

# High Voltage Transistors

## FEATURE

- Pb-Free package is available.

## DEVICE MARKING AND ORDERING INFORMATION

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

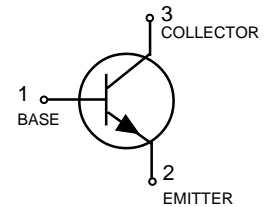
**LMBT5550LT1**  
**LMBT5551LT1**



**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)<br>$T_A = 25^\circ\text{C}$        | $P_D$           | 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<br>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 |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

## OFF CHARACTERISTICS

|   |               |     |     |                 |
|---|---------------|-----|-----|-----------------|
| Collector-Emitter Breakdown Voltage(3)<br>( $I_C = 1.0 \text{ mAdc}, I_E = 0$ ) | $V_{(BR)CEO}$ |     |     | Vdc             |
| LMBT5550  |               | 140 | —   |                 |
| LMBT5551  |               | 160 | —   |                 |
| Collector-Base Breakdown Voltage<br>( $I_C = 100 \mu\text{Adc}, I_E = 0$ )      | $V_{(BR)CBO}$ |     |     | Vdc             |
| LMBT5550  |               | 160 | —   |                 |
| LMBT5551  |               | 180 | —   |                 |
| Emitter-Base Breakdown Voltage<br>( $I_E = 10 \mu\text{Adc}, I_C = 0$ )         | $V_{(BR)EBO}$ |     |     | Vdc             |
|   |               | 6.0 | —   |                 |
| Collector Cutoff Current<br>( $V_{CB} = 100\text{Vdc}, I_E = 0$ )               | $I_{CBO}$     |     |     | 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<br>( $V_{BE} = 4.0\text{Vdc}, I_C = 0$ )                 | $I_{EBO}$     |     |     | nAdc            |
|   |               | —   | 50  |                 |

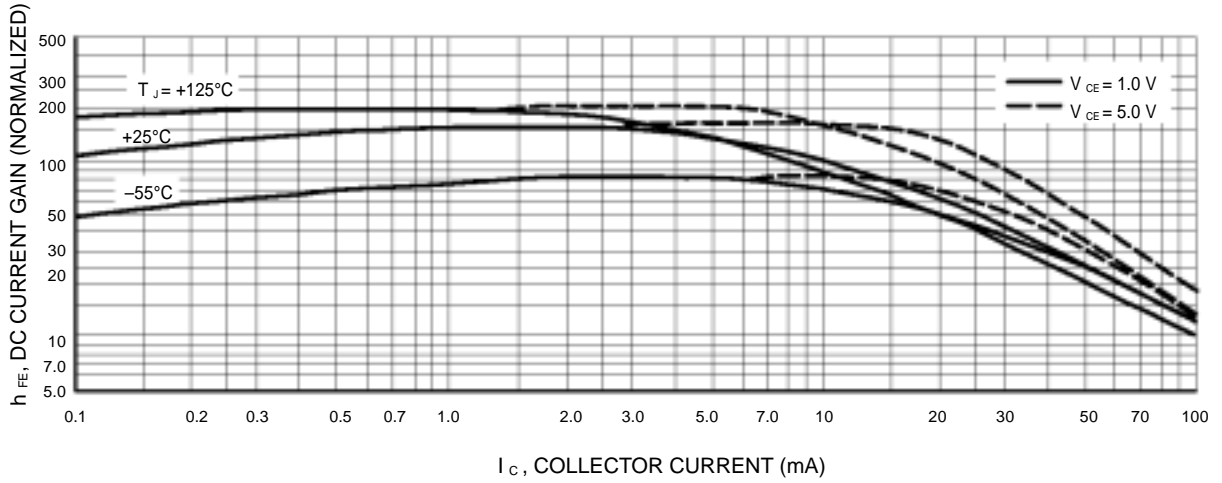
1. FR-5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
3. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2.0%.

