

# General Purpose Transistor

## PNP Silicon

### MMBT2907AWT1G, NSVMMBT2907AWT1G

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

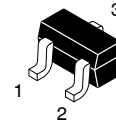
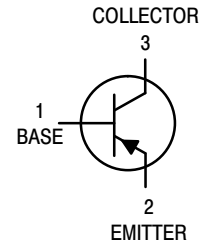
Rating	Symbol	Value	Unit
Collector – Emitter Voltage	$V_{CEO}$	-60	Vdc
Collector – Base Voltage	$V_{CBO}$	-60	Vdc
Emitter – Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current – Continuous	$I_C$	-600	mAdc

#### 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	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

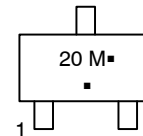
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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



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 <sup>†</sup>
MMBT2907AWT1G	SC-70 (Pb-Free)	3000 Tape & Reel
NSVMMBT2907AWT1G	SC-70 (Pb-Free)	3000 Tape & Reel

<sup>†</sup>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.

# MMBT2907AWT1G, NSVMMBT2907AWT1G

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector - Emitter Breakdown Voltage (Note 2) ( $I_C = -10\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	-60	-	Vdc
Collector - Base Breakdown Voltage ( $I_C = -10\text{ }\mu\text{A}$ , $I_E = 0$ )	$V_{(BR)CBO}$	-60	-	Vdc
Emitter - Base Breakdown Voltage ( $I_E = -10\text{ }\mu\text{A}$ , $I_C = 0$ )	$V_{(BR)EBO}$	-5.0	-	Vdc
Base Cutoff Current ( $V_{CE} = -30\text{ Vdc}$ , $V_{EB(off)} = -0.5\text{ Vdc}$ )	$I_{BL}$	-	-50	nAdc
Collector Cutoff Current ( $V_{CE} = -30\text{ Vdc}$ , $V_{EB(off)} = -0.5\text{ Vdc}$ )	$I_{CEX}$	-	-50	nAdc

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

DC Current Gain (Note 2) ( $I_C = -0.1\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -1.0\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -10\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -150\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ ) ( $I_C = -500\text{ mA}$ , $V_{CE} = -10\text{ Vdc}$ )	$H_{FE}$	75 100 100 100 50	- - - 340 -	-
Collector - Emitter Saturation Voltage (Note 2) ( $I_C = -150\text{ mA}$ , $I_B = -15\text{ mA}$ ) ( $I_C = -500\text{ mA}$ , $I_B = -50\text{ mA}$ )	$V_{CE(sat)}$	- -	-0.4 -1.6	Vdc
Base - Emitter Saturation Voltage (Note 2) ( $I_C = -150\text{ mA}$ , $I_B = -15\text{ mA}$ ) ( $I_C = -500\text{ mA}$ , $I_B = -50\text{ mA}$ )	$V_{BE(sat)}$	- -	-1.3 -2.6	Vdc

## SMALL-SIGNAL CHARACTERISTICS

Current - Gain - Bandwidth Product ( $I_C = -50\text{ mA}$ , $V_{CE} = 20\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	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	$(V_{CC} = -30\text{ Vdc}, I_C = -150\text{ mA}, I_{B1} = -15\text{ mA})$	$t_{on}$	-	45	ns
Delay Time		$t_d$	-	10	
Rise Time		$t_r$	-	40	
Storage Time	$(V_{CC} = -6.0\text{ Vdc}, I_C = -150\text{ mA}, I_{B1} = I_{B2} = 15\text{ mA})$	$t_s$	-	80	
Fall Time		$t_f$	-	30	
Turn-Off Time		$t_{off}$	-	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  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

