PN2907A

Preferred Device

# General Purpose Transistor

PNP Silicon

Features

- These are Pb-Free Devices*

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	W 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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor®

http://onsemi.com

COLLECTOR
3

2
BASE

1
EMITTER

TO-92
CASE 29
STYLE 1

1
2
3

STRAIGHT LEAD
BULK PACK

1
2
3

BENT LEAD
TAPE & REEL
AMMO PACK
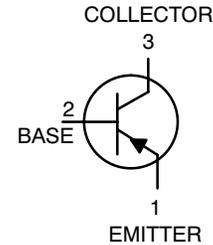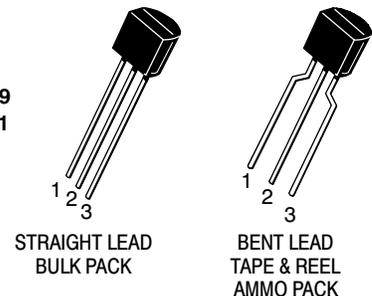
MARKING DIAGRAM

PN2
907A
YWW ▪
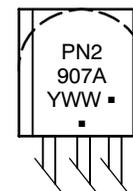
PN2907A	= Device Code
Y	= Year
WW	= Work Week
▪	= Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (Note 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
Base Current (V_{CE} = -30 Vdc, $V_{EB(off)}$ = -0.5 Vdc)	I_B	-	-50	nAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = -0.1 mAdc, V_{CE} = -10 Vdc) (I_C = -1.0 mAdc, V_{CE} = -10 Vdc) (I_C = -10 mAdc, V_{CE} = -10 Vdc) (I_C = -150 mAdc, V_{CE} = -10 Vdc) (Note 1) (I_C = -500 mAdc, V_{CE} = -10 Vdc) (Note 1)	h_{FE}	75 100 100 100 50	- - - 300 -	-
Collector-Emitter Saturation Voltage (Note 1) (I_C = -150 mAdc, I_B = -15 mAdc) (I_C = -500 mAdc, I_B = -50 mAdc)	$V_{CE(sat)}$	- -	-0.4 -1.6	Vdc
Base-Emitter Saturation Voltage (Note 1) (I_C = -150 mAdc, I_B = -15 mAdc) (I_C = -500 mAdc, I_B = -50 mAdc)	$V_{BE(sat)}$	- -	-1.3 -2.6	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain - Bandwidth Product (Notes 1 and 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%.
2. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

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ORDERING INFORMATION

Device	Package	Shipping[†]
PN2907AG	TO-92 (Pb-Free)	5000 Units / Bulk
PN2907ARLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

INPUT
$Z_0 = 50 \ \Omega$
PRF = 150 PPS
RISE TIME ≤ 2.0 ns
P.W. < 200 ns

-30 V
200
1.0 k
0
-16 V
50
200 ns
TO OSCILLOSCOPE
RISE TIME ≤ 5.0 ns
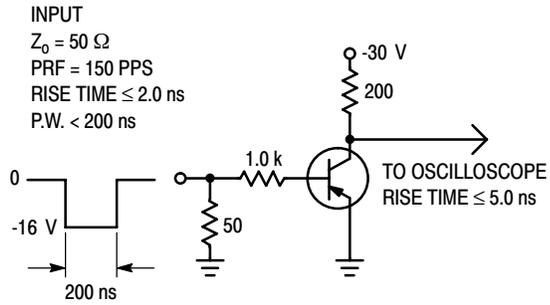
Figure 1. Delay and Rise Time Test Circuit

INPUT
$Z_0 = 50 \ \Omega$
PRF = 150 PPS
RISE TIME ≤ 2.0 ns
P.W. < 200 ns

+15 V   -6.0 V
1.0 k   37
1.0 k
0
-30 V
50
1N916
200 ns
TO OSCILLOSCOPE
RISE TIME ≤ 5.0 ns
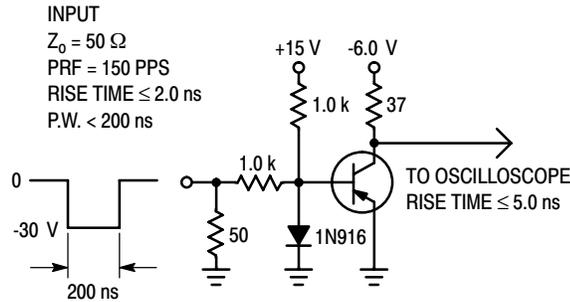
Figure 2. Storage and Fall Time Test Circuit

