

# High Voltage Transistors

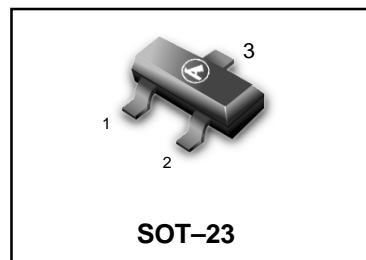
## NPN Silicon

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

### Ordering Information

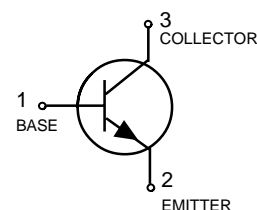
Device	Marking	Shipping
LMBT6 517LT1G S-LMBT6 517LT1G	1Z	3000/Tape&Reel
LMBT6517LT3G S-LMBT6517LT3G	1Z	10000/Tape&Reel

**LMBT6517LT1G**  
**S-LMBT6517LT1G**



### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	350	Vdc
Collector–Base Voltage	$V_{CBO}$	350	Vdc
Emitter–Base Voltage	$V_{EBO}$	5.0	Vdc
Base Current	$I_B$	250	mAdc
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

(S-)LMBT6517LT1 G= 1Z

### 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 ( $I_C = 1.0 \text{ mAdc}$ )	$V_{(BR)CEO}$	350	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}$ )	$V_{(BR)CBO}$	350	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}$ )	$V_{(BR)EBO}$	6.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = 250\text{Vdc}$ )	$I_{CBO}$	—	50	nAdc
Emitter Cutoff Current ( $V_{EB} = 5.0\text{Vdc}$ )	$I_{EBO}$	—	50	nAdc

1. FR–5 =  $1.0 \times 0.75 \times 0.062 \text{ in.}$

2. Alumina =  $0.4 \times 0.3 \times 0.024 \text{ in.}$  99.5% alumina.

LMBT6517LT1G , S-LMBT6517LT1G

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

Characteristic	Symbol	Min	Max	Unit
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**DC CHARACTERISTICS**

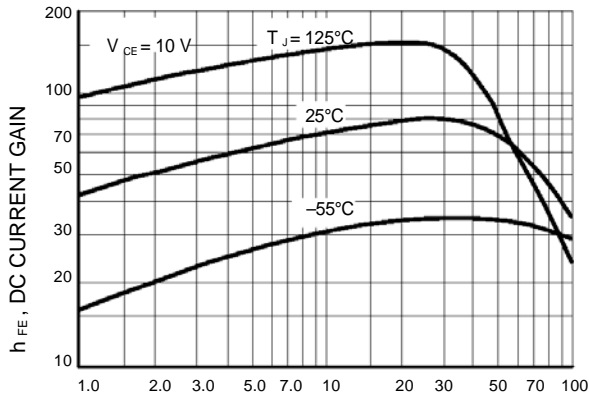
DC Current Gain ( $I_C = 1.0\text{ mAdc}, V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	20	—	—
( $I_C = 10\text{ mAdc}, V_{CE} = 10\text{ Vdc}$ )		30	—	—
( $I_C = 30\text{ mAdc}, V_{CE} = 10\text{ Vdc}$ )		30	200	—
( $I_C = 50\text{ mAdc}, V_{CE} = 10\text{ Vdc}$ )		20	200	—
( $I_C = 100\text{ mAdc}, V_{CE} = 10\text{ Vdc}$ )		15	—	—
Collector–Emitter Saturation Voltage(3) ( $I_C = 10\text{ mAdc}, I_B = 1.0\text{ mAdc}$ )	$V_{CE(sat)}$	—	0.30	Vdc
( $I_C = 20\text{ mAdc}, I_B = 2.0\text{ mAdc}$ )		—	0.35	—
( $I_C = 30\text{ mAdc}, I_B = 3.0\text{ mAdc}$ )		—	0.50	—
( $I_C = 50\text{ mAdc}, I_B = 5.0\text{ mAdc}$ )		—	1.0	—
Base – Emitter Saturation Voltage ( $I_C = 10\text{ mAdc}, I_B = 1.0\text{ mAdc},$ )	$V_{BE(sat)}$	—	0.75	Vdc
( $I_C = 20\text{ mAdc}, I_B = 2.0\text{ mAdc},$ )		—	0.85	—
( $I_C = 30\text{ mAdc}, I_B = 3.0\text{ mAdc},$ )		—	0.90	—
Base–Emitter On Voltage ( $I_C = 100\text{ mAdc}, V_{CE} = 10\text{ Vdc}$ )	$V_{BE(on)}$	—	2.0	Vdc

