

# 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.

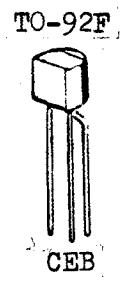
CASE



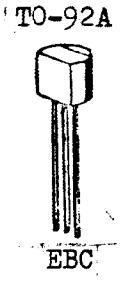
CBE



ECB



CEB



EBC

BC107,8,9

BC167,8,9

BC237,8,9

BC317,8,9

ABSOLUTE MAXIMUM RATINGS

TYPE	V <sub>CBO</sub> (V)	V <sub>CES</sub> (V)	V <sub>CBO</sub> (V)	V <sub>EBO</sub> (V)	I <sub>C</sub> (DC) (mA)	P <sub>tot</sub> (mW) *	T <sub>j</sub> , T <sub>stg</sub>
BC107	50	50	45	6	100	300	
BC108	30	30	20	5	100	300	-55 to 175°C
BC109	30	30	20	5	100	300	
BC167	50	50	45	6	100	300	
BC168	30	30	20	5	100	300	-55 to 150°C
BC169	30	30	20	5	100	300	
BC237	50	50	45	6	100	300	
BC238	30	30	20	5	100	300	-55 to 150°C
BC239	30	30	20	5	100	300	
BC317	50		45	6	150	310	
BC318	45		30	5	150	310	-55 to 150°C
BC319	30		20	5	150	310	

\* Total Power Dissipation @ T<sub>A</sub> ≤ 25°C

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	$I_C=10\mu\text{A} \quad I_E=0$
Collector-Emitter Breakdown Voltage	LVCEO *				V	$I_C=2\text{mA} \quad I_B=0$
Emitter-Base Breakdown Voltage	BVEBO				V	$I_E=1\mu\text{A} \quad I_C=0$
Collector Cutoff Current BC107, 108, 109 } only BC167, 168, 169 } only BC237, 238, 239 }	ICES		15	nA	VCE=VCES VBE=0	
			4	$\mu\text{A}$	VCE=VCES VBE=0 $T_A=125^\circ\text{C}$	
Collector Cutoff Current BC317, 318, 319 only	ICBO		30	nA	$V_{CB}=20\text{V} \quad I_E=0$	
			15	$\mu\text{A}$	$V_{CB}=20\text{V} \quad I_E=0$ $T_A=100^\circ\text{C}$	
Collector-Emitter Saturation Voltage BC107, 108, 109 } only BC167, 168, 169 } only BC237, 238, 239 }	VCE(sat)*	0.07 0.25	0.25	V	$I_C=10\text{mA} \quad I_B=0.5\text{mA}$	
		0.22 0.6	0.6	V	$I_C=100\text{mA} \quad I_B=5\text{mA}$	
Base-Emitter Saturation Voltage BC107, 108, 109 } only BC167, 168, 169 } only BC237, 238, 239 }	VBE(sat)*	0.07 0.2	0.2	V	$I_C=10\text{mA} \quad I_B=0.5\text{mA}$	
		0.2 0.5	0.5	V	$I_C=100\text{mA} \quad I_B=5\text{mA}$	
Base-Emitter Voltage All types	VBE *	0.55 0.63 0.7	0.7	V	$I_C=2\text{mA} \quad V_{CE}=5\text{V}$	
BC317, 318, 319 only		0.68 0.77	0.77	V	$I_C=10\text{mA} \quad V_{CE}=5\text{V}$	
Current Gain-Bandwidth Product BC107, 108, 109 } only BC167, 168, 169 } only BC237, 238, 239 }	fT	150 250		MHz	$I_C=10\text{mA} \quad V_{CE}=5\text{V}$	
Collector-Base Capacitance BC107, 108, 109 BC167, 168, 169 BC237, 238, 239 BC317, 318, 319	Cob	3.2 6.0	6.0	pF	$V_{CB}=10\text{V} \quad I_E=0$ $f=1\text{MHz}$	
		2.7 4.5	4.5	pF		
		2.7 4.5	4.5	pF		
		2.7 4.0	4.0	pF		
Noise Figure BC107, 108 BC167, 168 BC237, 238 BC317, 318	NF	2 10	10	dB	$I_C=0.2\text{mA} \quad V_{CE}=5\text{V}$ $R_G=2\text{k}\Omega \quad f=1\text{kHz}$ $\Delta f=200\text{Hz}$	
		2 10	10	dB		
		2 10	10	dB		
		2 6	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 BC239 BC319	NF only	1.5	4	dB	IC=0.2mA VCE=5V RG=2KΩ f=1kHz Δf=200Hz	IC=0.2mA VCE=5V RG=2KΩ f=30Hz-15kHz

