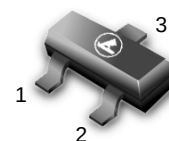


General Purpose Transistor

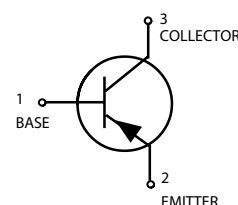
PNP Silicon

- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

LMBT2907LT1G
LMBT2907ALT1G
S-LMBT2907LT1G
S-LMBT2907ALT1G



SOT-23



ORDERING INFORMATION

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

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°C		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	P_D	300	mW
Derate above 25°C		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

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.

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.

LMBT2907LT1G LMBT2907ALT1G
S-LMBT2907LT1G S-LMBT2907ALT1G

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

ON CHARACTERISTICS

DC Current Gain ($I_C = -0.1\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$)	LMBT2907 LMBT2907A	h_{FE}	35 75	— —	
($I_C = -1.0\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$)	LMBT2907 LMBT2907A		50 100	— —	
($I_C = -10\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$)	LMBT2907 LMBT2907A		75 100	— —	
($I_C = -150\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$)(3)	LMBT2907 LMBT2907A		— 100	— 300	
($I_C = -500\text{ mAdc}$, $V_{CE} = -10\text{ Vdc}$)(3)	LMBT2907 LMBT2907A		30 50	— —	
Collector-Emitter Saturation Voltage(3) ($I_C = -150\text{ mAdc}$, $I_B = -15\text{ mAdc}$) ($I_C = -500\text{ mAdc}$, $I_B = -50\text{ mAdc}$)		$V_{CE(sat)}$	— —	-0.4 -1.6	Vdc
Base-Emitter Saturation Voltage(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

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

LMBT2907LT1G LMBT2907ALT1G
S-LMBT2907LT1G S-LMBT2907ALT1G

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

Characteristic	Symbol	Min	Max	Unit
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SMALL-SIGNAL CHARACTERISTICS

