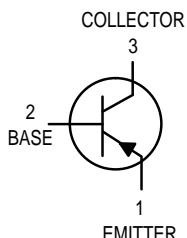
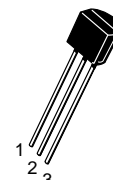


Amplifier Transistors

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°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	$^\circ\text{C}/\text{W}$
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 ($I_C = -2.0 \text{ mAdc}, I_B = 0$)	BC212 BC213 BC214 $V_{(BR)CEO}$	-50 -30 -30	— — —	— — —	Vdc
Collector–Base Breakdown Voltage ($I_C = -10 \mu\text{A}, I_E = 0$)	BC212 BC213 BC214 $V_{(BR)CBO}$	-60 -45 -45	— — —	— — —	Vdc
Emitter–Base Breakdown Voltage ($I_E = -10 \mu\text{Adc}, I_C = 0$)	BC212 BC213 BC214 $V_{(BR)EBO}$	-5 -5 -5	— — —	— — —	Vdc
Collector–Emitter Leakage Current ($V_{CB} = -30 \text{ V}$)	BC212 BC213 BC214 I_{CBO}	— — —	— — —	-15 -15 -15	nAdc
Emitter–Base Leakage Current ($V_{EB} = -4.0 \text{ V}, I_C = 0$)	BC212 BC213 BC214 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
ON CHARACTERISTICS					
DC Current Gain ($I_C = -10\ \mu\text{A}$, $V_{CE} = -5.0\ \text{V}$) ($I_C = -2.0\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$) ($I_C = -100\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$) ⁽¹⁾ 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⁾ Base–Emitter Saturation Voltage ($I_C = -100\ \text{mA}$, $I_B = -5.0\ \text{mA}$) Base–Emitter On Voltage ($I_C = -2.0\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$)	BC212	40	—	—	—
	BC213	40	—	—	—
	BC214	100	—	—	—
	BC212	60	—	—	—
	BC213	80	—	—	—
	BC214	140	—	600	—
	BC212, BC214	—	120	—	—
	BC213	—	140	—	—
	$V_{CE(\text{sat})}$	—	-0.10	—	—
$V_{BE(\text{sat})}$	—	-1.0	-1.4	—	Vdc
$V_{BE(\text{on})}$	-0.6	-0.62	-0.72	—	Vdc
DYNAMIC CHARACTERISTICS					
Current–Gain — Bandwidth Product ($I_C = -10\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$, $f = 100\ \text{MHz}$)	BC212	—	280	—	MHz
	BC214	—	320	—	
	BC213	—	360	—	
	Common–Base Output Capacitance ($V_{CB} = -10\ \text{V}$, $I_C = 0$, $f = 1.0\ \text{MHz}$)	C_{ob}	—	—	6.0
Noise Figure ($I_C = -0.2\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$, $R_S = 2.0\ \text{k}\Omega$, $f = 1.0\ \text{kHz}$) ($I_C = -0.2\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$, $R_S = 2.0\ \text{k}\Omega$, $f = 1.0\ \text{kHz}$, $f = 200\ \text{Hz}$)	BC214	—	—	2	dB
	BC212, BC213	—	—	10	
Small–Signal Current Gain ($I_C = -2.0\ \text{mA}$, $V_{CE} = -5.0\ \text{V}$, $f = 1.0\ \text{kHz}$)	BC212	60	—	—	—
	BC213	80	—	—	—
	BC214	140	—	—	—
	BC212B	200	—	400	—
	h_{fe}	—	—	—	—

