

Amplifier Transistors

NPN Silicon

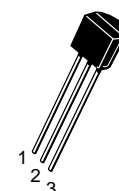
BC237,A,B,C
BC238B,C
BC239C

MAXIMUM RATINGS

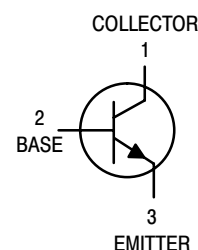
Rating	Symbol	BC237	BC238	BC239	Unit
Collector–Emitter Voltage	V_{CEO}	45	25	25	Vdc
Collector–Emitter Voltage	V_{CES}	50	30	30	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	5.0	5.0	Vdc
Collector Current — Continuous	I_C	100			mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350 2.8			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	$^\circ\text{C/W}$



CASE 29–11, STYLE 17
TO–92 (TO–226AA)



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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

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 BC239C

ELECTRICAL CHARACTERISTICS (T_A = 25°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)	h _{FE}	—	90	—	—
BC237A		—	150	—	
BC237B/238B		—	270	—	
BC237C/238C/239C					
(I _C = 2.0 mA, V _{CE} = 5.0 V)		120	—	800	
BC237		120	170	220	
BC237A		200	290	460	
BC237B/238B		380	500	800	
BC237C/238C/239C					
(I _C = 100 mA, V _{CE} = 5.0 V)		—	120	—	
BC237A		—	180	—	
BC237B/238B		—	300	—	
BC237C/238C/239C					
Collector–Emitter On Voltage (I _C = 10 mA, I _B = 0.5 mA)	V _{CE(sat)}	—	0.07	0.2	V
(I _C = 100 mA, I _B = 5.0 mA)		—	0.2	0.6	
BC237/BC238/BC239				0.8	
BC238					
Base–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA)	V _{BE(sat)}	—	0.6	0.83	V
(I _C = 100 mA, I _B = 5.0 mA)		—	—	1.05	
Base–Emitter On Voltage (I _C = 100 µA, V _{CE} = 5.0 V)	V _{BE(on)}	—	0.5	—	V
(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 (I _C = 0.5 mA, V _{CE} = 3.0 V, f = 100 MHz)	f _T	—	100	—	MHz
BC237		—	120	—	
BC238		—	140	—	
BC239					
(I _C = 10 mA, V _{CE} = 5.0 V, f = 100 MHz)		150	200	—	
BC237		150	240	—	
BC238		150	280	—	
BC239					
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)	NF	—	2.0	4.0	dB
BC239					
(I _C = 0.2 mA, V _{CE} = 5.0 V, R _S = 2.0 kΩ, f = 1.0 kHz, Δf = 200 Hz)		—	2.0	10	
BC237		—	2.0	10	
BC238		—	2.0	10	
BC239		—	2.0	4.0	

