

# High Voltage Transistors

## FEATURE

- Pb-Free package is available.

## DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
LMBT5550LT1	M1F	3000/Tape&Reel
LMBT5550LT1G (Pb-Free)	M1F	3000/Tape&Reel
LMBT5551LT1	G1	3000/Tape&Reel
LMBT5551LT1G (Pb-Free)	G1	3000/Tape&Reel

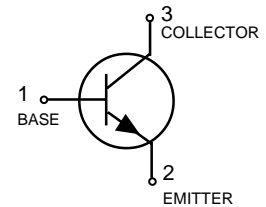
**LMBT5550LT1**  
**LMBT5551LT1**



**SOT-23**

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	140	Vdc
Collector-Base Voltage	$V_{CBO}$	160	Vdc
Emitter-Base Voltage	$V_{EBO}$	6.0	Vdc
Collector Current — Continuous	$I_C$	600	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	$^\circ\text{C}$

## 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) ( $I_C = 1.0 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$			Vdc
LMBT5550		140	—	
LMBT5551		160	—	
Collector-Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$			Vdc
LMBT5550		160	—	
LMBT5551		180	—	
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$			Vdc
		6.0	—	
Collector Cutoff Current ( $V_{CB} = 100\text{Vdc}, I_E = 0$ )	$I_{CBO}$			nAdc
LMBT5550		—	100	
LMBT5551		—	50	
( $V_{CB} = 100\text{Vdc}, I_E = 0, T_A = 100^\circ\text{C}$ )	LMBT5550			$\mu\text{Adc}$
( $V_{CB} = 120\text{Vdc}, I_E = 0, T_A = 100^\circ\text{C}$ )	LMBT5551			
Emitter Cutoff Current ( $V_{BE} = 4.0\text{Vdc}, I_C = 0$ )	$I_{EBO}$			nAdc
		—	50	

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.

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

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

Characteristic	Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>				
DC Current Gain (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	h <sub>FE</sub>	60	—	—
LMBT5550		80	—	—
(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	h <sub>FE</sub>	60	250	—
LMBT5550		80	250	—
(I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0V <sub>dc</sub> )	h <sub>FE</sub>	20	—	—
LMBT5550		30	—	—
LMBT5551	—	—	—	—
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	—	0.15	V <sub>dc</sub>
Both Types		—	0.25	—
(I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	—	0.20	—
LMBT5550		—	—	—
LMBT5551	—	—	—	—
Base–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )	V <sub>BE(sat)</sub>	—	1.0	V <sub>dc</sub>
Both Types		—	1.2	—
(I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )	V <sub>BE(sat)</sub>	—	1.0	—
LMBT5550		—	—	—
LMBT5551	—	—	—	—

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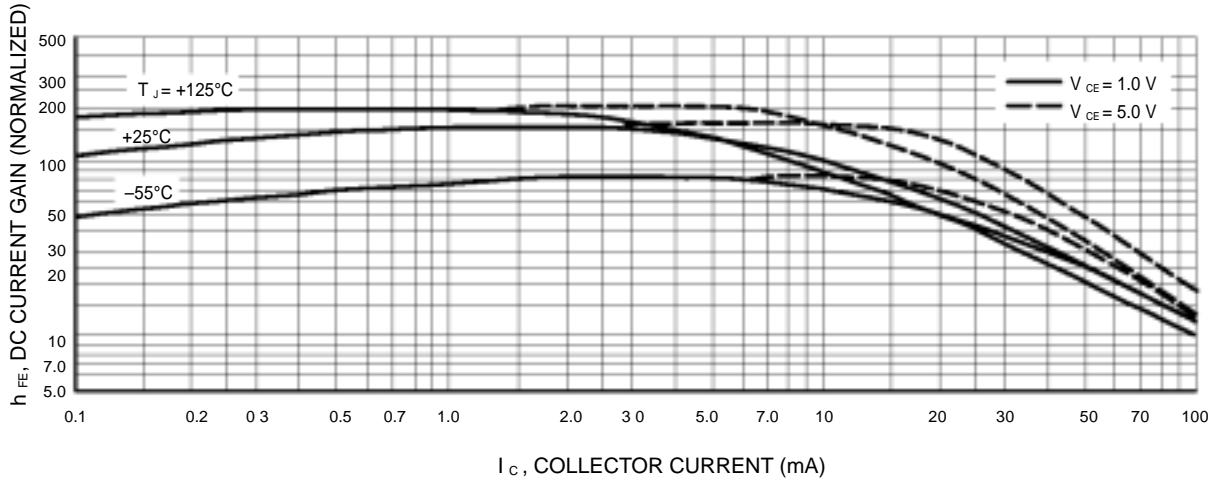


