

# General Purpose Transistor

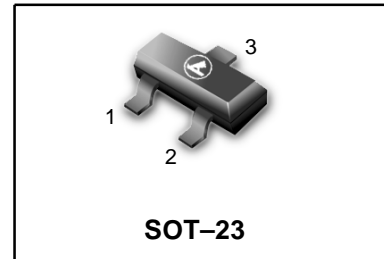
## PNP Silicon

- We declare that the material of product compliance with RoHS requirements.

**LMBT2907LT1G**  
**LMBT2907ALT1G**

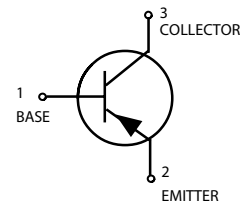
### MAXIMUM RATINGS

Rating	Symbol	Value		Unit
		2907	2907A	
Collector–Emitter Voltage	$V_{CEO}$	-40	-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, (1) $T_A = 25^\circ\text{C}$	$P_D$	225	mW
Derate above $25^\circ\text{C}$		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Derate above $25^\circ\text{C}$		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$



### ORDERING INFORMATION

Device	Marking	Shipping
LMBT2907LT1G	M2B	3000/Tape & Reel
LMBT2907LT3G	M2B	10000/Tape & Reel
LMBT2907ALT1G	2F	3000/Tape & Reel
LMBT2907ALT3G	2F	10000/Tape & Reel

### DEVICE MARKING

LMBT2907LT1G = M2B, LMBT2907ALT1G = 2F

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage(3) ( $I_C = -10\text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$			Vdc
	LMBT2907	-40	—	
	LMBT2907A	-60	—	
Collector–Emitter 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( $V_{CB} = -30\text{Vdc}, I_{BE(OFF)} = -0.5\text{Vdc}$ )	$I_{CEX}$	—	-50	nAdc
Collector Cutoff Current ( $V_{CB} = -50\text{Vdc}, I_E = 0$ )	$I_{CBO}$			$\mu\text{Adc}$
	LMBT2907	—	-0.020	
	LMBT2907A	—	-0.010	
( $V_{CB} = -50\text{Vdc}, I_E = 0, T_A = 125^\circ\text{C}$ )	LMBT2907	—	-20	
	LMBT2907A	—	-10	
Base Current( $V_{CE} = -30\text{Vdc}, V_{EB(OFF)} = -0.5\text{Vdc}$ )	$I_B$	—	-50	nAdc

1. FR-5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
3. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

**LMBT2907LT1G LMBT2907ALT1G**

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

Characteristic	Symbol	Min	Max	Unit
<b>DC CHARACTERISTICS</b>				
DC Current Gain	$h_{FE}$			—
( $I_C = -0.1\text{mA}$ , $V_{CE} = -10\text{Vdc}$ )	LMBT2907	35	—	
	LMBT2907A	75	—	
( $I_C = -1.0\text{mA}$ , $V_{CE} = -10\text{Vdc}$ )	LMBT2907	50	—	
	LMBT2907A	100	—	
( $I_C = -10\text{mA}$ , $V_{CE} = -10\text{Vdc}$ )	LMBT2907	75	—	
	LMBT2907A	100	—	
( $I_C = -150\text{mA}$ , $V_{CE} = -10\text{Vdc}$ )(3)	LMBT2907	—	—	
	LMBT2907A	100	300	
( $I_C = -500\text{mA}$ , $V_{CE} = -10\text{Vdc}$ )(3)	LMBT2907	30	—	
	LMBT2907A	50	—	
Collector–Emitter Saturation Voltage(3)	$V_{CE(sat)}$			Vdc
( $I_C = -150\text{mA}$ , $I_B = -15\text{mA}$ )		—	-0.4	
( $I_C = -500\text{mA}$ , $I_B = -50\text{mA}$ )		—	-1.6	
Base–Emitter Saturation Voltage(3)	$V_{BE(sat)}$			Vdc
( $I_C = -150\text{mA}$ , $I_B = -15\text{mA}$ )		—	-1.3	
( $I_C = -500\text{mA}$ , $I_B = -50\text{mA}$ )		—	-2.6	

**SMALL-SIGNAL CHARACTERISTICS**

Current–Gain — Bandwidth Product(3),(4)	$f_T$	200	—	MHz
( $I_C = -50\text{mA}$ , $V_{CE} = -20\text{Vdc}$ , $f = 100\text{MHz}$ )				
Output Capacitance	$C_{obo}$	—	8.0	pF
( $V_{CB} = -10\text{Vdc}$ , $I_E = 0$ , $f = 1.0\text{MHz}$ )				
Input Capacitance	$C_{ibo}$	—	30	pF
( $V_{EB} = -2.0\text{Vdc}$ , $I_C = 0$ , $f = 1.0\text{MHz}$ )				

**SWITCHING CHARACTERISTICS**

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

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.

