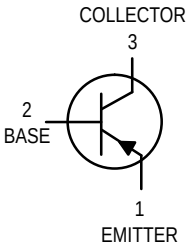
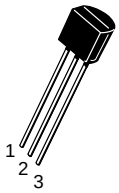
General Purpose Transistors
PNP Silicon

MPS2907
MPS2907A*

***Motorola Preferred Device**





CASE 29–04, STYLE 1
TO–92 (TO–226AA)

MAXIMUM RATINGS

Rating	Symbol	MPS2907	MPS2907A	Unit
Collector–Emitter Voltage	V_{CEO}	–40	–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}	–500 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)	MPS2907 MPS2907A	$V_{(BR)CEO}$	–40 –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)	 MPS2907 MPS2907A MPS2907 MPS2907A	I_{CBO}	 — — — —	 –0.02 –0.01 –20 –10	μAdc
Base Current (V_{CE} = –30 Vdc, $V_{EB(off)}$ = –0.5 Vdc)		I_B	—	–50	nAdc

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

Preferred devices are Motorola recommended choices for future use and best overall value.

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)	MPS2907		35	—	
	MPS2907A		75	—	
(I_C = –1.0 mAdc, V_{CE} = –10 Vdc)	MPS2907		50	—	
	MPS2907A		100	—	
(I_C = –10 mAdc, V_{CE} = –10 Vdc)	MPS2907		75	—	
	MPS2907A		100	—	
(I_C = –150 mAdc, V_{CE} = –10 Vdc)(1)	MPS2907, MPS2907A		100	300	
(I_C = –500 mAdc, V_{CE} = –10 Vdc)(1)	MPS2907		30	—	
	MPS2907A		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}	—	45	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}	—	100	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.