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TYPICAL CHARACTERISTICS
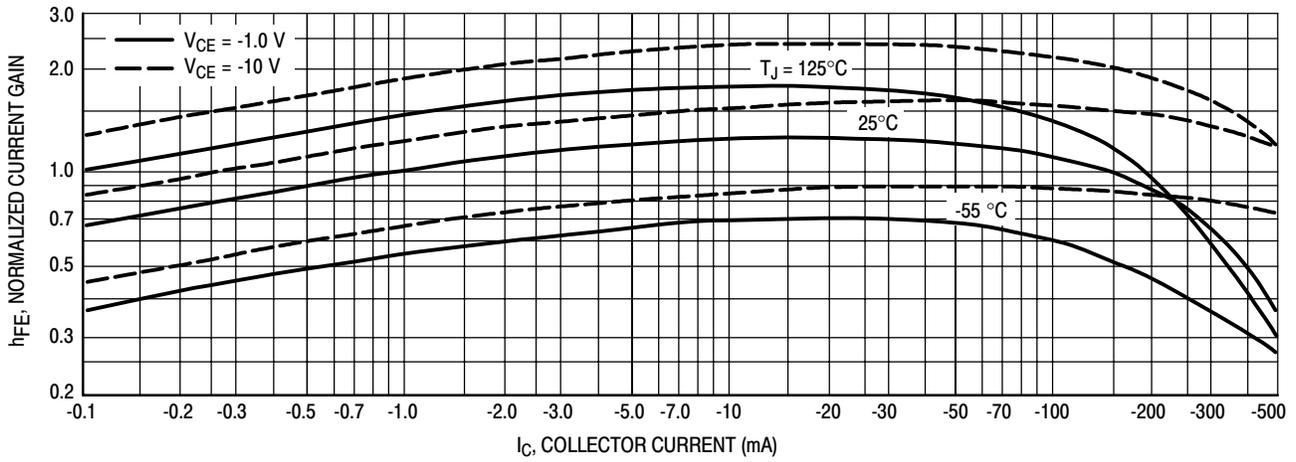
Figure 3. DC Current Gain
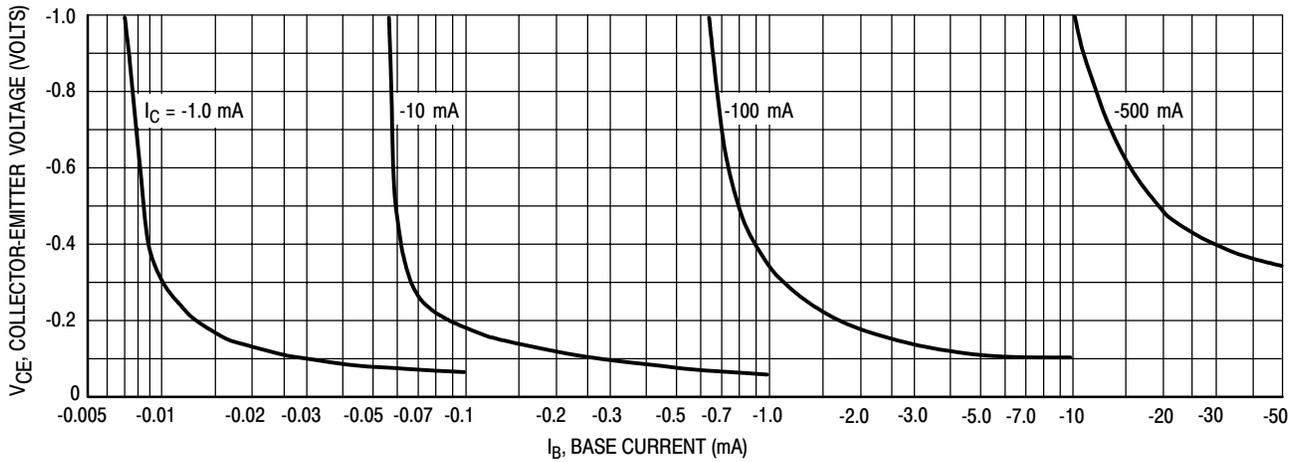
Figure 4. Collector Saturation Region
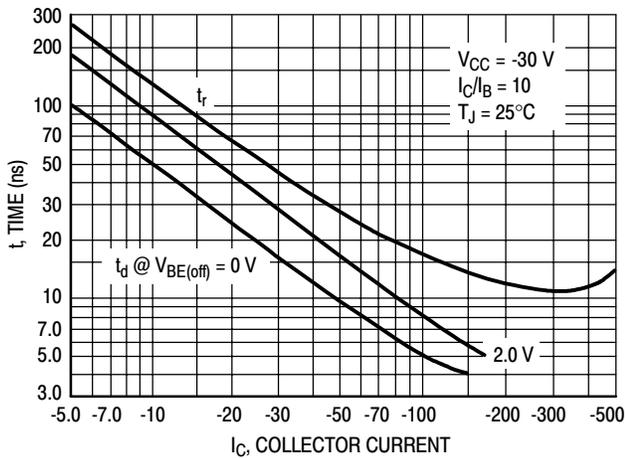
Figure 5. Turn-On Time
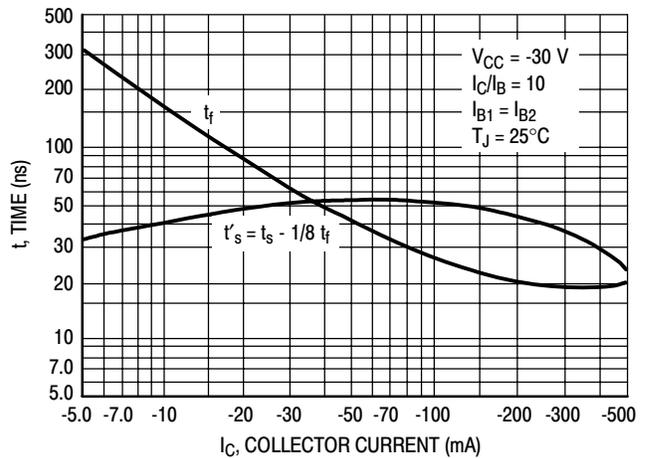
Figure 6. Turn-Off Time

