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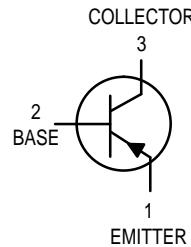
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# General Purpose Transistors

## 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	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

### 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> ( $I_C = -10 \text{ mA}\text{dc}$ , $I_B = 0$ )	$V_{(BR)CEO}$ MPS2907 MPS2907A	-40 -60	—	Vdc
Collector-Base Breakdown Voltage ( $I_C = -10 \mu\text{A}\text{dc}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-60	—	Vdc
Emitter-Base Breakdown Voltage ( $I_E = -10 \mu\text{A}\text{dc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-5.0	—	Vdc
Collector Cutoff Current ( $V_{CE} = -30 \text{ Vdc}$ , $V_{EB(\text{off})} = -0.5 \text{ Vdc}$ )	$I_{CEX}$	—	-50	nAdc
Collector Cutoff Current ( $V_{CB} = -50 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = -50 \text{ Vdc}$ , $I_E = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$ MPS2907 MPS2907A MPS2907 MPS2907A	— — — —	-0.02 -0.01 -20 -10	$\mu\text{A}\text{dc}$
Base Current ( $V_{CE} = -30 \text{ Vdc}$ , $V_{EB(\text{off})} = -0.5 \text{ Vdc}$ )	$I_B$	—	-50	nAdc

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

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

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)**

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain (I <sub>C</sub> = -0.1 mA, V <sub>CE</sub> = -10 Vdc)	MPS2907 MPS2907A	h <sub>FE</sub>	35	—
(I <sub>C</sub> = -1.0 mA, V <sub>CE</sub> = -10 Vdc)	MPS2907 MPS2907A		75	—
(I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -10 Vdc)	MPS2907 MPS2907A		50	—
(I <sub>C</sub> = -150 mA, V <sub>CE</sub> = -10 Vdc) <sup>(1)</sup>	MPS2907, MPS2907A		100	—
(I <sub>C</sub> = -500 mA, V <sub>CE</sub> = -10 Vdc) <sup>(1)</sup>	MPS2907 MPS2907A		75	—
			100	—
			300	—
			30	—
			50	—
Collector-Emitter Saturation Voltage <sup>(1)</sup> (I <sub>C</sub> = -150 mA, I <sub>B</sub> = -15 mA) (I <sub>C</sub> = -500 mA, I <sub>B</sub> = -50 mA)	V <sub>CE(sat)</sub>	—	-0.4	Vdc
Base-Emitter Saturation Voltage <sup>(1)</sup> (I <sub>C</sub> = -150 mA, I <sub>B</sub> = -15 mA) (I <sub>C</sub> = -500 mA, I <sub>B</sub> = -50 mA)	V <sub>BE(sat)</sub>	—	-1.3	Vdc
		—	-2.6	

**SMALL-SIGNAL CHARACTERISTICS**

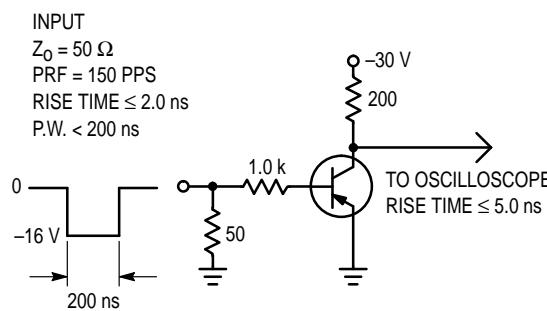
Current-Gain — Bandwidth Product <sup>(1), (2)</sup> (I <sub>C</sub> = -50 mA, V <sub>CE</sub> = -20 Vdc, f = 100 MHz)	f <sub>T</sub>	200	—	MHz
Output Capacitance (V <sub>CB</sub> = -10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	—	8.0	pF
Input Capacitance (V <sub>EB</sub> = -2.0 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>iob</sub>	—	30	pF

**SWITCHING CHARACTERISTICS**

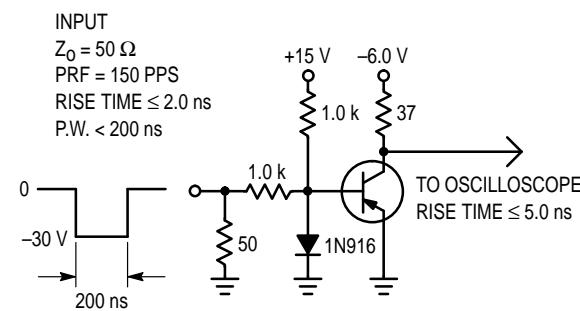
Turn-On Time	(V <sub>CC</sub> = -30 Vdc, I <sub>C</sub> = -150 mA, I <sub>B1</sub> = -15 mA) (Figures 1 and 5)	t <sub>on</sub>	—	45	ns
Delay Time		t <sub>d</sub>	—	10	ns
Rise Time		t <sub>r</sub>	—	40	ns
Turn-Off Time	(V <sub>CC</sub> = -6.0 Vdc, I <sub>C</sub> = -150 mA, I <sub>B1</sub> = I <sub>B2</sub> = 15 mA) (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  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

2. f<sub>T</sub> is defined as the frequency at which |h<sub>fe</sub>| extrapolates to unity.