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

SWITCHING CHARACTERISTICS

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

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

TYPICAL CHARACTERISTICS

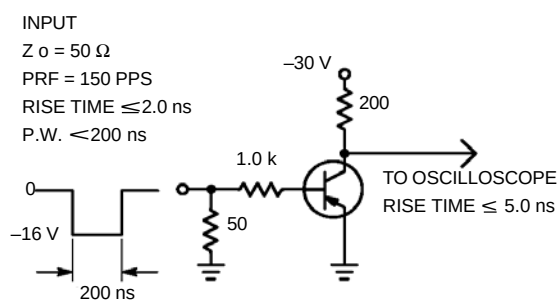


Figure 1. Delay and Rise Time Test Circuit

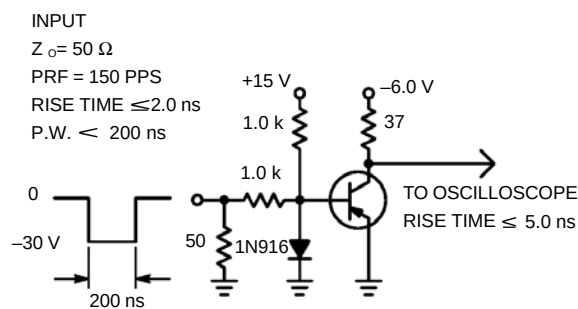


Figure 2. Storage and Fall Time Test Circuit

LMBT2907LT1G LMBT2907ALT1G
S-LMBT2907LT1G S-LMBT2907ALT1G

TYPICAL CHARACTERISTICS

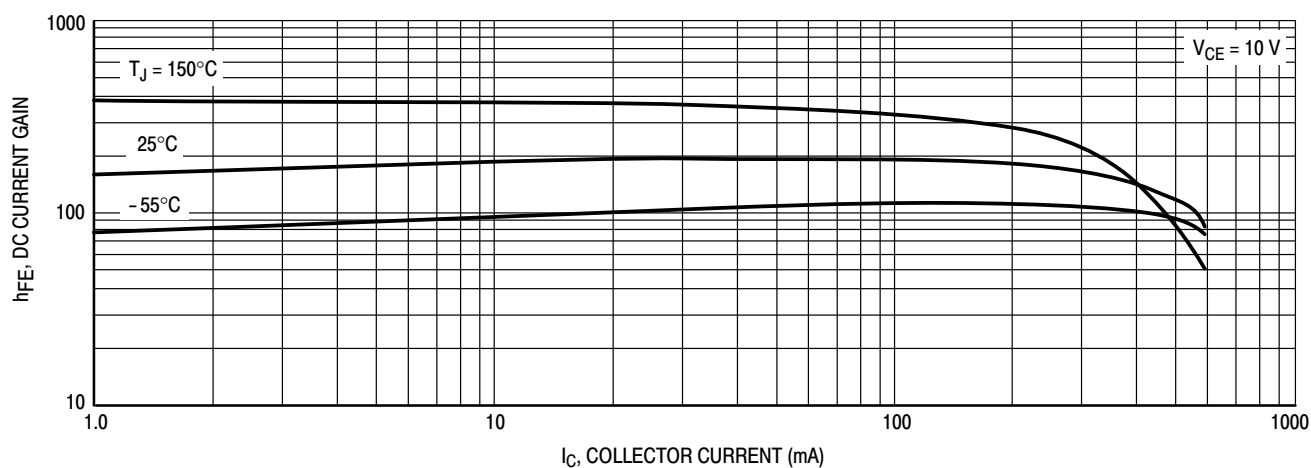


