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# MMBT6427LT1G

ON Semiconductor

Darlington Transistors 500mA 40V NPN

Any questions, please feel free to contact us.  
[info@kaimte.com](mailto:info@kaimte.com)

# MMBT6427LT1G, SMMBT6427LT1G

## Darlington Transistor

### NPN Silicon

#### Features

- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	$V_{CEO}$	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, (Note 1) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	300 2.4	mW 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	$^\circ\text{C}$

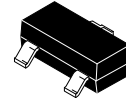
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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.

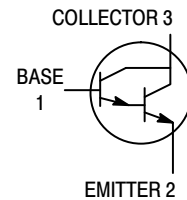


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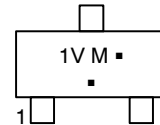
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SOT-23 (TO-236)  
CASE 318  
STYLE 6



#### MARKING DIAGRAM



1V = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### ORDERING INFORMATION

Device	Package	Shipping†
MMBT6427LT1G	SOT-23 (Pb-Free)	3,000 Tape & Reel
SMMBT6427LT1G	SOT-23 (Pb-Free)	3,000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# MMBT6427LT1G, SMMBT6427LT1G

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector – Emitter Breakdown Voltage (I <sub>C</sub> = 10 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CEO</sub>	40	–	Vdc
Collector – Base Breakdown Voltage (I <sub>C</sub> = 100 μAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	40	–	Vdc
Emitter – Base Breakdown Voltage (I <sub>C</sub> = 10 μAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	12	–	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 25 Vdc, I <sub>B</sub> = 0)	I <sub>CES</sub>	–	1.0	μAdc
Collector Cutoff Current (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0)	I <sub>CBO</sub>	–	50	nAdc
Emitter Cutoff Current (V <sub>EB</sub> = 10 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	50	nAdc
<b>ON CHARACTERISTICS</b>				
DC Current Gain (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 5.0 Vdc) (I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 5.0 Vdc) (I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 5.0 Vdc)	h <sub>FE</sub>	10,000 20,000 14,000	100,000 200,000 140,000	–
Collector – Emitter Saturation Voltage (I <sub>C</sub> = 50 mAdc, I <sub>B</sub> = 0.5 mAdc) (I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 0.5 mAdc)	V <sub>CE(sat)</sub> <sup>(3)</sup>	– –	1.2 1.5	Vdc
Base – Emitter Saturation Voltage (I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 0.5 mAdc)	V <sub>BE(sat)</sub>	–	2.0	Vdc
Base – Emitter On Voltage (I <sub>C</sub> = 50 mAdc, V <sub>CE</sub> = 5.0 Vdc)	V <sub>BE(on)</sub>	–	1.75	Vdc
<b>SMALL – SIGNAL CHARACTERISTICS</b>				
Output Capacitance (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	–	7.0	pF
Input Capacitance (V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	–	15	pF
Current Gain – High Frequency (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 5.0 Vdc, f = 100 MHz)	h <sub>fe</sub>	1.3	–	Vdc
Noise Figure (I <sub>C</sub> = 1.0 mAdc, V <sub>CE</sub> = 5.0 Vdc, R <sub>S</sub> = 100 kΩ, f = 1.0 kHz)	NF	–	10	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