**Figure 1. Delay and Rise Time Test Circuit**



**Figure 2. Storage and Fall Time Test Circuit**

## TYPICAL CHARACTERISTICS

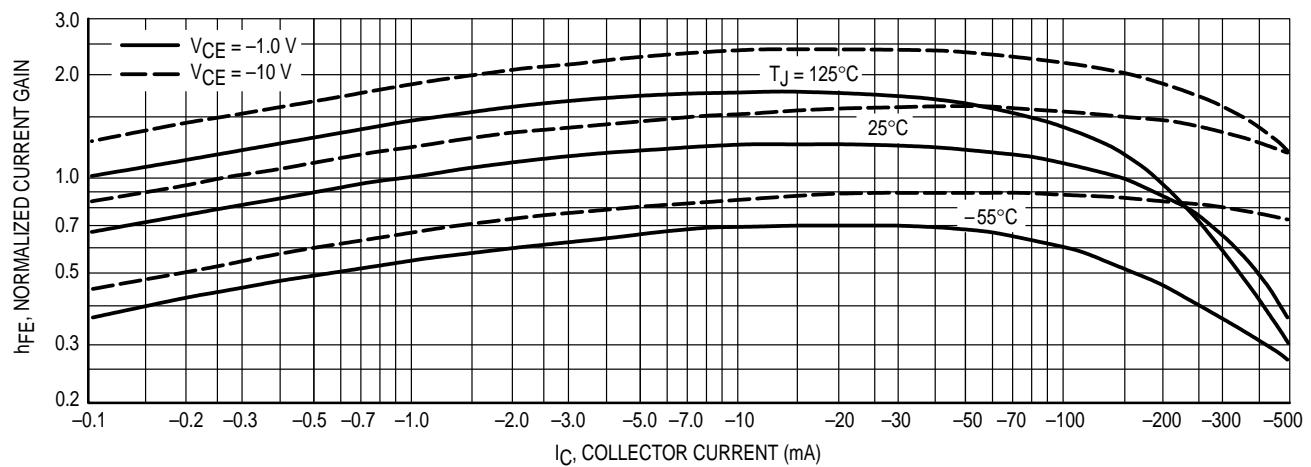


Figure 3. DC Current Gain

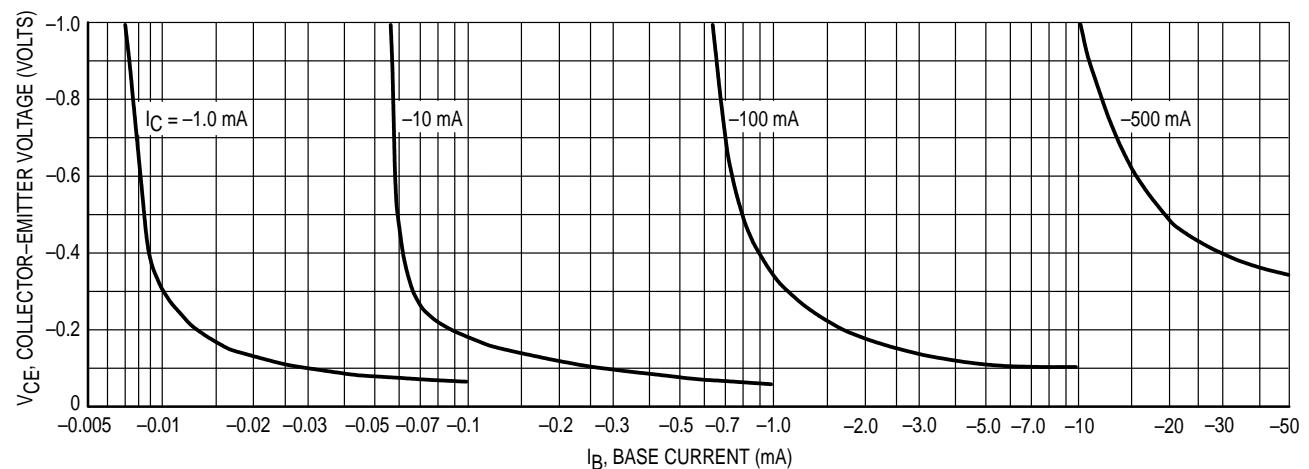


Figure 4. Collector Saturation Region

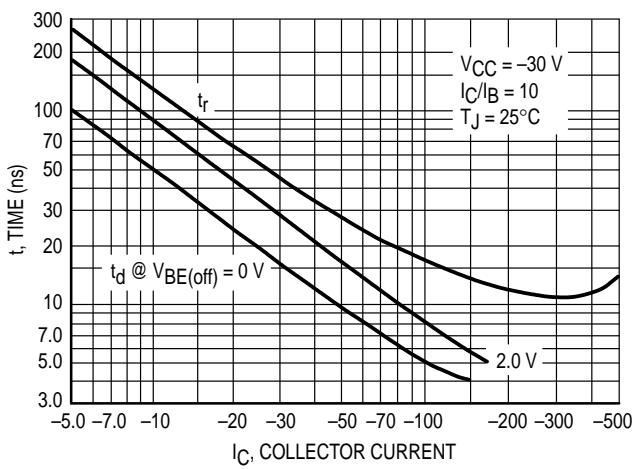


Figure 5. Turn-On Time

