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# BC237, BC237B, BC237C, BC239C

## Amplifier Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	45 25	Vdc
Collector-Emitter Voltage	$V_{CES}$	50 30	Vdc
Collector-Emitter Voltage	$V_{EBO}$	6.0 5.0	Vdc
Collector Current - Continuous	$I_C$	100	mAdc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $T_A = 25^\circ\text{C}$	$P_D$	350 2.8	mW mW/°C
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $T_A = 25^\circ\text{C}$	$P_D$	1.0 8.0	W mW/°C
Operating and Storage 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

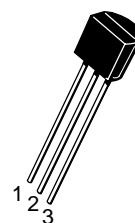
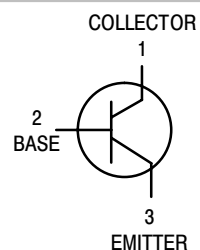
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



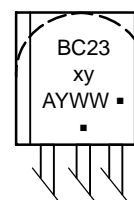
ON Semiconductor®

<http://onsemi.com>



TO-92  
CASE 29  
STYLE 17

#### MARKING DIAGRAM



BC23xy = Device Code  
x = 7 or 9  
y = B or C

A = Assembly Location  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping†
BC237	TO-92	5000 Units / Bulk
BC237G	TO-92 (Pb-Free)	5000 Units / Bulk
BC237B	TO-92	5000 Units / Bulk
BC237BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC237BRL1	TO-92	2000/Tape & Reel
BC237BRL1G	TO-92 (Pb-Free)	2000/Tape & Reel
BC237BZL1	TO-92	2000/Ammo Pack
BC237BZL1G	TO-92 (Pb-Free)	2000/Ammo Pack
BC237C	TO-92	5000 Units / Bulk
BC237CG	TO-92 (Pb-Free)	5000 Units / Bulk

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# BC237, BC237B, BC237C, BC239C

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 2.0 mA, I <sub>B</sub> = 0)	BC237 BC239	V <sub>(BR)CEO</sub>	45 25	– –	– –	V
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 100 μA, I <sub>C</sub> = 0)	BC237 BC239	V <sub>(BR)EBO</sub>	6.0 5.0	– –	– –	V
Collector Cutoff Current (V <sub>CE</sub> = 30 V, V <sub>BE</sub> = 0) (V <sub>CE</sub> = 50 V, V <sub>BE</sub> = 0) (V <sub>CE</sub> = 30 V, V <sub>BE</sub> = 0) T <sub>A</sub> = 125°C (V <sub>CE</sub> = 50 V, V <sub>BE</sub> = 0) T <sub>A</sub> = 125°C	BC239 BC237 BC239 BC237	I <sub>CES</sub>	– – – –	0.2 0.2 0.2 0.2	15 15 4.0 4.0	nA μA
<b>ON CHARACTERISTICS</b>						
DC Current Gain (I <sub>C</sub> = 10 μA, V <sub>CE</sub> = 5.0 V)  (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V)  (I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 V)	BC237B BC237C/239C BC237 BC237B BC237C/239C BC237B BC237C/239C	h <sub>FE</sub>	– – 120 200 380 – –	150 270 – 290 500 180 300	– – 800 460 800 – –	–
Collector–Emitter On Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA) (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 5.0 mA)	BC237/BC239 BC237/BC239	V <sub>CE(sat)</sub>	– –	0.07 0.2	0.2 0.6	V
Base–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA) (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 5.0 mA)		V <sub>BE(sat)</sub>	– –	0.6 –	0.83 1.05	V
Base–Emitter On Voltage (I <sub>C</sub> = 100 μA, V <sub>CE</sub> = 5.0 V) (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V) (I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 V)		V <sub>BE(on)</sub>	– 0.55 –	0.5 0.62 0.83	– 0.7 –	V
<b>DYNAMIC CHARACTERISTICS</b>						
Current–Gain — Bandwidth Product (I <sub>C</sub> = 0.5 mA, V <sub>CE</sub> = 3.0 V, f = 100 MHz)  (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V, f = 100 MHz)	BC237 BC239 BC237 BC239	f <sub>T</sub>	– – 150 150	100 140 200 280	– – – –	MHz
Collector–Base Capacitance (V <sub>CB</sub> = 10 V, I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>obo</sub>	–	–	4.5	pF
Emitter–Base Capacitance (V <sub>EB</sub> = 0.5 V, I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>ibo</sub>	–	8.0	–	pF
Noise Figure (I <sub>C</sub> = 0.2 mA, V <sub>CE</sub> = 5.0 V, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz) (I <sub>C</sub> = 0.2 mA, V <sub>CE</sub> = 5.0 V, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)	BC239 BC237 BC239	NF	– – –	2.0 2.0 2.0	4.0 10 4.0	dB

