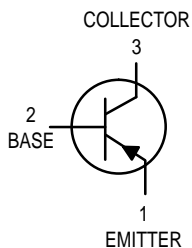
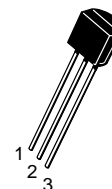


# Amplifier Transistors

## PNP Silicon



**BC212,B**  
**BC213**  
**BC214**



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

### MAXIMUM RATINGS

Rating	Symbol	BC 212	BC 213	BC 214	Unit
Collector–Emitter Voltage	$V_{CEO}$	-50	-30	-30	Vdc
Collector–Base Voltage	$V_{CBO}$	-60	-45	-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			mW
		2.8			mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0			Watts
		8.0			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	$^\circ\text{C}/\text{W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage ( $I_C = -2.0 \text{ mAdc}, I_B = 0$ )	$V_{(BR)CEO}$	-50 -30 -30	— — —	— — —	Vdc
Collector–Base Breakdown Voltage ( $I_C = -10 \mu\text{A}, I_E = 0$ )	$V_{(BR)CBO}$	-60 -45 -45	— — —	— — —	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -10 \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	-5 -5 -5	— — —	— — —	Vdc
Collector–Emitter Leakage Current ( $V_{CB} = -30 \text{ V}$ )	$I_{CBO}$	— — —	— — —	-15 -15 -15	nAdc
Emitter–Base Leakage Current ( $V_{EB} = -4.0 \text{ V}, I_C = 0$ )	$I_{EBO}$	— — —	— — —	-15 -15 -15	nAdc

**BC212,B BC213 BC214**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>						
DC Current Gain ( $I_C = -10\ \mu\text{A}$ , $V_{CE} = -5.0\ \text{Vdc}$ )  ( $I_C = -2.0\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ )  ( $I_C = -100\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ )(1)	BC212	$h_{FE}$	40	—	—	—
	BC213		40	—	—	—
	BC214		100	—	—	—
	BC212	$h_{FE}$	60	—	—	—
	BC213		80	—	—	—
	BC214		140	—	600	—
	BC212, BC214	$h_{FE}$	—	120	—	—
	BC213		—	140	—	—
	Collector–Emitter Saturation Voltage ( $I_C = -10\ \text{mA}$ , $I_B = -0.5\ \text{mA}$ ) ( $I_C = -100\ \text{mA}$ , $I_B = -5.0\ \text{mA}$ )(1)		$V_{CE(sat)}$	—	-0.10	—
			—	-0.25	-0.6	
Base–Emitter Saturation Voltage ( $I_C = -100\ \text{mA}$ , $I_B = -5.0\ \text{mA}$ )		$V_{BE(sat)}$	—	-1.0	-1.4	Vdc
Base–Emitter On Voltage ( $I_C = -2.0\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ )		$V_{BE(on)}$	-0.6	-0.62	-0.72	Vdc
<b>DYNAMIC CHARACTERISTICS</b>						
Current–Gain — Bandwidth Product ( $I_C = -10\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ , $f = 100\ \text{MHz}$ )	BC212	$f_T$	—	280	—	MHz
	BC214		—	320	—	
	BC213		—	360	—	
Common–Base Output Capacitance ( $V_{CB} = -10\ \text{Vdc}$ , $I_C = 0$ , $f = 1.0\ \text{MHz}$ )		$C_{ob}$	—	—	6.0	pF
Noise Figure ( $I_C = -0.2\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ , $R_S = 2.0\ \text{k}\Omega$ , $f = 1.0\ \text{kHz}$ ) ( $I_C = -0.2\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ , $R_S = 2.0\ \text{k}\Omega$ , $f = 1.0\ \text{kHz}$ , $f = 200\ \text{Hz}$ )	BC214	NF	—	—	2	dB
	BC212, BC213		—	—	10	
Small–Signal Current Gain ( $I_C = -2.0\ \text{mA}$ , $V_{CE} = -5.0\ \text{Vdc}$ , $f = 1.0\ \text{kHz}$ )	BC212	$h_{fe}$	60	—	—	—
	BC213		80	—	—	—
	BC214		140	—	—	—
	BC212B		200	—	400	—

