

# MPS2907A

Preferred Device

## General Purpose Transistors

PNP Silicon



ON Semiconductor™

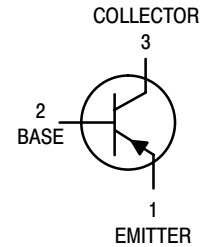
<http://onsemi.com>

### MAXIMUM RATINGS

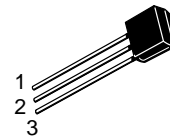
Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	–60	Vdc
Collector–Base Voltage	$V_{CBO}$	–60	Vdc
Emitter–Base Voltage	$V_{EBO}$	–5.0	Vdc
Collector Current – Continuous	$I_C$	–600	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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

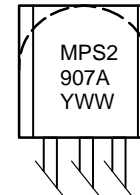


STYLE 1



TO-92  
CASE 29  
STYLES 1, 14

### MARKING DIAGRAMS



Y = Year  
WW = Work Week

### ORDERING INFORMATION

Device	Package	Shipping
MPS2907A	TO-92	5000 Units/Box
MPS2907ARLRA	TO-92	2000/Tape & Reel
MPS2907ARLRE	TO-92	2000/Ammo Pack
MPS2907ARLRM	TO-92	2000/Ammo Pack
MPS2907ARLRP	TO-92	2000/Ammo Pack

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

# MPS2907A

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage (Note 1.) (I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	–60	–	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = –10 μA <sub>dc</sub> , I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	–60	–	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = –10 μA <sub>dc</sub> , I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	–5.0	–	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = –30 V <sub>dc</sub> , V <sub>EB(off)</sub> = –0.5 V <sub>dc</sub> )	I <sub>CEX</sub>	–	–50	nA <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = –50 V <sub>dc</sub> , I <sub>E</sub> = 0) (V <sub>CB</sub> = –50 V <sub>dc</sub> , I <sub>E</sub> = 0, T <sub>A</sub> = 150°C)	I <sub>CBO</sub>	– –	–0.01 –10	μA <sub>dc</sub>
Base Current (V <sub>CE</sub> = –30 V <sub>dc</sub> , V <sub>EB(off)</sub> = –0.5 V <sub>dc</sub> )	I <sub>B</sub>	–	–50	nA <sub>dc</sub>

## ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = –0.1 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> ) (I <sub>C</sub> = –1.0 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> ) (I <sub>C</sub> = –10 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> ) (I <sub>C</sub> = –150 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> ) (Note 1.) (I <sub>C</sub> = –500 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> ) (Note 1.)	h <sub>FE</sub>	75 100 100 100 50	– – – 300 –	–
Collector–Emitter Saturation Voltage (Note 1.) (I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B</sub> = –15 mA <sub>dc</sub> ) (I <sub>C</sub> = –500 mA <sub>dc</sub> , I <sub>B</sub> = –50 mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	– –	–0.4 –1.6	V <sub>dc</sub>
Base–Emitter Saturation Voltage (Note 1.) (I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B</sub> = –15 mA <sub>dc</sub> ) (I <sub>C</sub> = –500 mA <sub>dc</sub> , I <sub>B</sub> = –50 mA <sub>dc</sub> )	V <sub>BE(sat)</sub>	– –	–1.3 –2.6	V <sub>dc</sub>

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (Notes 1. and 2.), (I <sub>C</sub> = –50 mA <sub>dc</sub> , V <sub>CE</sub> = –20 V <sub>dc</sub> , f = 100 MHz)	f <sub>T</sub>	200	–	MHz
Output Capacitance (V <sub>CB</sub> = –10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	–	8.0	pF
Input Capacitance (V <sub>EB</sub> = –2.0 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	–	30	pF

## SWITCHING CHARACTERISTICS

Turn–On Time	(V <sub>CC</sub> = –30 V <sub>dc</sub> , I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B1</sub> = –15 mA <sub>dc</sub> ) (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 V <sub>dc</sub> , I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B1</sub> = I <sub>B2</sub> = 15 mA <sub>dc</sub> ) (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 ≤ 300 μs, Duty Cycle ≤ 2%.
2. f<sub>T</sub> is defined as the frequency at which |h<sub>fe</sub>| extrapolates to unity.

