

# Darlington Transistors

## NPN Silicon

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

### Ordering Information

Device	Marking	Shipping
LMBT6427LT1G	1V	3000/Tape&Reel
LMBT6427LT3G	1V	10000/Tape&Reel

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CE0}$	40	Vdc
Collector–Base Voltage	$V_{CBO}$	40	Vdc
Emitter–Base Voltage	$V_{EBO}$	12	Vdc
Collector Current — Continuous	$I_C$	500	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	$^\circ\text{C}$

### DEVICE MARKING

LMBT6427LT1G = 1V

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

Characteristic	Symbol	Min	Max	Unit
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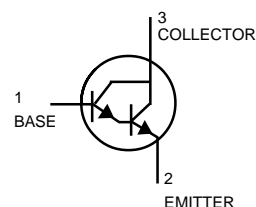
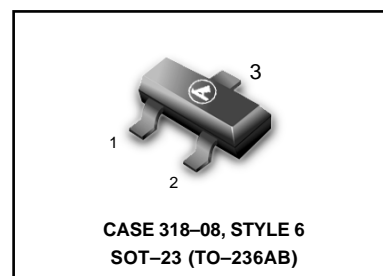
### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage(3) ( $I_C = 10 \text{ mAdc}, V_{BE} = 0$ )	$V_{(BR)CEO}$	40	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$	40	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$	12	—	Vdc
Collector Cutoff Current ( $V_{CE} = 25\text{Vdc}, I_B = 0$ )	$I_{CES}$	—	1.0	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CB} = 30\text{Vdc}, I_E = 0$ )	$I_{CBO}$	—	50	nAdc
Emitter Cutoff Current ( $V_{EB} = 10\text{Vdc}, I_C = 0$ )	$I_{EBO}$	—	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.

## LMBT6427LT1G



**LMBT6427LT1G**

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

Characteristic	Symbol	Min	Max	Unit
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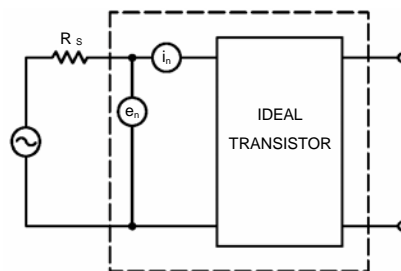
**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 10 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ ) ( $I_C = 100 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ ) ( $I_C = 500 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ )	$h_{FE}$	10,000 20,000 14,000	100,000 200,000 140,000	—
Collector–Emitter Saturation Voltage ( $I_C = 50 \text{ mAdc}, I_B = 0.5 \text{ mAdc}$ ) ( $I_C = 500 \text{ mAdc}, I_B = 0.5 \text{ mAdc}$ )	$V_{CE(sat)}(3)$	— —	1.2 1.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = 500 \text{ mAdc}, I_B = 0.5 \text{ mAdc}$ )	$V_{BE(sat)}$	—	2.0	Vdc
Base–Emitter On Voltage ( $I_C = 50 \text{ mAdc}, V_{CE} = 5.0 \text{ Vdc}$ )	$V_{BE(on)}$	—	1.75	Vdc

**SMALL–SIGNAL CHARACTERISTICS**

Output Capacitance ( $V_{CB} = 10 \text{ Vdc}, I_E = 0, f = 1.0 \text{ MHz}$ )	$C_{obo}$	—	7.0	pF
Input Capacitance ( $V_{EB} = 0.5 \text{ Vdc}, I_C = 0, f = 1.0 \text{ MHz}$ )	$C_{ibo}$	—	15	pF
Current Gain–High Frequency ( $V_{CE} = 5.0 \text{ Vdc}, I_C = 10 \text{ mAdc}, f = 100 \text{ MHz}$ )	$ h_{fe} $	1.3	—	Vdc
Noise Finure ( $V_{CE} = 5.0 \text{ Vdc}, I_C = 1.0 \text{ mAdc}, R_S = 100 \text{ k}\Omega, f = 1.0 \text{ kHz}$ )	NF	—	10	dB

