAL TRANSISTORS FOR USE IN AF SMALL SIGNAL AMPLIFIER STAGES AND DIRECT COUPLED CIRCUITS.

BC107, 8, 9 are complementary to BC177, 8, 9.

BC167, 8, 9 are complementary to BC257, 8, 9.

BC237, 8, 9 are complementary to BC307, 8, 9.

BC317, 8, 9 are complementary to BC320, 1, 2.

CASE

TO-18



CBE

BC107,8,9

TO-92B



ECB

BC167,8,9

TO-92F



CEB

BC237,8,9

TO-92A



EBC

BC317,8,9

ABSOLUTE MAXIMUM RATINGS

TYPE	V _{CEO} (V)	V _{CES} (V)	V _{CE0} (V)	V _{EB0} (V)	I _C (DC) (mA)	P _{tot} (mW) *	T _j , T _{stg}
BC107	50	50	45	6	100	300	-55 to 175°C
BC108	30	30	20	5	100	300	
BC109	30	30	20	5	100	300	
BC167	50	50	45	6	100	300	-55 to 150°C
BC168	30	30	20	5	100	300	
BC169	30	30	20	5	100	300	
BC237	50	50	45	6	100	300	-55 to 150°C
BC238	30	30	20	5	100	300	
BC239	30	30	20	5	100	300	
BC317	50		45	6	150	310	-55 to 150°C
BC318	45		30	5	150	310	
BC319	30		20	5	150	310	

* Total Power Dissipation @ T_A ≤ 25°C



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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITIONS
Collector-Base Breakdown Voltage	BVCBO	↑ Note 1 ↓			V	$I_C=10\mu\text{A}$ $I_E=0$
Collector-Emitter Breakdown Voltage	LVCEO *		V			$I_C=2\text{mA}$ $I_B=0$
Emitter-Base Breakdown Voltage	BVEBO		V			$I_E=1\mu\text{A}$ $I_C=0$
Collector Cutoff Current BC107, 108, 109 } BC167, 168, 169 } only BC237, 238, 239 }	ICES			15 4	nA μA	$V_{CE}=V_{CES}$ $V_{BE}=0$ $V_{CE}=V_{CES}$ $V_{BE}=0$ $T_A=125^{\circ}\text{C}$
Collector Cutoff Current BC317, 318, 319 only	ICBO			30 15	nA μA	$V_{CB}=20\text{V}$ $I_E=0$ $V_{CB}=20\text{V}$ $I_E=0$ $T_A=100^{\circ}\text{C}$
Collector-Emitter Saturation Voltage BC107, 108, 109 } BC167, 168, 169 } only BC237, 238, 239 }	$V_{CE}(\text{sat})^*$		0.07 0.25		V	$I_C=10\text{mA}$ $I_B=0.5\text{mA}$ $I_C=100\text{mA}$ $I_B=5\text{mA}$
BC317, 318, 319 only	$V_{CE}(\text{sat})^*$		0.07 0.2		V	$I_C=10\text{mA}$ $I_B=0.5\text{mA}$ $I_C=100\text{mA}$ $I_B=5\text{mA}$
Base-Emitter Saturation Voltage BC107, 108, 109 } BC167, 168, 169 } only BC237, 238, 239 }	$V_{BE}(\text{sat})^*$		0.7 0.83		V	$I_C=10\text{mA}$ $I_B=0.5\text{mA}$ $I_C=100\text{mA}$ $I_B=5\text{mA}$
BC317, 318, 319 only	$V_{BE}(\text{sat})^*$		0.9 1.05		V	$I_C=100\text{mA}$ $I_B=5\text{mA}$
Base-Emitter Voltage All types BC317, 318, 319 only	V_{BE}^*	0.55	0.63 0.7		V	$I_C=2\text{mA}$ $V_{CE}=5\text{V}$ $I_C=10\text{mA}$ $V_{CE}=5\text{V}$
BC317, 318, 319 only	V_{BE}^*	0.68	0.77		V	$I_C=10\text{mA}$ $V_{CE}=5\text{V}$
Current Gain-Bandwidth Product BC107, 108, 109 } BC167, 168, 169 } only BC237, 238, 239 }	f_T	150	250		MHz	$I_C=10\text{mA}$ $V_{CE}=5\text{V}$
Collector-Base Capacitance BC107, 108, 109	Cob		3.2 6.0		pF	$V_{CB}=10\text{V}$ $I_E=0$ $f=1\text{MHz}$
BC167, 168, 169			2.7 4.5		pF	
BC237, 238, 239			2.7 4.5		pF	
BC317, 318, 319			2.7 4.0		pF	
Noise Figure BC107, 108	NF		2 10		dB	$I_C=0.2\text{mA}$ $V_{CE}=5\text{V}$ $R_G=2\text{K}\Omega$ $f=1\text{kHz}$ $\Delta f=200\text{Hz}$
BC167, 168			2 10		dB	
BC237, 238			2 10		dB	
BC317, 318			2 6		dB	

