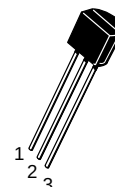
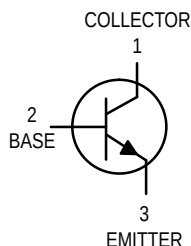


Amplifier Transistors

NPN Silicon

BC237,A,B,C
BC238B,C
BC239,C



CASE 29-04, STYLE 17
TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	BC 237	BC 238	BC 239	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			mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350 2.8			mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 8.0			Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to +150			$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 2.0\text{ mA}$, $I_B = 0$)	BC237 BC238 BC239	$V_{(BR)CEO}$	45 25 25	— — —	— — —	V
Emitter–Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$, $I_C = 0$)	BC237 BC238 BC239	$V_{(BR)EBO}$	6.0 5.0 5.0	— — —	— — —	V
Collector Cutoff Current ($V_{CE} = 30\text{ V}$, $V_{BE} = 0$)	BC238 BC239	I_{CES}	— —	0.2 0.2	15 15	nA
($V_{CE} = 50\text{ V}$, $V_{BE} = 0$)	BC237		—	0.2	15	
($V_{CE} = 30\text{ V}$, $V_{BE} = 0$) $T_A = 125^\circ\text{C}$	BC238 BC239		— —	0.2 0.2	4.0 4.0	μA
($V_{CE} = 50\text{ V}$, $V_{BE} = 0$) $T_A = 125^\circ\text{C}$	BC237		—	0.2	4.0	

BC237,A,B,C BC238B,C BC239,C**ELECTRICAL CHARACTERISTICS** ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit	
ON CHARACTERISTICS							
DC Current Gain (I _C = 10 μA, V _{CE} = 5.0 V) (I _C = 2.0 mA, V _{CE} = 5.0 V) (I _C = 100 mA, V _{CE} = 5.0 V)	BC237A	h _{FE}	—	90	—	—	
	BC237B/238B		—	150	—		
	BC237C/238C/239C		—	270	—		
	BC237		120	—	800		
	BC239		120	—	800		
	BC237A		120	170	220		
	BC237B/238B		200	290	460		
	BC237C/238C/239C		380	500	800		
	BC237A		—	120	—		
	BC237B/238B	—	180	—			
	BC237C/238C/239C	—	300	—			
	Collector–Emitter On Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA)	BC237/BC238/BC239 BC237/BC239 BC238	V _{CE(sat)}	— —	0.07 0.2	0.2 0.6 0.8	V
	Base–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA)		V _{BE(sat)}	— —	0.6 —	0.83 1.05	V
	Base–Emitter On Voltage (I _C = 100 μA, V _{CE} = 5.0 V) (I _C = 2.0 mA, V _{CE} = 5.0 V) (I _C = 100 mA, V _{CE} = 5.0 V)		V _{BE(on)}	— 0.55 —	0.5 0.62 0.83	— 0.7 —	V
	DYNAMIC CHARACTERISTICS						
Current–Gain — Bandwidth Product (I _C = 0.5 mA, V _{CE} = 3.0 V, f = 100 MHz) (I _C = 10 mA, V _{CE} = 5.0 V, f = 100 MHz)	BC237 BC238 BC239 BC237 BC238 BC239	f _T	— — — 150 150 150	100 120 140 200 240 280	— — — — — —	MHz	
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 (I _C = 0.2 mA, V _{CE} = 5.0 V, R _S = 2.0 kΩ, f = 1.0 kHz) (I _C = 0.2 mA, V _{CE} = 5.0 V, R _S = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)	BC239 BC237 BC238 BC239	NF	— — — —	2.0 2.0 2.0 2.0	4.0 10 10 4.0	dB	

