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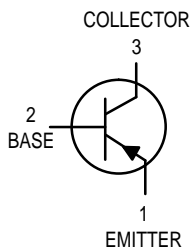
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# General Purpose Transistors

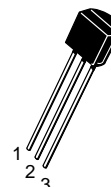
## PNP Silicon

Jameco Part Number 211342



**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 @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0		mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12		Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–500 to +150		$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = -10\text{ mAdc}$ , $I_E = 0$ )	$V_{(BR)CEO}$	–40 –60	— —	Vdc
Collector–Base Breakdown Voltage ( $I_C = -10\text{ }\mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	–60	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -10\text{ }\mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	–5.0	—	Vdc
Collector Cutoff Current ( $V_{CE} = -30\text{ Vdc}$ , $V_{EB(off)} = -0.5\text{ Vdc}$ )	$I_{CEX}$	—	–50	nAdc
Collector Cutoff Current ( $V_{CB} = -50\text{ Vdc}$ , $I_E = 0$ )  ( $V_{CB} = -50\text{ Vdc}$ , $I_E = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$	— — — —	–0.02 –0.01 –20 –10	$\mu\text{Adc}$
Base Current ( $V_{CE} = -30\text{ Vdc}$ , $V_{EB(off)} = -0.5\text{ Vdc}$ )	$I_B$	—	–50	nAdc

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

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

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

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C = -0.1\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )	$h_{FE}$	MPS2907 MPS2907A	35 75	—
( $I_C = -1.0\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )		MPS2907 MPS2907A	50 100	—
( $I_C = -10\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )		MPS2907 MPS2907A	75 100	—
( $I_C = -150\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ ) <sup>(1)</sup>		MPS2907, MPS2907A	100	300
( $I_C = -500\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ ) <sup>(1)</sup>		MPS2907 MPS2907A	30 50	—
Collector–Emitter Saturation Voltage <sup>(1)</sup> ( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ ) ( $I_C = -500\text{ mAdc}$ , $I_B = -50\text{ mAdc}$ )	$V_{CE(sat)}$	— —	— -0.4 -1.6	Vdc
Base–Emitter Saturation Voltage <sup>(1)</sup> ( $I_C = -150\text{ mAdc}$ , $I_B = -15\text{ mAdc}$ ) ( $I_C = -500\text{ mAdc}$ , $I_B = -50\text{ mAdc}$ )	$V_{BE(sat)}$	— —	— -1.3 -2.6	Vdc

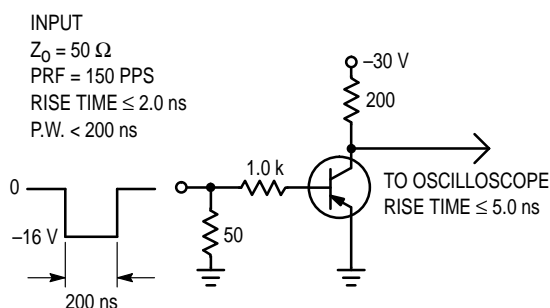
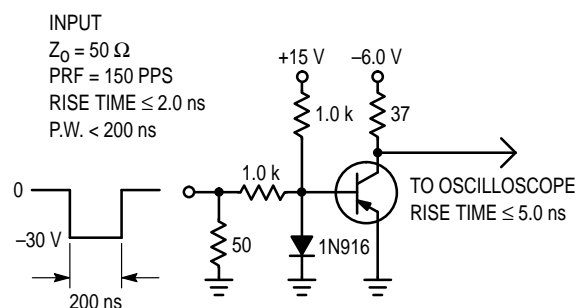
**SMALL–SIGNAL CHARACTERISTICS**

Current–Gain — Bandwidth Product <sup>(1), (2)</sup> ( $I_C = -50\text{ mAdc}$ , $V_{CE} = -20\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	200	—	MHz
Output Capacitance ( $V_{CB} = -10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	8.0	pF
Input Capacitance ( $V_{EB} = -2.0\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	—	30	pF

**SWITCHING CHARACTERISTICS**

Turn–On Time	(V <sub>CC</sub> = -30 Vdc, I <sub>C</sub> = -150 mAdc, I <sub>B1</sub> = -15 mAdc) (Figures 1 and 5)	t <sub>on</sub>	—	45	ns
Delay Time		t <sub>d</sub>	—	10	ns
Rise Time		t <sub>r</sub>	—	40	ns
Turn–Off Time	(V <sub>CC</sub> = -6.0 Vdc, I <sub>C</sub> = -150 mAdc, I <sub>B1</sub> = I <sub>B2</sub> = 15 mAdc) (Figure 2)	t <sub>off</sub>	—	100	ns
Storage Time		t <sub>s</sub>	—	80	ns
Fall Time		t <sub>f</sub>	—	30	ns