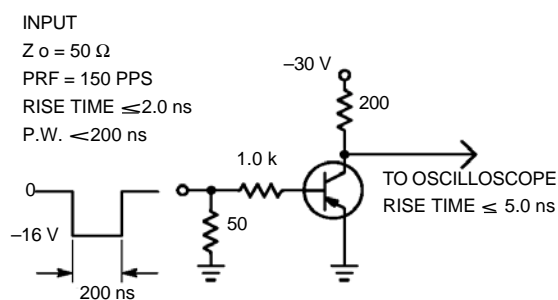


Figure 1. Delay and Rise Time Test Circuit

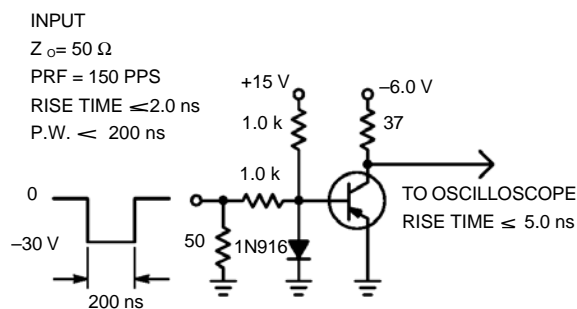


Figure 2. Storage and Fall Time Test Circuit

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TYPICAL CHARACTERISTICS

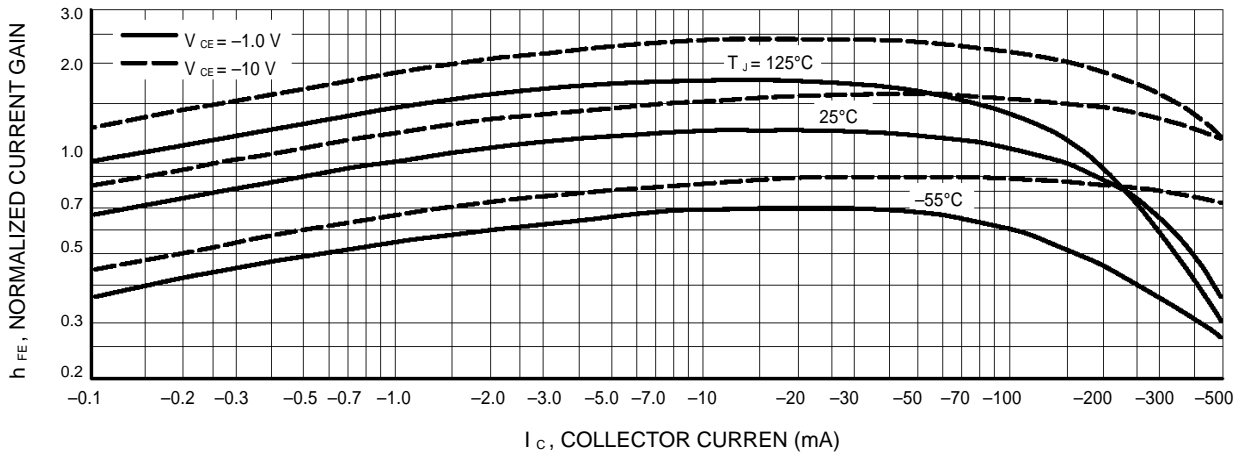


Figure 3. DC Current Gain

