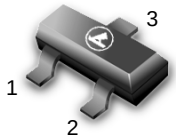
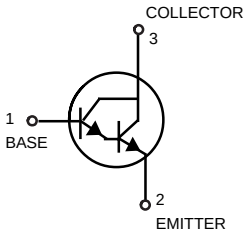
Darlington Amplifier Transistors

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

LMBTA13LT1G
LMBTA14LT1G
S-LMBTA13LT1G
S-LMBTA14LT1G



SOT–23



ORDERING INFORMATION

Device	Marking	Shipping
(S-)LMBTA13LT1G	1M	3000/Tape & Reel
(S-)LMBTA14LT1G	1N	3000/Tape & Reel
(S-)LMBTA13LT3G	1M	10000/Tape & Reel
(S-)LMBTA14LT3G	1N	10000/Tape & Reel

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CES}	30	Vdc
Collector–Base Voltage	V_{CBO}	30	Vdc
Emitter–Base Voltage	V_{EBO}	10	Vdc
Collector Current — Continuous	I_C	300	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1) T_A = 25°C	P_D	225	mW
Derate above 25°C		1.8	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (2) T_A = 25°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

(S-)LMBTA13LT1G = 1M; (S-)LMBTA14LT1G = 1N;

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Breakdown Voltage (I_C = 100 μAdc, V_{BE} = 0)	$V_{(BR)CEO}$	30	—	Vdc
Collector Cutoff Current (V_{CB} = 30Vdc, I_E = 0)	I_{CBO}	—	100	nAdc
Emitter Cutoff Current (V_{EB} = 10Vdc, I_C = 0)	I_{EBO}	—	100	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.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

Characteristic		Symbol	Min	Max	Unit
ON CHARACTERISTICS (3)					
DC Current Gain		h_{FE}			—
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	LMBTA13		5,000	—	
	LMBTA14		10,000	—	
(I_C = 100mAdc, V_{CE} = 5.0Vdc)	LMBTA13		10,000	—	
	LMBTA14		20,000	—	
Collector–Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 0.1 mAdc)		$V_{CE(sat)}$	—	1.5	Vdc
Base–Emitter On Voltage (I_C = 100mAdc, V_{CE} = 5.0Vdc)		V_{BE}	—	2.0	Vdc
SMALL–SIGNAL CHARACTERISTICS					
Current – Gain–Bandwidth Product(4) (V_{CE} = 5.0 Vdc, I_C = 10mAdc, f = 100 MHz)		f_T	125	—	MHz

3. Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

4. $f_T = |h_{fe}| * f_{test}$.

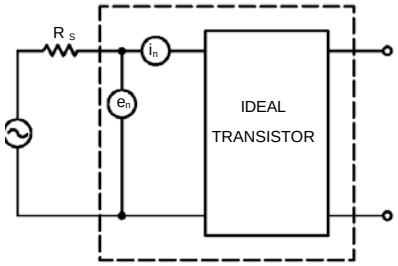
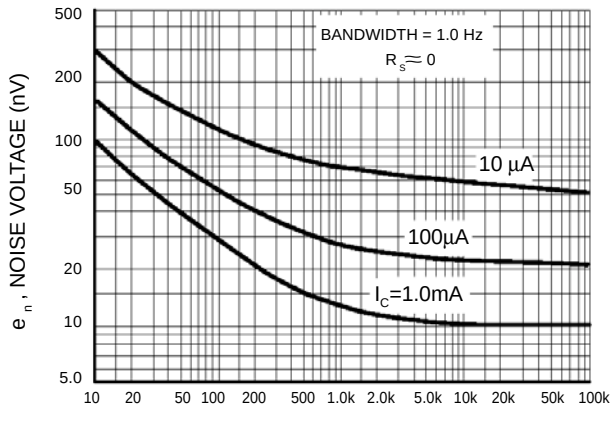