**SMALL–SIGNAL CHARACTERISTICS**

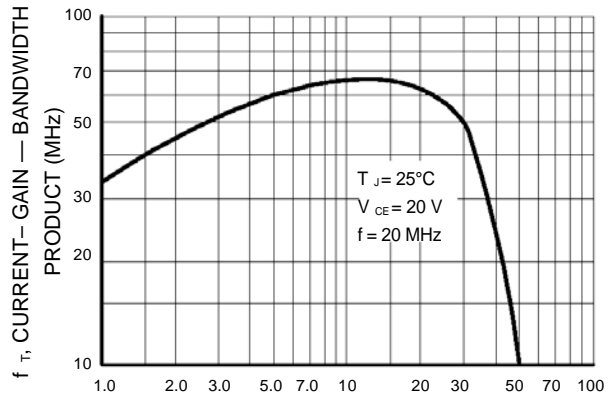
Current Gain–Bandwidth Product ( $V_{CE} = 20\text{ Vdc}, I_C = 10\text{ mAdc}, f = 20\text{ MHz}$ )	$f_T$	40	200	MHz
Collector –Base Capacitance ( $V_{CB} = 20\text{ Vdc}, f = 1.0\text{ MHz}$ )	$C_{cb}$	—	6.0	pF
Emitter –Base Capacitance ( $V_{EB} = 0.5\text{ Vdc}, f = 1.0\text{ MHz}$ )	$C_{eb}$	—	80	pF

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

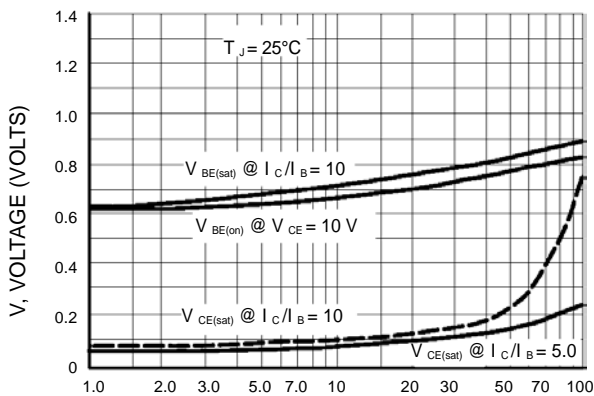
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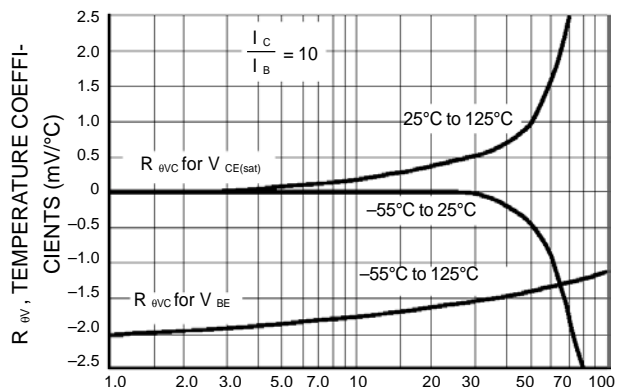
IC, COLLECTOR CURRENT (mA)  
**Figure 1. DC Current Gain**



