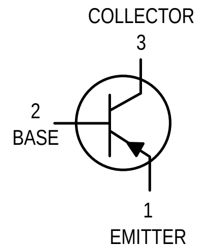
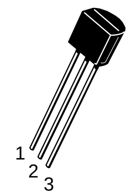
Amplifier Transistors
PNP Silicon

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°C Derate above 25°C	P_D	350 2.8			mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.0 8.0			Watts mW/°C
Operating and Storage Junction 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

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage (I_C = –2.0 mAdc, I_B = 0)	BC212 BC213 BC214	$V_{(BR)CEO}$	–50 –30 –30	— — —	— — —	Vdc
Collector–Base Breakdown Voltage (I_C = –10 μA, I_E = 0)	BC212 BC213 BC214	$V_{(BR)CBO}$	–60 –45 –45	— — —	— — —	Vdc
Emitter–Base Breakdown Voltage (I_E = –10 μAdc, I_C = 0)	BC212 BC213 BC214	$V_{(BR)EBO}$	–5 –5 –5	— — —	— — —	Vdc
Collector–Emitter Leakage Current (V_{CB} = –30 V)	BC212 BC213 BC214	I_{CBO}	— — —	— — —	–15 –15 –15	nAdc
Emitter–Base Leakage Current (V_{EB} = –4.0 V, I_C = 0)	BC212 BC213 BC214	I_{EBO}	— — —	— — —	–15 –15 –15	nAdc