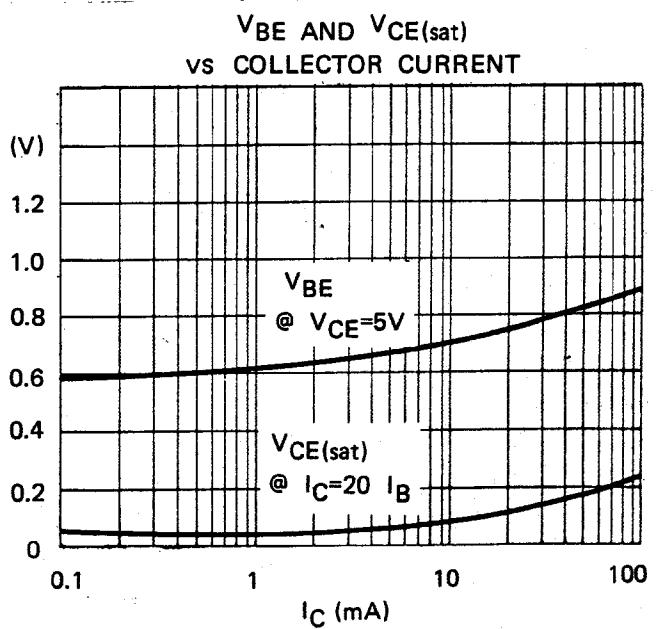
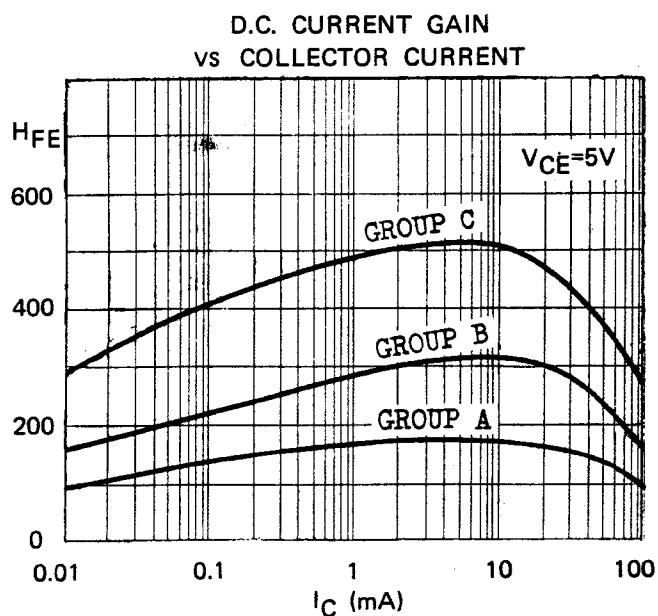
D.C. CURRENT GAIN ( $H_{FE}$ ) @  $V_{CE}=5V$   $T_A=25^\circ C$

at $I_C$ (Pulsed)	H <sub>FE</sub> GROUP A			H <sub>FE</sub> GROUP B			H <sub>FE</sub> 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 @  $I_C=2mA$   $V_{CE}=5V$   $f=1kHz$   $T_A=25^\circ C$

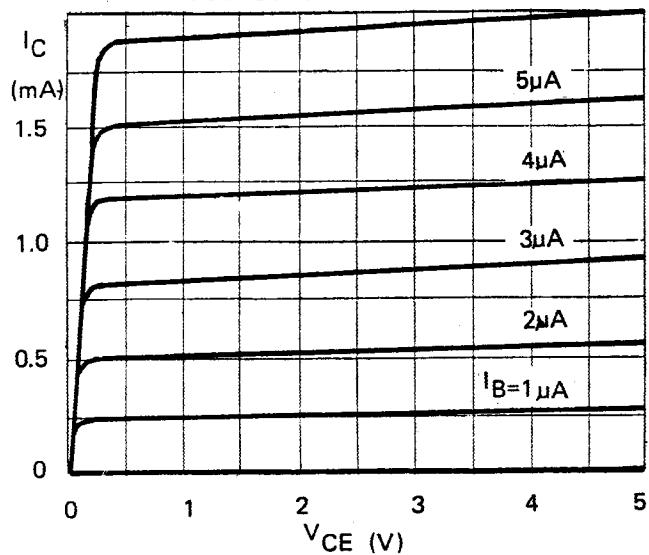
h - PARAMETER	SYMBOL	H <sub>FE</sub> GROUP A			H <sub>FE</sub> GROUP B			H <sub>FE</sub> GROUP C			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
Input Impedance	$h_{ie}$	1.6	2.7	4.5	3.2	4.5	8.5	6	8.7	15	KΩ
Voltage Feedback Ratio	$h_{re}$		1.5			2		3			$\times 10^{-4}$
Small Signal Current Gain	$h_{fe}$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

