



**THE DATASHEET OF
MMBT2907AM3T5G**



MMBT2907AM3T5G

PNP General Purpose Transistor

The MMBT2907AM3T5G device is a spin-off of our popular SOT-23 three-leaded device. It is designed for general purpose amplifier applications and is housed in the SOT-723 surface mount package. This device is ideal for low-power surface mount applications where board space is at a premium.

Features

- Reduces Board Space
- 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) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	265 2.1	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	470	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	640 5.1	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	195	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

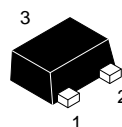
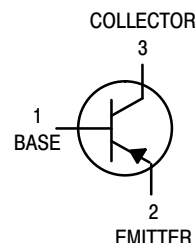
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-5 = $1.0 \times 0.75 \times 0.062$ in.
2. Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.



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MARKING DIAGRAM

SOT-723
CASE 631AA
STYLE 1



AC = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
MMBT2907AM3T5G	SOT-723 (Pb-Free)	8000/Tape & Reel
NSVMMBT2907AM3T5G	SOT-723 (Pb-Free)	8000/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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (Note 3) ($I_C = -10\text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	-60	-	Vdc
Collector–Base Breakdown Voltage ($I_C = -10\ \mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	-60	-	Vdc
Emitter–Base Breakdown Voltage ($I_E = -10\ \mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	-5.0	-	Vdc
Collector Cutoff Current ($V_{CE} = -30\text{ Vdc}$, $V_{EB(off)} = -0.5\text{ Vdc}$)	I_{CEX}	-	-50	nAdc
Collector Cutoff Current ($V_{CB} = -50\text{ Vdc}$, $I_E = 0$) ($V_{CB} = -50\text{ Vdc}$, $I_E = 0$, $T_A = 125^\circ\text{C}$)	I_{CBO}	-	-0.010 -10	μAdc
Base Cutoff Current ($V_{CE} = -30\text{ Vdc}$, $V_{EB(off)} = -0.5\text{ Vdc}$)	I_{BL}	-	-50	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = -0.1\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -10\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -150\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$) ($I_C = -500\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$) (Note 3)	h_{FE}	75 100 100 100 50	- - - 300 -	-
Collector–Emitter Saturation Voltage (Note 3) ($I_C = -150\text{ mAdc}$, $I_B = -15\text{ mAdc}$) (Note 3) ($I_C = -500\text{ mAdc}$, $I_B = -50\text{ mAdc}$)	$V_{CE(sat)}$	- -	-0.4 -1.6	Vdc
Base–Emitter Saturation Voltage (Note 3) ($I_C = -150\text{ mAdc}$, $I_B = -15\text{ mAdc}$) ($I_C = -500\text{ mAdc}$, $I_B = -50\text{ mAdc}$)	$V_{BE(sat)}$	- -	-1.3 -2.6	Vdc

SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (Notes 3, 4) ($I_C = -50\text{ mAdc}$, $V_{CE} = -20\text{ Vdc}$, $f = 100\text{ MHz}$)	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	

SWITCHING CHARACTERISTICS

Turn–On Time	$(V_{CC} = -30\text{ Vdc}$, $I_C = -150\text{ mAdc}$, $I_{B1} = -15\text{ mAdc}$)	t_{on}	-	45	ns
Delay Time		t_d	-	10	
Rise Time		t_r	-	40	
Turn–Off Time	$(V_{CC} = -6.0\text{ Vdc}$, $I_C = -150\text{ mAdc}$, $I_{B1} = I_{B2} = -15\text{ mAdc}$)	t_{off}	-	100	
Storage Time		t_s	-	80	
Fall Time		t_f	-	30	

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

4. f_T is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.

