

# High Voltage Transistors

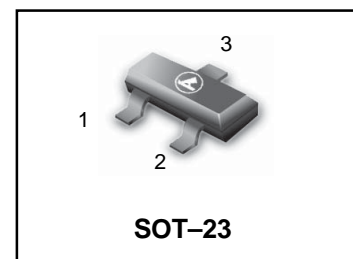
## FEATURE

- 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.

**LMBT5550LT1G**  
**LMBT5551LT1G**  
**S-LMBT5550LT1G**  
**S-LMBT5551LT1G**

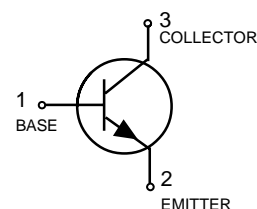
## DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
LMBT5550LT1G S-LMBT5550LT1G	M1F	3000/Tape&Reel
LMBT5550LT3G S-LMBT5550LT3G	M1F	10000/Tape&Reel
LMBT5551LT1G S-LMBT5551LT1G	G1	3000/Tape&Reel
LMBT5551LT3G S-LMBT5551LT3G	G1	10000/Tape&Reel



## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CEO}$	140	Vdc
	MMBT5550 MMBT5551	160	
Collector - Base Voltage	$V_{CBO}$	160	Vdc
	MMBT5550 MMBT5551	180	
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 (Note 1) @ $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	225	mW
		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 (Note 2) @ $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	300	mW
		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	$^\circ\text{C}$

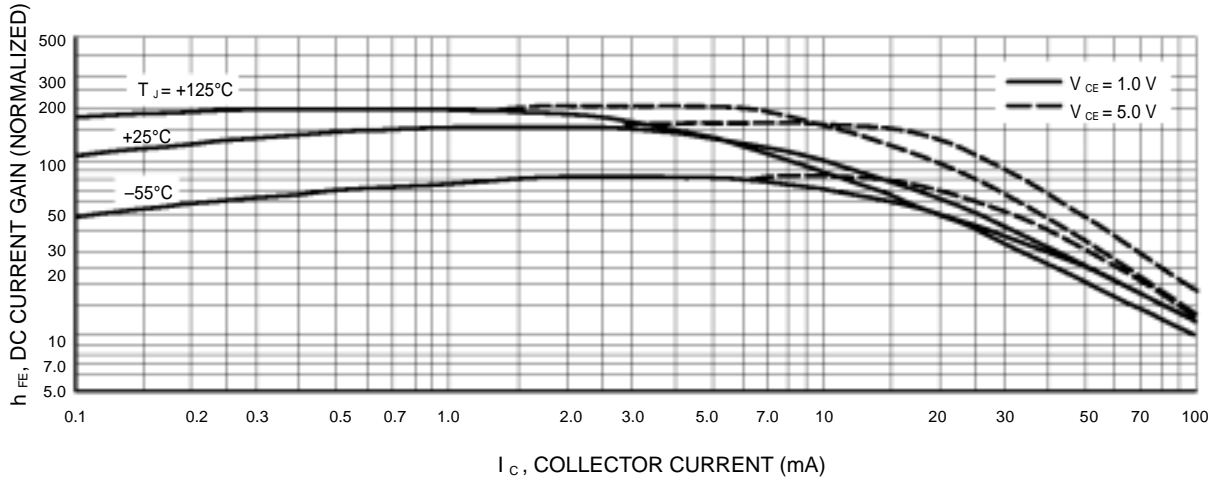
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**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