3. **Pulse Tent:** Pulse Width = 300 $\mu\text{s}$ , Duty Cycle = 2.0%

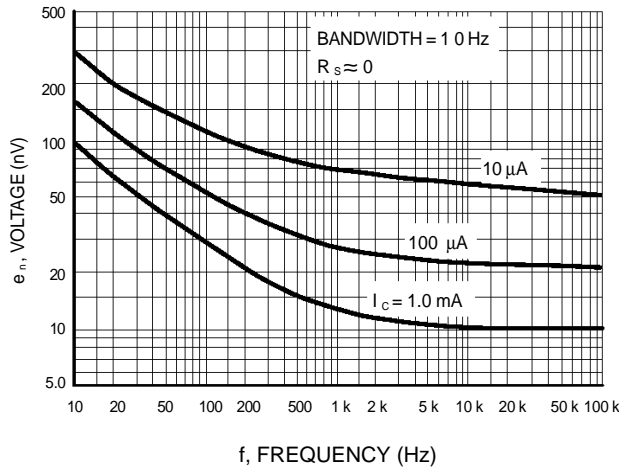


**Figure 1. Transistor Noise Model**

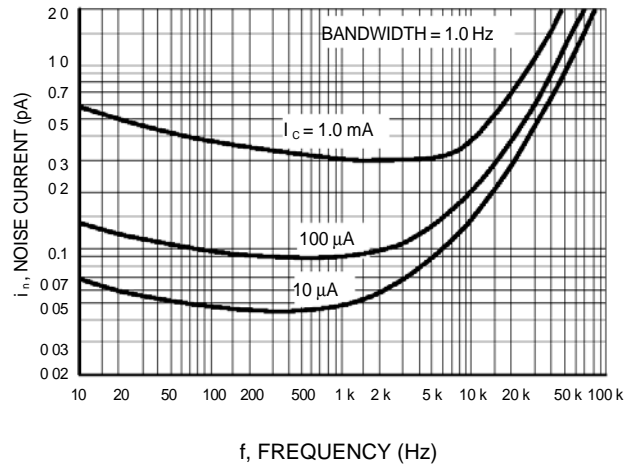
**LMBT6427LT1G**

**NOISE CHARACTERISTICS**

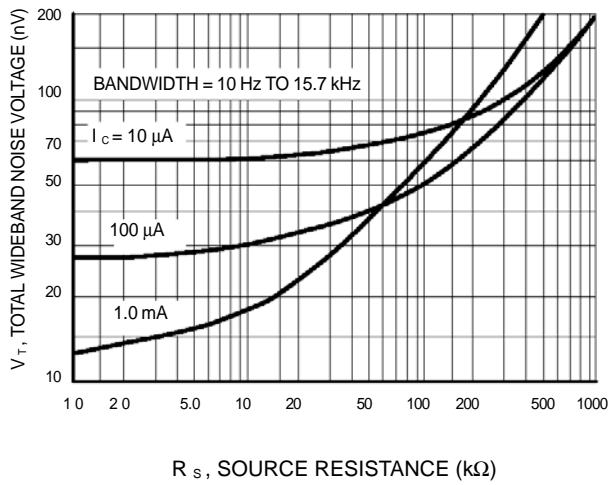
( $V_{CE} = 5.0 \text{ Vdc}$ ,  $T_A = 25^\circ\text{C}$ )



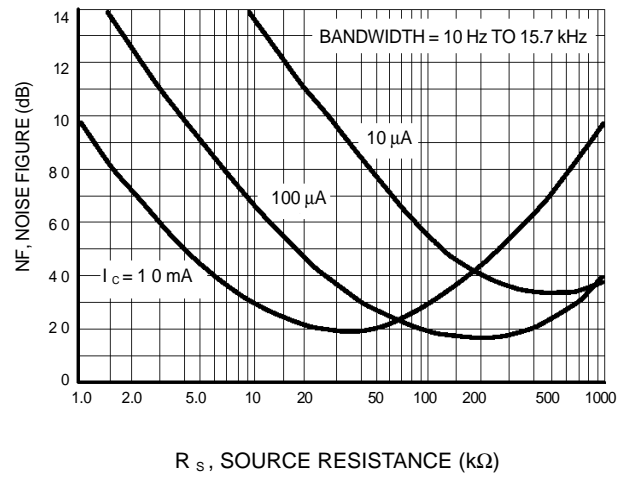
**Figure 2. Noise Voltage**



**Figure 3. Noise Current**



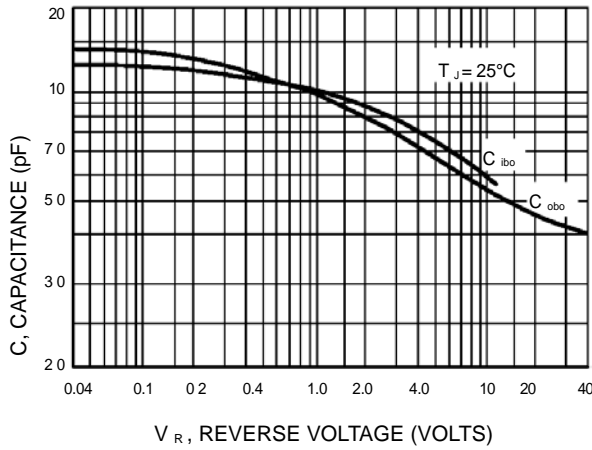
**Figure 4. Total Wideband Noise Voltage**