# MMBT6427LT1G, SMMBT6427LT1G

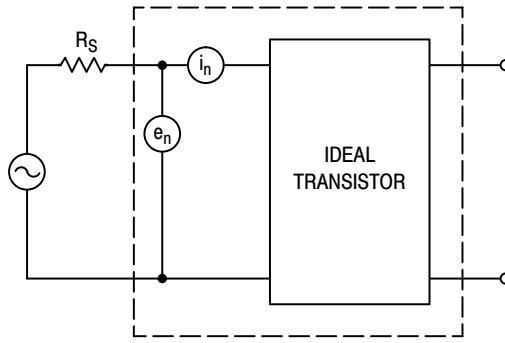


Figure 1. Transistor Noise Model

## NOISE CHARACTERISTICS

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

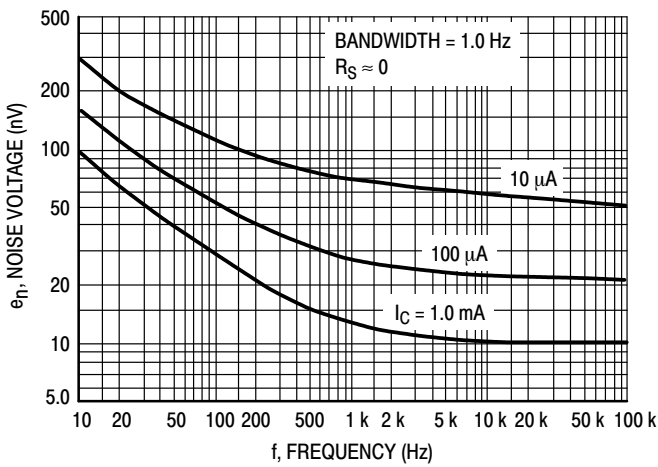


Figure 2. Noise Voltage

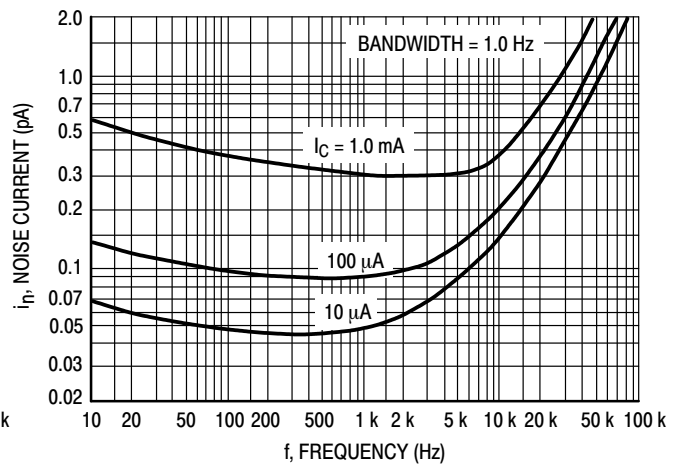


Figure 3. Noise Current

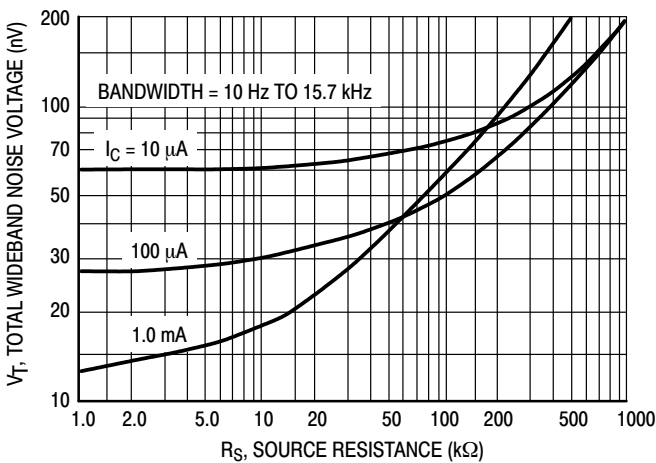


Figure 4. Total Wideband Noise Voltage

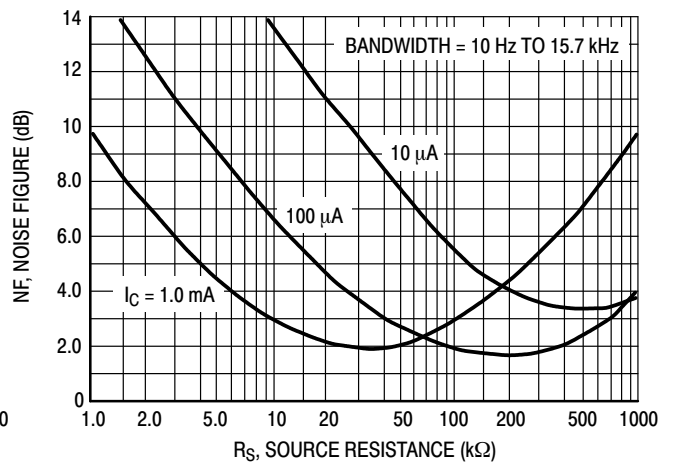


Figure 5. Wideband Noise Figure

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## SMALL-SIGNAL CHARACTERISTICS