Figure 3. DC Current Gain

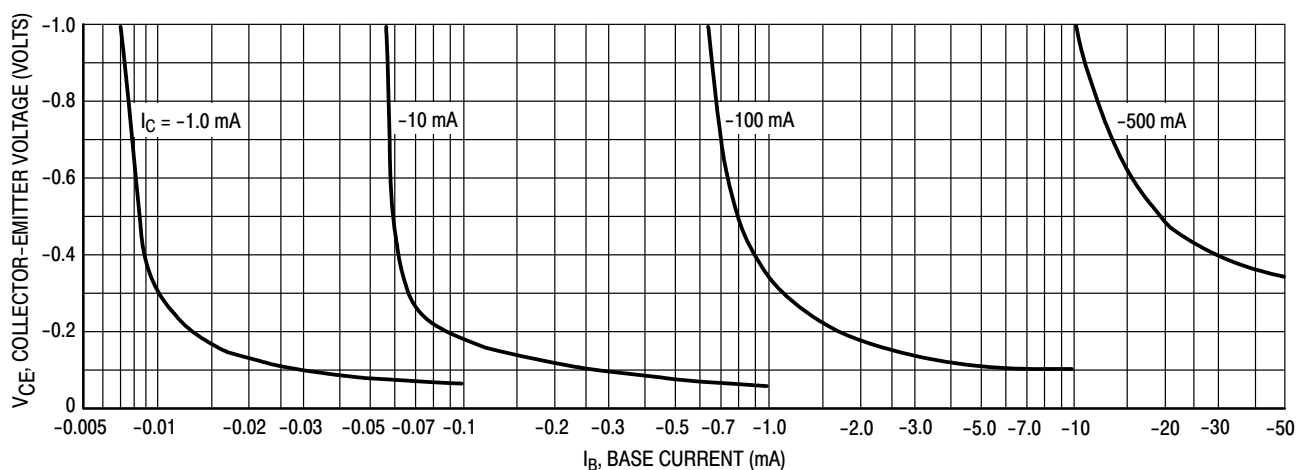


Figure 4. Collector Saturation Region

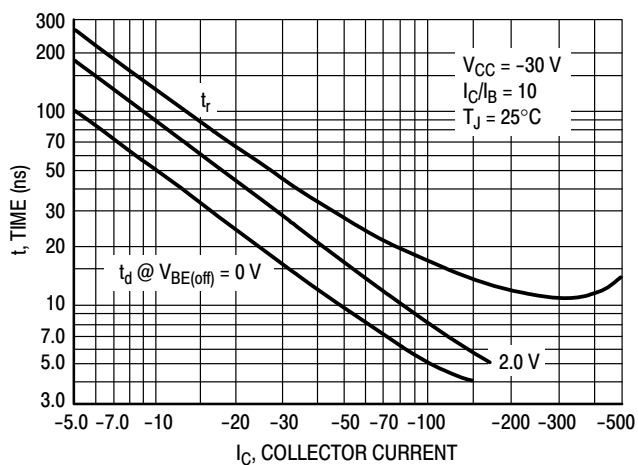


Figure 5. Turn-On Time

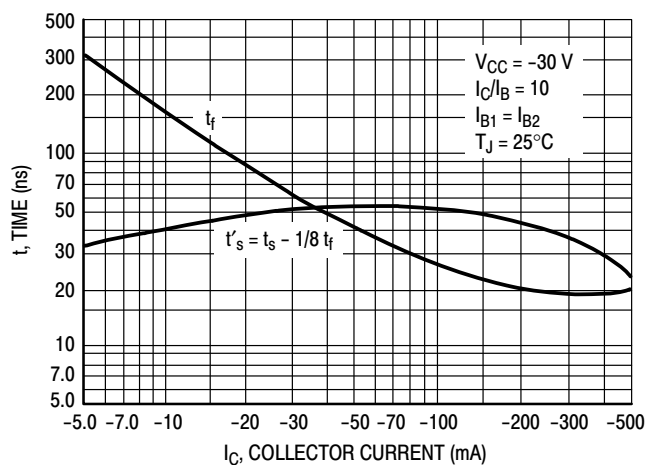


Figure 6. Turn-Off Time

LMBT2907LT1G LMBT2907ALT1G
S-LMBT2907LT1G S-LMBT2907ALT1G

TYPICAL SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE

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

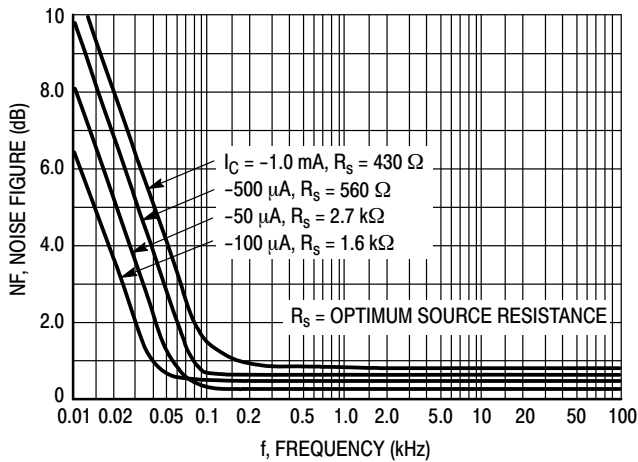


Figure 7. Frequency Effects