BC237,A,B,C BC238B,C BC239C

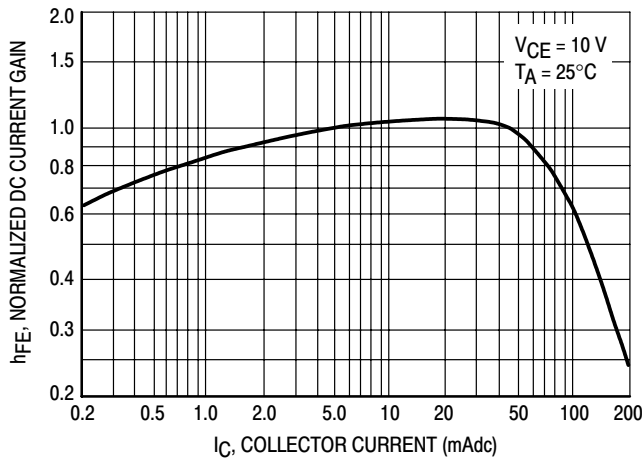


Figure 1. Normalized DC Current Gain

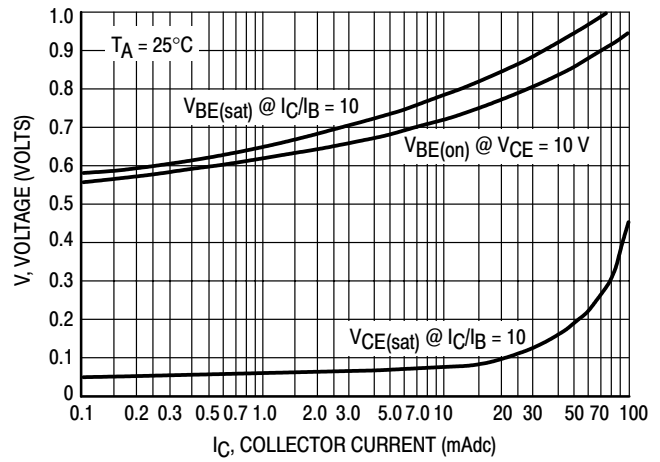


Figure 2. "Saturation" and "On" Voltages

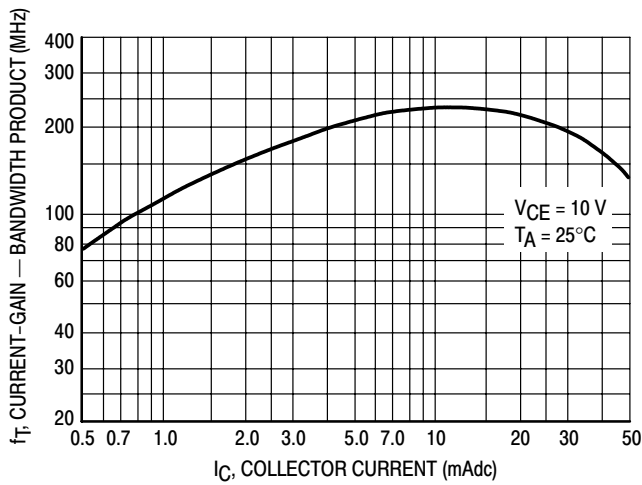


Figure 3. Current-Gain — Bandwidth Product

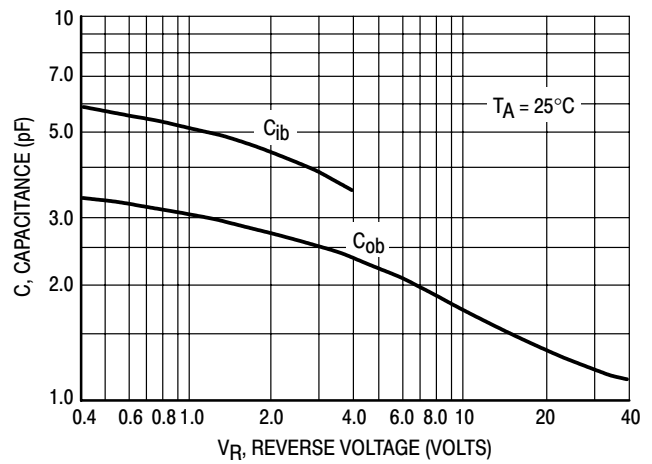


Figure 4. Capacitances

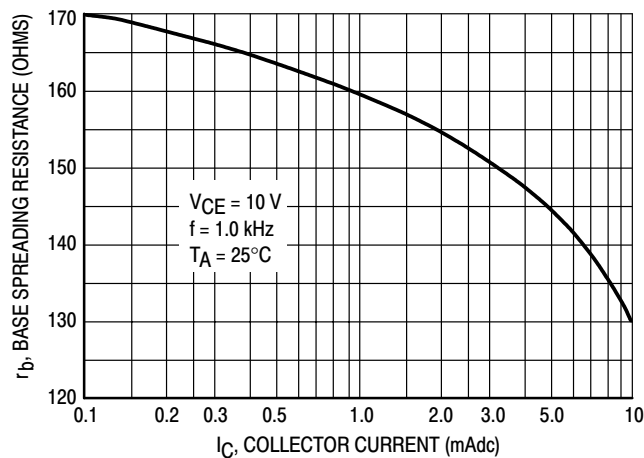
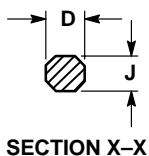
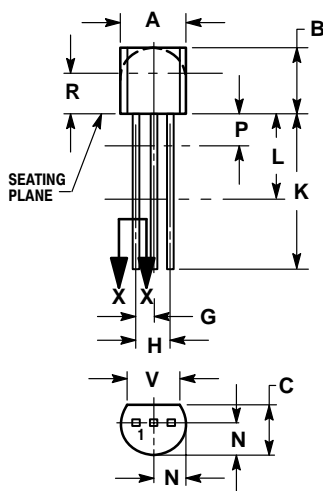


Figure 5. Base Spreading Resistance

BC237,A,B,C BC238B,C BC239C

PACKAGE DIMENSIONS

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




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

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	---

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031
Phone: 81-3-5740-2700
Email: r14525@onsemi.com

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.

This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.