

# BC212, BC212B, BC213

## Amplifier Transistors

PNP Silicon



ON Semiconductor™

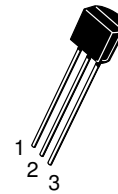
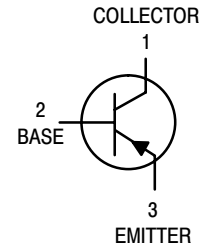
<http://onsemi.com>

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage BC212 BC213	$V_{CEO}$	-50 -30	Vdc
Collector-Base Voltage BC212 BC213	$V_{CBO}$	-60 -45	Vdc
Emitter-Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current – Continuous	$I_C$	-100	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	350 2.8	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0 8.0	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

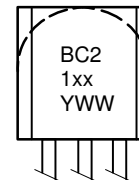
### THERMAL CHARACTERISTICS

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



TO-92  
CASE 29  
STYLE 17

### MARKING DIAGRAMS



BC21xx = Specific Device Code  
xx = 2, 2B, or 3  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

Device	Package	Shipping
BC212	TO-92	5000 Units/Box
BC212B	TO-92	5000 Units/Box
BC212BRL1	TO-92	2000/Tape & Reel
BC212BZL1	TO-92	2000/Ammo Pack
BC213	TO-92	5000 Units/Box

## BC212, BC212B, BC213

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

Characteristic		Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = –2.0 mA, I <sub>B</sub> = 0)	BC212 BC213	V <sub>(BR)CEO</sub>	–50 –30	– –	– –	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = –10 μA, I <sub>E</sub> = 0)	BC212 BC213	V <sub>(BR)CBO</sub>	–60 –45	– –	– –	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = –10 μA, I <sub>C</sub> = 0)	BC212 BC213	V <sub>(BR)EBO</sub>	–5 –5	– –	– –	V <sub>dc</sub>
Collector–Emitter Leakage Current (V <sub>CB</sub> = –30 V)	BC212 BC213	I <sub>CBO</sub>	– –	– –	–15 –15	nA <sub>dc</sub>
Emitter–Base Leakage Current (V <sub>EB</sub> = –4.0 V, I <sub>C</sub> = 0)	BC212 BC213	I <sub>EBO</sub>	– –	– –	–15 –15	nA <sub>dc</sub>

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = –10 μA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> )	BC212 BC213	h <sub>FE</sub>	40 40	– –	– –	–
(I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> )	BC212 BC213		60 80	– –	– –	
(I <sub>C</sub> = –100 mA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> ) (Note 1.)	BC212 BC213		– –	120 140	– –	
Collector–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) (Note 1.)		V <sub>CE(sat)</sub>	– –	–0.10 –0.25	– –0.6	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = –100 mA, I <sub>B</sub> = –5.0 mA)		V <sub>BE(sat)</sub>	–	–1.0	–1.4	V <sub>dc</sub>
Base–Emitter On Voltage (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> )		V <sub>BE(on)</sub>	–0.6	–0.62	–0.72	V <sub>dc</sub>

### DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product (I <sub>C</sub> = –10 mA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> , f = 100 MHz)	BC212 BC213	f <sub>T</sub>	– –	280 360	– –	MHz
Common–Base Output Capacitance (V <sub>CB</sub> = –10 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>ob</sub>	–	–	6.0	pF
Noise Figure (I <sub>C</sub> = –0.2 mA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> , R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, f = 200 Hz)	BC212, BC213	NF	–	–	10	dB
Small–Signal Current Gain (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V <sub>dc</sub> , f = 1.0 kHz)	BC212 BC213 BC212B	h <sub>fe</sub>	60 80 200	– – –	– – 400	–