* Pulse Test : Pulse Width=0.3ms, Duty Cycle=1%

Note 1 : equal to the value of absolute maximum ratings.

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PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITIONS
Noise Figure	BC109 BC169	NF		1.5	4	dB	$I_C=0.2mA$ $V_{CE}=5V$ $R_G=2K\Omega$ $f=1kHz$ $\Delta f=200Hz$
	BC239 BC319			1.2	4		

D.C. CURRENT GAIN (HFE) @ $V_{CE}=5V$ $T_A=25^\circ C$

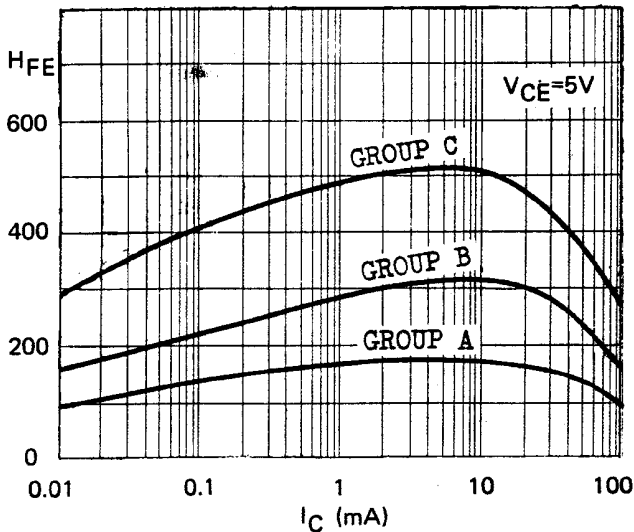
at I_C (Pulsed)	HFE GROUP A			HFE GROUP B			HFE GROUP C		
	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
0.01mA	40	90		40	170		100	290	
2mA	110	170	220	200	300	450	420	520	800
100mA		100			160			270	