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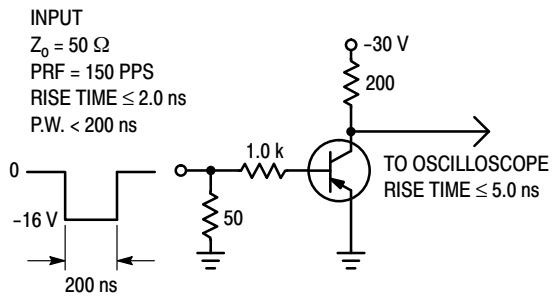


Figure 1. Delay and Rise Time Test Circuit

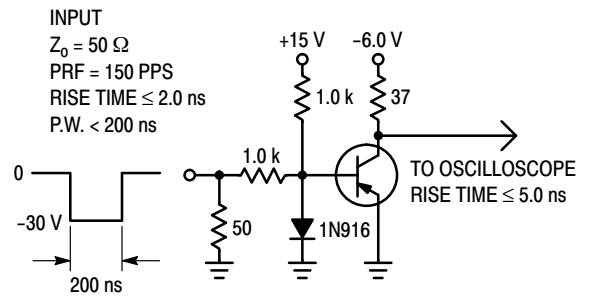


Figure 2. Storage and Fall Time Test Circuit

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TYPICAL CHARACTERISTICS

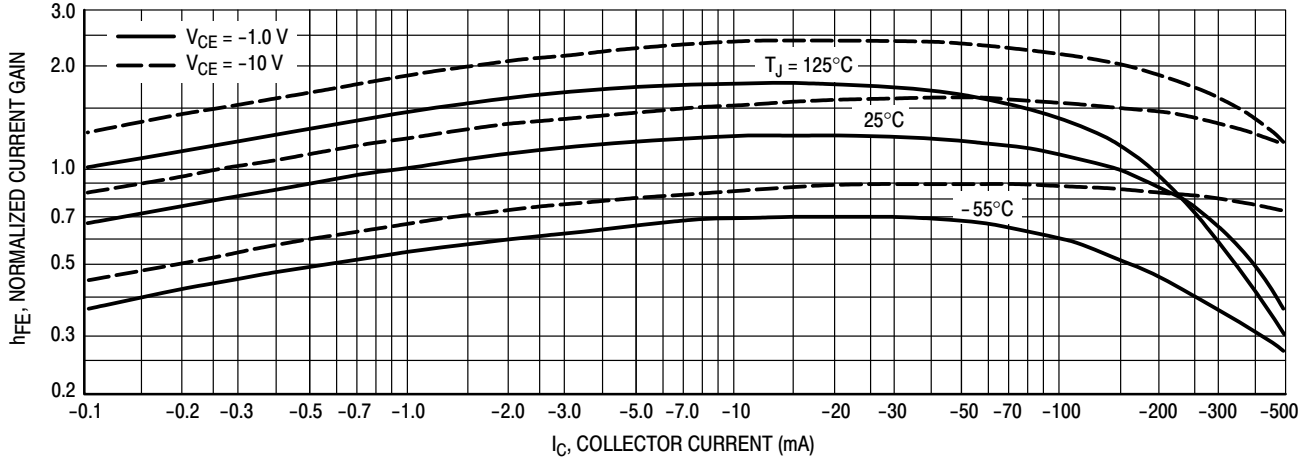