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TYPICAL SMALL-SIGNAL CHARACTERISTICS
NOISE FIGURE
V_{CE} = 10 Vdc, T_A = 25°C
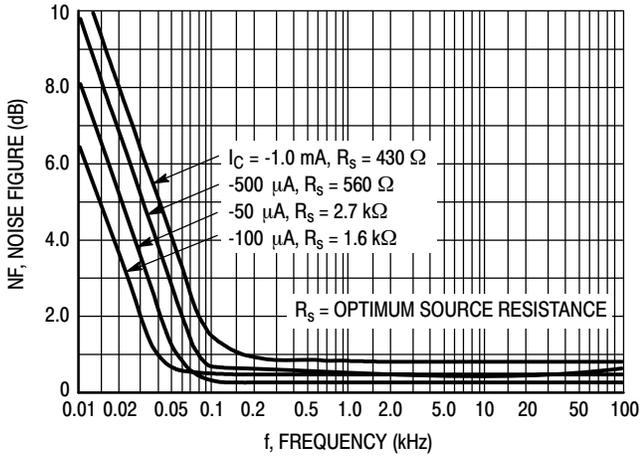
Figure 7. Frequency Effects
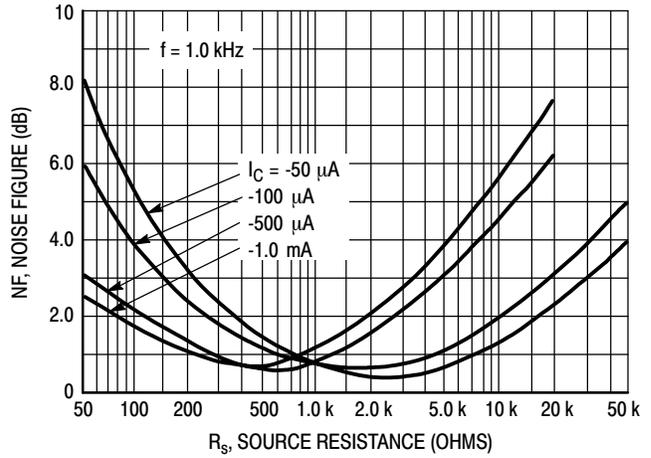
Figure 8. Source Resistance Effects
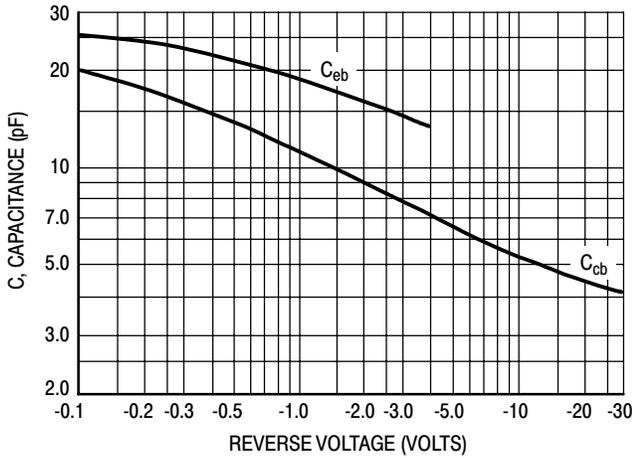
Figure 9. Capacitances
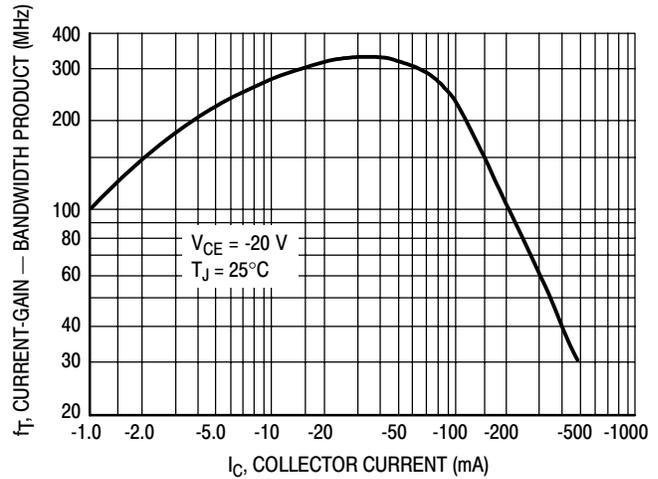
Figure 10. Current-Gain — Bandwidth Product
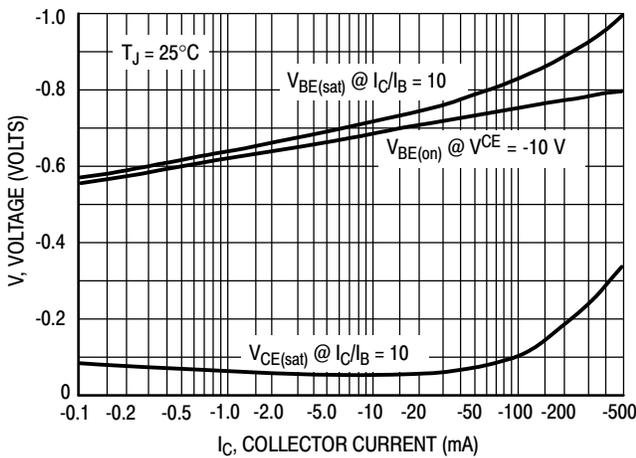
Figure 11. "On" Voltage
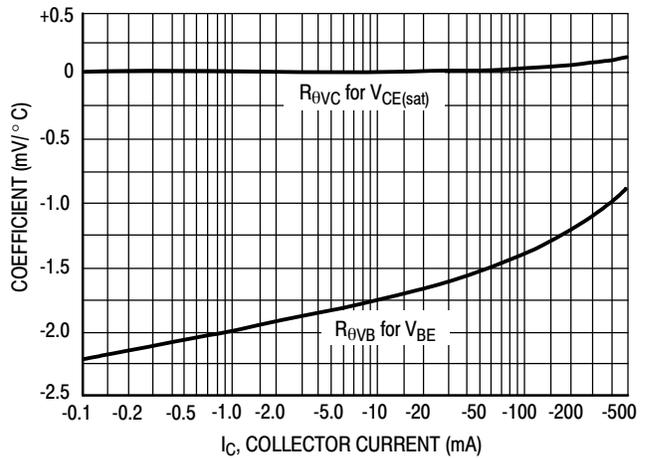
Figure 12. Temperature Coefficients