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .
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

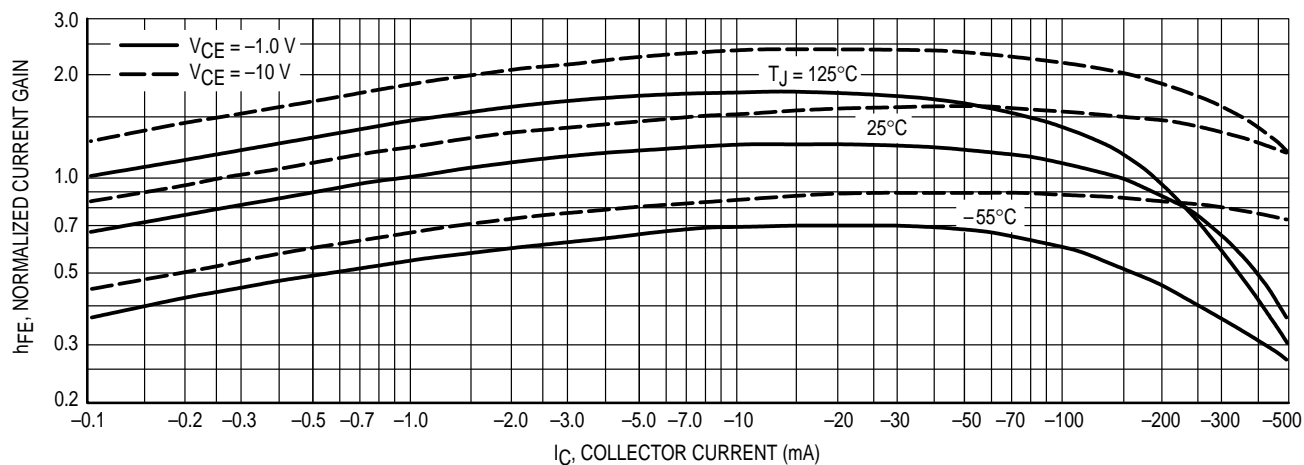


Figure 3. DC Current Gain

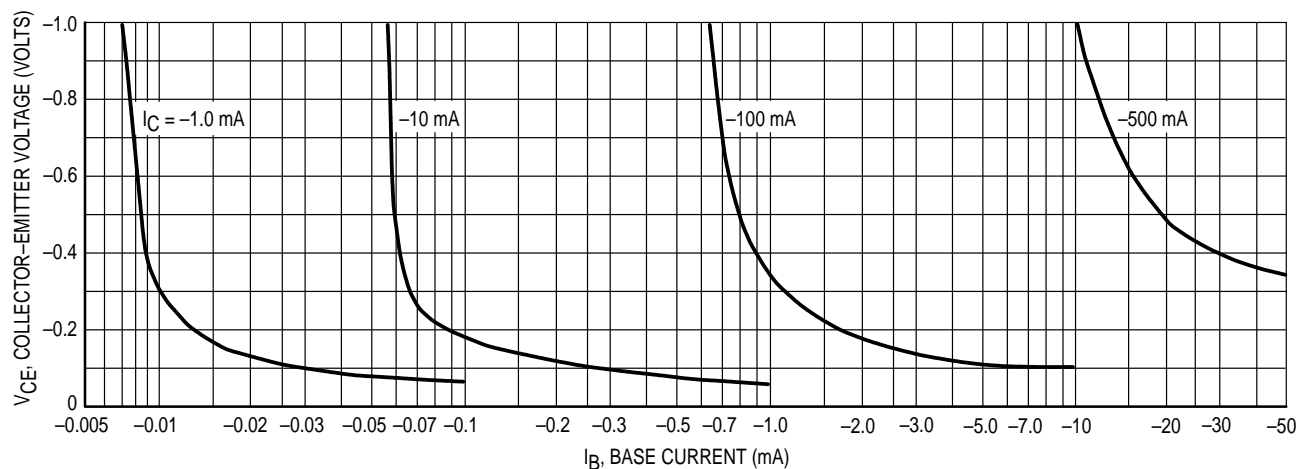


Figure 4. Collector Saturation Region