1. Pulse Test: T<sub>p</sub> 300 s, Duty Cycle 2.0%.

# BC212, BC212B, BC213

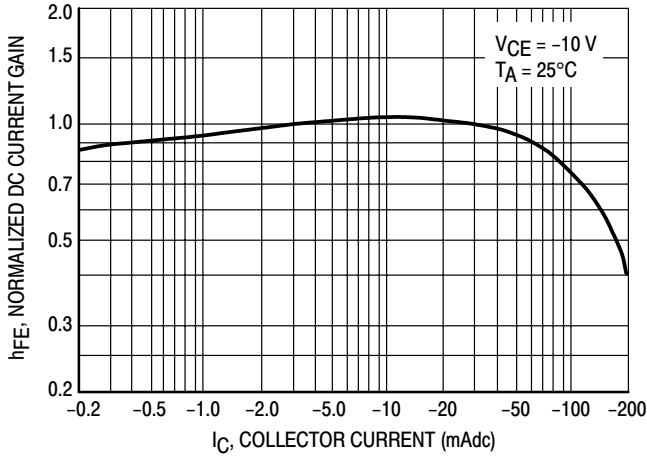


Figure 1. Normalized DC Current Gain

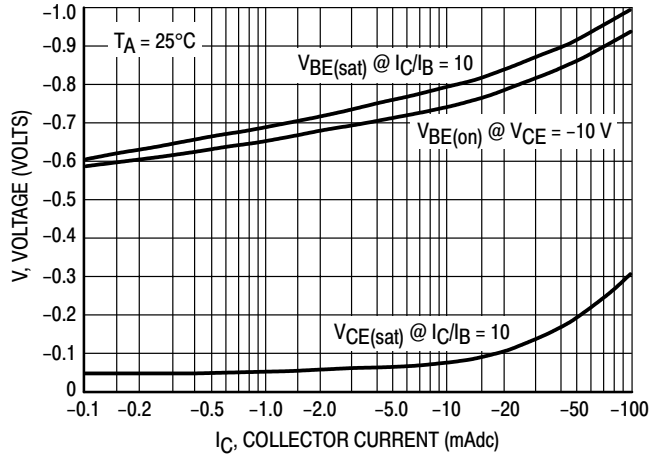


Figure 2. "Saturation" and "On" Voltages

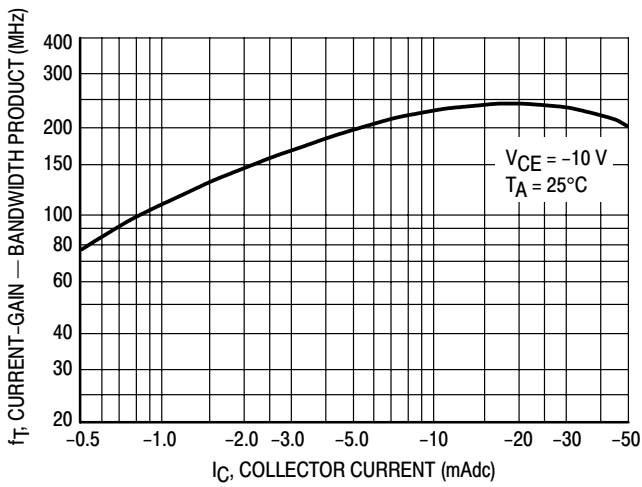


Figure 3. Current-Gain - Bandwidth Product

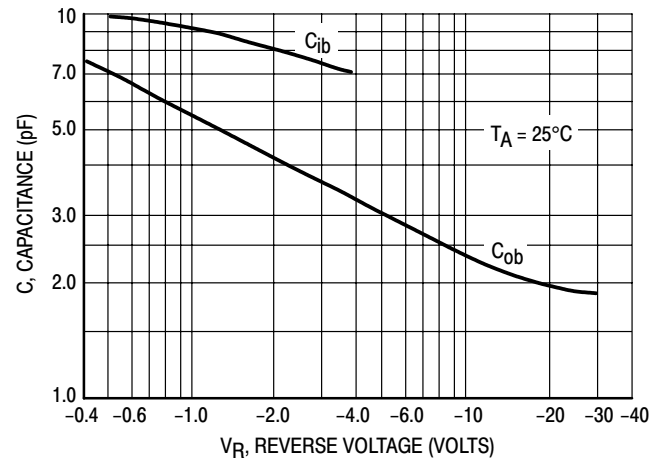


Figure 4. Capacitances

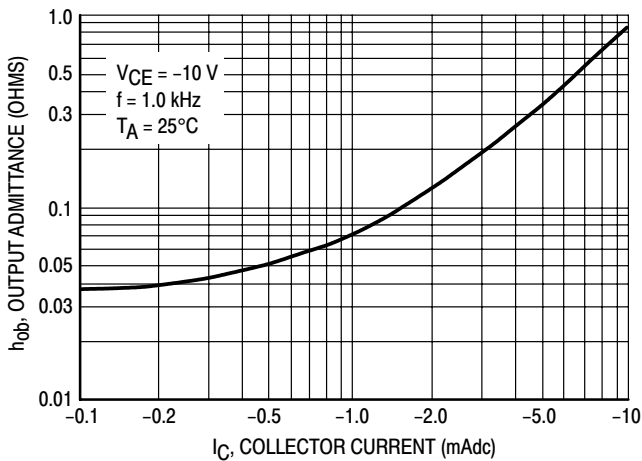


Figure 5. Output Admittance

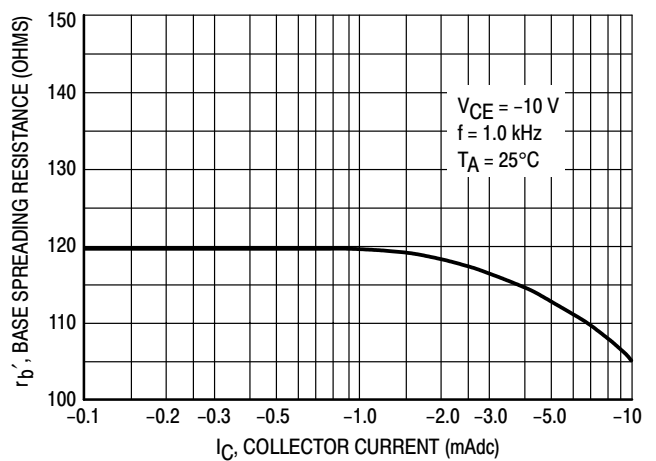
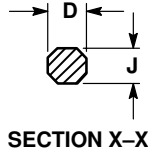
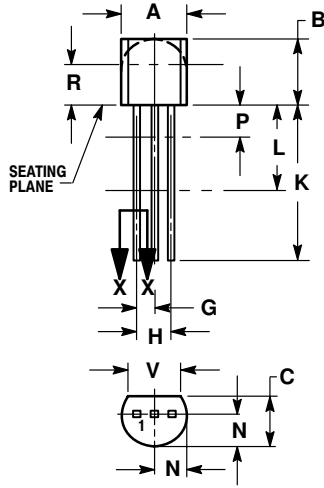


Figure 6. Base Spreading Resistance

# BC212, BC212B, BC213

## 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:

1. COLLECTOR
2. BASE
3. EMITTER

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