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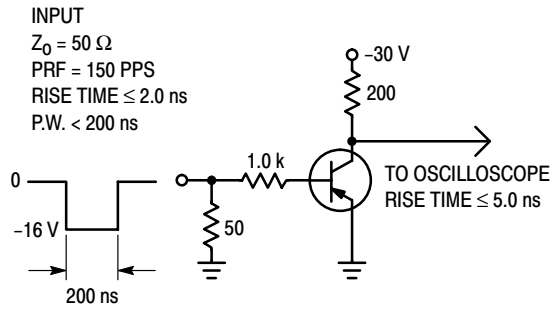


Figure 1. Delay and Rise Time Test Circuit

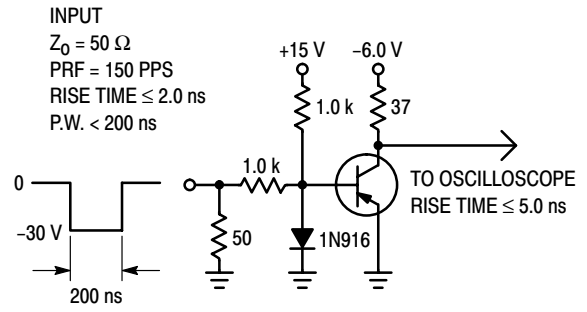


Figure 2. Storage and Fall Time Test Circuit

## TYPICAL CHARACTERISTICS

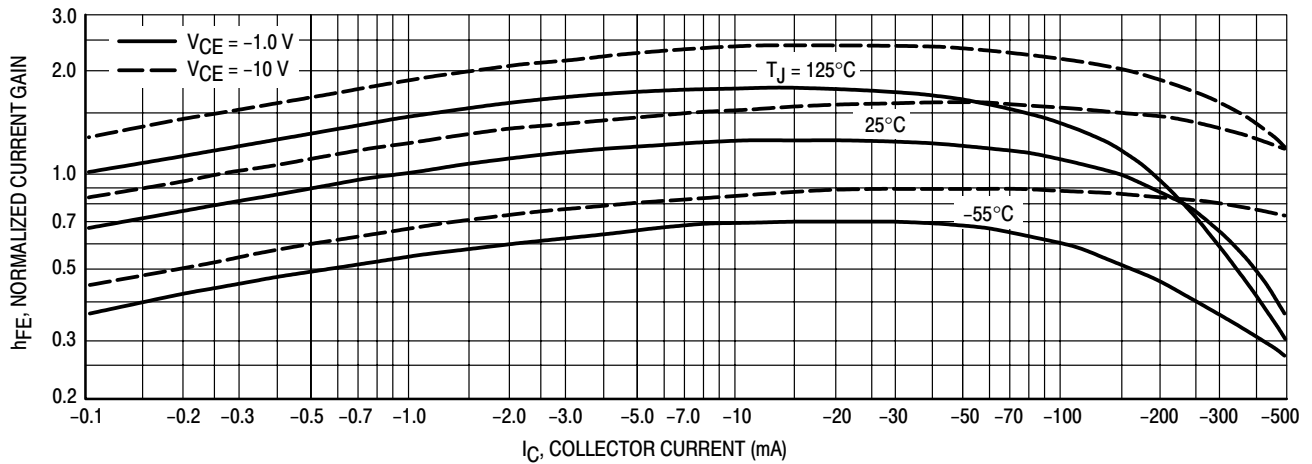


Figure 3. DC Current Gain