Figure 1. Transistor Noise Model

LMBTA13LT1G LMBTA14LT1G
S-LMBTA13LT1G S-LMBTA14LT1G

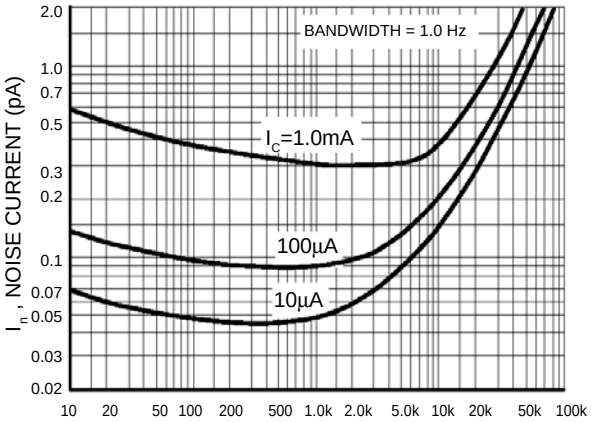
NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)



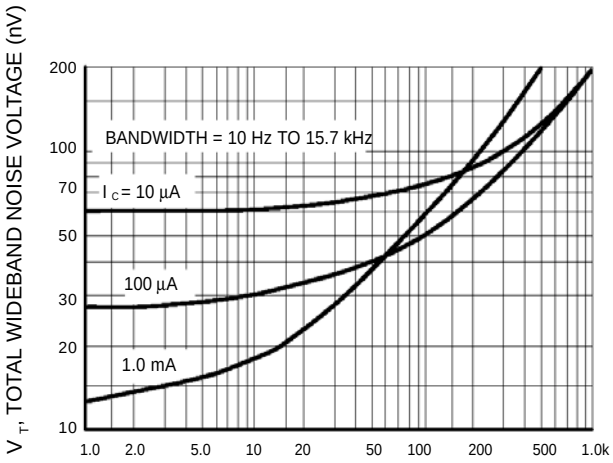
f, FREQUENCY (Hz)

Figure 2. Noise Voltage



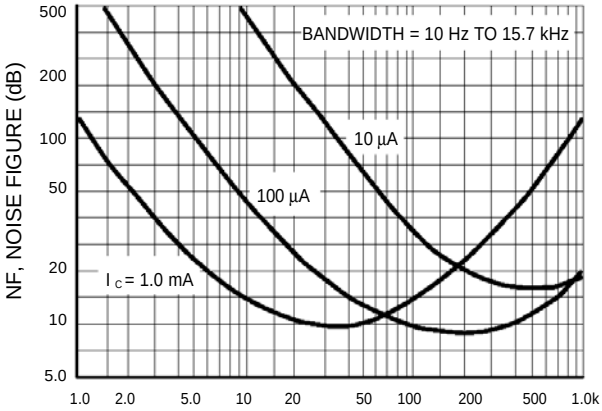
f, FREQUENCY (Hz)

Figure 3. Noise Current



R S , SOURCE RESISTANCE (kΩ)

Figure 4. Total Wideband Noise Voltage



R S , SOURCE RESISTANCE (kΩ)

