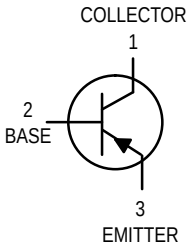
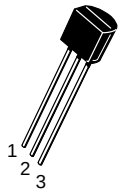
Amplifier Transistor

PNP Silicon

P2N2907A





CASE 29–04, STYLE 17
TO–92 (TO–226AA)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	–60	Vdc
Collector–Base Voltage	V_{CBO}	–60	Vdc
Emitter–Base Voltage	V_{EBO}	–5.0	Vdc
Collector Current — Continuous	I_C	–600	mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12	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	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage(1) (I_C = –10 mAdc, I_B = 0)	$V_{(BR)CEO}$	–60	—	Vdc
Collector–Base Breakdown Voltage (I_C = –10 μAdc, I_E = 0)	$V_{(BR)CBO}$	–60	—	Vdc
Emitter–Base Breakdown Voltage (I_E = –10 μAdc, I_C = 0)	$V_{(BR)EBO}$	–5.0	—	Vdc
Collector Cutoff Current (V_{CE} = –30 Vdc, $V_{EB(off)}$ = –0.5 Vdc)	I_{CEX}	—	–50	nAdc
Collector Cutoff Current (V_{CB} = –50 Vdc, I_E = 0) (V_{CB} = –50 Vdc, I_E = 0, T_A = 150°C)	I_{CBO}	 — —	 –0.01 –10	μAdc
Emitter Cutoff Current (V_{EB} = –3.0 Vdc)	I_{EBO}	—	–10	nAdc
Collector Cutoff Current (V_{CE} = –10 V)	I_{CEO}	—	–10	nAdc
Base Cutoff Current (V_{CE} = –30 Vdc, $V_{EB(off)}$ = –0.5 Vdc)	I_{BEX}	—	–50	nAdc

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS				
DC Current Gain	h_{FE}			—
(I_C = –0.1 mAdc, V_{CE} = –10 Vdc)		75	—	
(I_C = –1.0 mAdc, V_{CE} = –10 Vdc)		100	—	
(I_C = –10 mAdc, V_{CE} = –10 Vdc)		100	—	
(I_C = –150 mAdc, V_{CE} = –10 Vdc)(1)		100	300	
(I_C = –500 mAdc, V_{CE} = –10 Vdc)(1)		50	—	
Collector–Emitter Saturation Voltage(1)	$V_{CE(sat)}$			Vdc
(I_C = –150 mAdc, I_B = –15 mAdc)		—	–0.4	
(I_C = –500 mAdc, I_B = –50 mAdc)		—	–1.6	
Base–Emitter Saturation Voltage(1)	$V_{BE(sat)}$			Vdc
(I_C = –150 mAdc, I_B = –15 mAdc)		—	–1.3	
(I_C = –500 mAdc, I_B = –50 mAdc)		—	–2.6	
SMALL–SIGNAL CHARACTERISTICS				
Current–Gain — Bandwidth Product(1), (2) (I_C = –50 mAdc, V_{CE} = –20 Vdc, f = 100 MHz)	f_T	200	—	MHz
Output Capacitance (V_{CB} = –10 Vdc, I_E = 0, f = 1.0 MHz)	C_{obo}	—	8.0	pF
Input Capacitance (V_{EB} = –2.0 Vdc, I_C = 0, f = 1.0 MHz)	C_{ibo}	—	30	pF
SWITCHING CHARACTERISTICS				
Turn–On Time	(V_{CC} = –30 Vdc, I_C = –150 mAdc, I_{B1} = –15 mAdc) (Figures 1 and 5)	t_{on}	—	50	ns
Delay Time		t_d	—	10	ns
Rise Time		t_r	—	40	ns
Turn–Off Time	(V_{CC} = –6.0 Vdc, I_C = –150 mAdc, I_{B1} = I_{B2} = –15 mAdc) (Figure 2)	t_{off}	—	110	ns
Storage Time		t_s	—	80	ns
Fall Time		t_f	—	30	ns