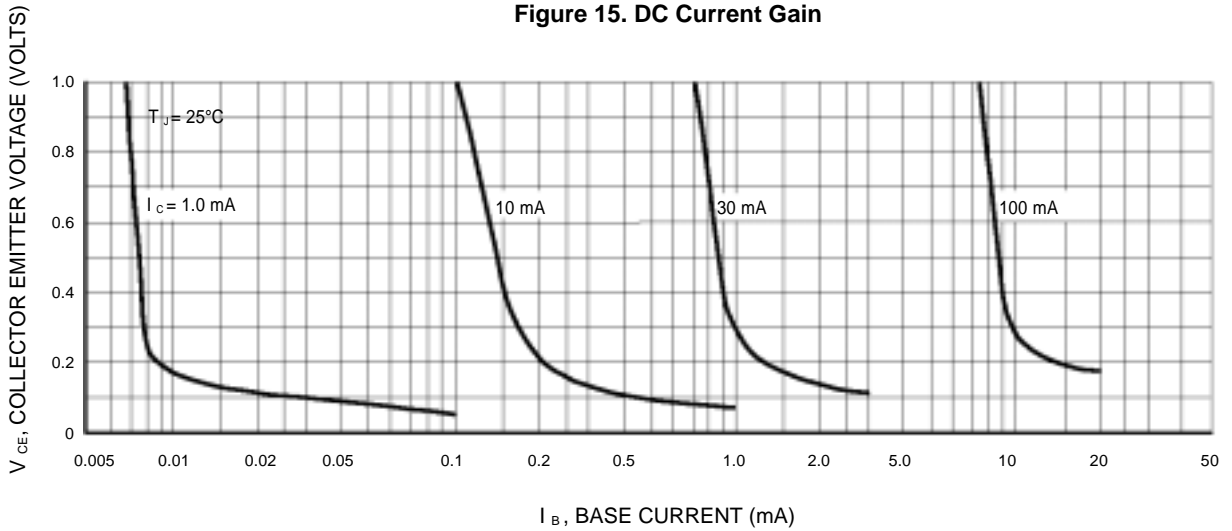
Characteristic		Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector - Emitter Breakdown Voltage (Note 3) ( $I_C = 1.0 \text{ mAdc}$ , $I_B = 0$ )	LMBT5550 LMBT5551	$V_{(BR)CEO}$	140 160	- -	Vdc
Collector - Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}$ , $I_E = 0$ )	LMBT5550 LMBT5551	$V_{(BR)CBO}$	160 180	- -	Vdc
Emitter - Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}$ , $I_C = 0$ )		$V_{(BR)EBO}$	6.0	-	Vdc
Collector Cutoff Current ( $V_{CB} = 100 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 120 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 100 \text{ Vdc}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$ ) ( $V_{CB} = 120 \text{ Vdc}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$ )	LMBT5550 LMBT5551 LMBT5550 LMBT5551	$I_{CBO}$	- - - -	100 50 100 50	nAdc   $\mu\text{Adc}$
Emitter Cutoff Current ( $V_{EB} = 4.0 \text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	-	50	nAdc
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 1.0 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )  ( $I_C = 10 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )  ( $I_C = 50 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	LMBT5550 LMBT5551 LMBT5550 LMBT5551 LMBT5550 LMBT5551	$h_{FE}$	60 80 60 80 20 30	- - 250 250 - -	-
Collector - Emitter Saturation Voltage ( $I_C = 10 \text{ mAdc}$ , $I_B = 1.0 \text{ mAdc}$ ) ( $I_C = 50 \text{ mAdc}$ , $I_B = 5.0 \text{ mAdc}$ )	Both Types LMBT5550 LMBT5551	$V_{CE(sat)}$	- - -	0.15 0.25 0.20	Vdc
Base - Emitter Saturation Voltage ( $I_C = 10 \text{ mAdc}$ , $I_B = 1.0 \text{ mAdc}$ ) ( $I_C = 50 \text{ mAdc}$ , $I_B = 5.0 \text{ mAdc}$ )	Both Types LMBT5550 LMBT5551	$V_{BE(sat)}$	- - -	1.0 1.2 1.0	Vdc
Collector Emitter Cut-off ( $V_{CB} = 10 \text{ V}$ ) ( $V_{CB} = 75 \text{ V}$ )	Both Types	$I_{CES}$	- -	50 100	nA

- FR-5 = 1.0 x 0.75 x 0.062 in.
- Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
- Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2.0%.

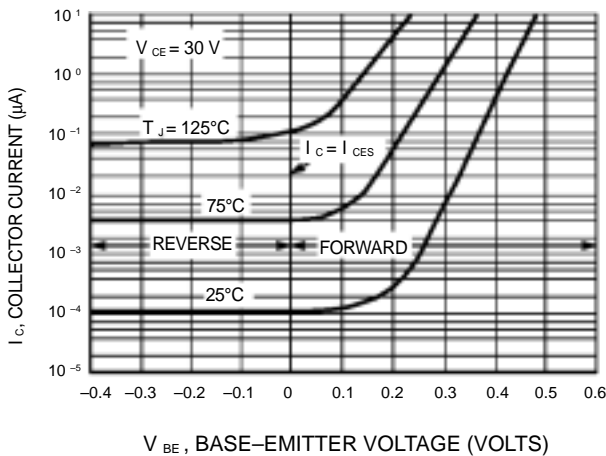
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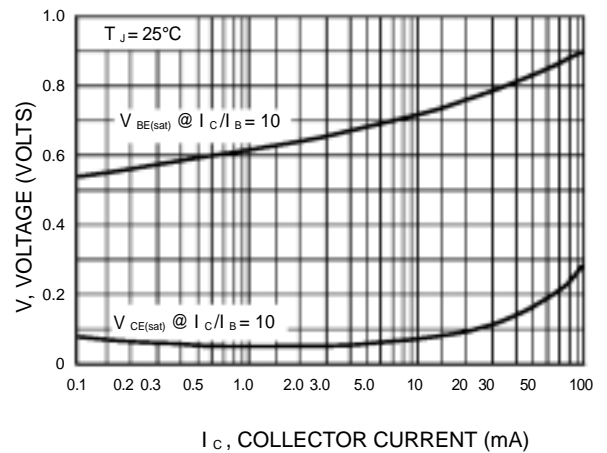
$I_C$ , COLLECTOR CURRENT (mA)  
**Figure 15. DC Current Gain**