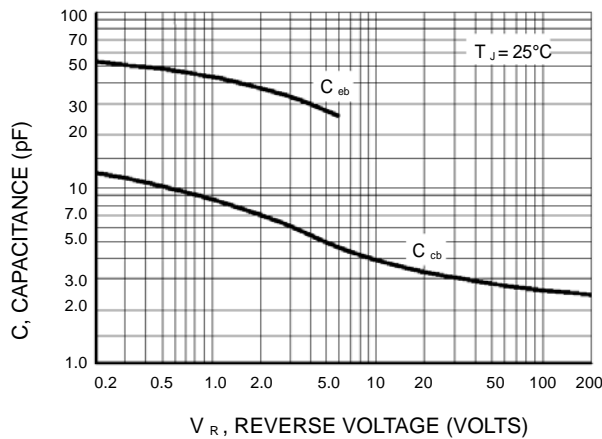
IC, COLLECTOR CURRENT (mA)  
**Figure 2. Current-Gain — Bandwidth Product**



IC, COLLECTOR CURRENT (mA)  
**Figure 3. "On" Voltages**

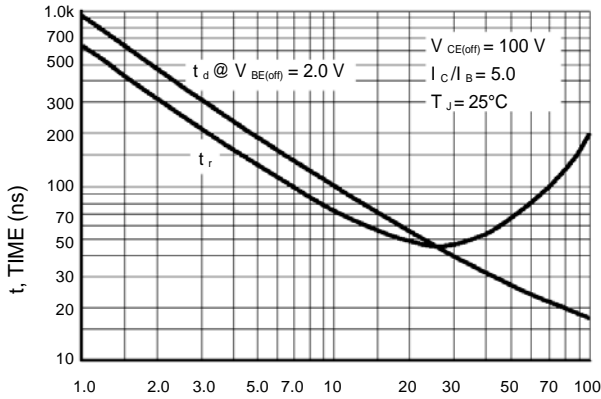


IC, COLLECTOR CURRENT (mA)  
**Figure 4. Temperature Coefficients**

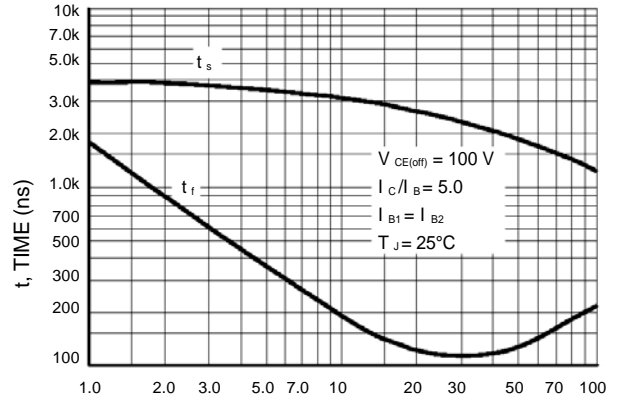


**Figure 5. Capacitance**

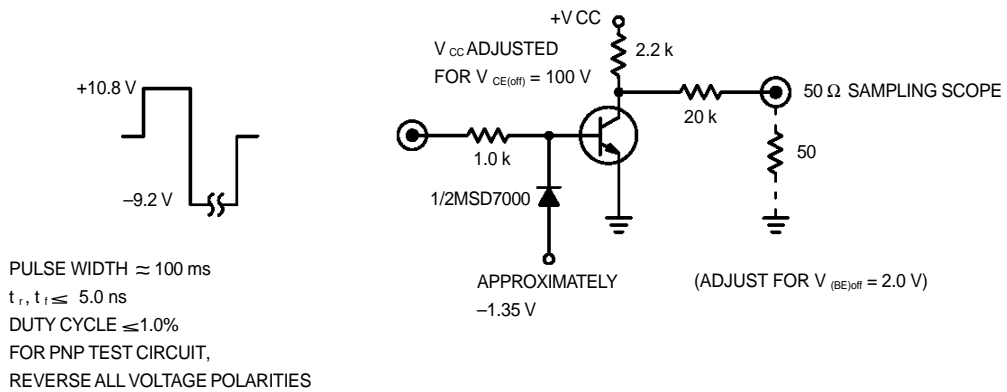
LMBT6517LT1G , S-LMBT6517LT1G



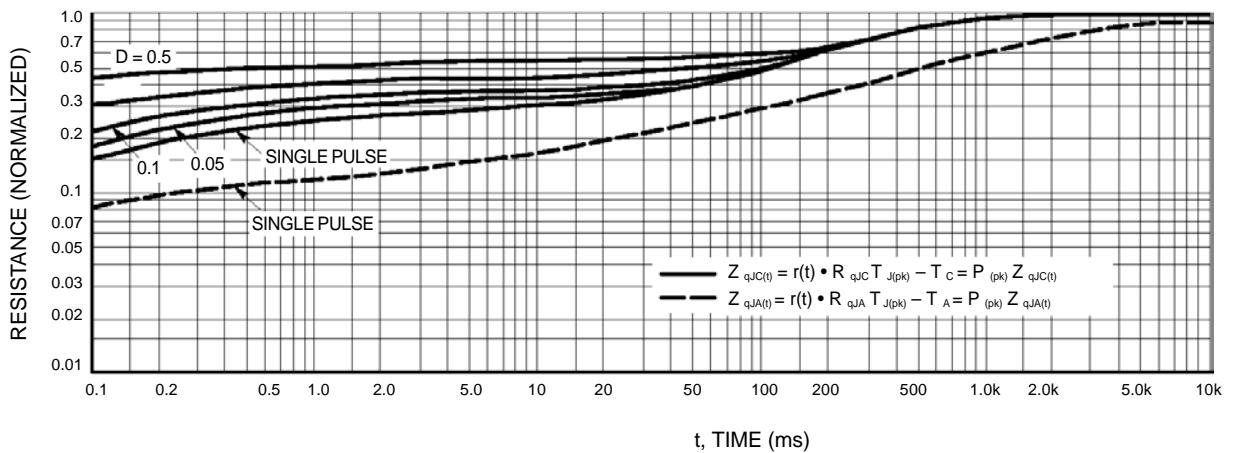