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

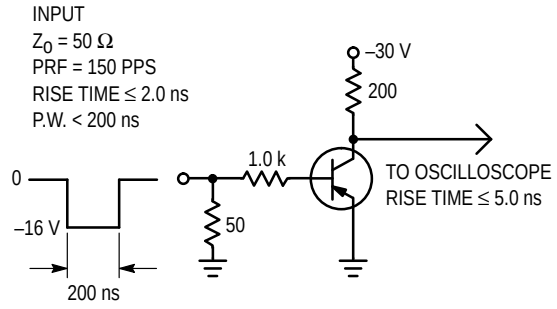


Figure 1. Delay and Rise Time Test Circuit

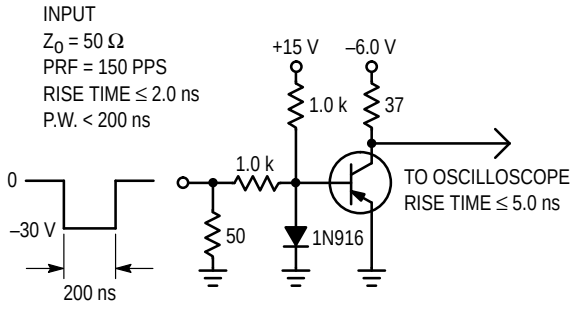


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

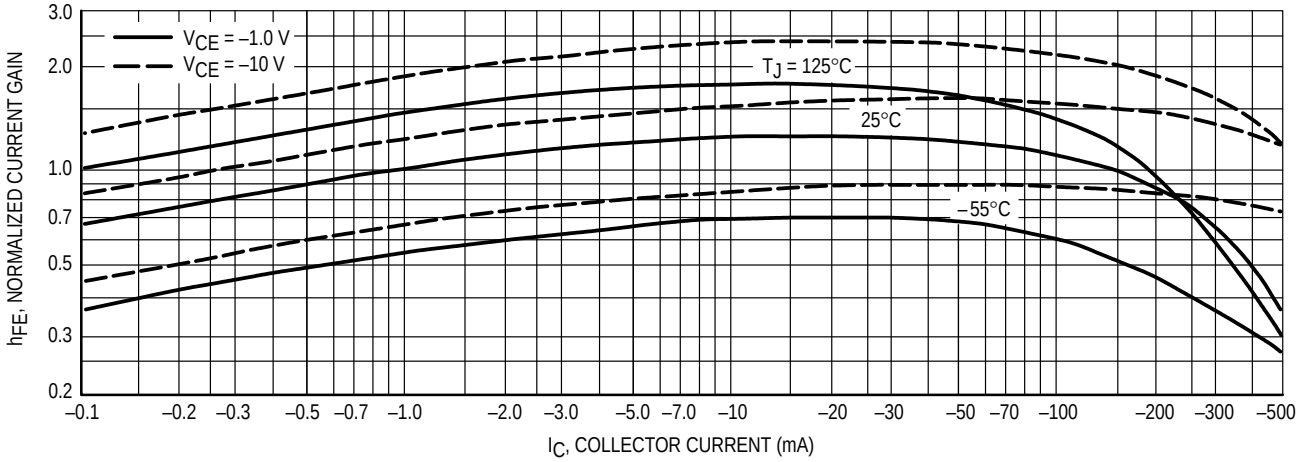


Figure 3. DC Current Gain

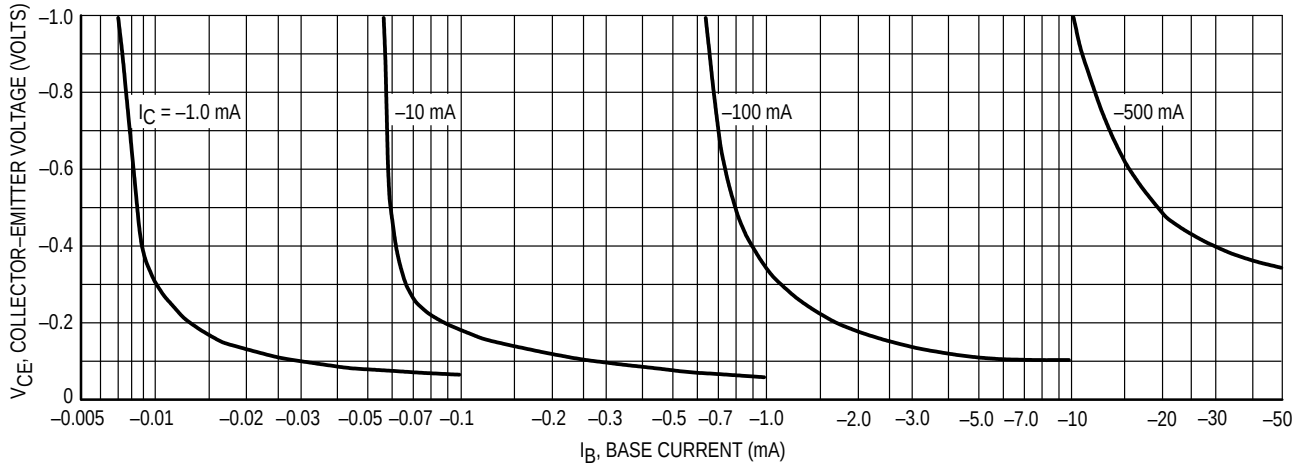


Figure 4. Collector Saturation Region

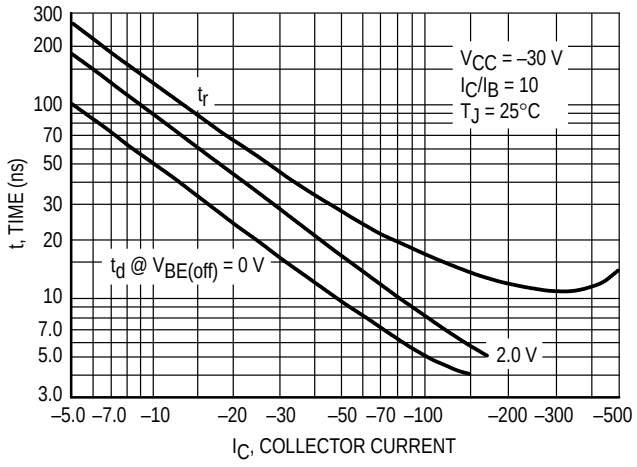


Figure 5. Turn–On Time