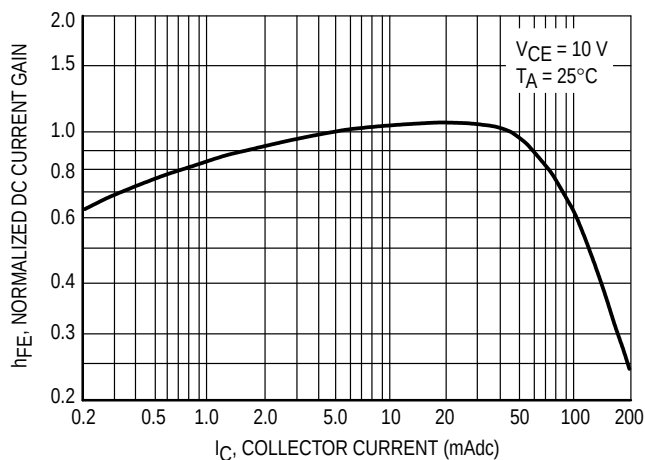


Figure 1. Normalized DC Current Gain

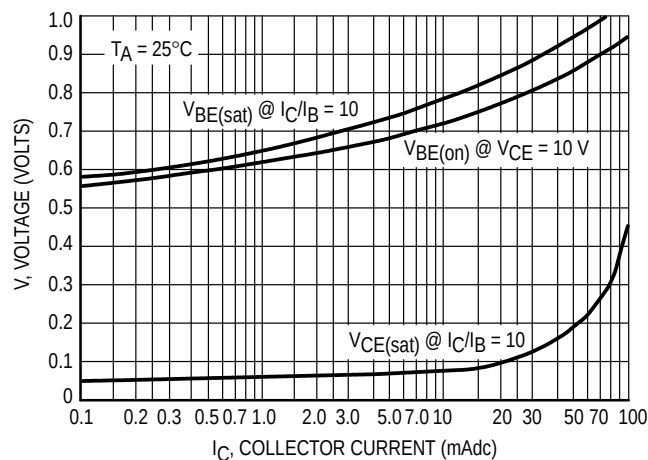


Figure 2. "Saturation" and "On" Voltages

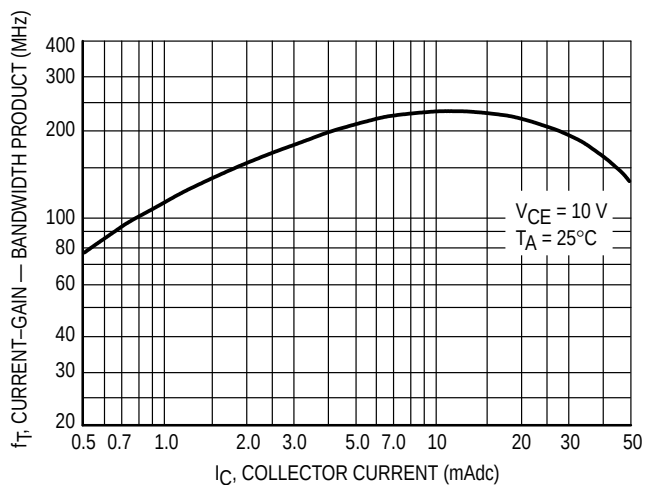


Figure 3. Current-Gain — Bandwidth Product

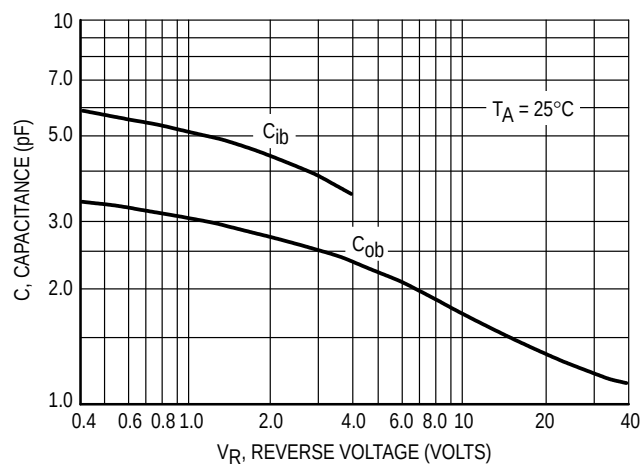


Figure 4. Capacitances

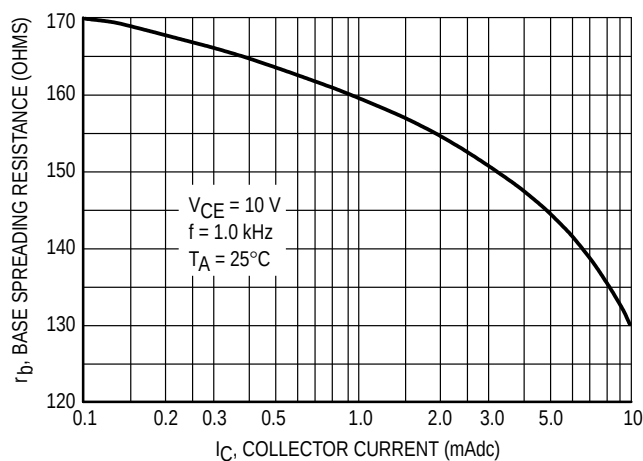
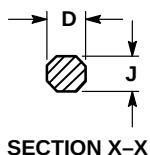
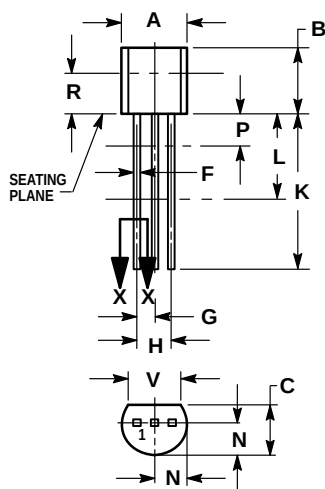


Figure 5. Base Spreading Resistance

PACKAGE DIMENSIONS



**CASE 029-04
(TO-226AA)
ISSUE AD**

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K. MINIMUM LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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:

1. COLLECTOR
2. BASE
3. EMITTER

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