Figure 15. DC Current Gain

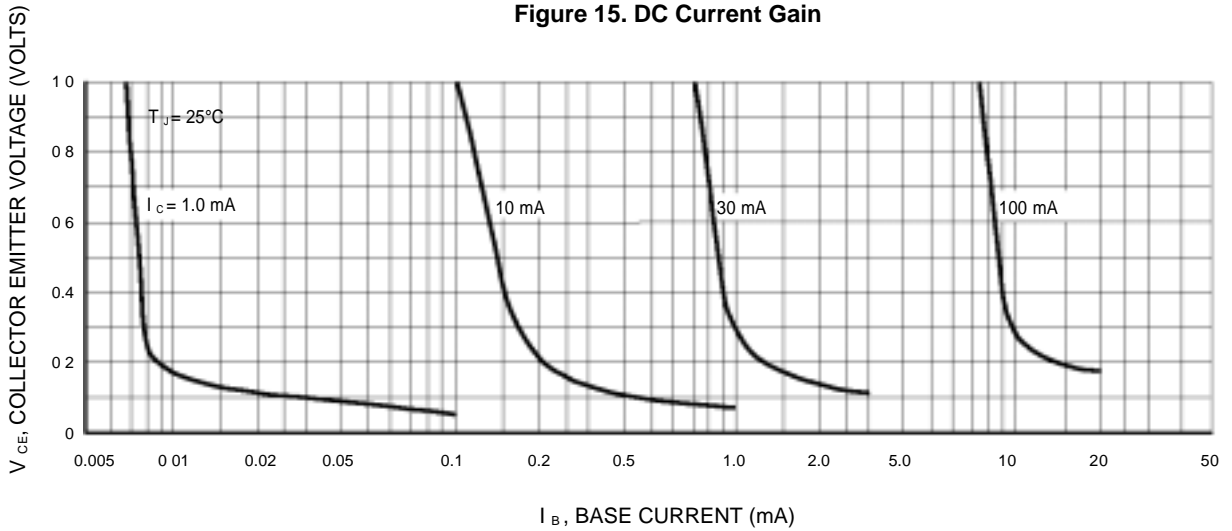


Figure 16. Collector Saturation Region

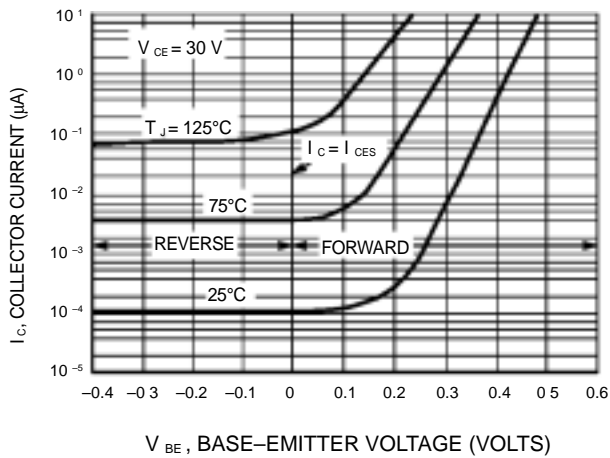


Figure 3. Collector Cut-Off Region

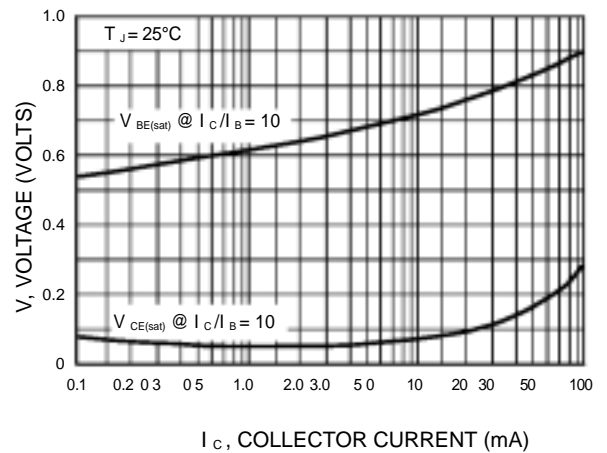
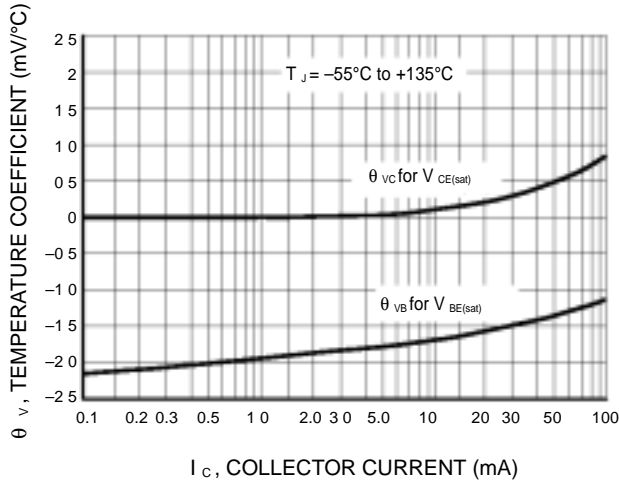
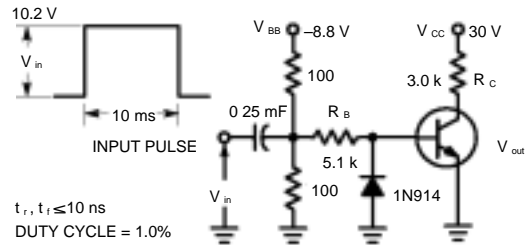