# BC237, BC237B, BC237C, BC239C

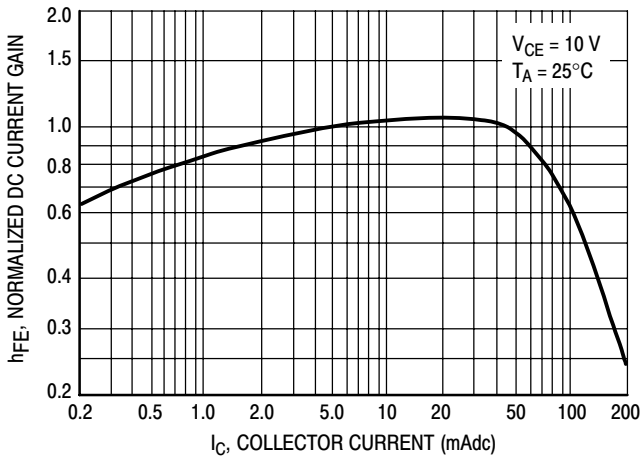


Figure 1. Normalized DC Current Gain

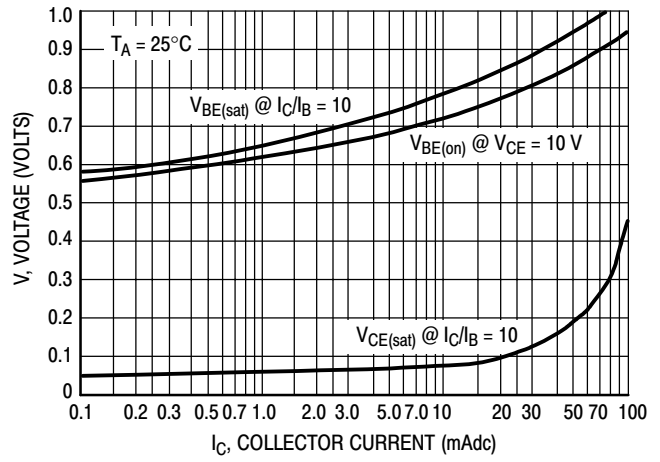


Figure 2. "Saturation" and "On" Voltages

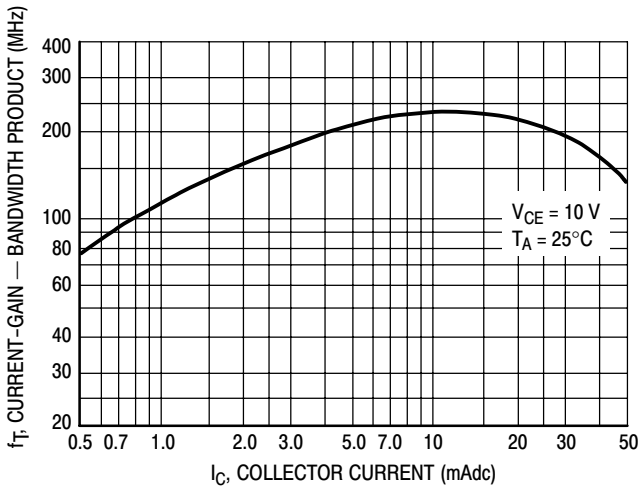


Figure 3. Current-Gain — Bandwidth Product

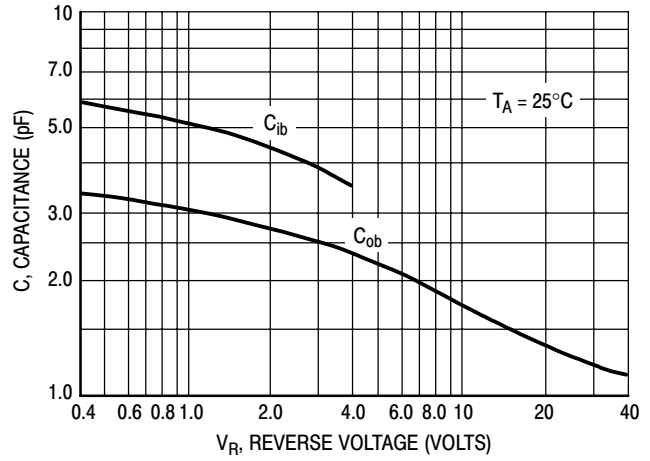


Figure 4. Capacitances

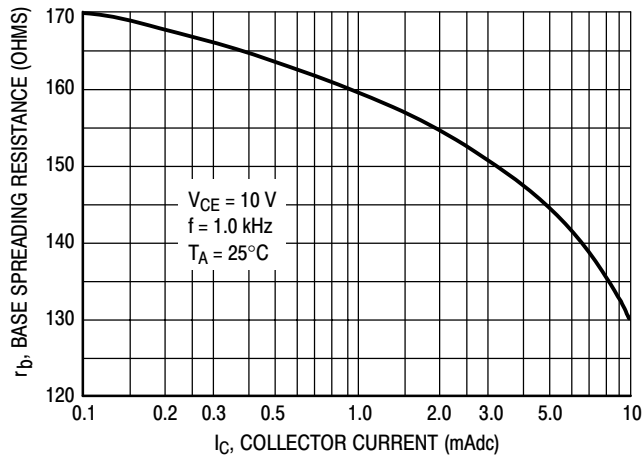
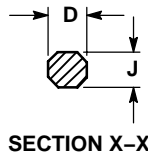
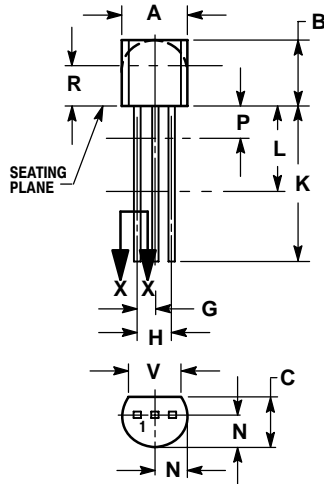


Figure 5. Base Spreading Resistance

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## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



**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.

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	0.021	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
- BASE
- EMITTER

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