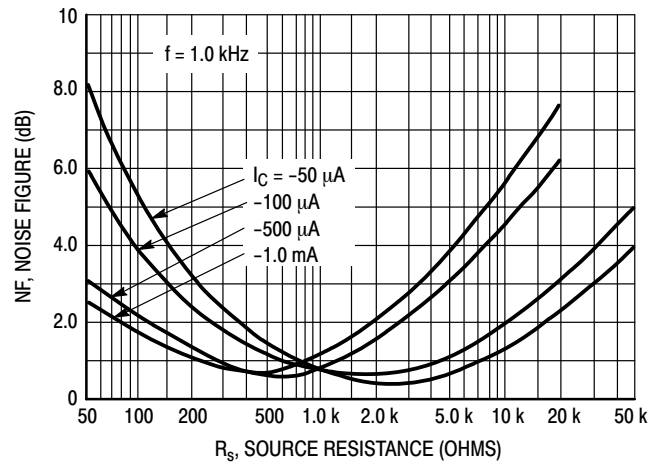


Figure 8. Source Resistance Effects

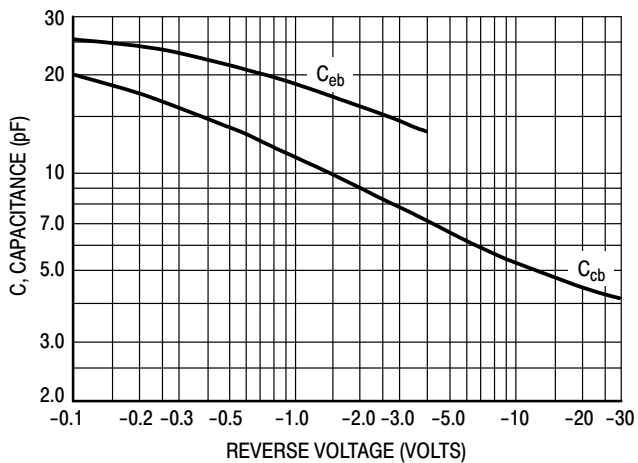


Figure 9. Capacitances

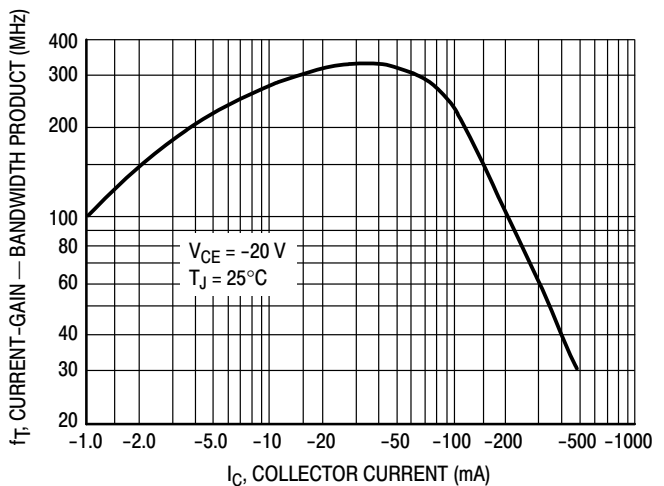


Figure 10. Current-Gain - Bandwidth Product

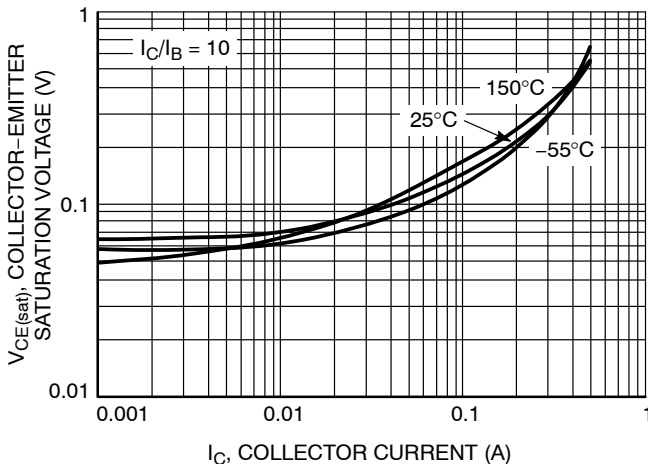


Figure 11. Collector Emitter Saturation Voltage vs. Collector Current

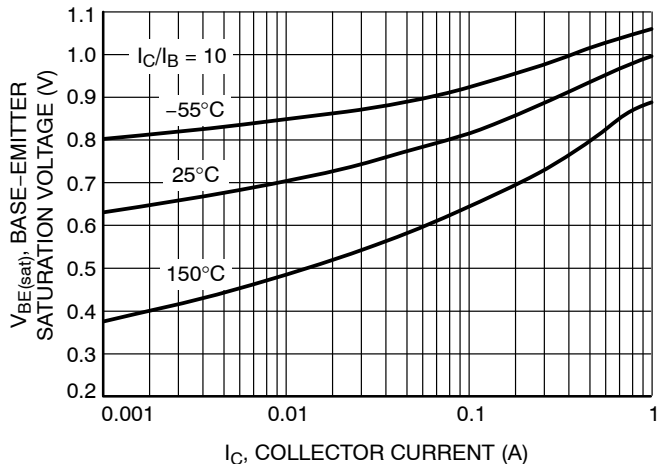


Figure 12. Base Emitter Saturation Voltage vs. Collector Current

LMBT2907LT1G LMBT2907ALT1G
S-LMBT2907LT1G S-LMBT2907ALT1G