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PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-11
ISSUE AM
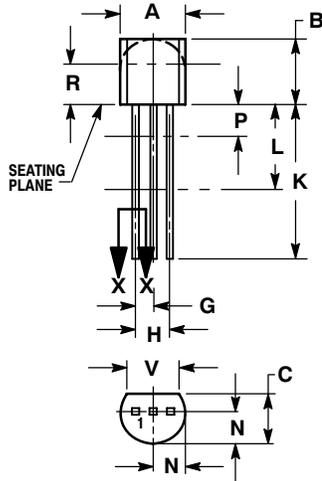
STRAIGHT LEAD BULK PACK

SEATING PLANE
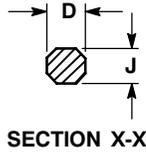
SECTION X-X

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 MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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	---
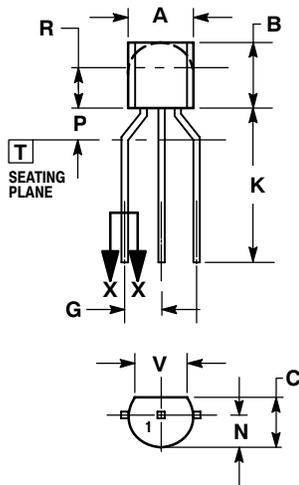
BENT LEAD TAPE & REEL AMMO PACK

SEATING PLANE
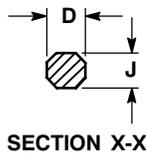
SECTION X-X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS MIN	MILLIMETERS MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

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