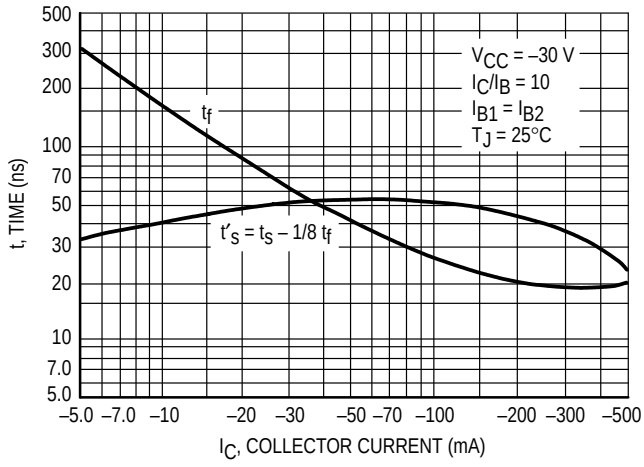


Figure 6. Turn–Off Time

TYPICAL SMALL–SIGNAL CHARACTERISTICS

NOISE FIGURE

V_{CE} = 10 Vdc, T_A = 25°C

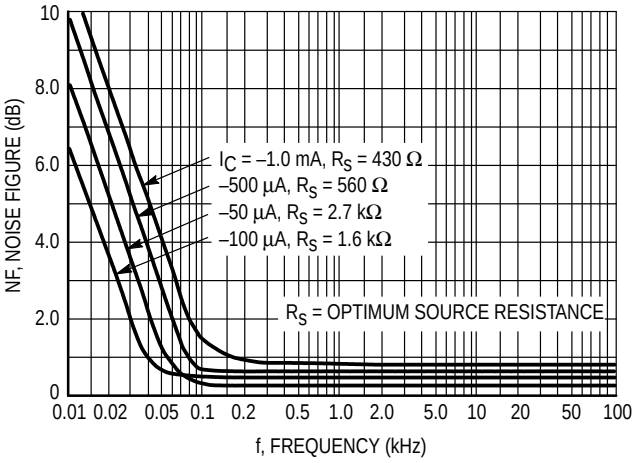


Figure 7. Frequency Effects

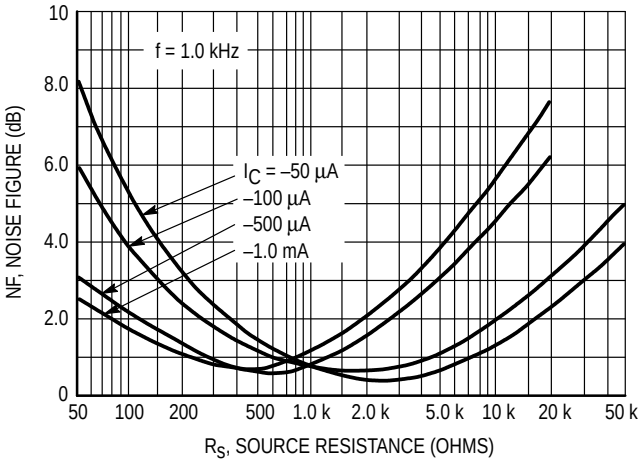


Figure 8. Source Resistance Effects

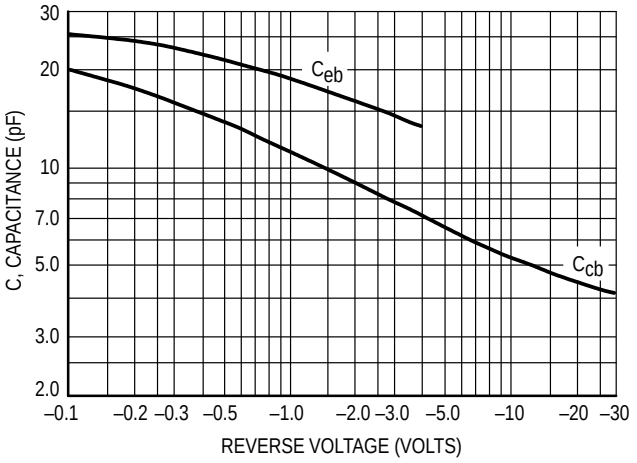


Figure 9. Capacitances

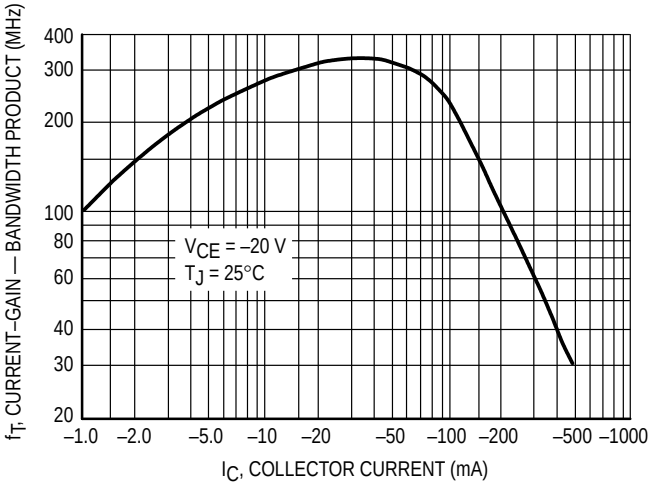


Figure 10. Current–Gain — Bandwidth Product

