

# MMBT2907AWT1G, NSVMMBT2907AWT1G

## General Purpose Transistor

### PNP Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SC-70/SOT-323 package which is designed for low power surface mount applications.

#### Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### 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

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Thermal Resistance Junction-to-Ambient	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

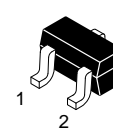
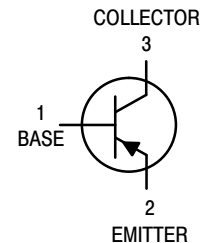
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-5 = 1.0 x 0.75 x 0.062 in.



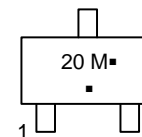
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SC-70/SOT-323  
CASE 419-04  
STYLE 3

#### MARKING DIAGRAM



20 = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation may vary depending upon manufacturing location.

#### ORDERING INFORMATION

Device	Package	Shipping†
MMBT2907AWT1G	SC-70 (Pb-Free)	3000 Tape & Reel
NSVMMBT2907AWT1G	SC-70 (Pb-Free)	3000 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.

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## 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 2) (I <sub>C</sub> = -10 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	-60	-	Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = -10 mAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	-60	-	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = -10 μAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	-5.0	-	Vdc
Base Cutoff Current (V <sub>CE</sub> = -30 Vdc, V <sub>EB(off)</sub> = -0.5 Vdc)	I <sub>BL</sub>	-	-50	nAdc
Collector Cutoff Current (V <sub>CE</sub> = -30 Vdc, V <sub>EB(off)</sub> = -0.5 Vdc)	I <sub>CEx</sub>	-	-50	nAdc

## ON CHARACTERISTICS<sup>(3)</sup>

DC Current Gain (Note 2) (I <sub>C</sub> = -0.1 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -1.0 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -10 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -150 mAdc, V <sub>CE</sub> = -10 Vdc) (I <sub>C</sub> = -500 mAdc, V <sub>CE</sub> = -10 Vdc)	H <sub>FE</sub>	75 100 100 100 50	- - - 340 -	-
Collector–Emitter Saturation Voltage (Note 2) (I <sub>C</sub> = -150 mAdc, I <sub>B</sub> = -15 mAdc) (I <sub>C</sub> = -500 mAdc, I <sub>B</sub> = -50 mAdc)	V <sub>CE(sat)</sub>	- -	-0.4 -1.6	Vdc
Base–Emitter Saturation Voltage (Note 2) (I <sub>C</sub> = -150 mAdc, I <sub>B</sub> = -15 mAdc) (I <sub>C</sub> = -500 mAdc, I <sub>B</sub> = -50 mAdc)	V <sub>BE(sat)</sub>	- -	-1.3 -2.6	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I <sub>C</sub> = -50 mAdc, 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>ibo</sub>	-	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)	t <sub>on</sub>	-	45	ns
Delay Time		t <sub>d</sub>	-	10	
Rise Time		t <sub>r</sub>	-	40	
Storage Time	(V <sub>CC</sub> = -6.0 Vdc, I <sub>C</sub> = -150 mAdc, I <sub>B1</sub> = I <sub>B2</sub> = 15 mAdc)	t <sub>s</sub>	-	80	
Fall Time		t <sub>f</sub>	-	30	
Turn-Off Time		t <sub>off</sub>	-	100	