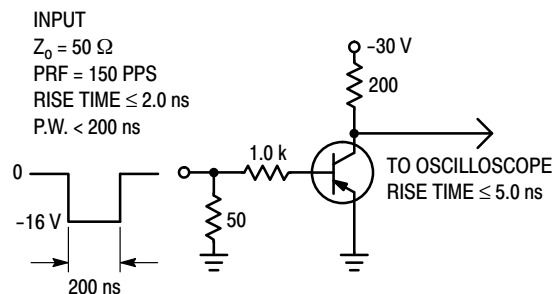


Figure 1. Delay and Rise Time Test Circuit

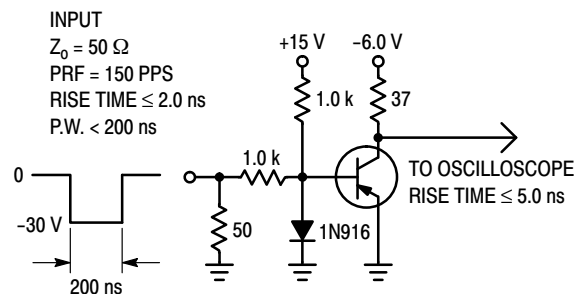


Figure 2. Storage and Fall Time Test Circuit

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## TYPICAL CHARACTERISTICS



Figure 3. DC Current Gain



Figure 4. Collector Saturation Region

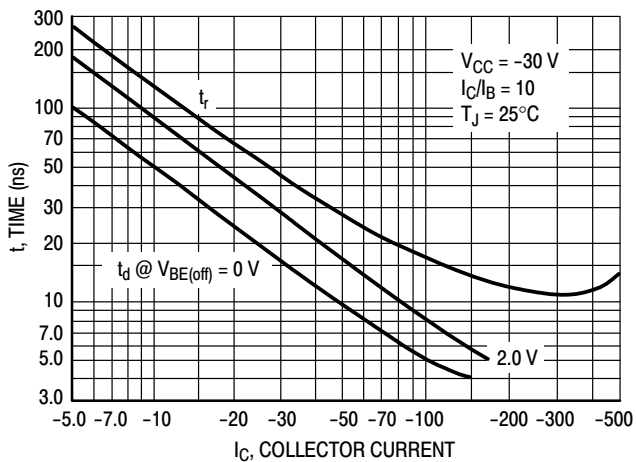


Figure 5. Turn-On Time

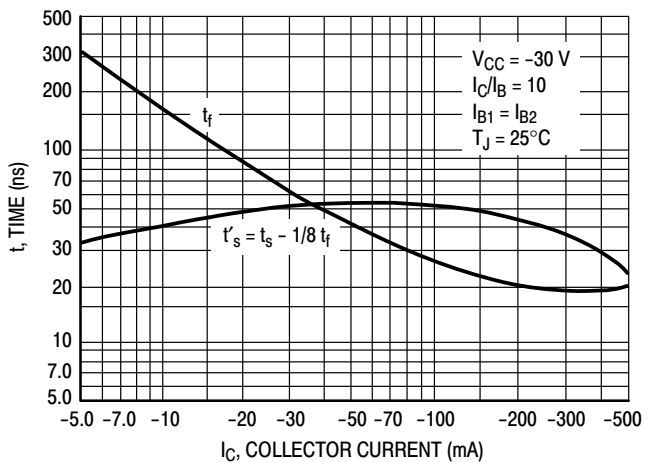
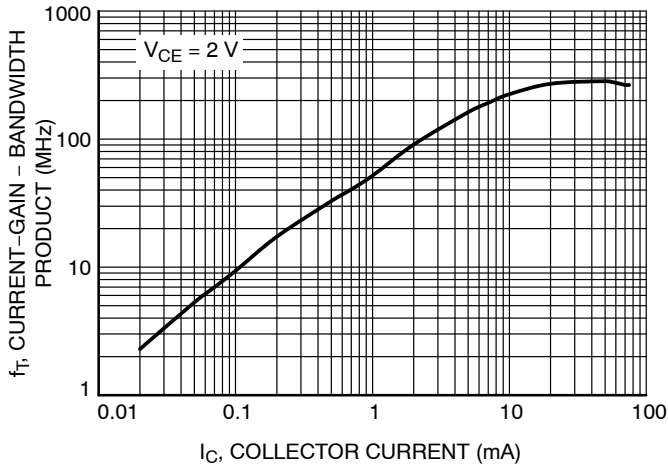