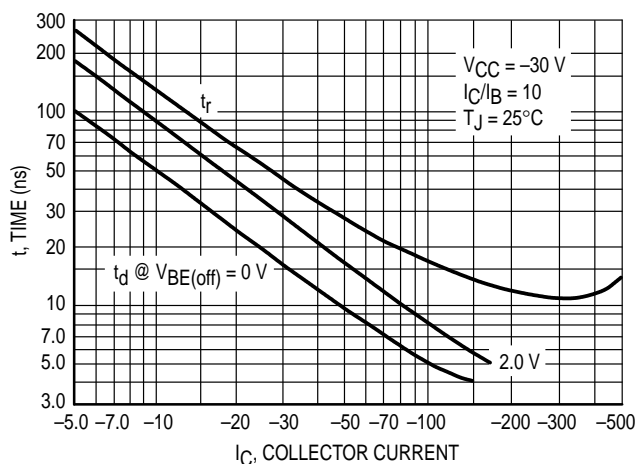


Figure 5. Turn-On Time

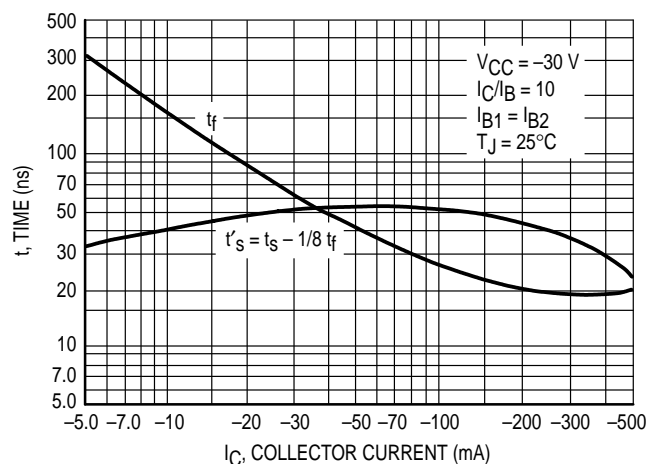


Figure 6. Turn-Off Time

## TYPICAL SMALL-SIGNAL CHARACTERISTICS

## NOISE FIGURE

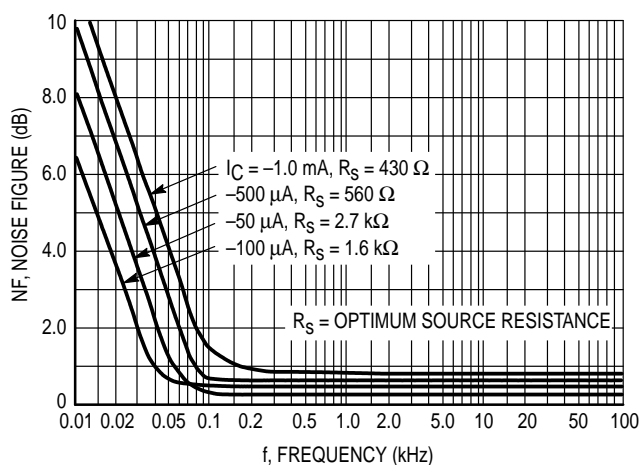
 $V_{CE} = 10 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$ 