Figure 3. DC Current Gain

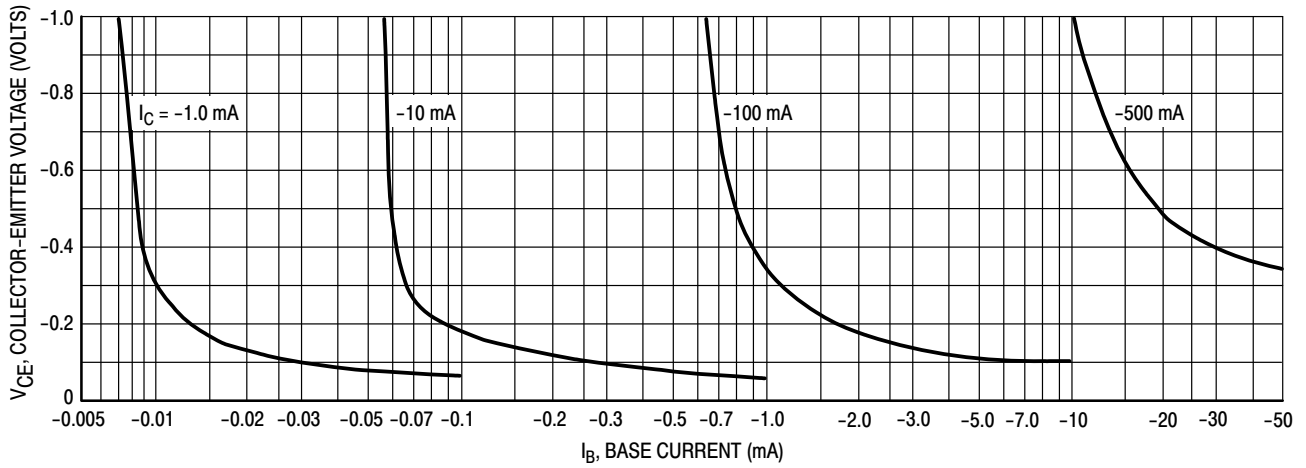


Figure 4. Collector Saturation Region

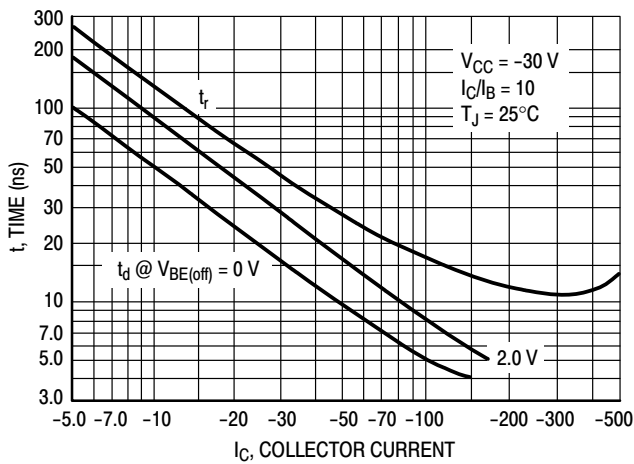


Figure 5. Turn-On Time

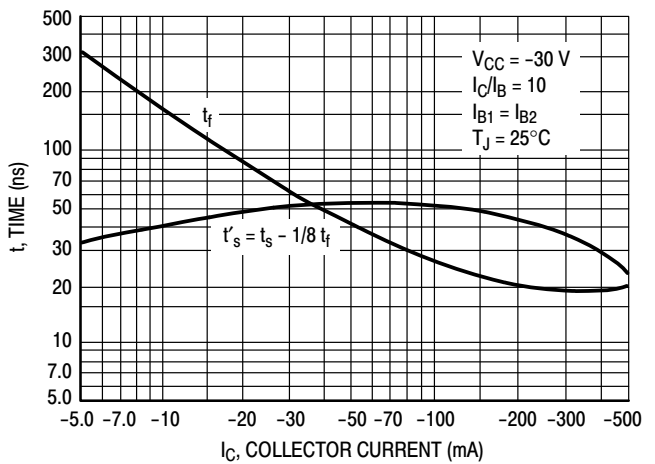


Figure 6. Turn-Off Time

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TYPICAL SMALL-SIGNAL Characteristics NOISE FIGURE