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

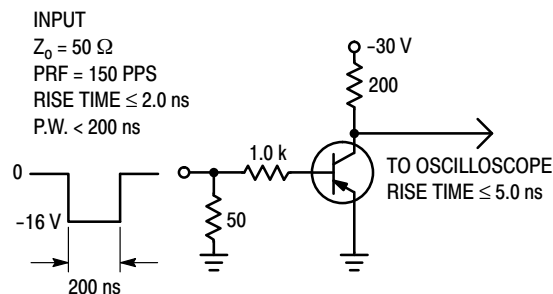


Figure 1. Delay and Rise Time Test Circuit

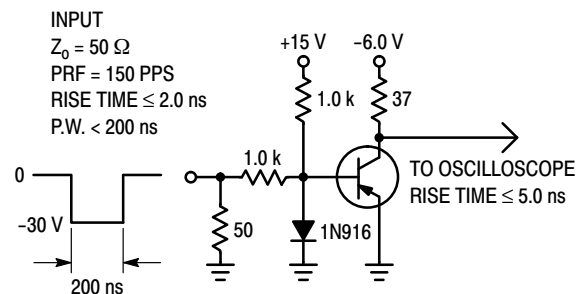


Figure 2. Storage and Fall Time Test Circuit

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## TYPICAL CHARACTERISTICS



Figure 3. DC Current Gain



Figure 4. Collector Saturation Region

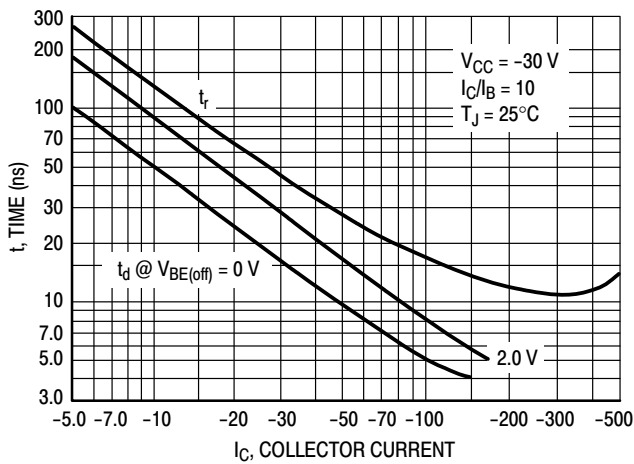


Figure 5. Turn-On Time

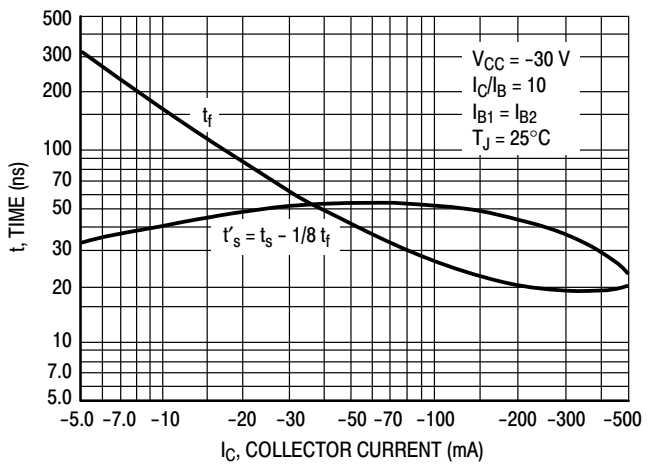


Figure 6. Turn-Off Time

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## TYPICAL SMALL-SIGNAL Characteristics NOISE FIGURE