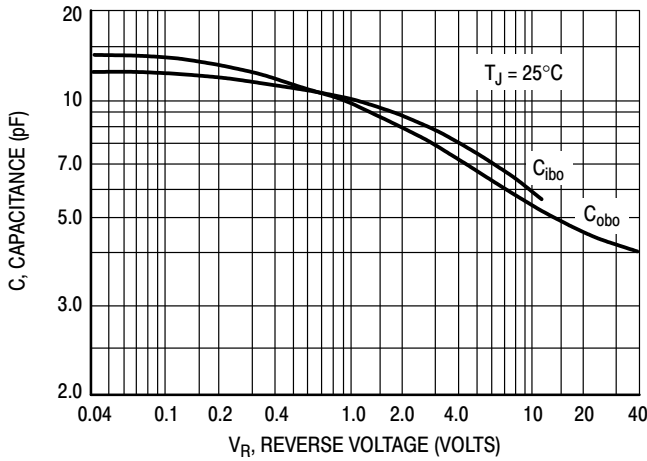


Figure 6. Capacitance

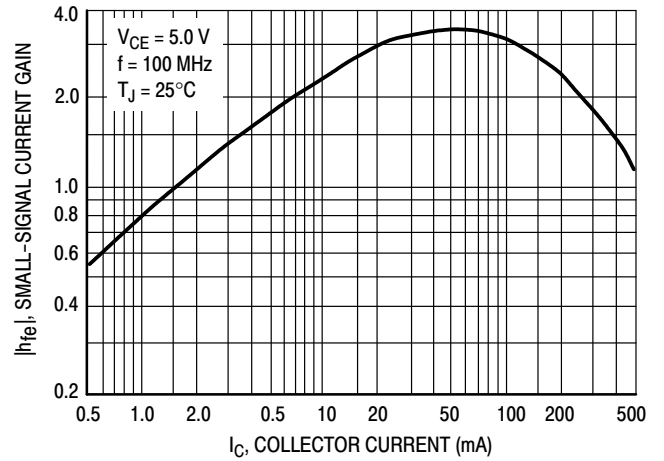


Figure 7. High Frequency Current Gain

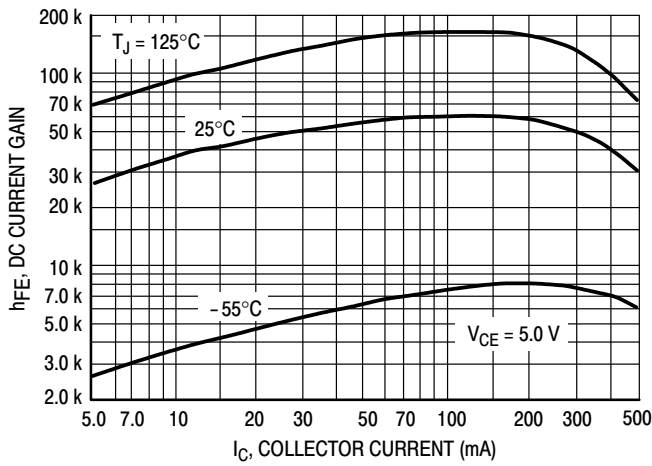


Figure 8. DC Current Gain

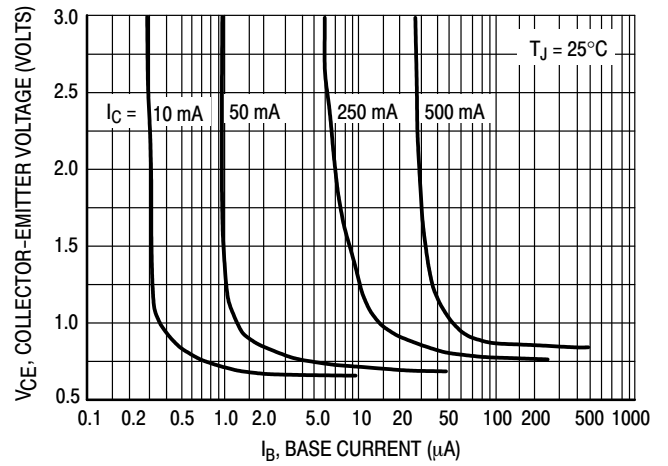


Figure 9. Collector Saturation Region

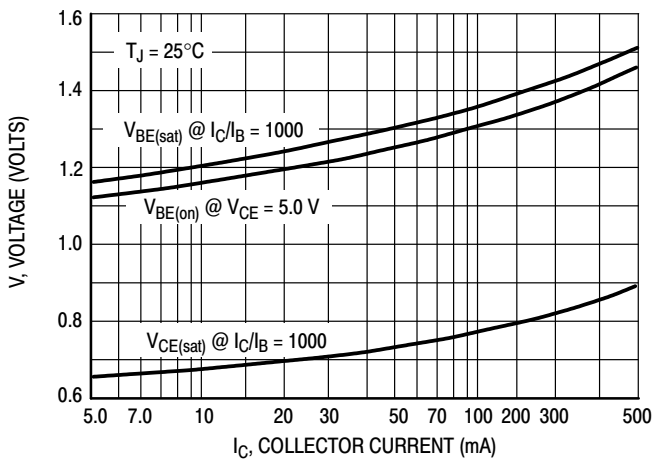


Figure 10. "On" Voltages

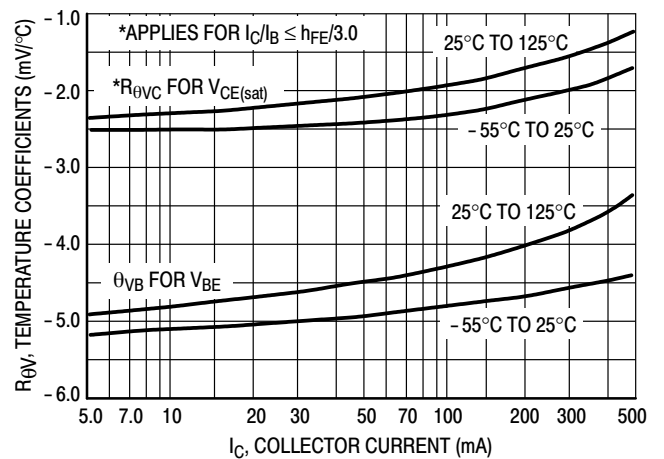