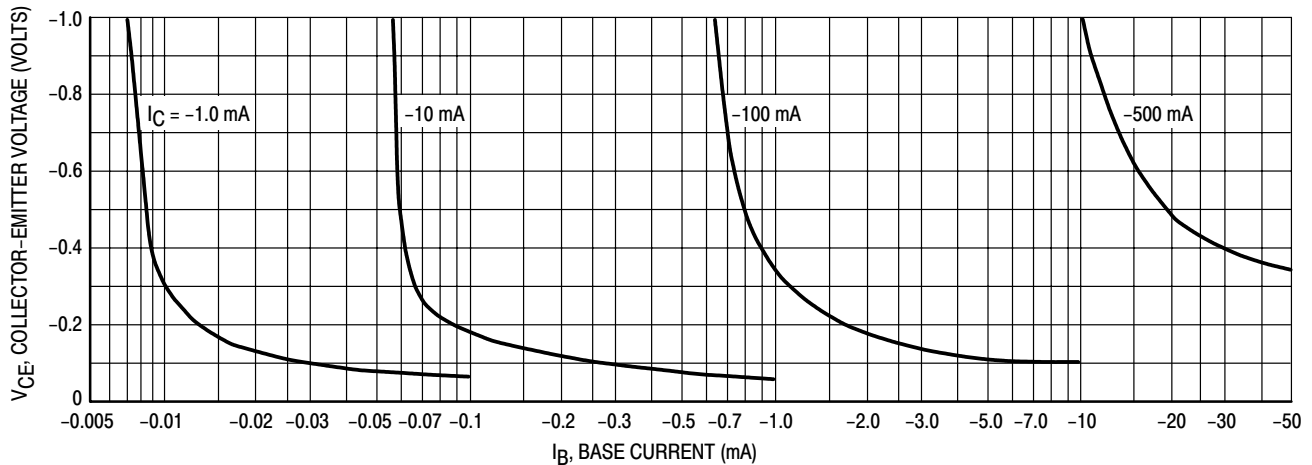


Figure 4. Collector Saturation Region

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## TYPICAL CHARACTERISTICS

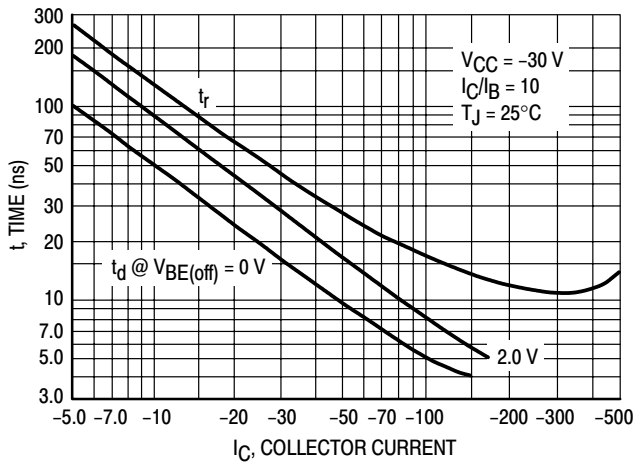


Figure 5. Turn-On Time

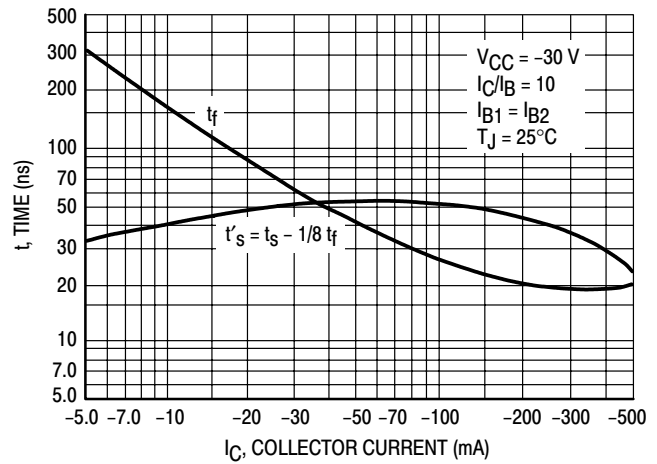


Figure 6. Turn-Off Time