TYPICAL SMALL-SIGNAL Characteristics
NOISE FIGURE

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

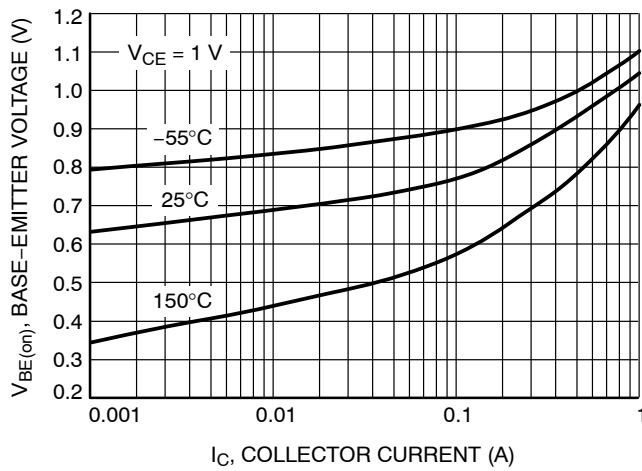


Figure 13. Base Emitter Voltage vs. Collector Current

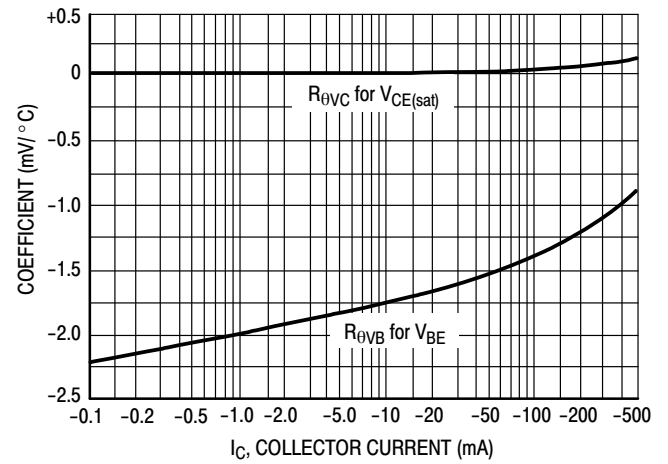


Figure 14. Temperature Coefficients

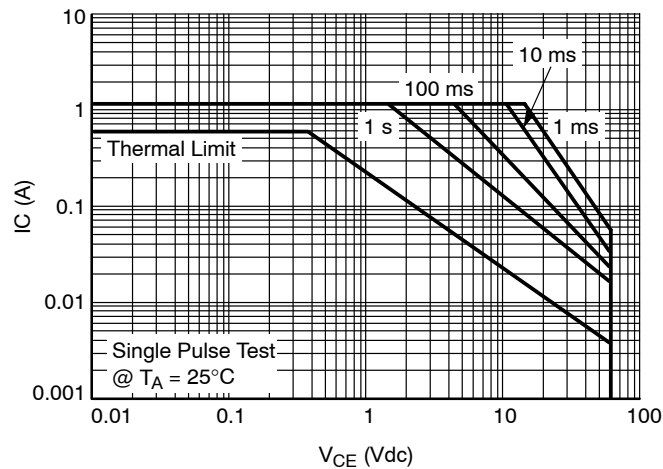
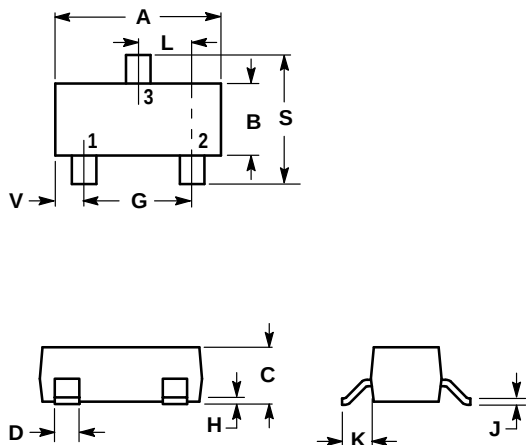


Figure 15. Safe Operating Area

LMBT2907LT1G LMBT2907ALT1G
S-LMBT2907LT1G S-LMBT2907ALT1G

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