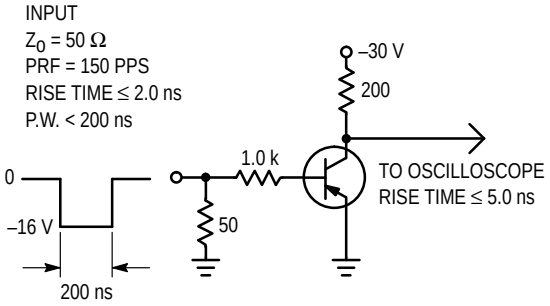


Figure 1. Delay and Rise Time Test Circuit

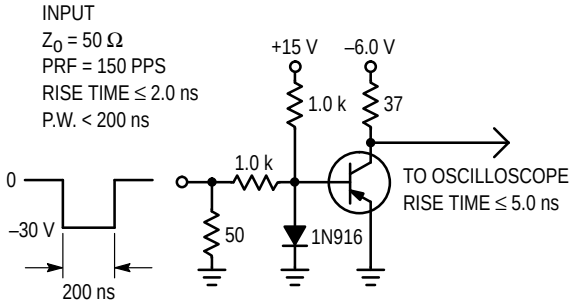


Figure 2. Storage and Fall Time Test Circuit

TYPICAL CHARACTERISTICS

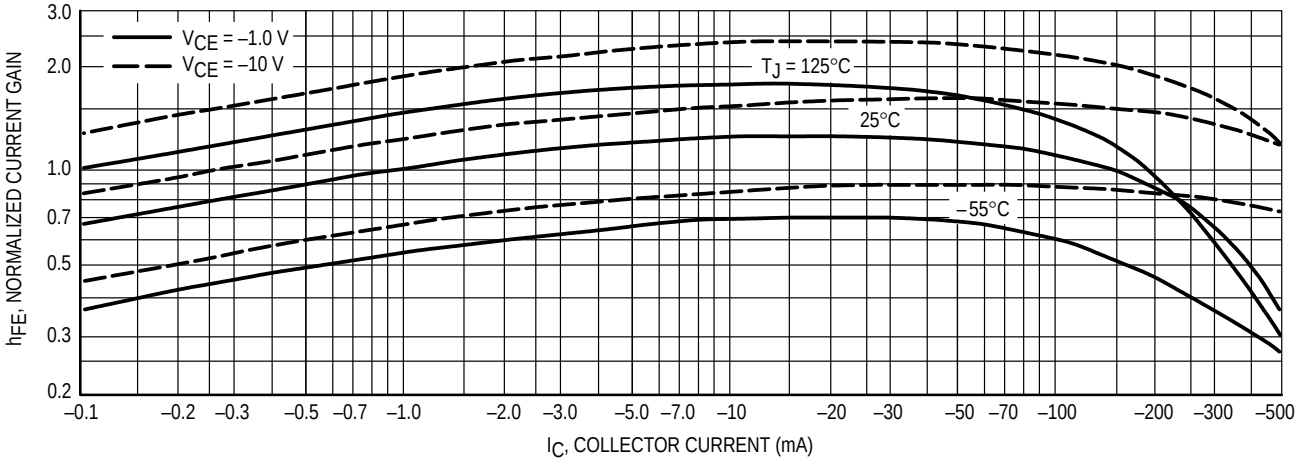


Figure 3. DC Current Gain

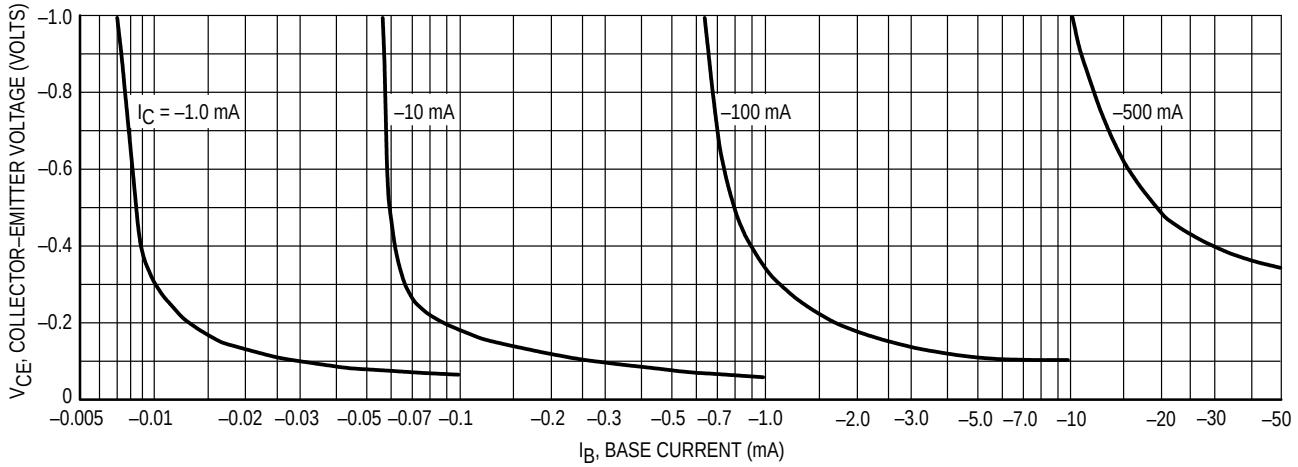


Figure 4. Collector Saturation Region

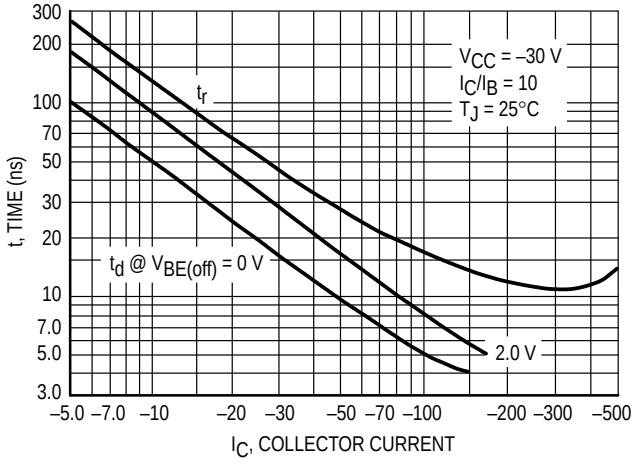


Figure 5. Turn–On Time