$I_B$ , BASE CURRENT (mA)  
**Figure 16. Collector Saturation Region**

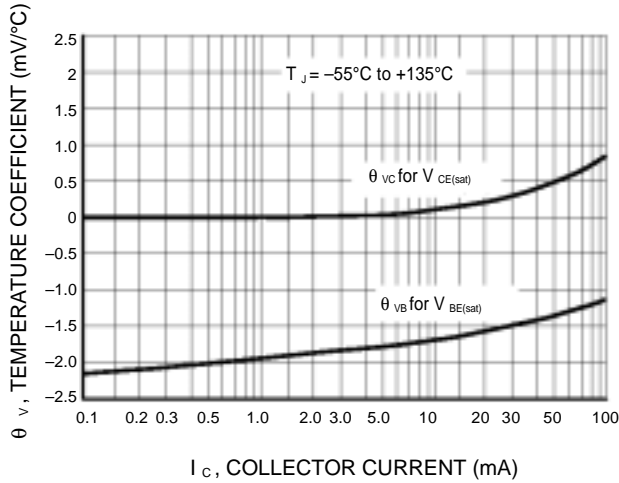


$V_{BE}$ , BASE-EMITTER VOLTAGE (VOLTS)  
**Figure 3. Collector Cut-Off Region**

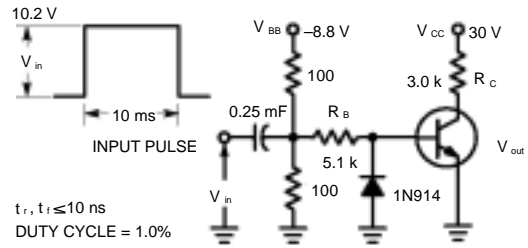


$I_C$ , COLLECTOR CURRENT (mA)  
**Figure 4. "On" Voltages**

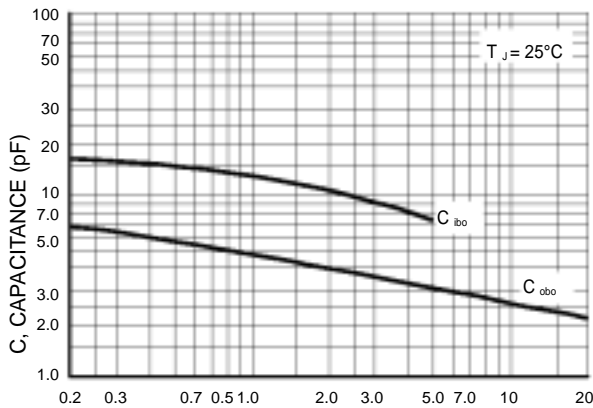
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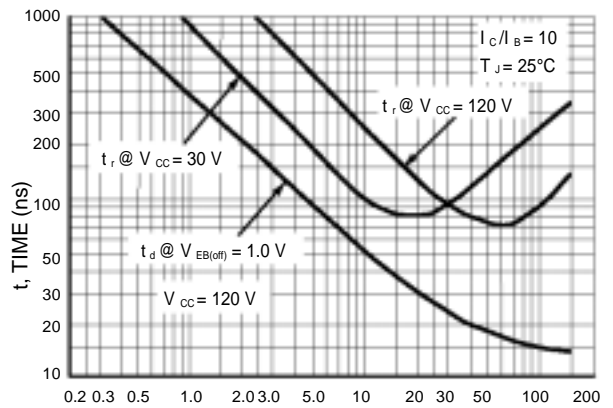
**Figure 5. Temperature Coefficients**



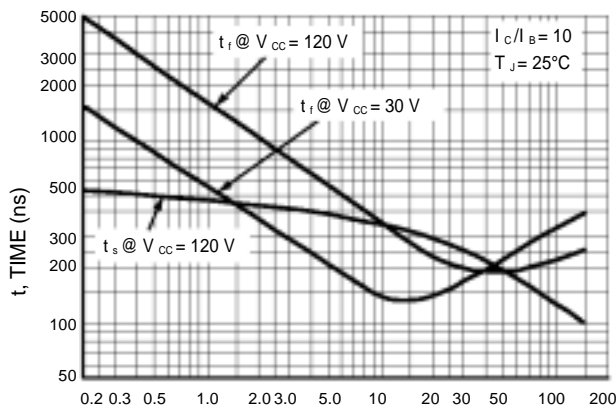
Values Shown are for  $I_c @ 10 \text{ mA}$   
**Figure 6. Switching Time Test Circuit**



**Figure 7. Capacitances Figure**



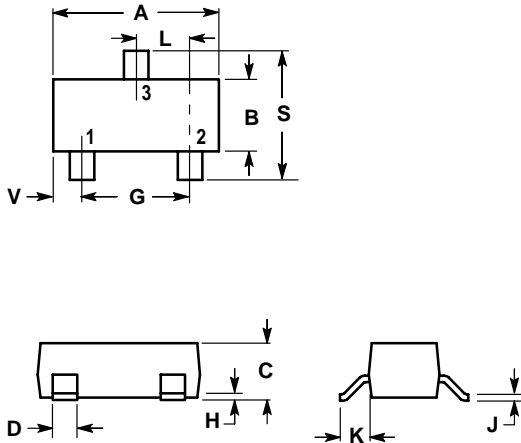
**8. Turn-On Time**



**Figure 9. Turn-Off Time**

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**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

