

General Purpose Transistors

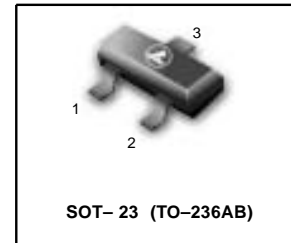
PNP Silicon

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

ORDERING INFORMATION

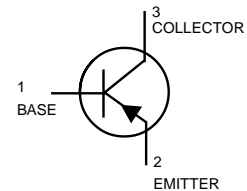
Device	Marking	Shipping
LMBT3906LT1G	2A	3000/Tape & Reel
LMBT3906LT3G	2A	10000/Tape & Reel

LMBT3906LT1G



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CE0}	-40	Vdc
Collector–Base Voltage	V_{CBO}	-40	Vdc
Emitter–Base Voltage	V_{EBO}	-5.0	Vdc
Collector Current — Continuous	I_C	-200	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/°C
	θ_{JA}	556	°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/°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	°C

DEVICE MARKING

LMBT3906LT1G = 2A

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) ($I_C = -1.0\text{ mAdc}, I_B = 0$)	$V_{(BR)CEO}$	-40	—	Vdc
Collector–Base Breakdown Voltage ($I_C = -10\ \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	-40	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = -10\ \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	-5.0	—	Vdc
Base Cutoff Current ($V_{CE} = -30\text{ Vdc}, V_{EB} = -3.0\text{ Vdc}$)	I_{BL}	—	-50	nAdc
Collector Cutoff Current ($V_{CE} = -30\text{ Vdc}, V_{EB} = -3.0\text{ Vdc}$)	I_{CEX}	—	-50	nAdc

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

LMBT3906LT1G
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS (2)				
DC Current Gain ($I_C = -0.1\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$)	h_{FE}	60	—	—
($I_C = -1.0\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$)		80	—	—
($I_C = -10\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$)		100	300	—
($I_C = -50\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$)		60	—	—
($I_C = -100\text{ mAdc}$, $V_{CE} = -1.0\text{ Vdc}$)		30	—	—
Collector–Emitter Saturation Voltage ($I_C = -10\text{ mAdc}$, $I_B = -1.0\text{ mAdc}$)	$V_{CE(sat)}$	—	-0.25	Vdc
($I_C = -50\text{ mAdc}$, $I_B = -5.0\text{ mAdc}$)		—	-0.4	—
Base–Emitter Saturation Voltage ($I_C = -10\text{ mAdc}$, $I_B = -1.0\text{ mAdc}$)	$V_{BE(sat)}$	-0.65	-0.85	Vdc
($I_C = -50\text{ mAdc}$, $I_B = -5.0\text{ mAdc}$)		—	-0.95	—

SMALL-SIGNAL CHARACTERISTICS

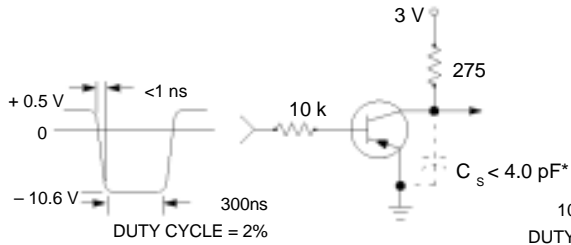
Current–Gain — Bandwidth Product ($I_C = -10\text{ mAdc}$, $V_{CE} = -20\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	250	—	MHz
Output Capacitance ($V_{CB} = -5.0\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	4.5	pF
Input Capacitance ($V_{EB} = -0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	—	10	pF
Input Impedance ($V_{CE} = -10\text{ Vdc}$, $I_C = -1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{ie}	2.0	12	k Ω
Voltage Feedback Ratio ($V_{CE} = -10\text{ Vdc}$, $I_C = -1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{re}	0.1	10	$\times 10^{-4}$
Small–Signal Current Gain ($V_{CE} = -10\text{ Vdc}$, $I_C = -1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	100	400	—
Output Admittance ($V_{CE} = -10\text{ Vdc}$, $I_C = -1.0\text{ mAdc}$, $f = 1.0\text{ kHz}$)	* h_{oe}	3.0	60	μmhos
Noise Figure ($V_{CE} = -5.0\text{ Vdc}$, $I_C = -100\text{ }\mu\text{Adc}$, $R_s = 1.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$)	NF	—	4.0	dB

