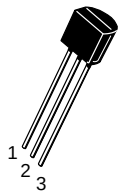
Amplifier Transistors
NPN Silicon

BC237,A,B,C
BC238B,C
BC239C



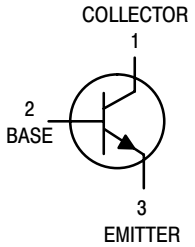
CASE 29–11, STYLE 17
TO–92 (TO–226AA)

MAXIMUM RATINGS

Rating	Symbol	BC237	BC238	BC239	Unit
Collector–Emitter Voltage	V_{CEO}	45	25	25	Vdc
Collector–Emitter Voltage	V_{CES}	50	30	30	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	5.0	5.0	Vdc
Collector Current — Continuous	I_C	100			mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	350 2.8			mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.0 8.0			Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150			°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	357	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	125	°C/W



ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I_C = 2.0 mA, I_B = 0)	BC237 BC238 BC239	$V_{(BR)CEO}$	45 25 25	— — —	— — —	V
Emitter–Base Breakdown Voltage (I_E = 100 μA, I_C = 0)	BC237 BC238 BC239	$V_{(BR)EBO}$	6.0 5.0 5.0	— — —	— — —	V
Collector Cutoff Current (V_{CE} = 30 V, V_{BE} = 0)	 BC238 BC239	I_{CES}	 — —	 0.2 0.2	 15 15	nA
(V_{CE} = 50 V, V_{BE} = 0)	BC237		—	0.2	15	
(V_{CE} = 30 V, V_{BE} = 0) T_A = 125°C	BC238 BC239		— —	0.2 0.2	4.0 4.0	μA
(V_{CE} = 50 V, V_{BE} = 0) T_A = 125°C	BC237		—	0.2	4.0	

May, 2001 – Rev. 3
Publication Order Number:
BC237/D

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				—
(I_C = 10 μA, V_{CE} = 5.0 V)	BC237A		—	90	—	
	BC237B/238B		—	150	—	
	BC237C/238C/239C		—	270	—	
(I_C = 2.0 mA, V_{CE} = 5.0 V)	BC237		120	—	800	
	BC237A		120	170	220	
	BC237B/238B		200	290	460	
	BC237C/238C/239C		380	500	800	
(I_C = 100 mA, V_{CE} = 5.0 V)	BC237A		—	120	—	
	BC237B/238B		—	180	—	
	BC237C/238C/239C		—	300	—	
Collector–Emitter On Voltage		$V_{CE(sat)}$				V
(I_C = 10 mA, I_B = 0.5 mA)	BC237/BC238/BC239		—	0.07	0.2	
(I_C = 100 mA, I_B = 5.0 mA)	BC237/BC239		—	0.2	0.6	
	BC238				0.8	
Base–Emitter Saturation Voltage		$V_{BE(sat)}$				V
(I_C = 10 mA, I_B = 0.5 mA)			—	0.6	0.83	
(I_C = 100 mA, I_B = 5.0 mA)			—	—	1.05	
Base–Emitter On Voltage		$V_{BE(on)}$				V
(I_C = 100 μA, V_{CE} = 5.0 V)			—	0.5	—	
(I_C = 2.0 mA, V_{CE} = 5.0 V)			0.55	0.62	0.7	
(I_C = 100 mA, V_{CE} = 5.0 V)			—	0.83	—	
DYNAMIC CHARACTERISTICS						
Current–Gain — Bandwidth Product		f_T				MHz
(I_C = 0.5 mA, V_{CE} = 3.0 V, f = 100 MHz)	BC237		—	100	—	
	BC238		—	120	—	
	BC239		—	140	—	
(I_C = 10 mA, V_{CE} = 5.0 V, f = 100 MHz)	BC237		150	200	—	
	BC238		150	240	—	
	BC239		150	280	—	
Collector–Base Capacitance (V_{CB} = 10 V, I_C = 0, f = 1.0 MHz)		C_{obo}	—	—	4.5	pF
Emitter–Base Capacitance (V_{EB} = 0.5 V, I_C = 0, f = 1.0 MHz)		C_{ibo}	—	8.0	—	pF
Noise Figure		NF				dB
(I_C = 0.2 mA, V_{CE} = 5.0 V, R_S = 2.0 kΩ, f = 1.0 kHz)	BC239		—	2.0	4.0	
(I_C = 0.2 mA, V_{CE} = 5.0 V, R_S = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)	BC237		—	2.0	10	
	BC238		—	2.0	10	
	BC239		—	2.0	4.0	