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

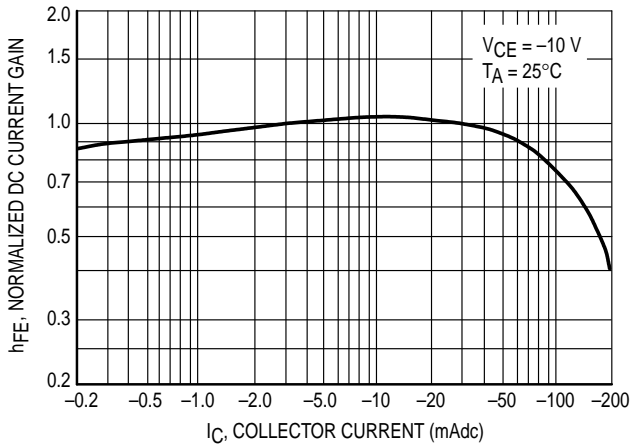


Figure 1. Normalized DC Current Gain

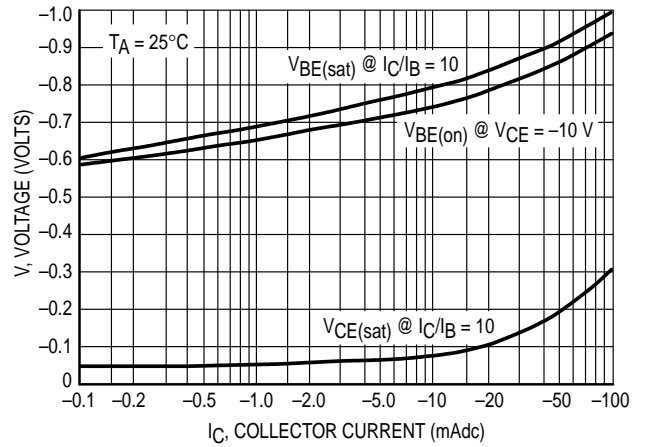


Figure 2. "Saturation" and "On" Voltages

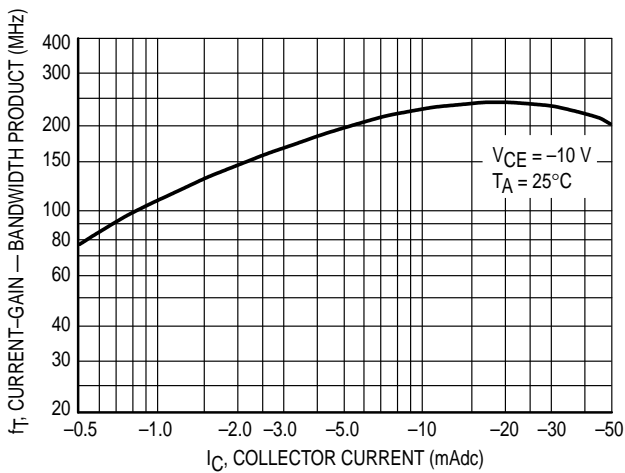


Figure 3. Current-Gain — Bandwidth Product

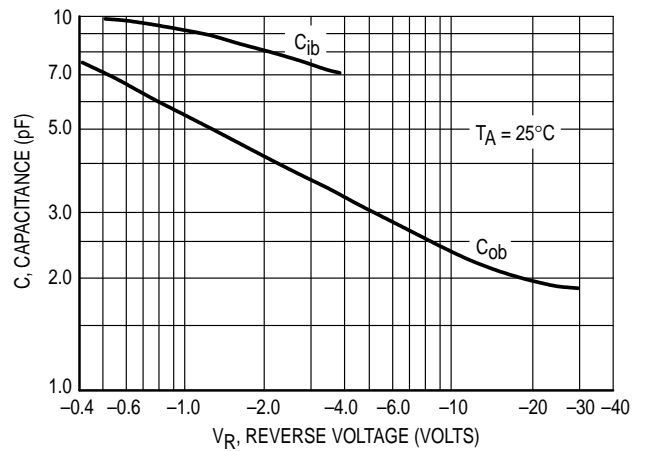


Figure 4. Capacitances

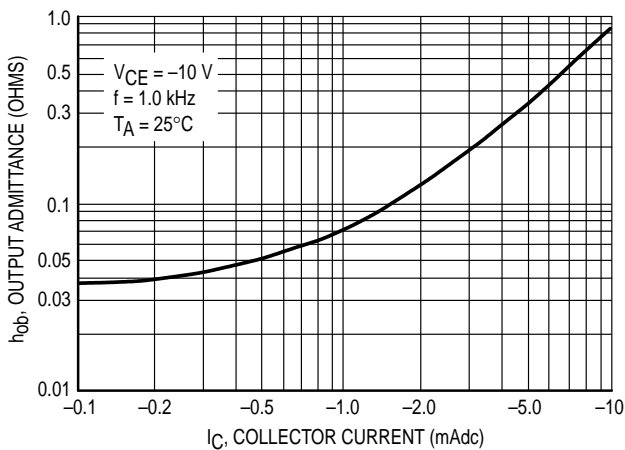


Figure 5. Output Admittance

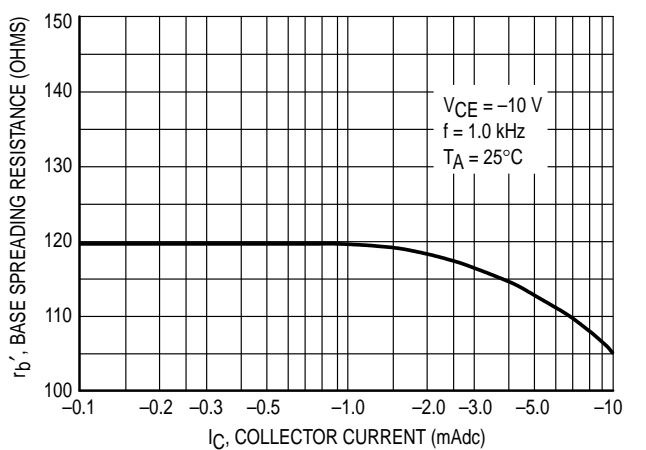
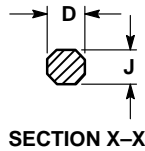
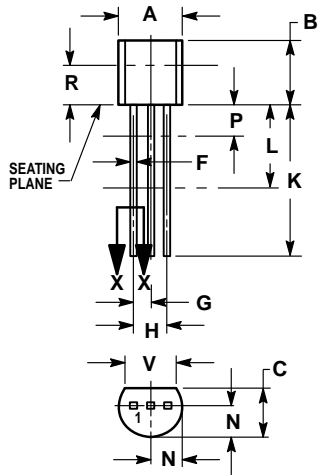


Figure 6. Base Spreading Resistance

PACKAGE DIMENSIONS



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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