SWITCHING CHARACTERISTICS

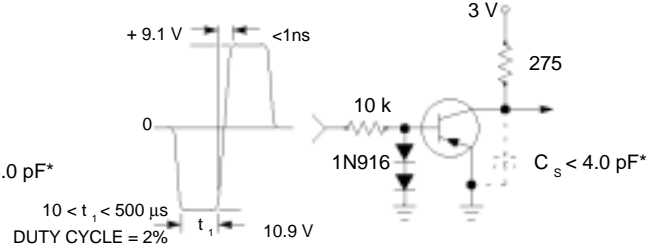
Delay Time	($V_{CC} = -3.0\text{ Vdc}$, $V_{BE} = 0.5\text{ Vdc}$,	t_d	—	35	ns
Rise Time	$I_C = -10\text{ mAdc}$, $I_{B1} = -1.0\text{ mAdc}$)	t_d	—	35	
Storage Time	($V_{CC} = -3.0\text{ Vdc}$, $I_C = -10\text{ mAdc}$,	t_s	—	225	ns
Fall Time	$I_{B1} = I_{B2} = -1.0\text{ mAdc}$)	t_f	—	75	

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

LMBT3906LT1G



**Figure 1. Delay and Rise Time
Equivalent Test Circuit**



**Figure 2. Storage and Fall Time
Equivalent Test Circuit**

*Total shunt capacitance of test jig and connectors

TYPICAL TRANSIENT CHARACTERISTICS