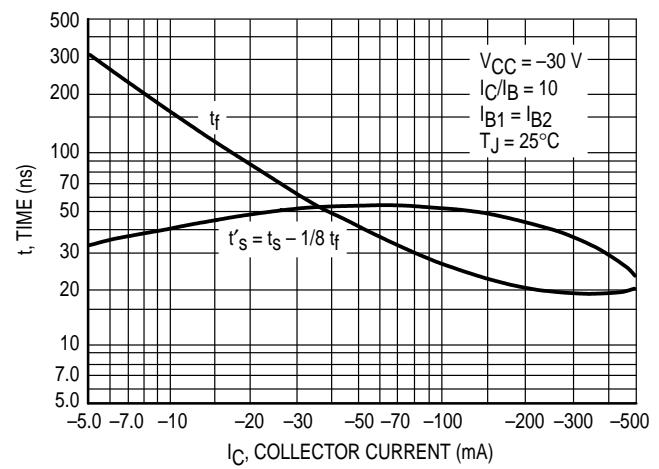
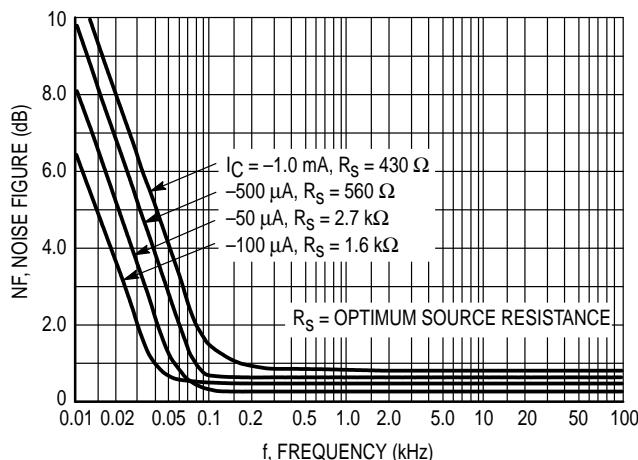
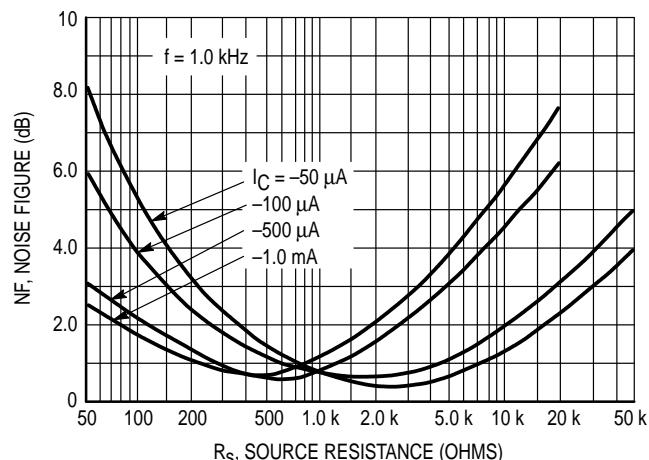
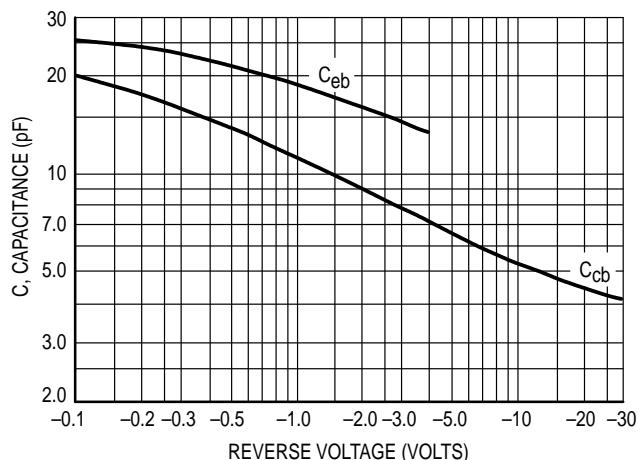
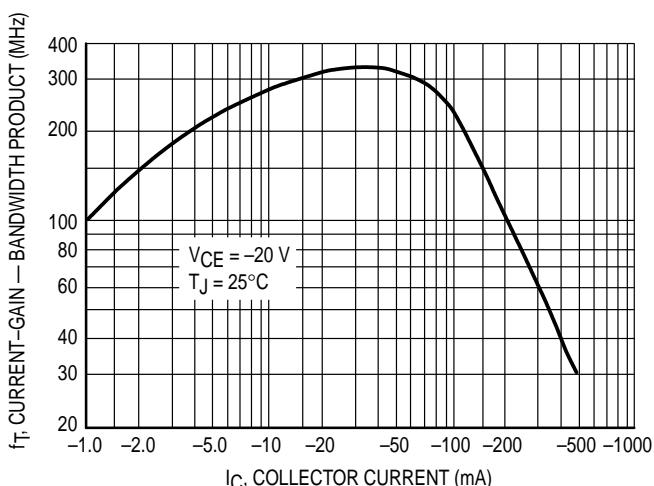
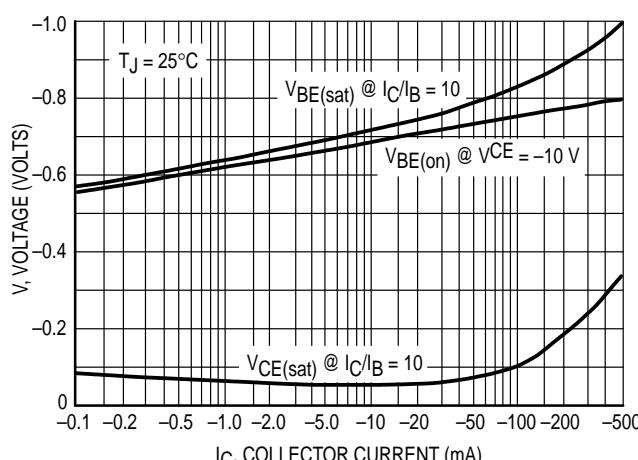
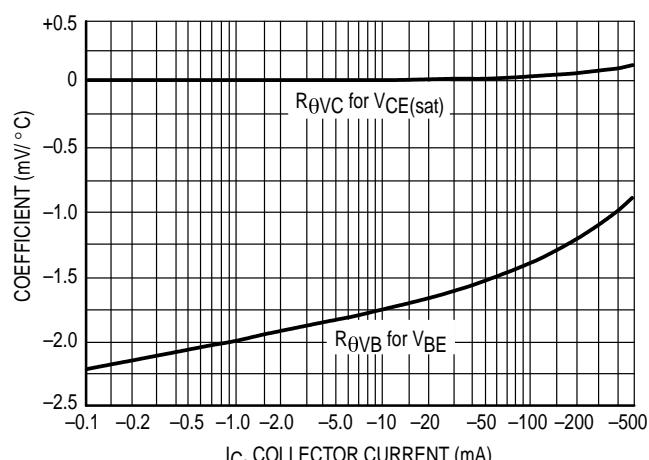
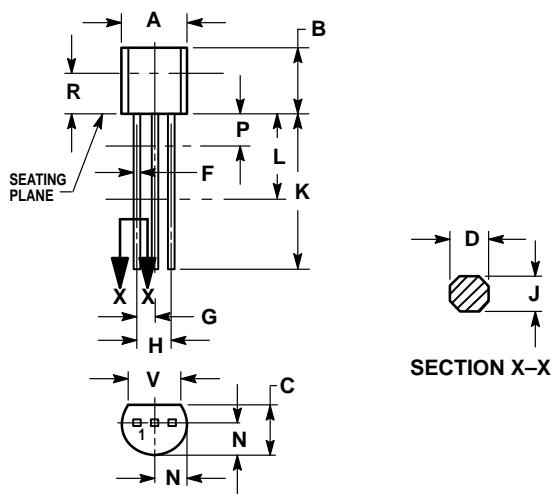


Figure 6. Turn-Off Time

**TYPICAL SMALL-SIGNAL CHARACTERISTICS**
**NOISE FIGURE**
 **$V_{CE} = 10$  Vdc,  $T_A = 25^\circ\text{C}$** 

**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****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	—

**CASE 029-04  
(TO-226AA)  
ISSUE AD**

STYLE 1:  
PIN 1. Emitter  
2. Base  
3. Collector

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