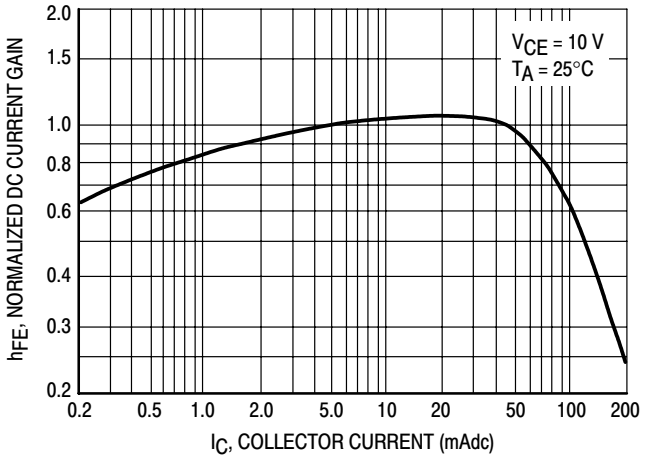


Figure 1. Normalized DC Current Gain

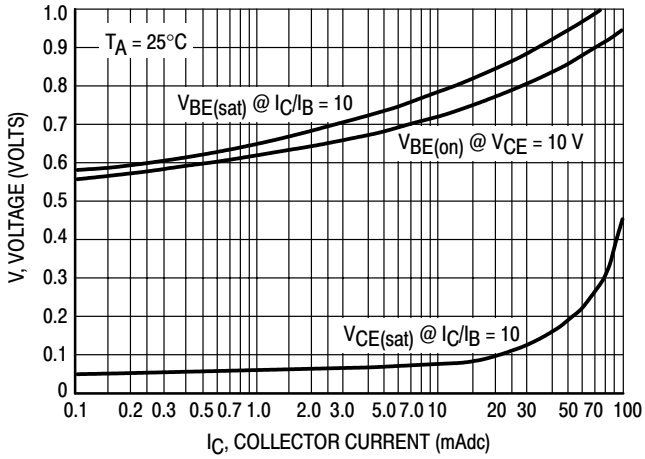


Figure 2. “Saturation” and “On” Voltages

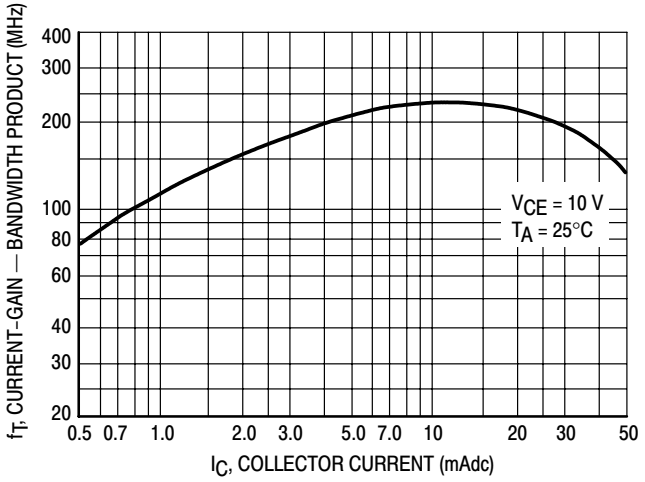


Figure 3. Current−Gain — Bandwidth Product

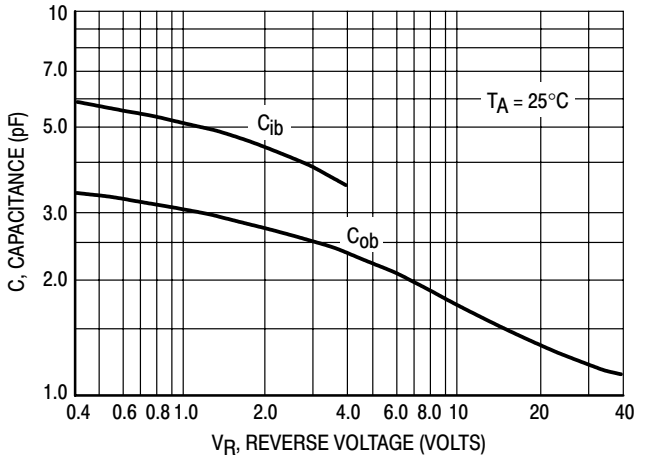


Figure 4. Capacitances

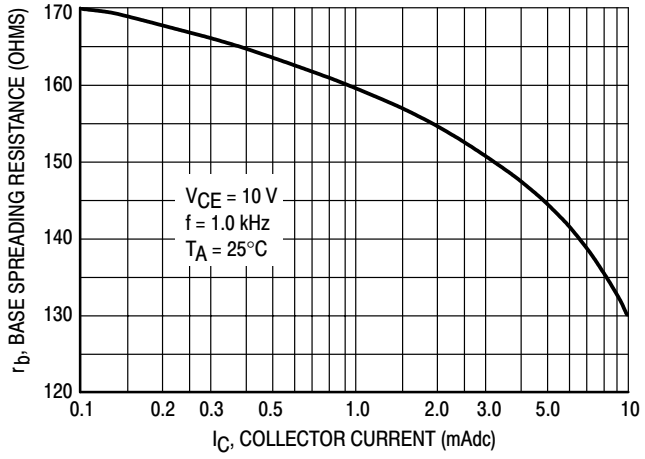
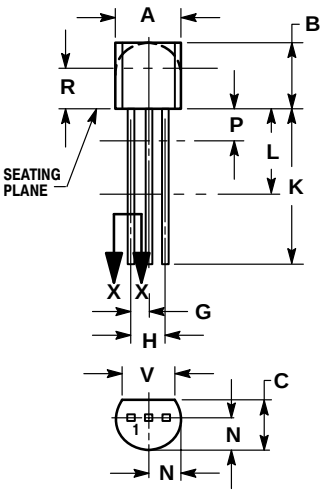
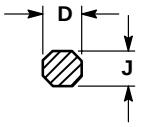


Figure 5. Base Spreading Resistance

PACKAGE DIMENSIONS

TO–92 (TO–226)
CASE 29–11
ISSUE AL





SECTION X–X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

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