Figure 4. "On" Voltages

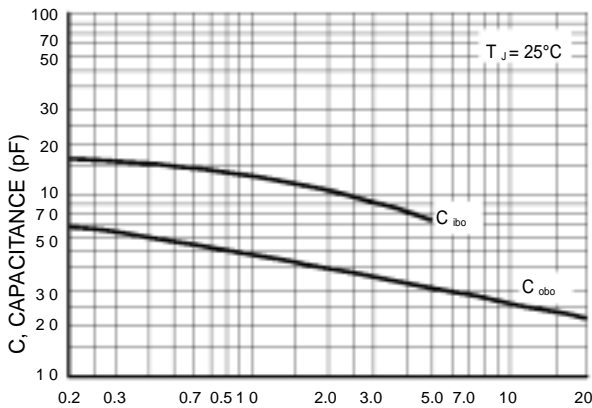
**LMBT5550LT1 LMBT5551LT1**



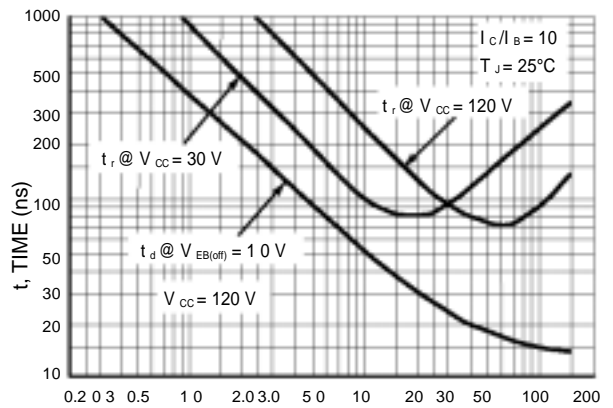
**Figure 5. Temperature Coefficients**



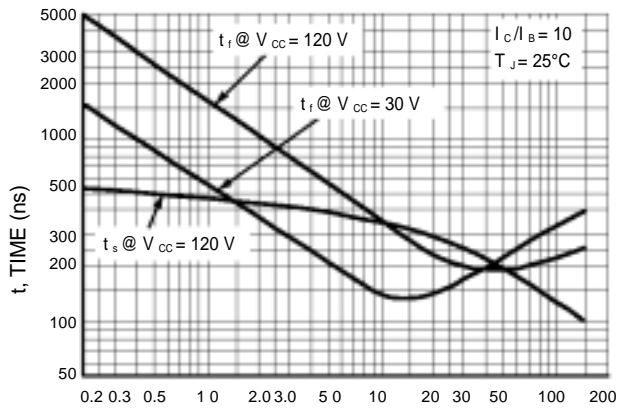
Values Shown are for  $I_c @ 10 \text{ mA}$   
**Figure 6. Switching Time Test Circuit**



**Figure 7. Capacitances Figure**



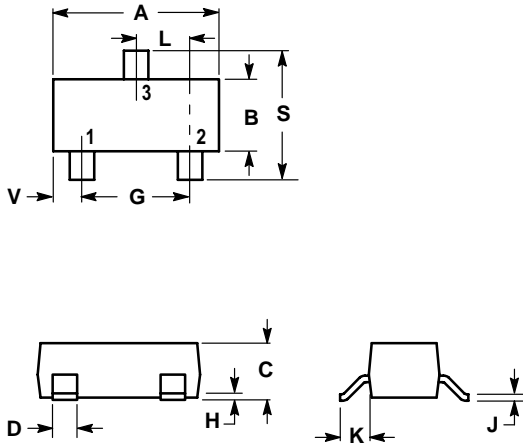
**8. Turn-On Time**



**Figure 9. Turn-Off Time**

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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

- P N 1. BASE  
 2. EMITTER  
 3. COLLECTOR