Figure 6. Turn-Off Time

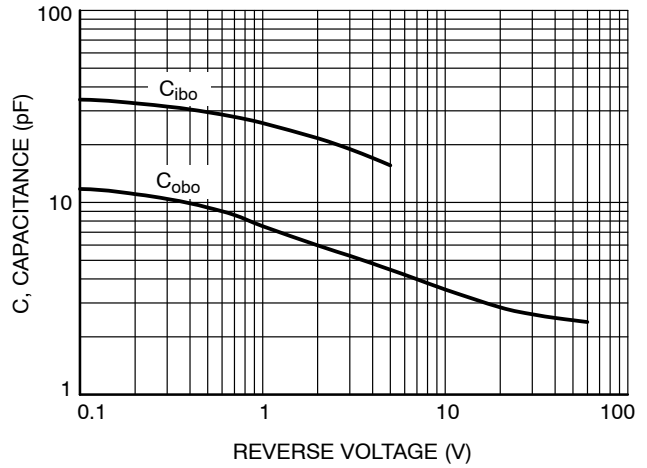
# MMBT2907AWT1G, NSVMMBT2907AWT1G

## TYPICAL SMALL-SIGNAL Characteristics NOISE FIGURE

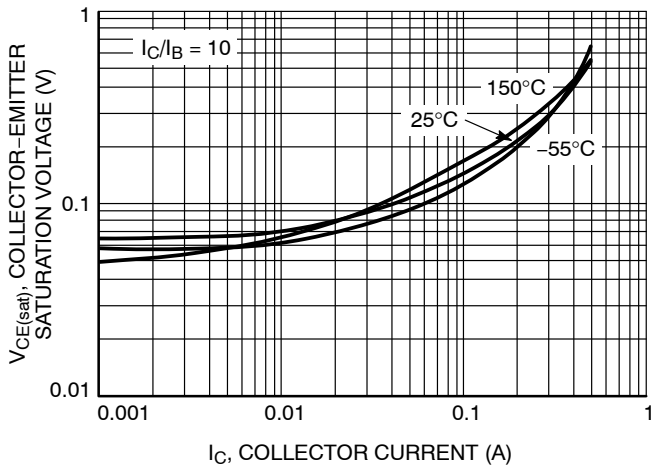
$V_{CE} = 10 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$



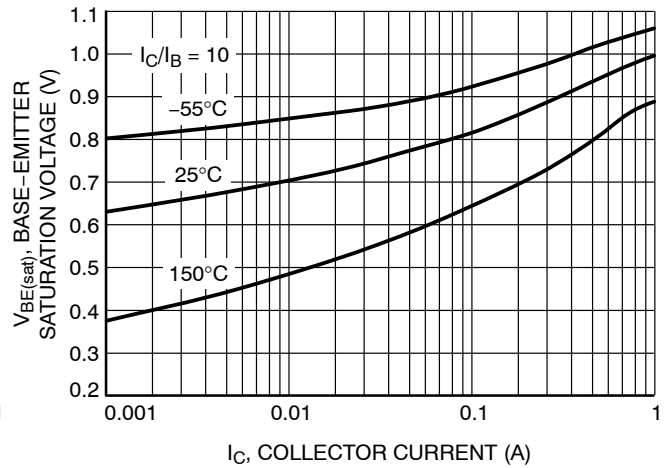
**Figure 7. Current-Gain - Bandwidth Product**



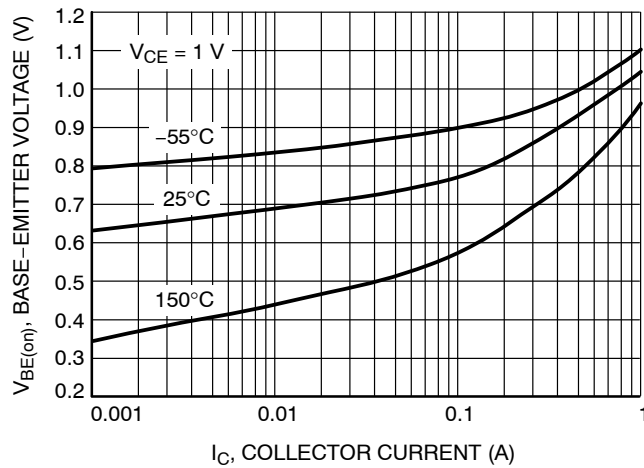
**Figure 8. Capacitances**



**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**

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



SCALE 4:1

## SC-70 (SOT-323) CASE 419 ISSUE R

DATE 11 OCT 2022



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME 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 BSC		
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	2.00	2.20	0.071	0.080	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
H <sub>E</sub>	2.00	2.10	2.40	0.079	0.083	0.095

### GENERIC MARKING DIAGRAM



- XX = Specific Device Code
- M = Date Code
- = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.



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

### SOLDERING FOOTPRINT

STYLE 1: CANCELLED	STYLE 2: PIN 1. ANODE 2. N.C. 3. CATHODE	STYLE 3: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 5: PIN 1. ANODE 2. ANODE 3. CATHODE
STYLE 6: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 7: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 8: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 9: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE	STYLE 10: PIN 1. CATHODE 2. ANODE 3. ANODE-CATHODE
				STYLE 11: PIN 1. CATHODE 2. CATHODE 3. CATHODE

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