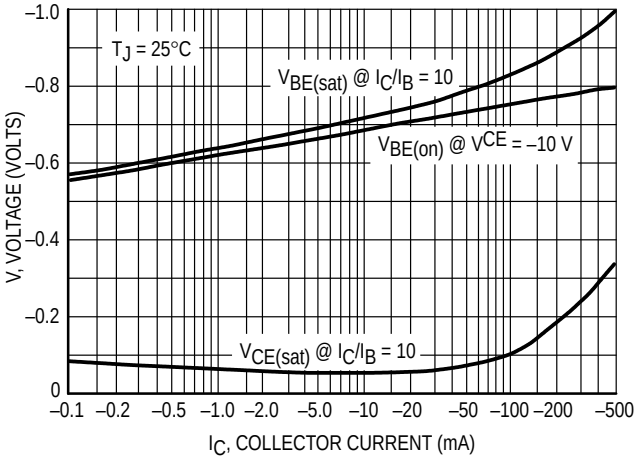


Figure 11. “On” Voltage

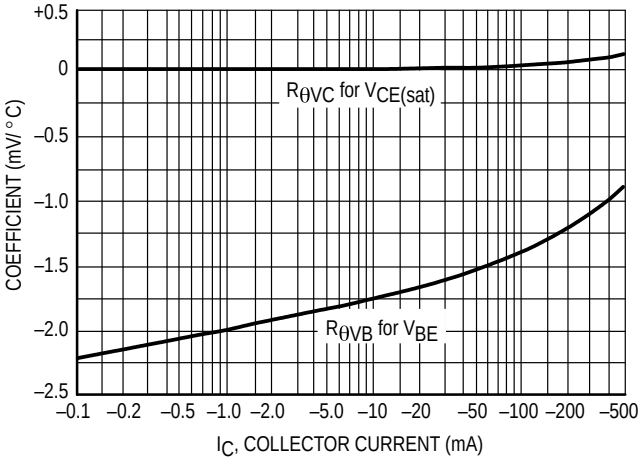
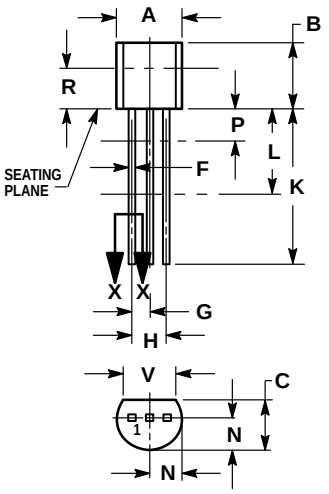
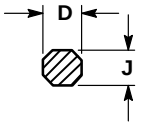


Figure 12. Temperature Coefficients

PACKAGE DIMENSIONS





SECTION X–X

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.

	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	—

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

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