Figure 11. Temperature Coefficients

# MMBT6427LT1G, SMMBT6427LT1G

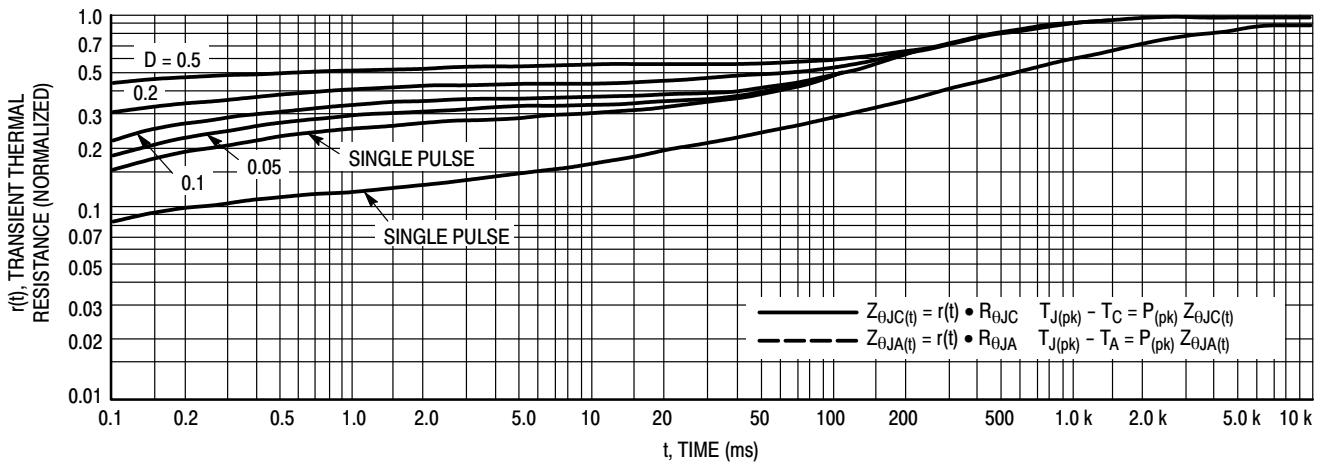
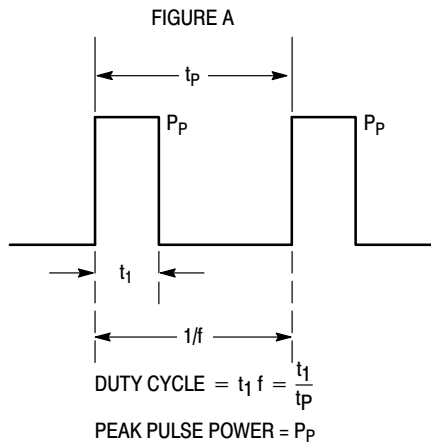


Figure 12. Thermal Response

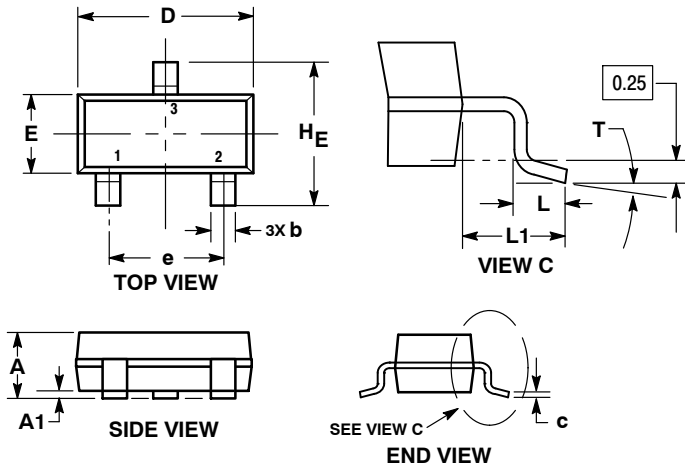


**Design Note: Use of Transient Thermal Resistance Data**

# MMBT6427LT1G, SMMBT6427LT1G

## PACKAGE DIMENSIONS

SOT-23 (TO-236)  
CASE 318-08  
ISSUE AR



### NOTES:

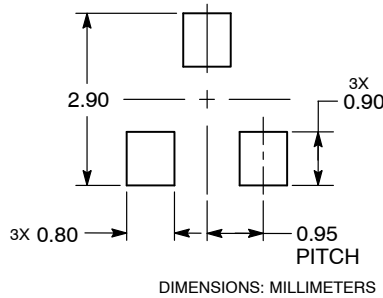
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
c	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
H <sub>E</sub>	2.10	2.40	2.64	0.083	0.094	0.104
T	0°	---	10°	0°	---	10°

### STYLE 6:

1. BASE
2. EMITTER
3. COLLECTOR

## RECOMMENDED SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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