## TYPICAL SMALL-SIGNAL CHARACTERISTICS

### NOISE FIGURE

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

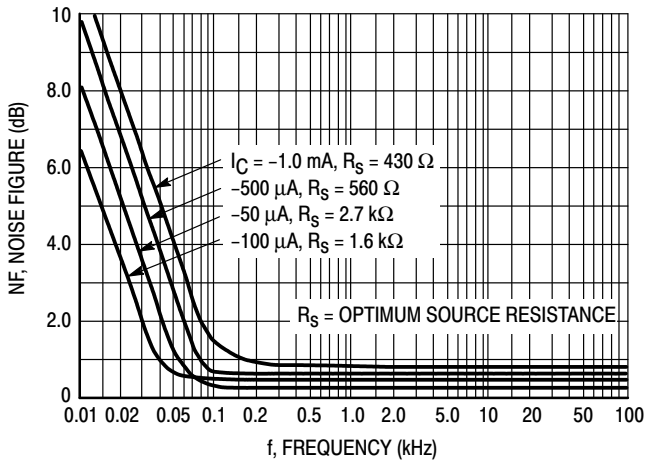


Figure 7. Frequency Effects

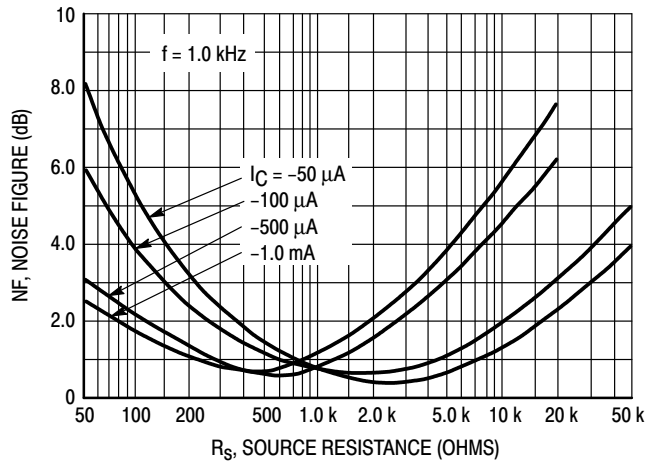


Figure 8. Source Resistance Effects

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## TYPICAL SMALL-SIGNAL CHARACTERISTICS