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

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

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

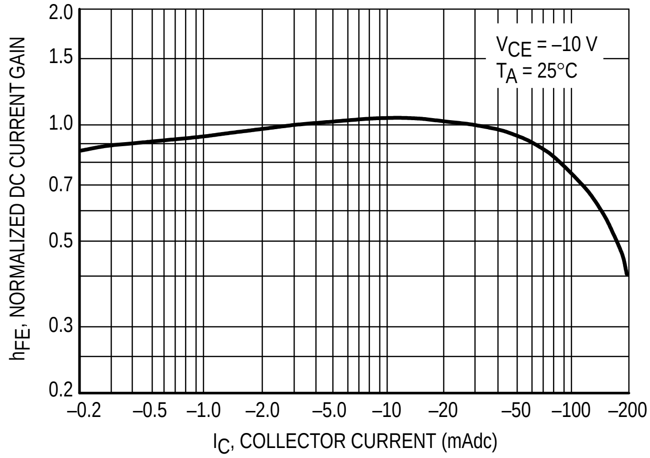


Figure 1. Normalized DC Current Gain

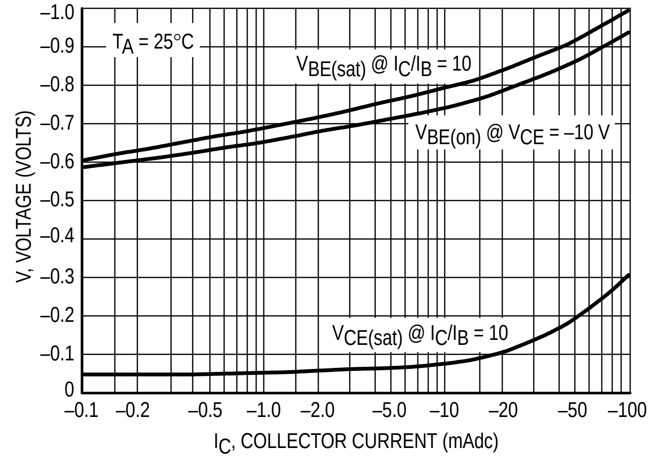


Figure 2. “Saturation” and “On” Voltages

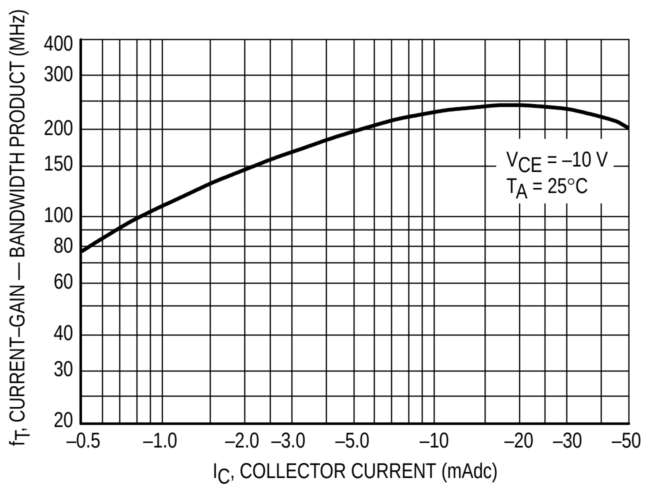


Figure 3. Current–Gain — Bandwidth Product

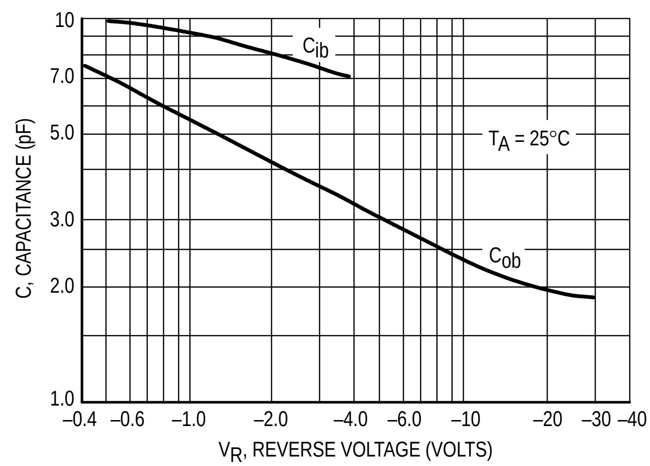


Figure 4. Capacitances

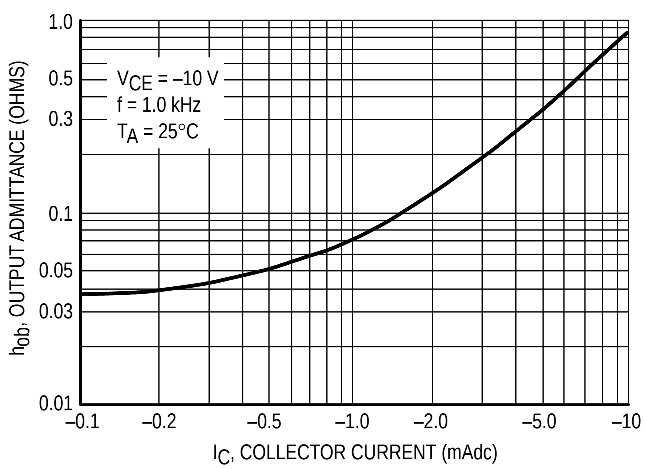


Figure 5. Output Admittance

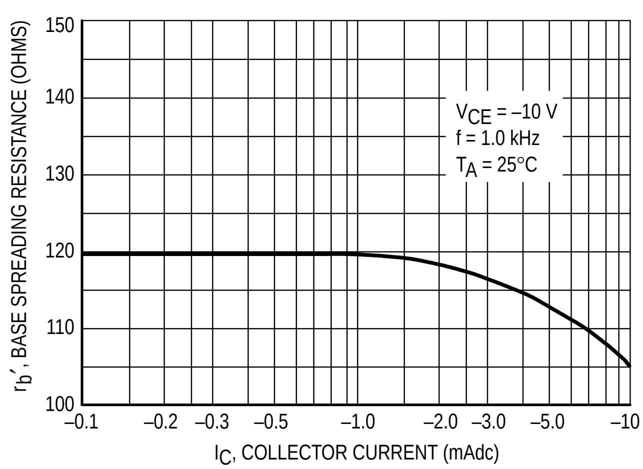
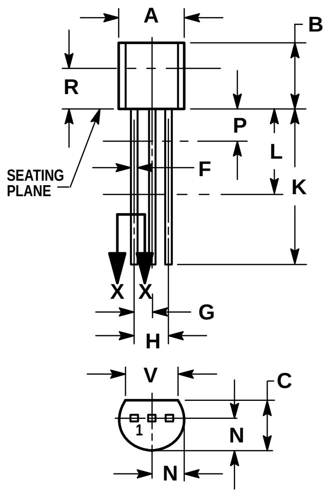
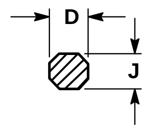


Figure 6. Base Spreading Resistance

PACKAGE DIMENSIONS





SECTION X–X

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.

	INCHES		MILLIMETERS	
DIM	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

How to reach us:
USA/EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1–800–441–2447

MFAX: RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244–6609
INTERNET: http://Design–NET.com

JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, Toshikatsu Otsuki,
6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 03–3521–8315

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298