$I_C$ , COLLECTOR CURRENT (mA)  
**Figure 6. Turn-On Time**



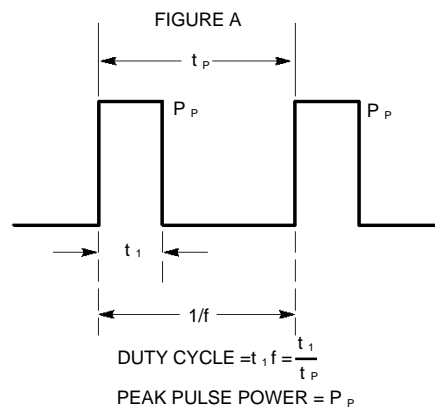
$I_C$ , COLLECTOR CURRENT (mA)  
**Figure 7. Turn-Off Time**



**Figure 8. Switching Time Test Circuit**



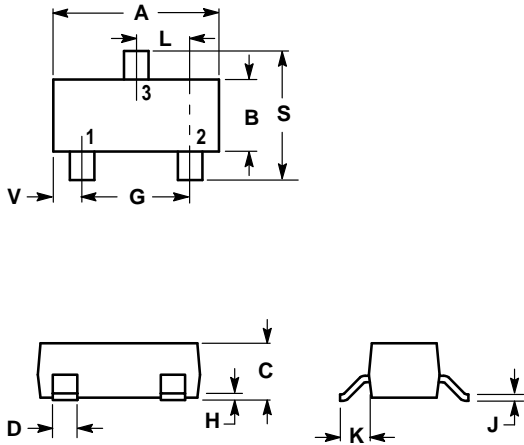
**Figure 9. Thermal Response**

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

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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