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

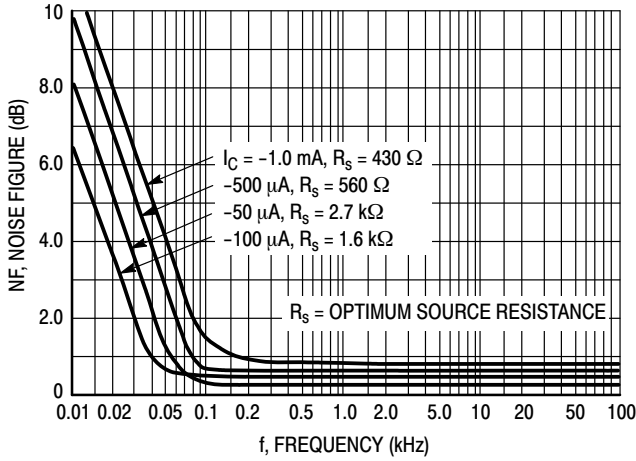


Figure 7. Frequency Effects

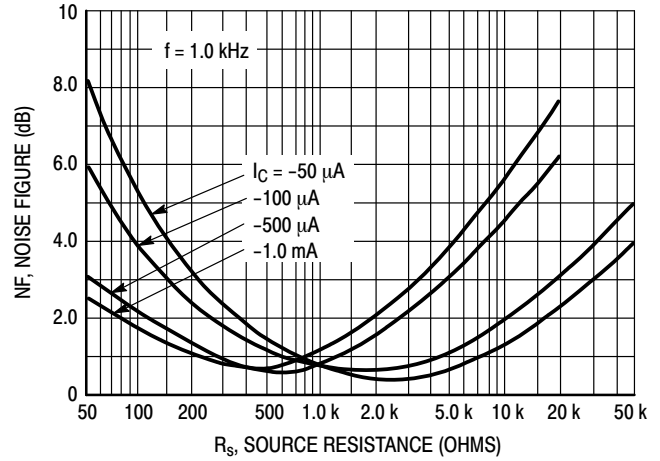


Figure 8. Source Resistance Effects

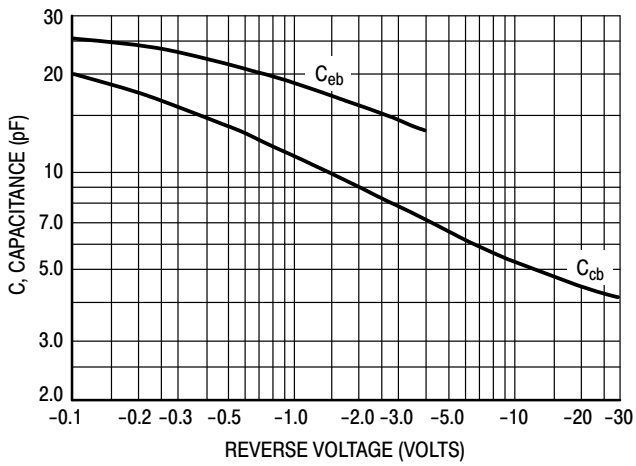


Figure 9. Capacitances

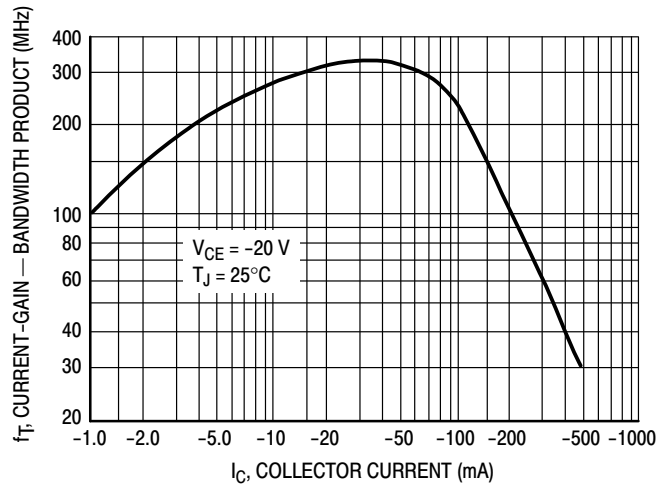


Figure 10. Current-Gain - Bandwidth Product

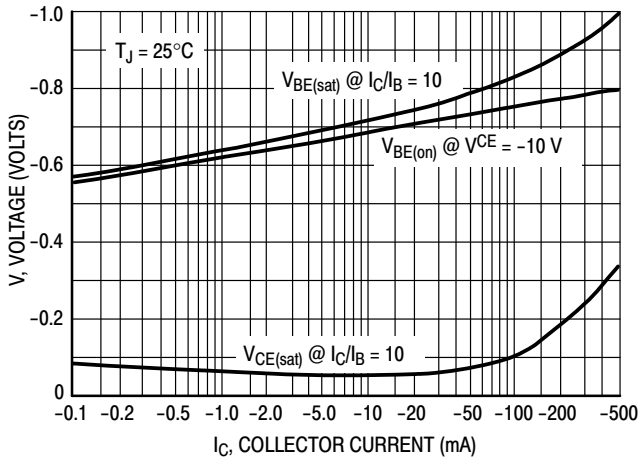


Figure 11. "On" Voltage

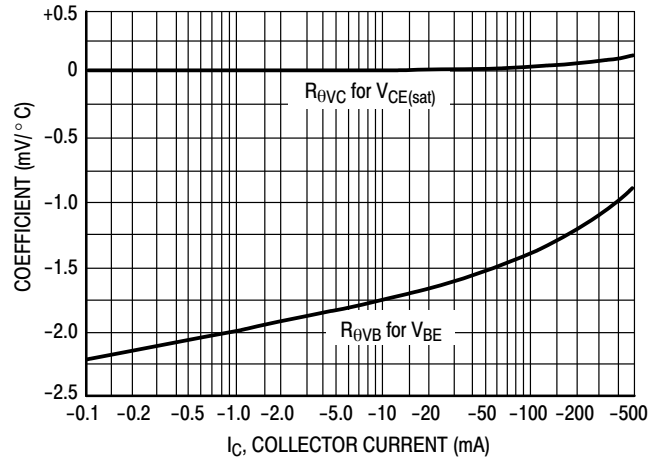
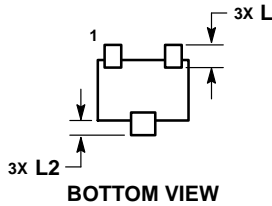
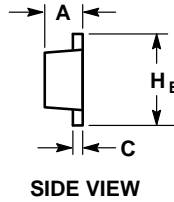
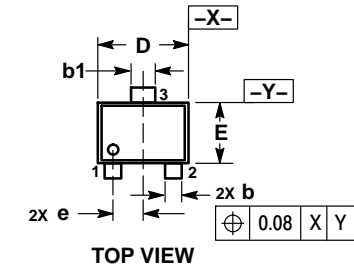


Figure 12. Temperature Coefficients

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PACKAGE DIMENSIONS

SOT-723
CASE 631AA
ISSUE D



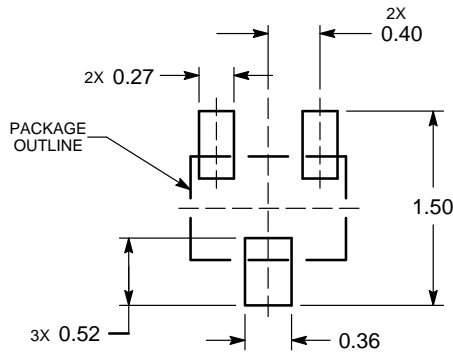
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.45	0.50	0.55
b	0.15	0.21	0.27
b1	0.25	0.31	0.37
C	0.07	0.12	0.17
D	1.15	1.20	1.25
E	0.75	0.80	0.85
e	0.40 BSC		
H E	1.15	1.20	1.25
L	0.29 REF		
L2	0.15	0.20	0.25

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

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*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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