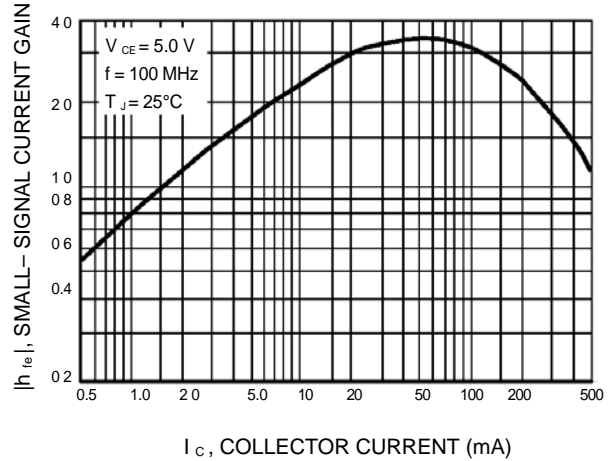
**Figure 5. Wideband Noise Figure**

**LMBT6427LT1G**

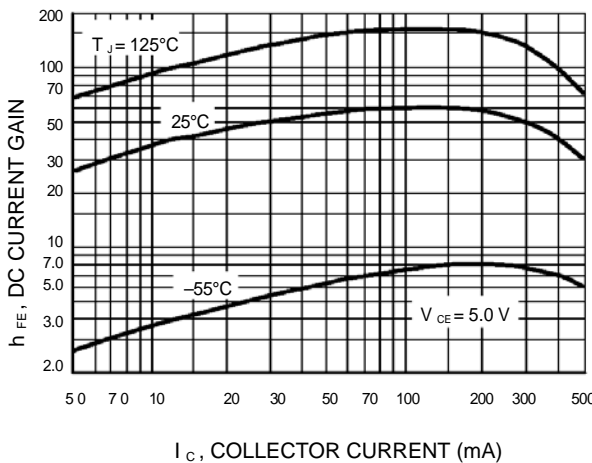
**SMALL-SIGNAL CHARACTERISTICS**



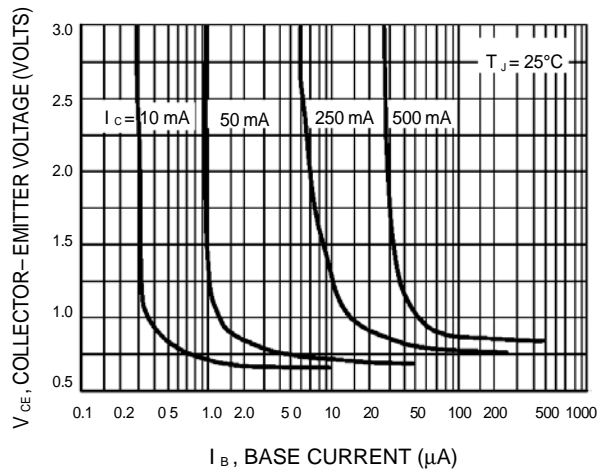
**Figure 6. Capacitance**



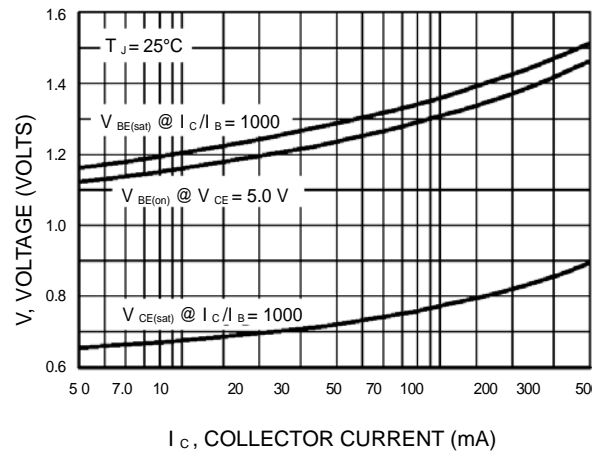
**Figure 7. High Frequency Current Gain**