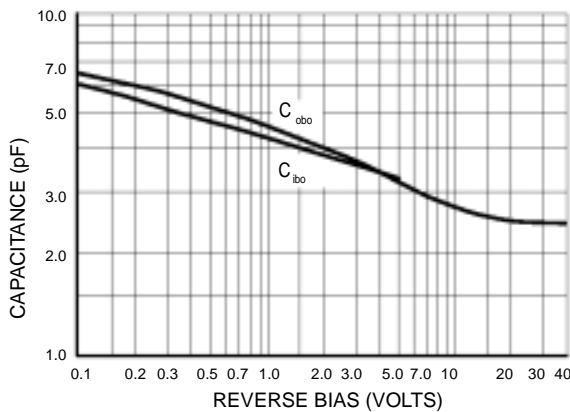


Figure 3. Capacitance

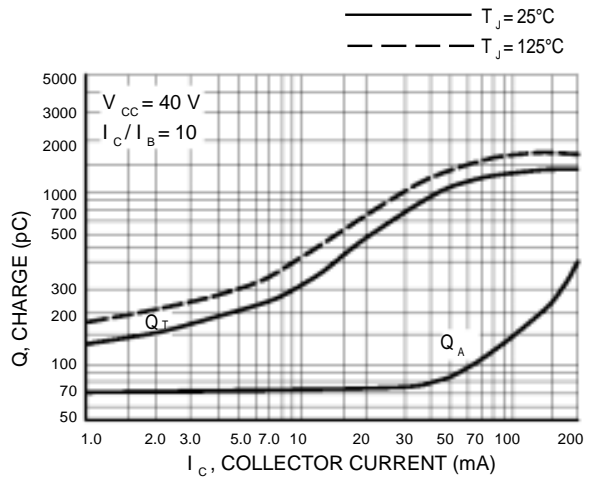


Figure 4. Charge Data

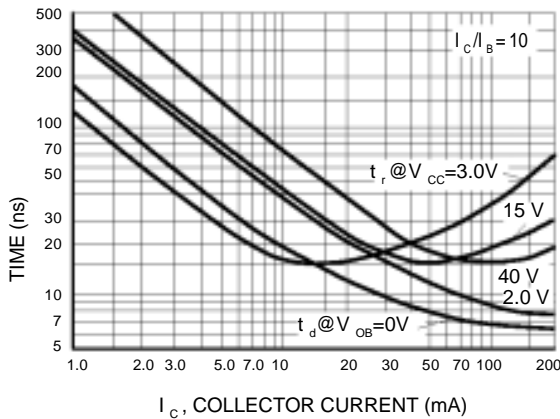


Figure 5. Turn-On Time

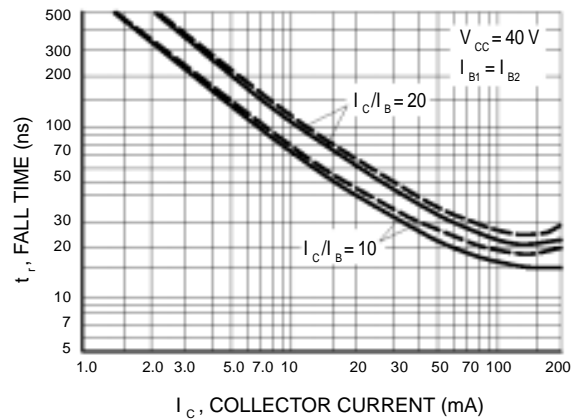


Figure 6. Fall Time

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TYPICAL AUDIO SMALL-SIGNAL CHARACTERISTICS

NOISE FIGURE VARIATIONS

($V_{CE} = -5.0$ Vdc, $T_A = 25^\circ\text{C}$, Bandwidth = 1.0 Hz)

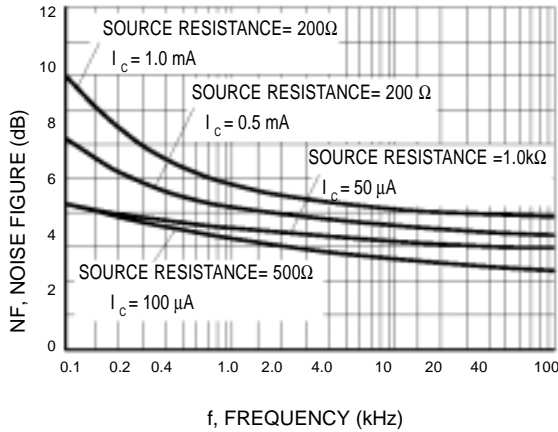


Figure 7. Noise Figure

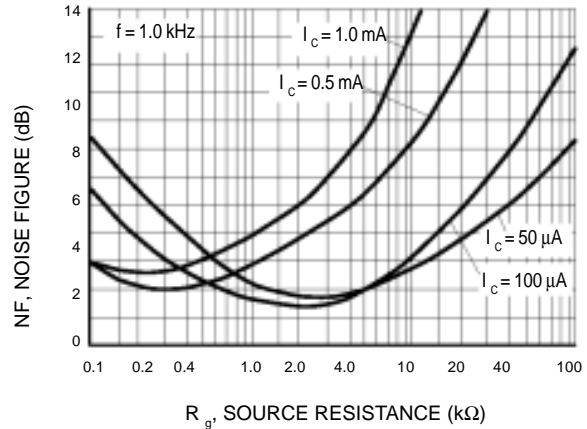


Figure 8. Noise Figure

h PARAMETERS

($V_{CE} = 10$ Vdc, $f = 1.0$ kHz, $T_A = 25^\circ\text{C}$)