h-PARAMETERS @ $I_C=2mA$ $V_{CE}=5V$ $f=1kHz$ $T_A=25^\circ C$

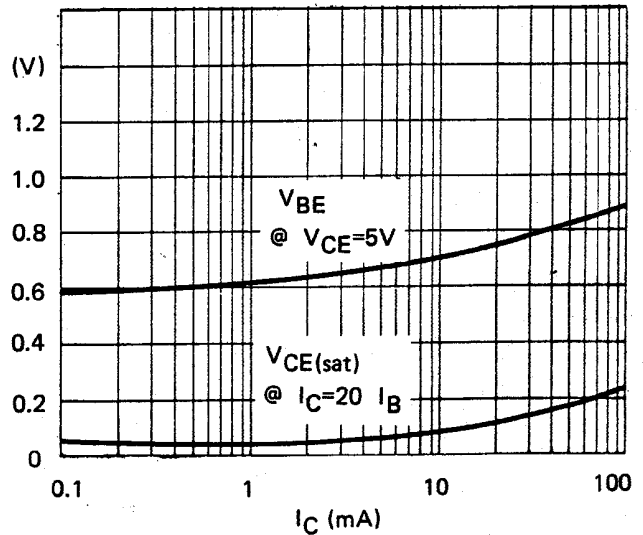
h - PARAMETER	SYMBOL	HFE GROUP A			HFE GROUP B			HFE GROUP C			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Input Impedance	h_{ie}	1.6	2.7	4.5	3.2	4.5	8.5	6	8.7	15	$K\Omega$
Voltage Feedback Ratio	h_{re}		1.5			2			3		$\times 10^{-4}$
Small Signal Current Gain	h_{fe}	125	190	260	240	330	500	450	580	900	
Output Admittance	h_{oe}		18	30		30	60		60	110	μS

TYPICAL CHARACTERISTICS AT $T_A=25^\circ C$ (Pulse Test)

D.C. CURRENT GAIN
vs COLLECTOR CURRENT

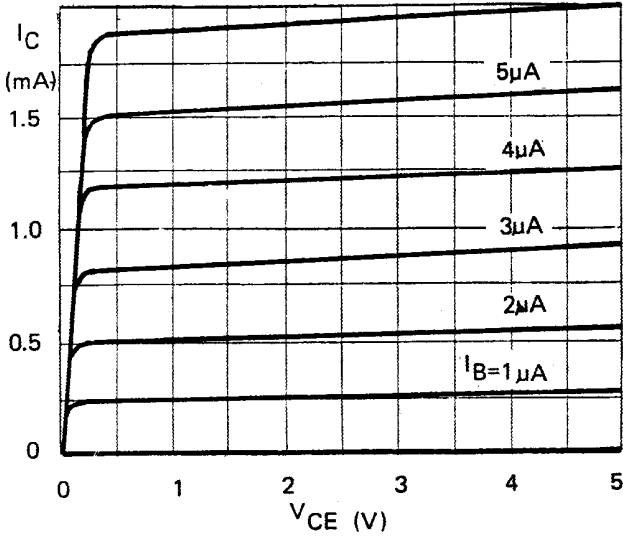


V_{BE} AND $V_{CE(sat)}$
vs COLLECTOR CURRENT

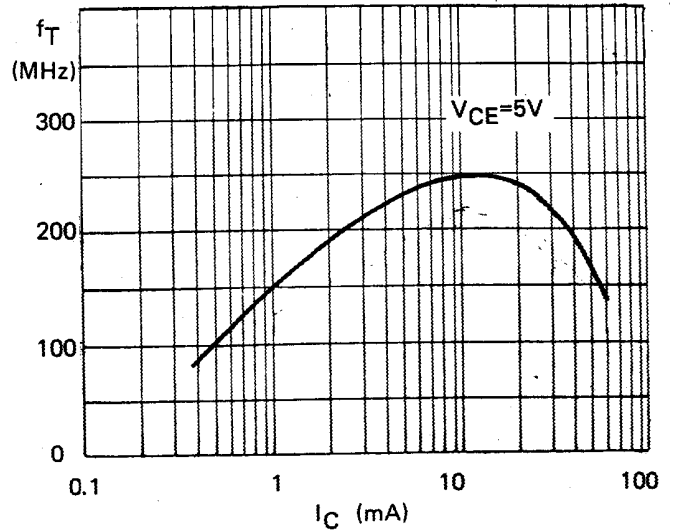


BC107 family
 TYPICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ UNLESS OTHERWISE SPECIFIED)