Figure 5. Wideband Noise Figure

SMALL–SIGNAL CHARACTERISTICS

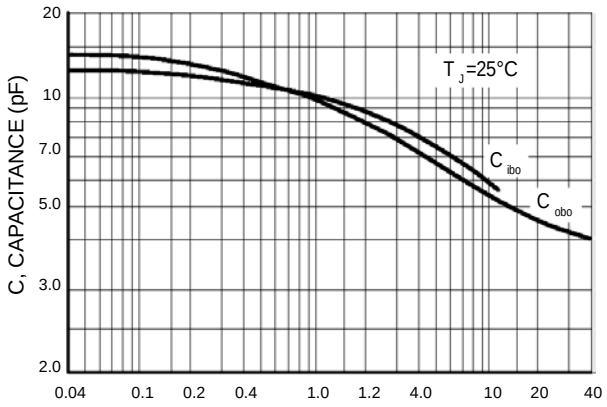


Figure 6. Capacitance

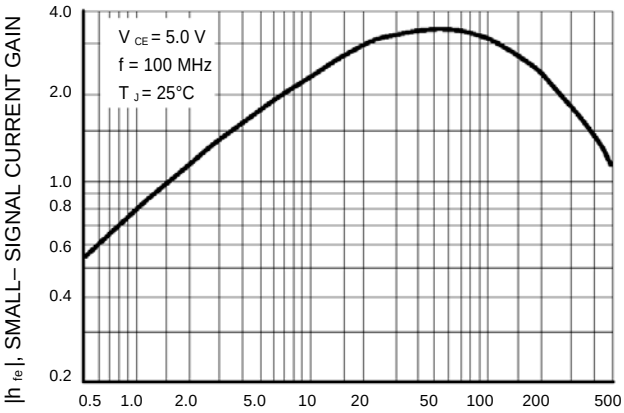


Figure 7. High Frequency Current Gain

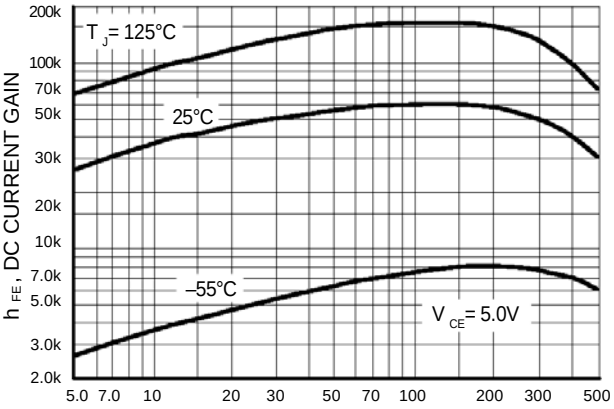


Figure 8. DC Current Gain

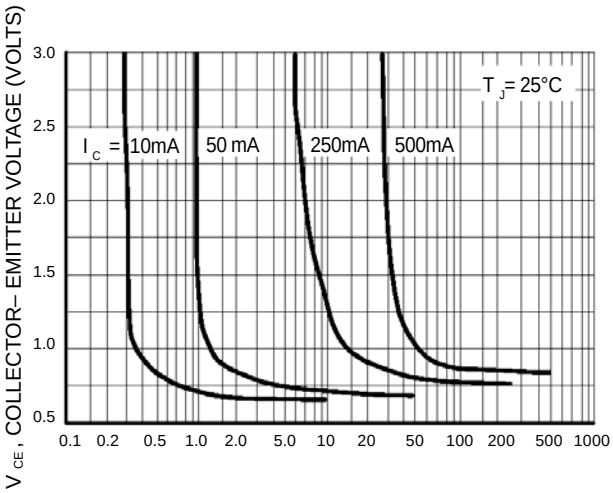


Figure 9. Collector Saturation Region

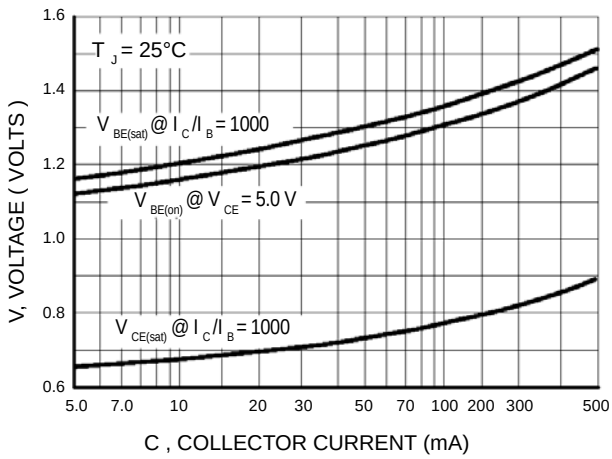


Figure 17. “ON” Voltages

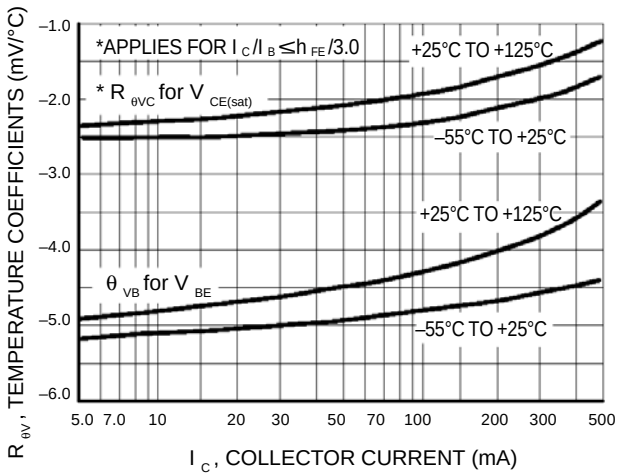