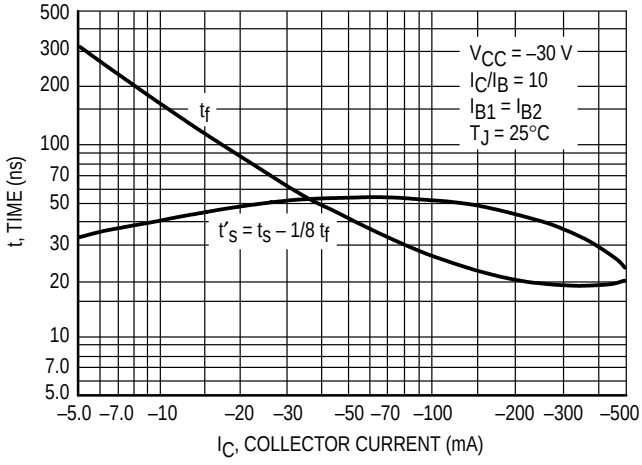


Figure 6. Turn–Off Time

TYPICAL SMALL–SIGNAL CHARACTERISTICS

NOISE FIGURE

V_{CE} = 10 Vdc, T_A = 25°C

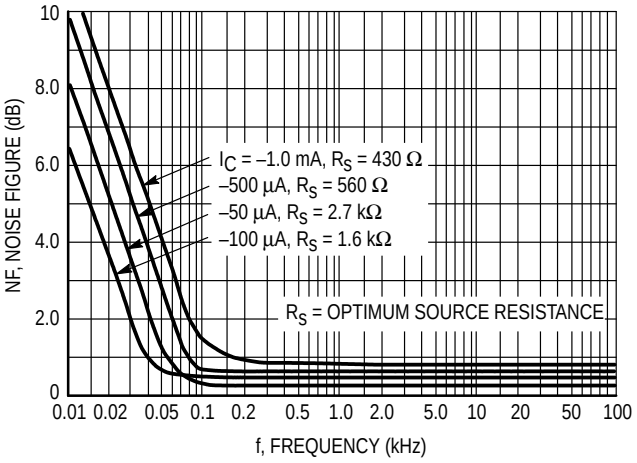


Figure 7. Frequency Effects

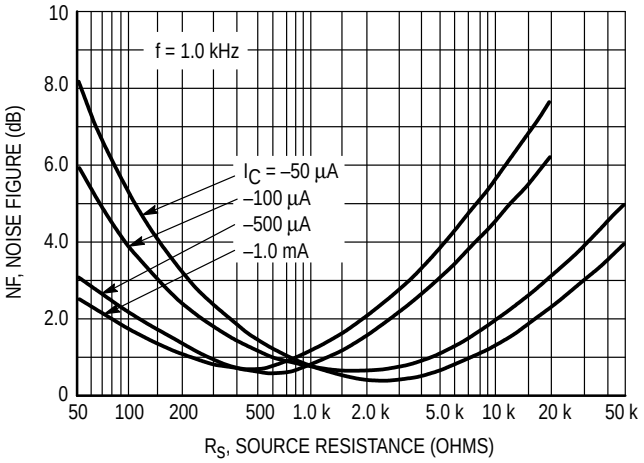


Figure 8. Source Resistance Effects

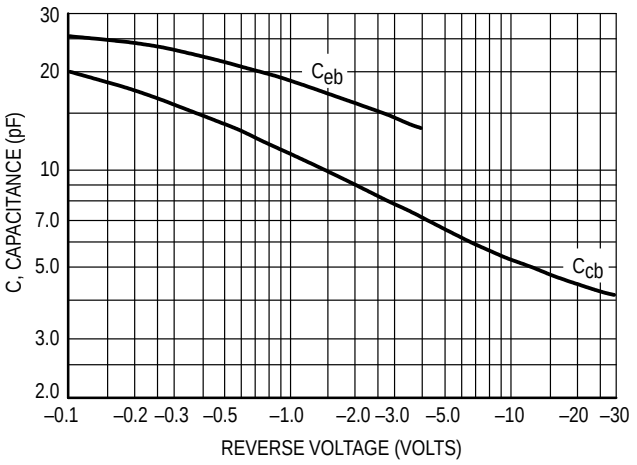


Figure 9. Capacitances

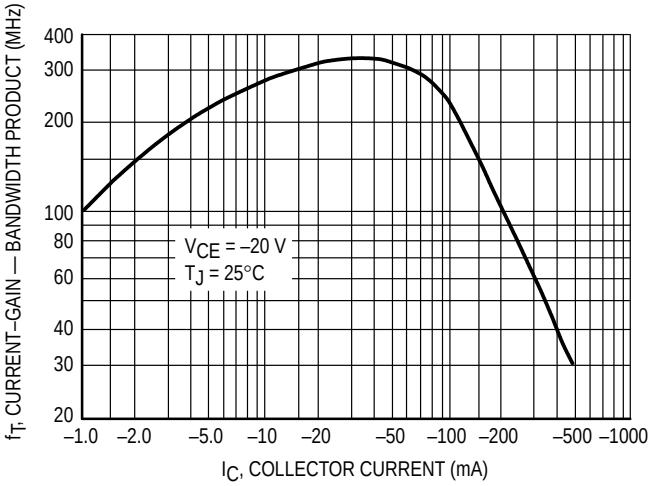


Figure 10. Current–Gain — Bandwidth Product