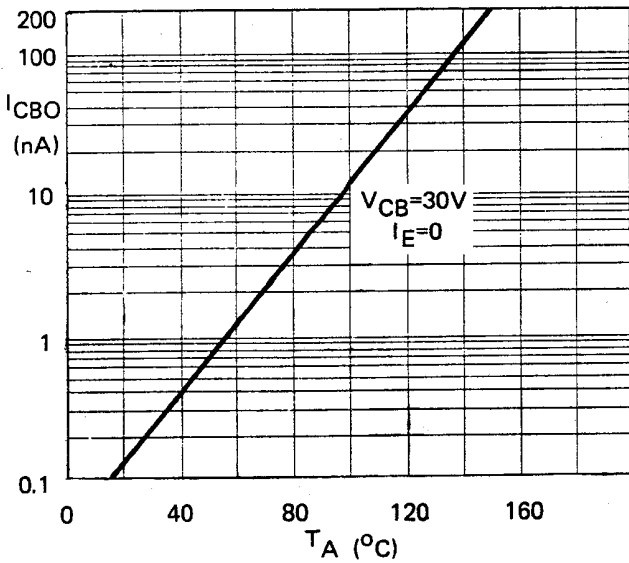
COMMON EMITTER
 OUTPUT CHARACTERISTICS



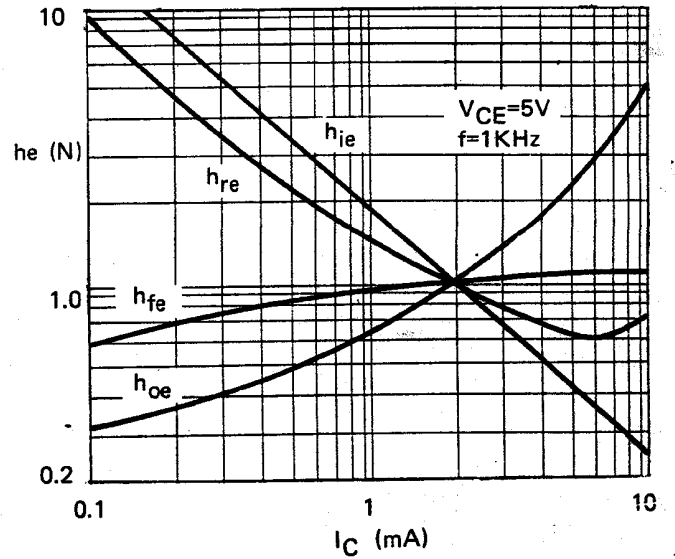
CURRENT GAIN - BANDWIDTH PRODUCT
 vs COLLECTOR CURRENT



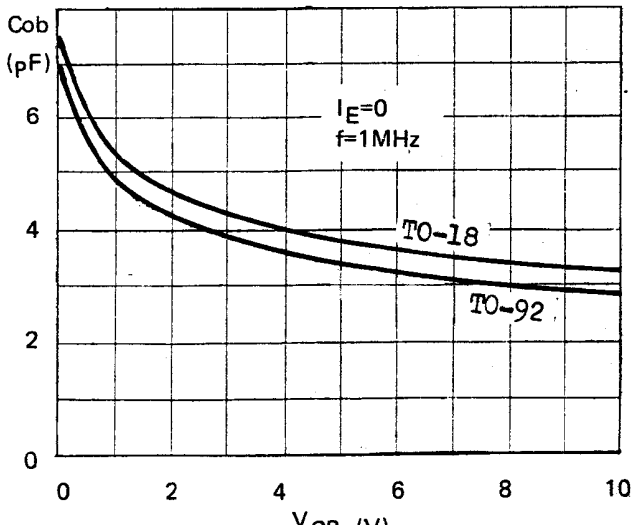
COLLECTOR CUTOFF CURRENT
 vs AMBIENT TEMPERATURE



h-PARAMETERS (NORMALIZED)
 vs COLLECTOR CURRENT



COLLECTOR-BASE CAPACITANCE
 vs COLLECTOR-BASE VOLTAGE



BROAD BAND NOISE FIGURE
 vs COLLECTOR CURRENT