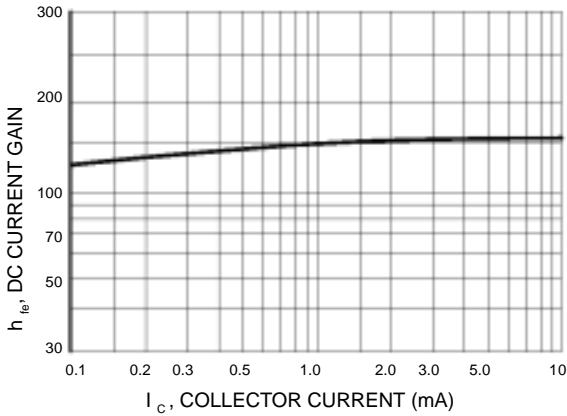


Figure 9. Current Gain

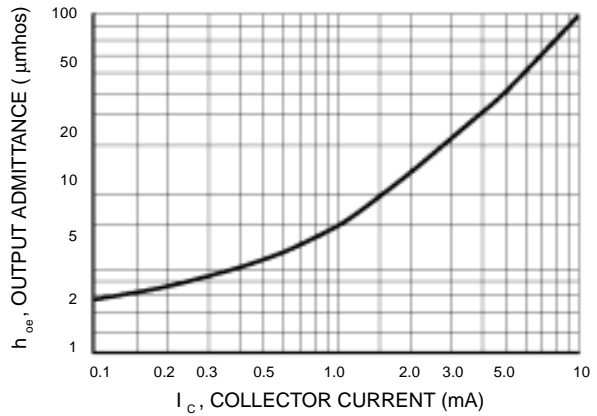


Figure 10. Output Admittance

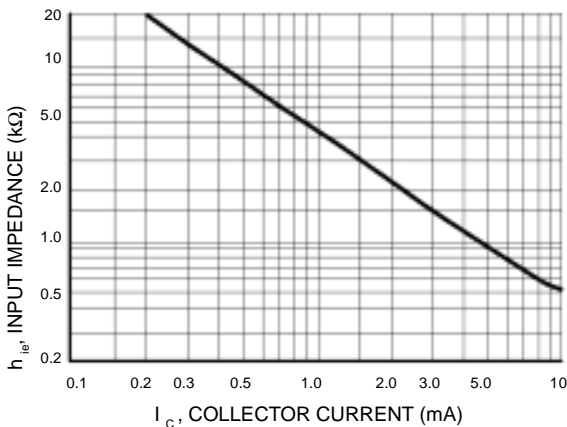


Figure 11. Input Impedance

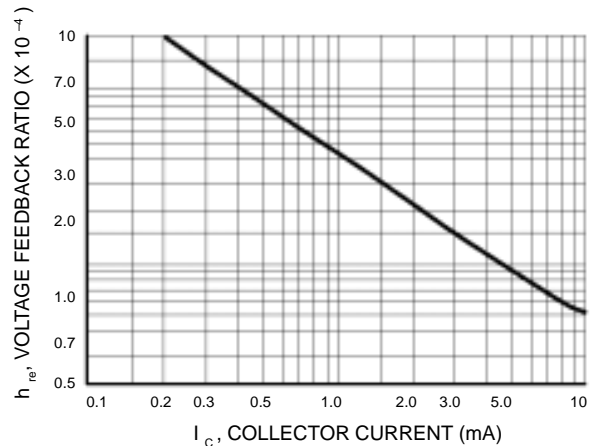


Figure 12. Voltage Feedback Ratio

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TYPICAL STATIC CHARACTERISTICS