### NOISE FIGURE

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

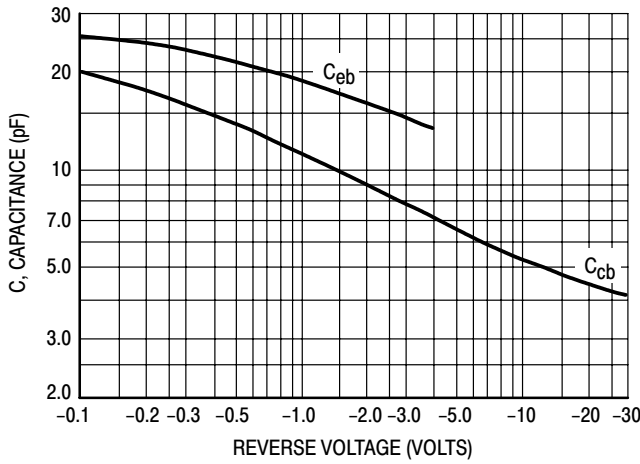


Figure 9. Capacitances

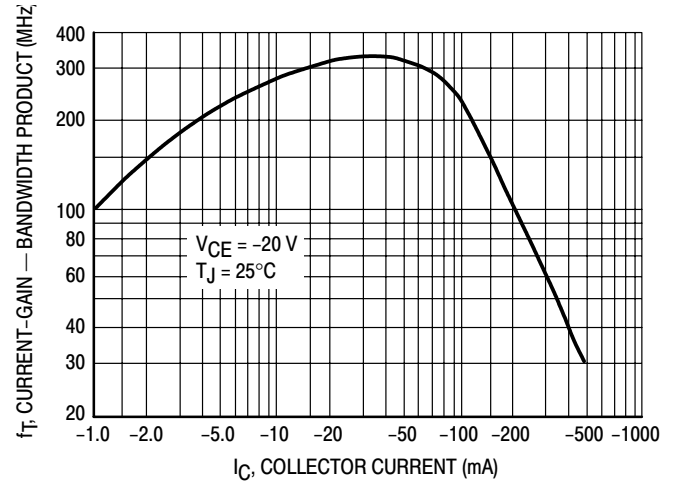


Figure 10. Current-Gain — Bandwidth Product

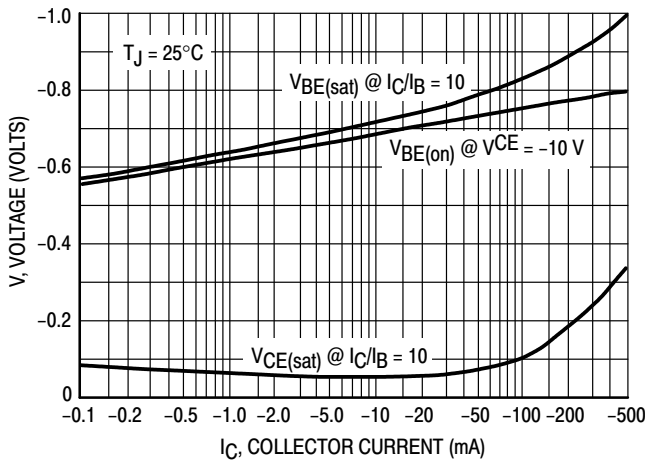


Figure 11. "On" Voltage

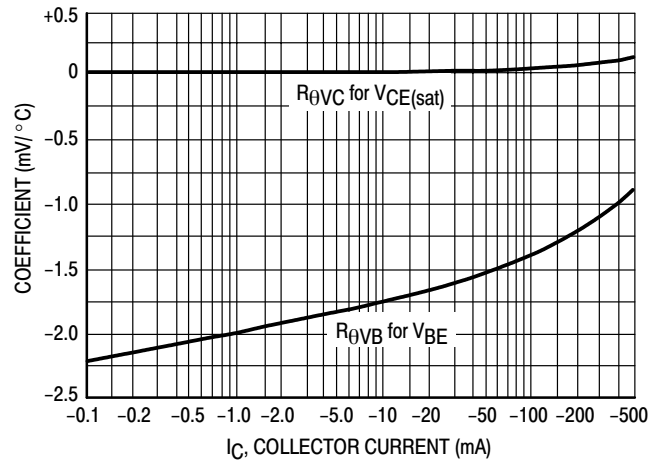
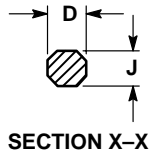
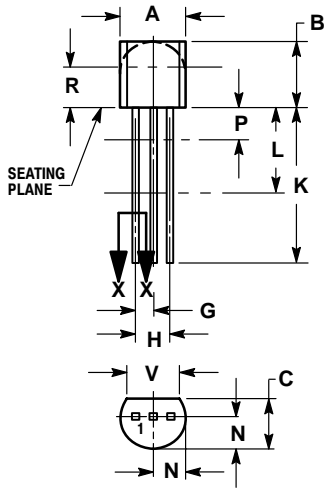


Figure 12. Temperature Coefficients

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## PACKAGE DIMENSIONS

TO-92  
TO-226AA  
CASE 29-11  
ISSUE AL



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. 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	0.021	0.407	0.533
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

STYLE 14:

- PIN 1. EMITTER
2. COLLECTOR
3. BASE