 1. Pulse Test:  $T_p$  300 s, Duty Cycle 2.0%.

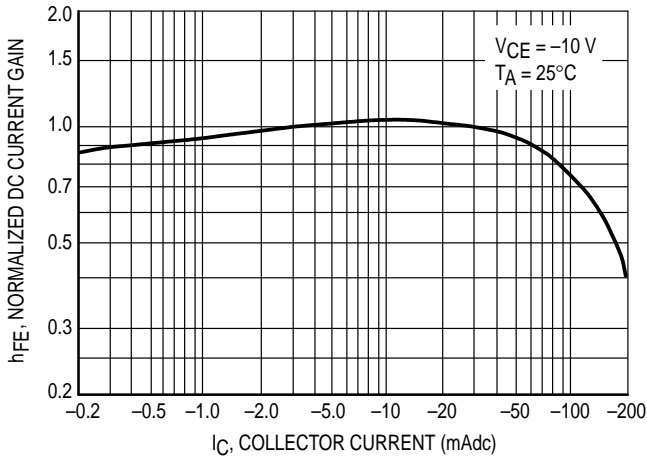


Figure 1. Normalized DC Current Gain

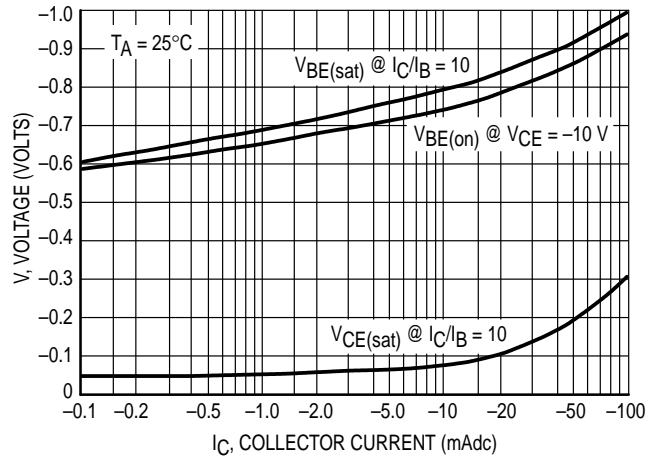


Figure 2. "Saturation" and "On" Voltages

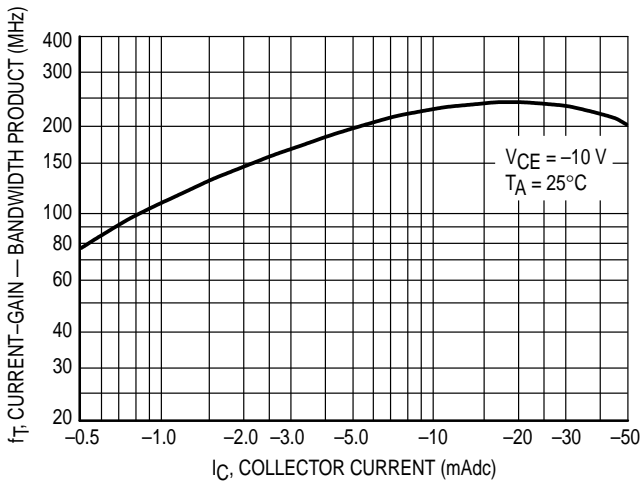


Figure 3. Current-Gain — Bandwidth Product

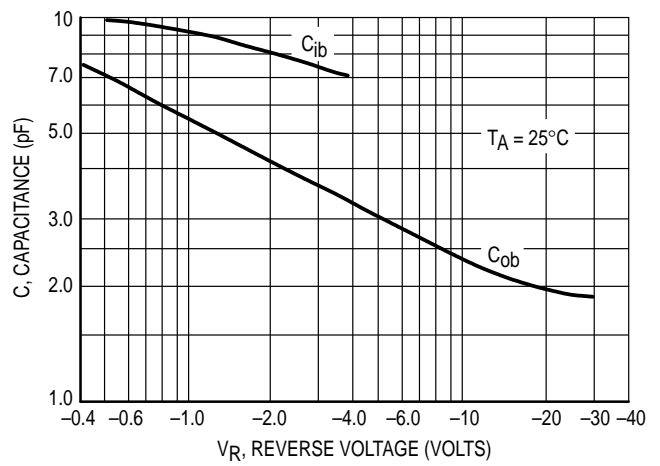


Figure 4. Capacitances

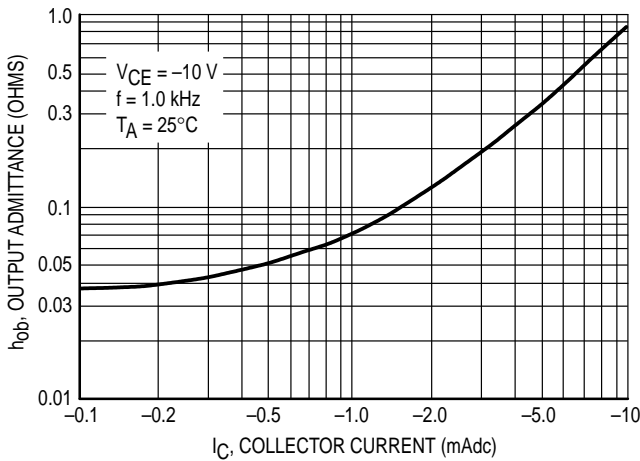


Figure 5. Output Admittance

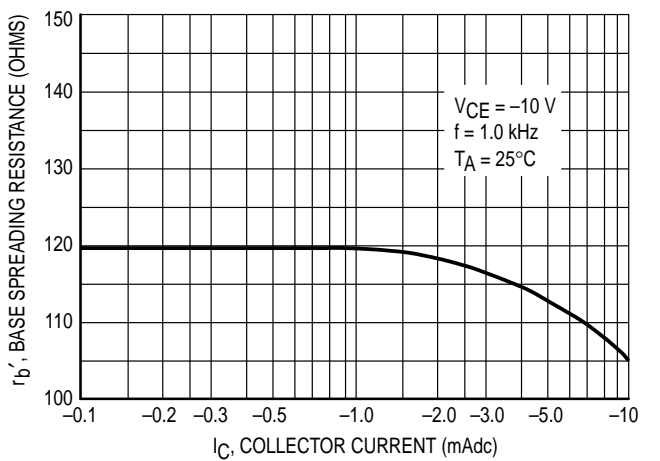


Figure 6. Base Spreading Resistance

PACKAGE DIMENSIONS



- 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	—

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

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

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