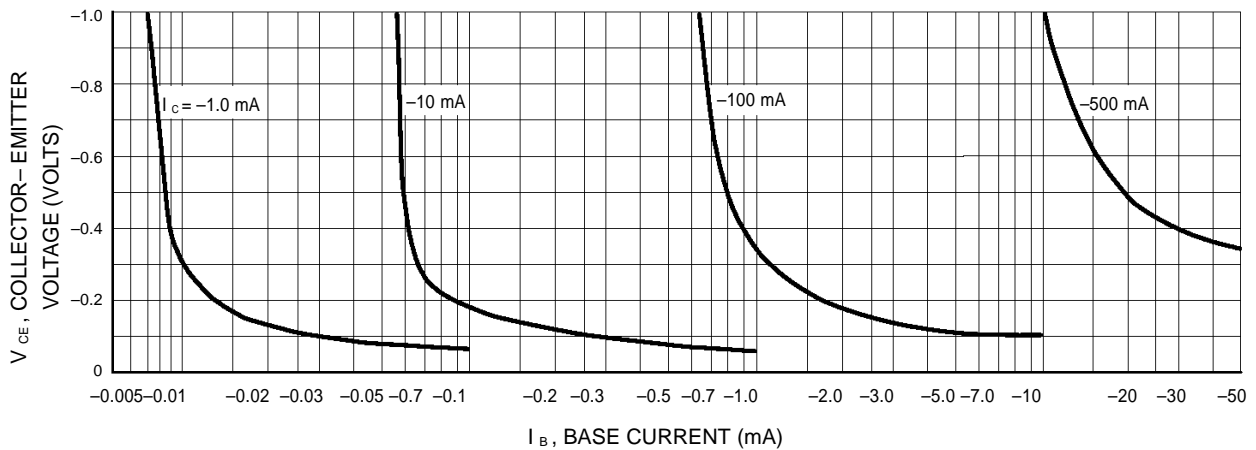


Figure 4. Collector Saturation Region

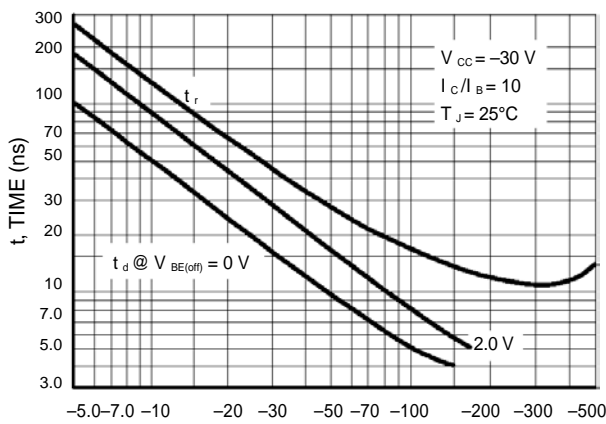


Figure 5. Turn-On Time

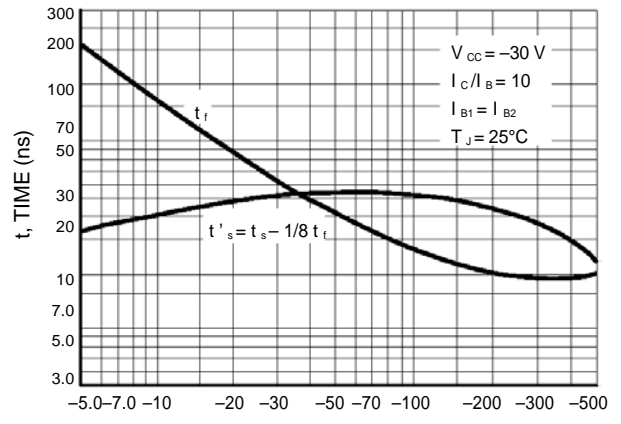


Figure 6. Turn-Off Time

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TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