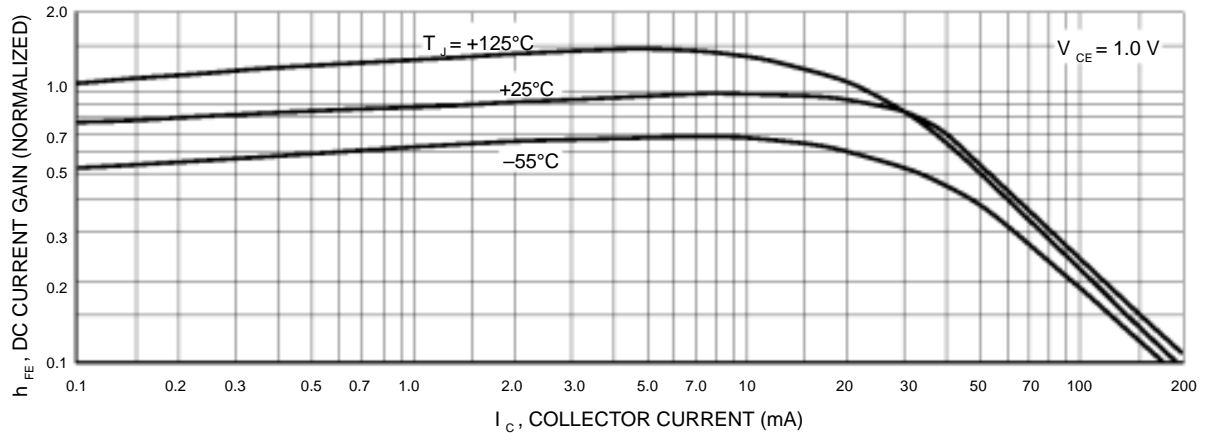


Figure 13. DC Current Gain

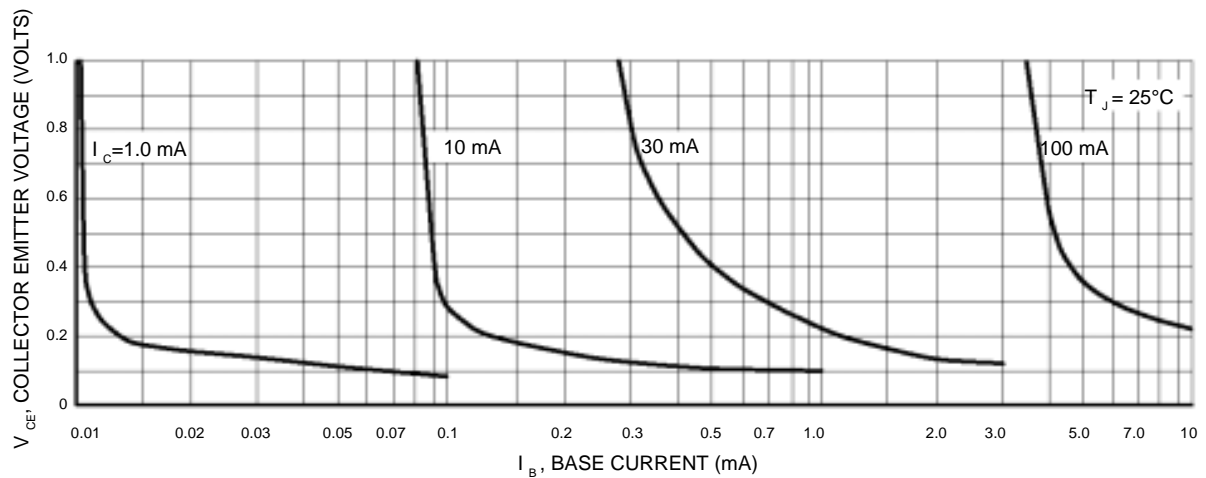


Figure 14. Collector Saturation Region

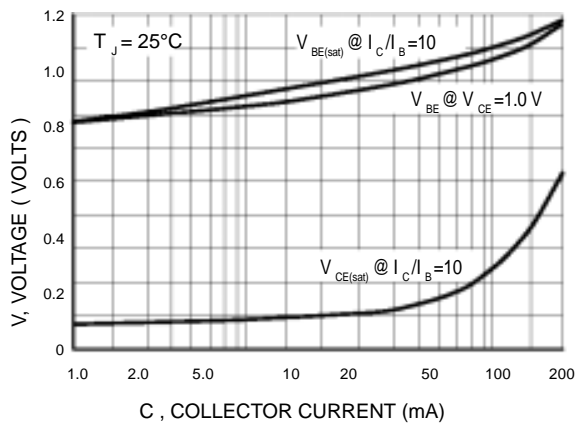


Figure 15. "ON" Voltages

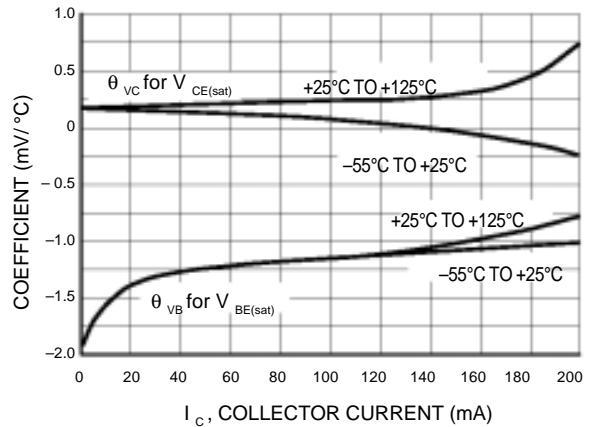
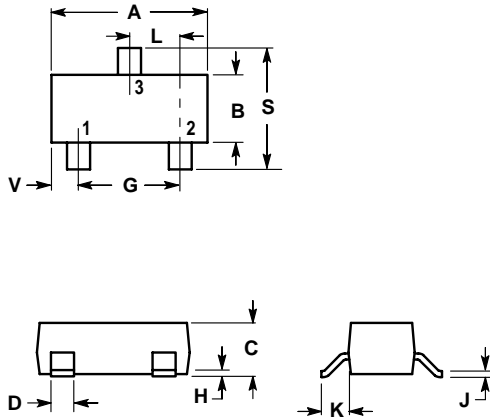


Figure 16. Temperature Coefficients

LMBT3906LT1G

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