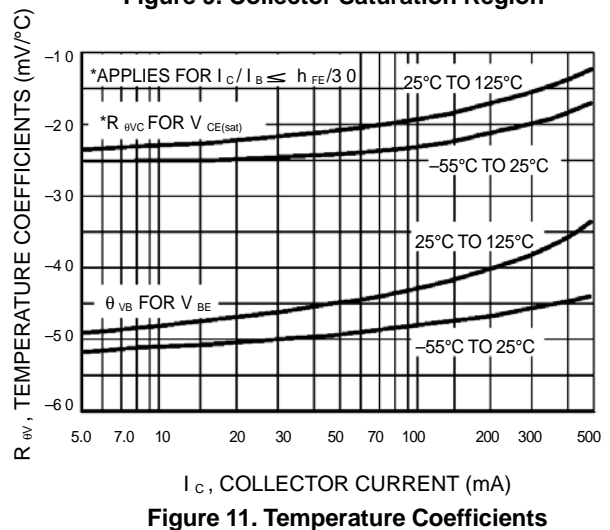
**Figure 8. DC Current Gain**



**Figure 9. Collector Saturation Region**



**Figure 10. "On" Voltages**



**Figure 11. Temperature Coefficients**

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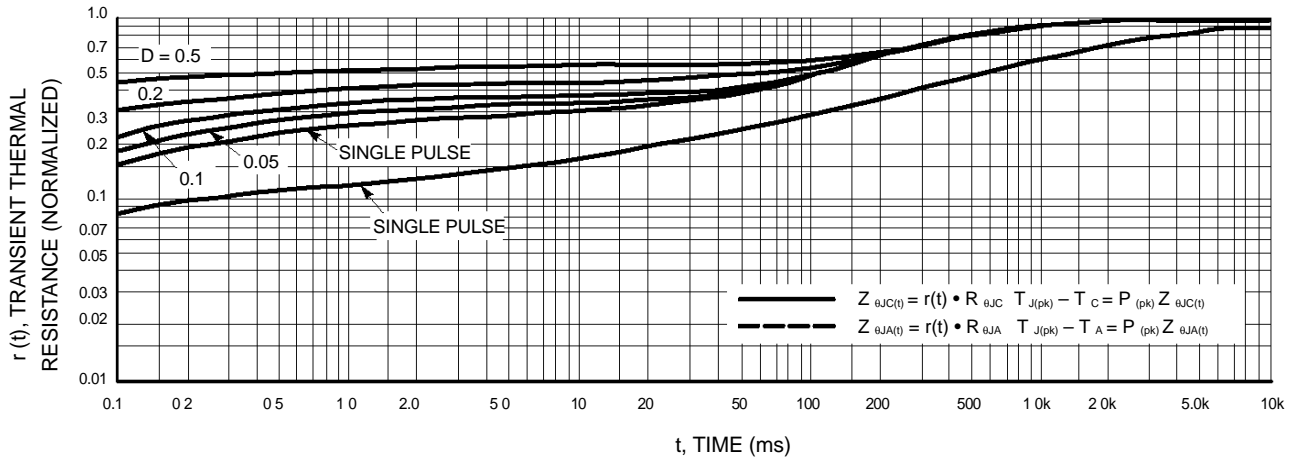
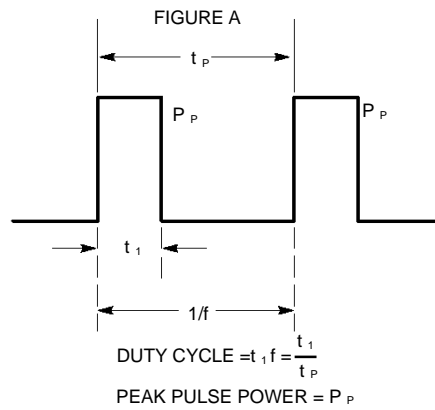


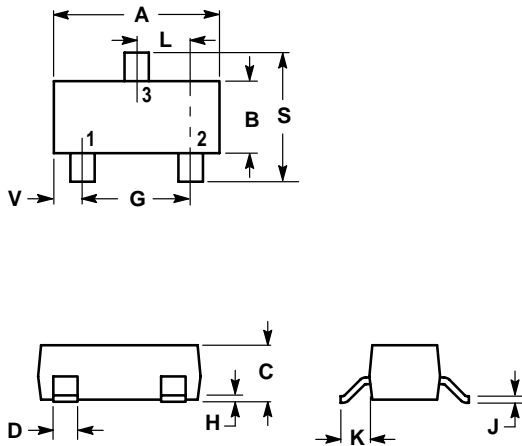
Figure 12. Thermal Response



Design Note: Use of Transient Thermal Resistance Data

**LMBT6427LT1G**
**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