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

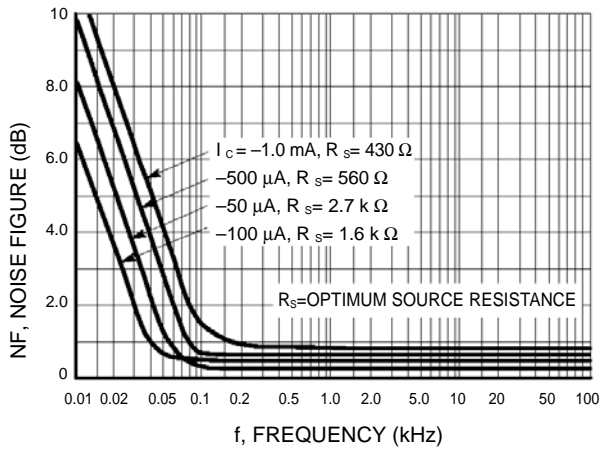


Figure 7. Frequency Effects

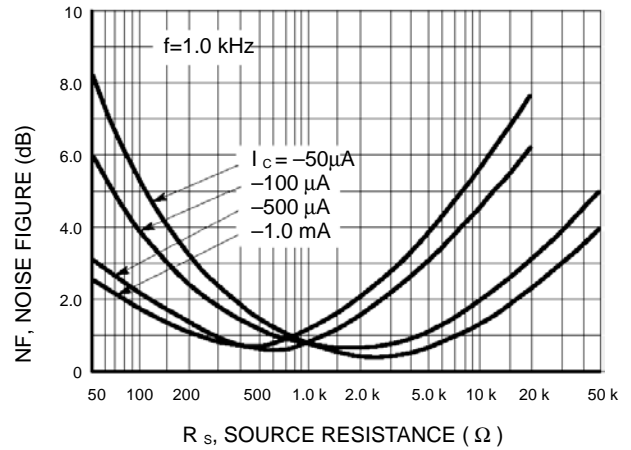


Figure 8. Source Resistance Effects

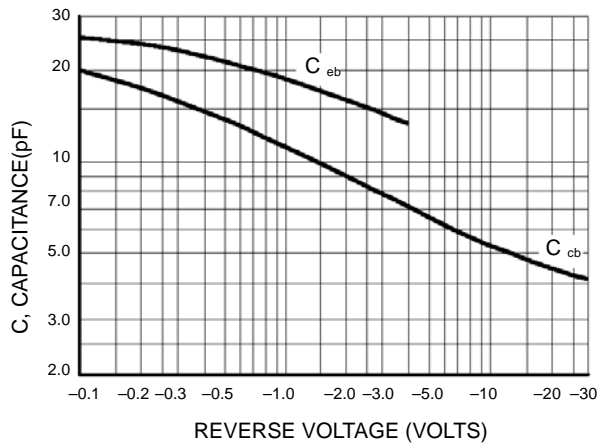


Figure 9. Capacitances

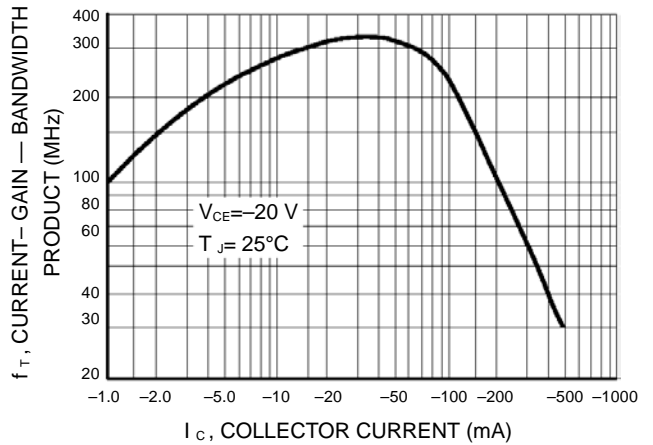


Figure 10. Current-Gain — Bandwidth Product

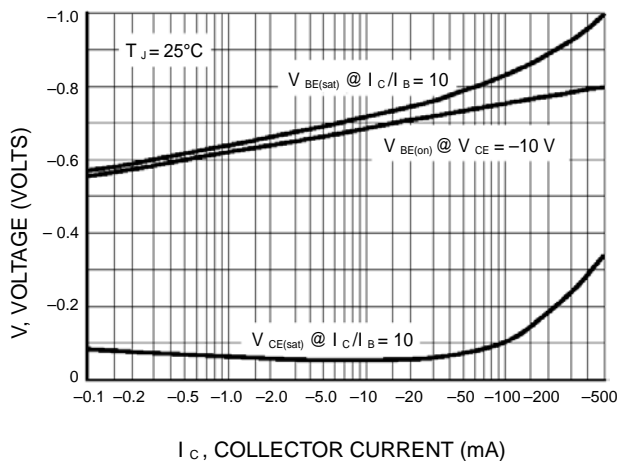


Figure 11. "On" Voltage

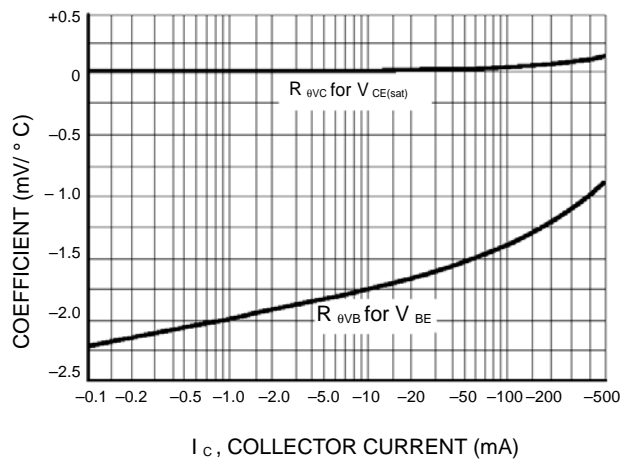
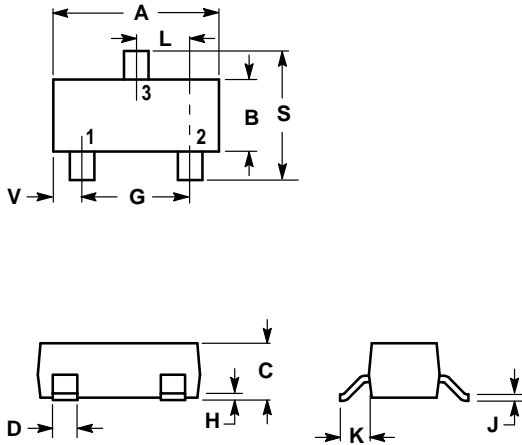


Figure 12. Temperature Coefficients

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SOT-23



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

- PIN 1. BASE  
 2. EMITTER  
 3. COLLECTOR