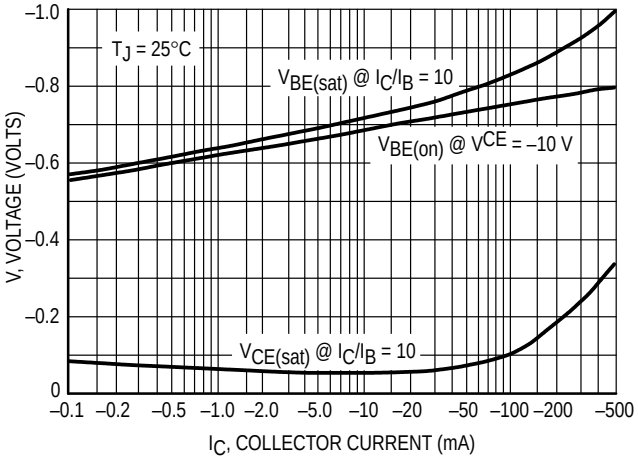


Figure 11. “On” Voltage

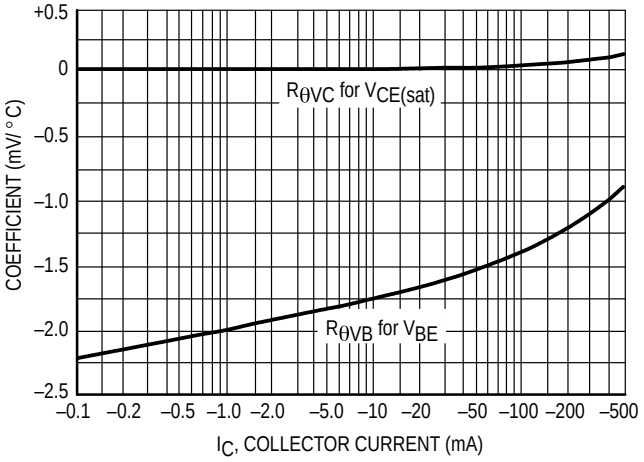
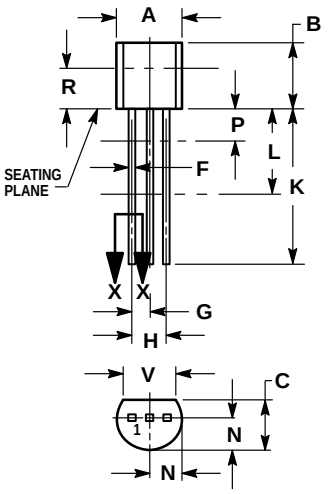
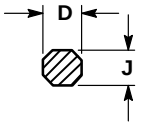


Figure 12. Temperature Coefficients

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

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INTERNET: http://Design–NET.com

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