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

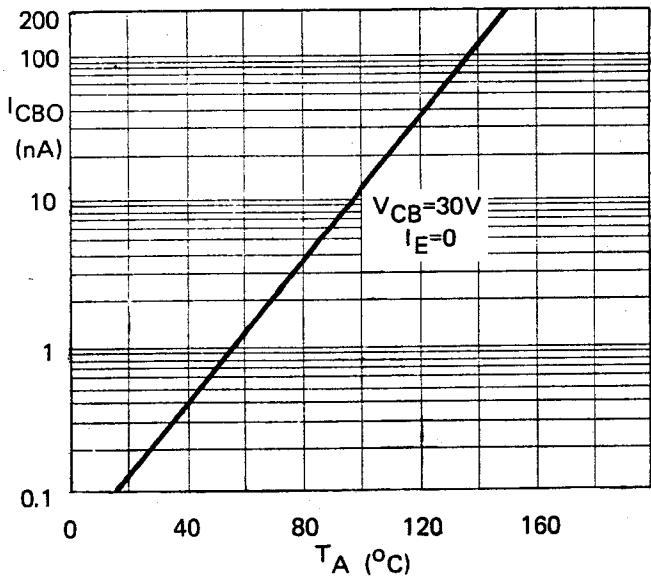


**BC107 family**  
**TYPICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$  UNLESS OTHERWISE SPECIFIED)**

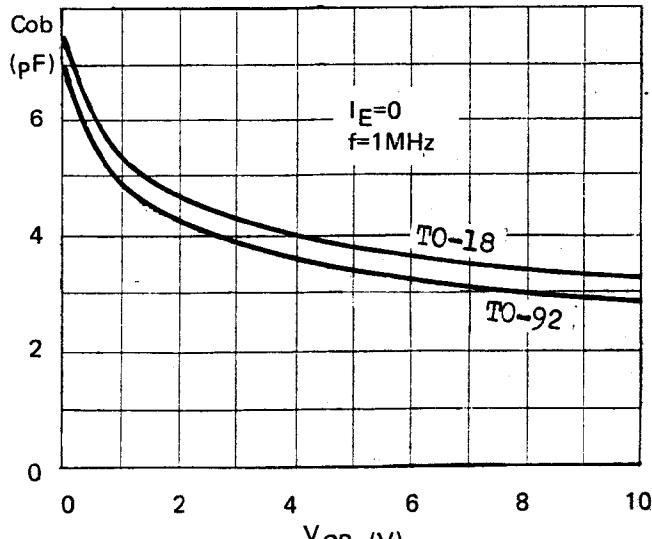
COMMON Emitter  
OUTPUT CHARACTERISTICS



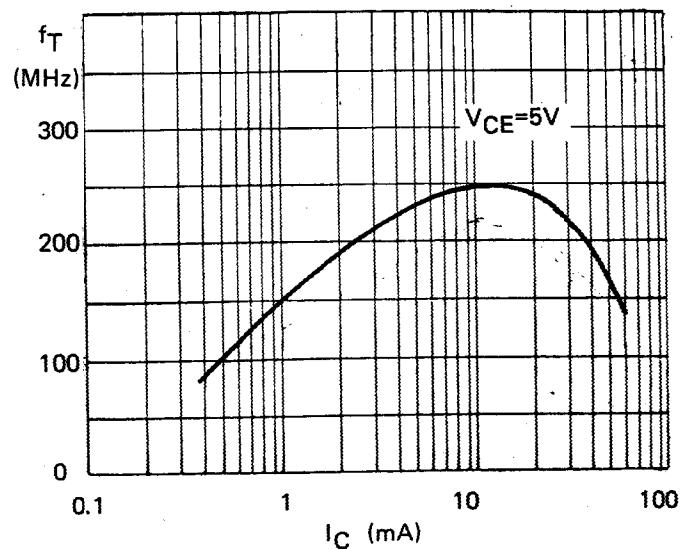
COLLECTOR CUTOFF CURRENT  
VS AMBIENT TEMPERATURE



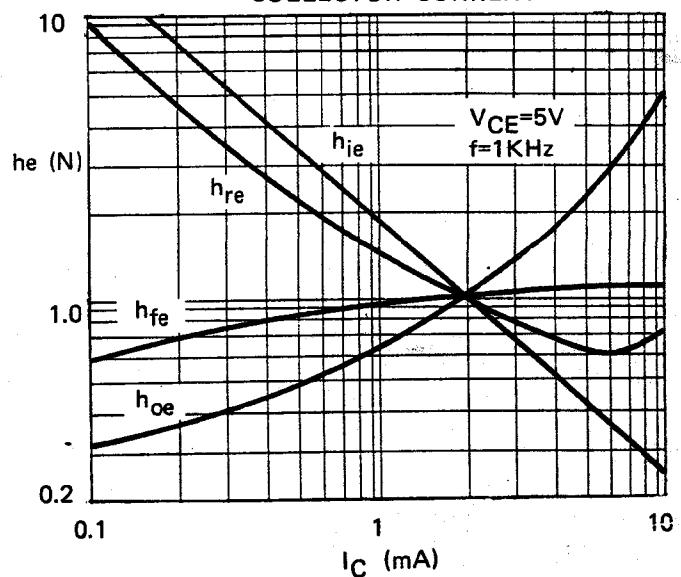
COLLECTOR-BASE CAPACITANCE  
VS COLLECTOR-BASE VOLTAGE



CURRENT GAIN - BANDWIDTH PRODUCT  
VS COLLECTOR CURRENT



h-PARAMETERS (NORMALIZED)  
VS COLLECTOR CURRENT



BROAD BAND NOISE FIGURE  
VS COLLECTOR CURRENT