Figure 18. Temperature Coefficients

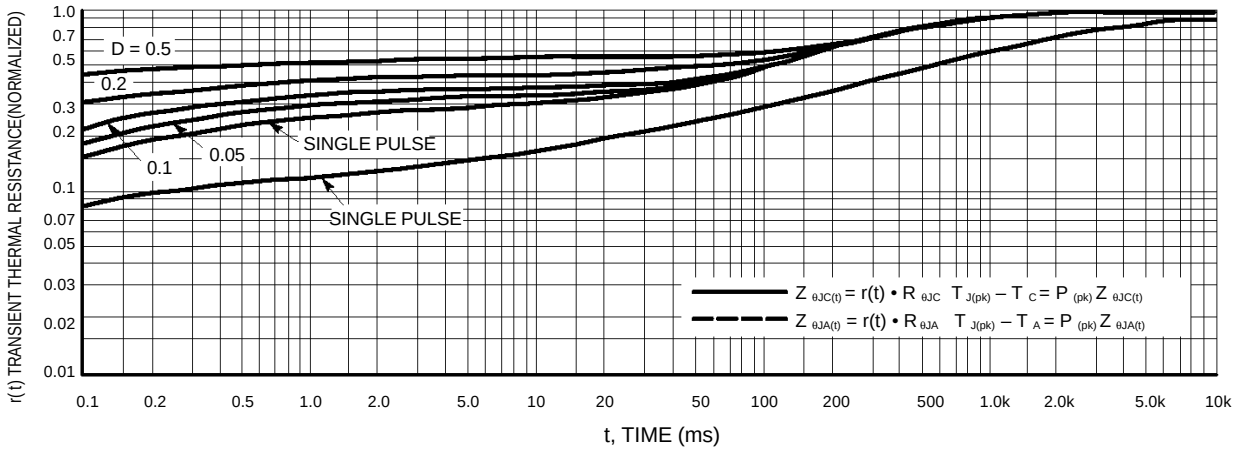


Figure 12. Thermal Response

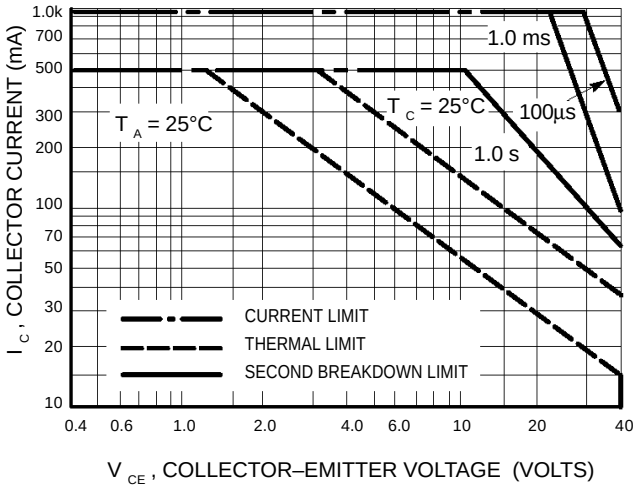
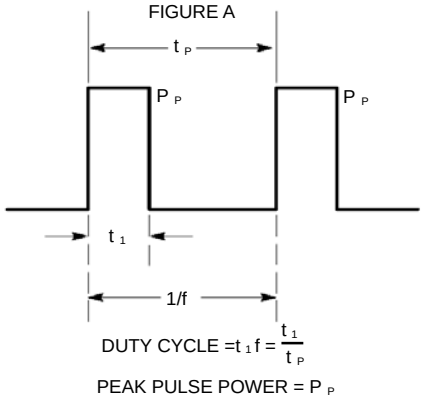


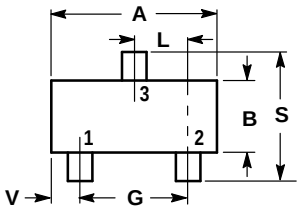
Figure 13.Active Region Safe Operating Area

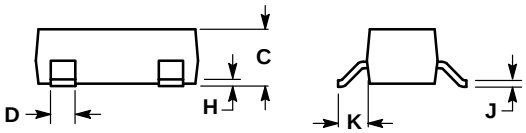


Design Note: Use of Transient Thermal Resistance Data

LMBTA13LT1G LMBTA14LT1G
S-LMBTA13LT1G S-LMBTA14LT1G

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