Figure 7. Frequency Effects

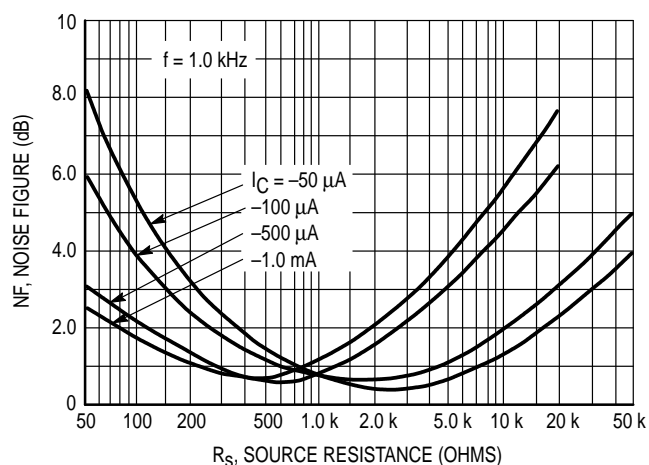


Figure 8. Source Resistance Effects

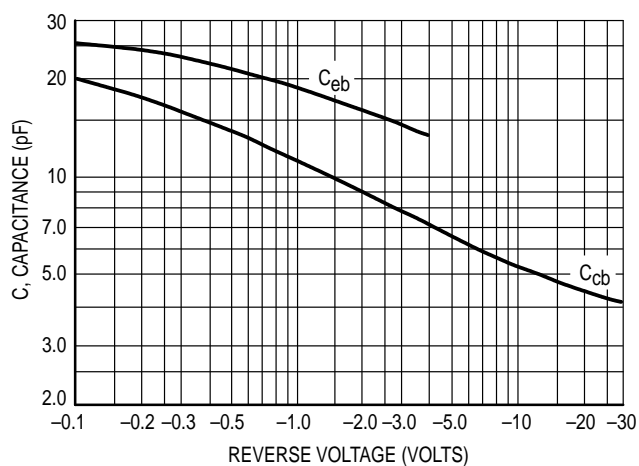


Figure 9. Capacitances

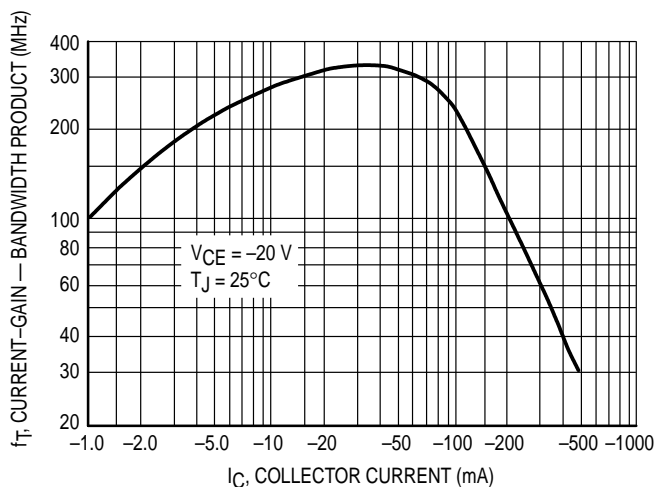


Figure 10. Current-Gain — Bandwidth Product

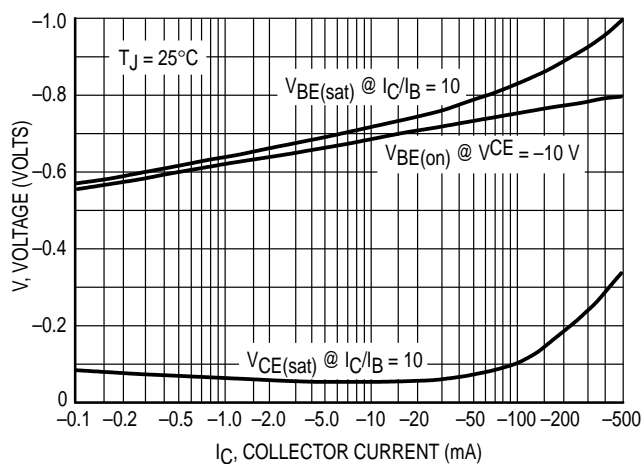


Figure 11. "On" Voltage

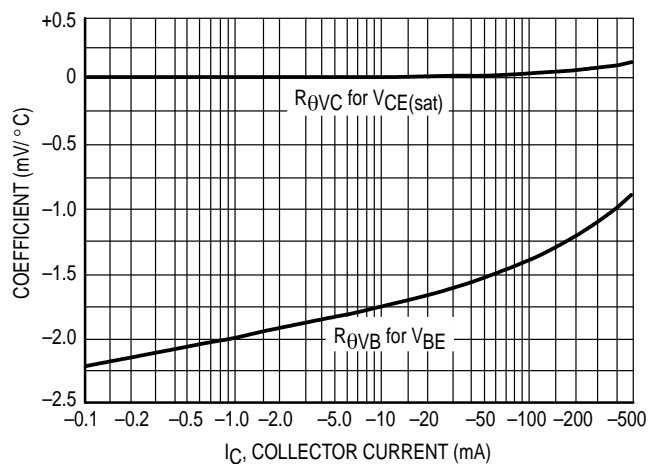
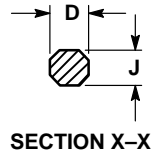
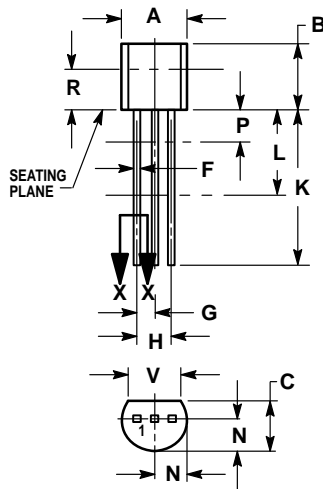


Figure 12. Temperature Coefficients

## 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.

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 1:

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

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