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

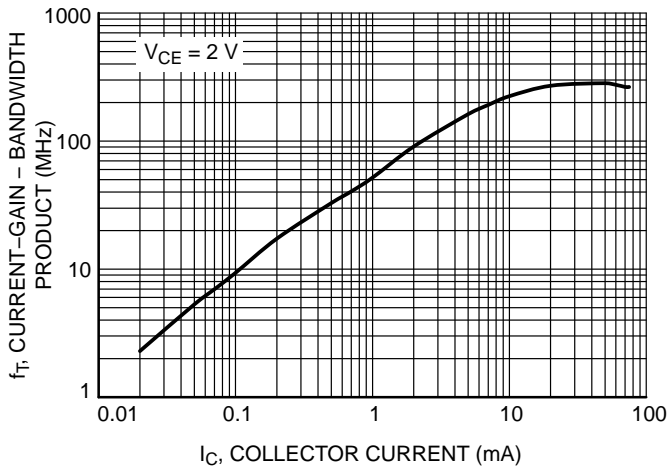


Figure 7. Current-Gain - Bandwidth Product

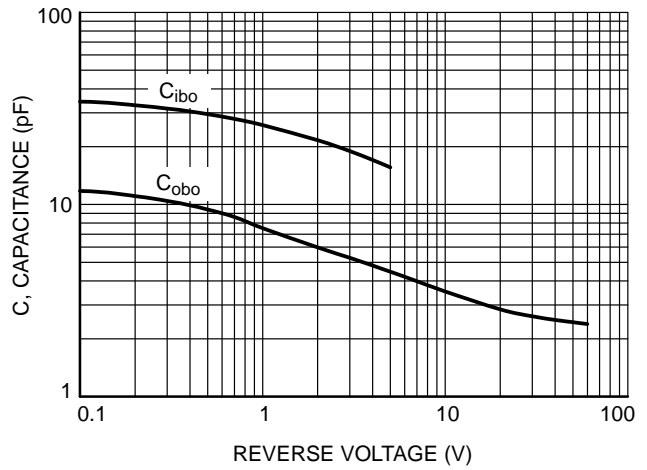


Figure 8. Capacitances

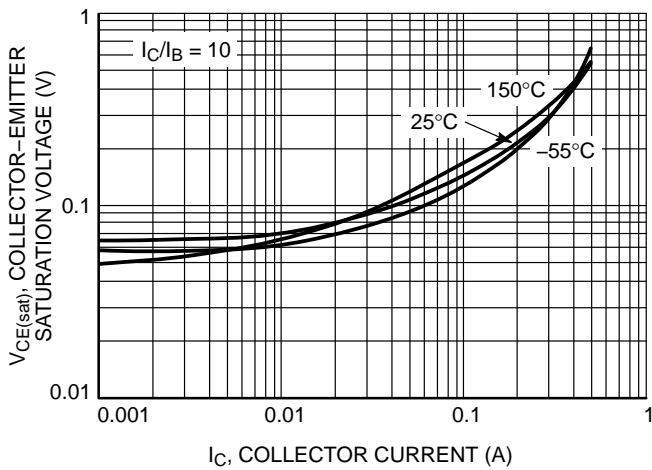


Figure 9. Collector-Emitter Saturation Voltage vs. Collector Current

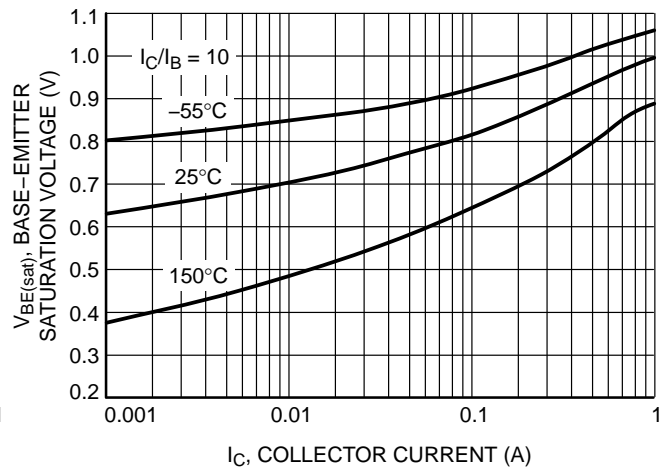


Figure 10. Base-Emitter Saturation Voltage vs. Collector Current

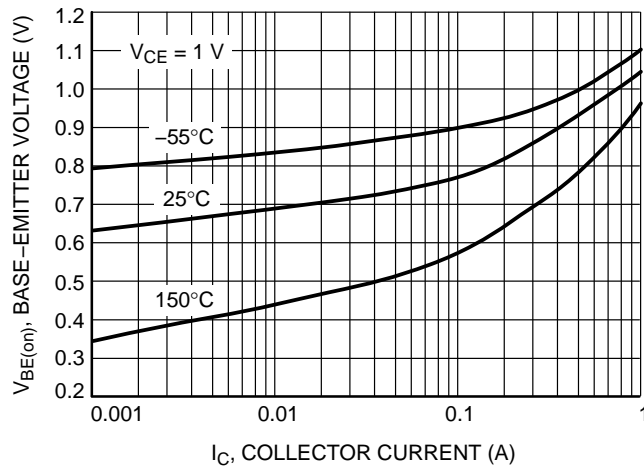
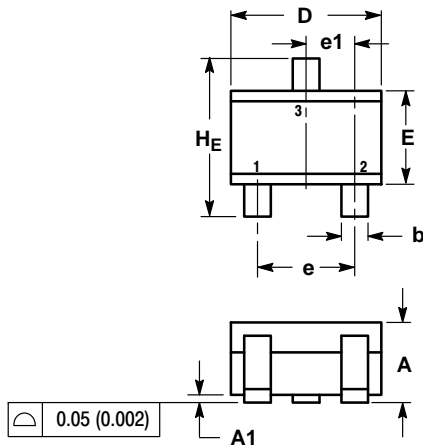


Figure 11. Base-Emitter Voltage vs. Collector Current

# MMBT2907AWT1G, NSVMMBT2907AWT1G

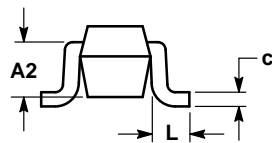
## PACKAGE DIMENSIONS

### SC-70 (SOT-323) CASE 419-04 ISSUE N



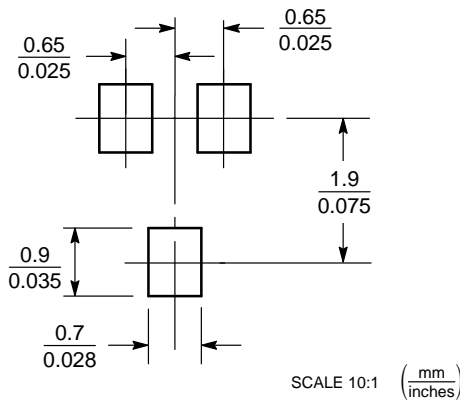
- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.70 REF			0.028 REF		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.56	0.008	0.015	0.022
HE	2.00	2.10	2.40	0.079	0.083	0.095



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

### SOLDERING FOOTPRINT\*



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

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