**LMBT5550LT1 LMBT5551LT1**

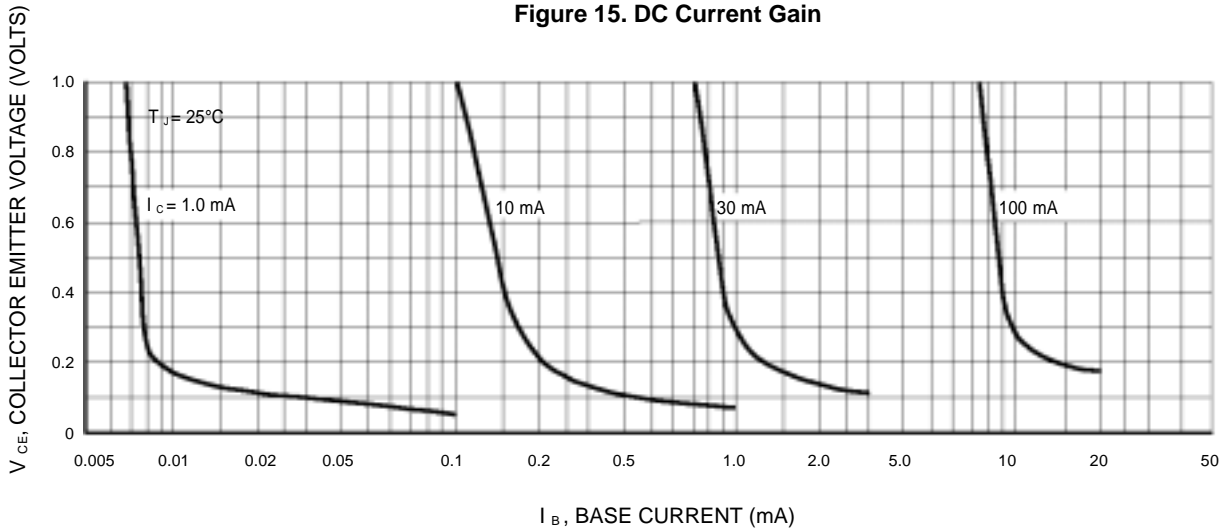
**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

| Characteristic  | Symbol               | Min | Max  | Unit            |
|---|----------------------|-----|------|-----------------|
| <b>ON CHARACTERISTICS</b>   |                      |     |      |                 |
| DC Current Gain<br>(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<br>(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 | V <sub>dc</sub> |
| (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 | V <sub>dc</sub> |
| LMBT5550  |                      | —   | 0.20 | V <sub>dc</sub> |
| LMBT5551  | —                    | —   | —    | —               |
| Base–Emitter Saturation Voltage<br>(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  | V <sub>dc</sub> |
| (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  | V <sub>dc</sub> |
| LMBT5550  |                      | —   | 1.0  | V <sub>dc</sub> |
| LMBT5551  | —                    | —   | —    | —               |

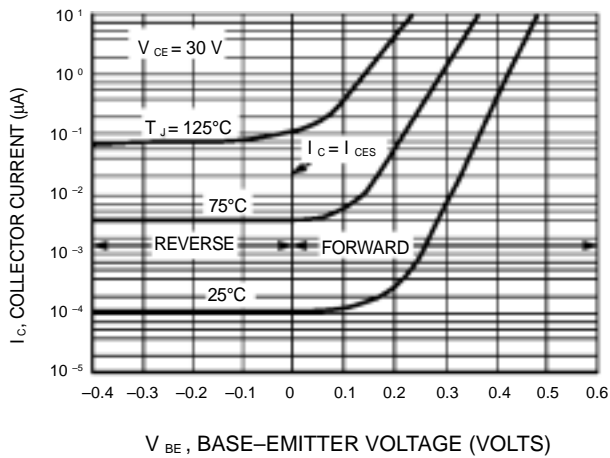
**LMBT5550LT1 LMBT5551LT1**



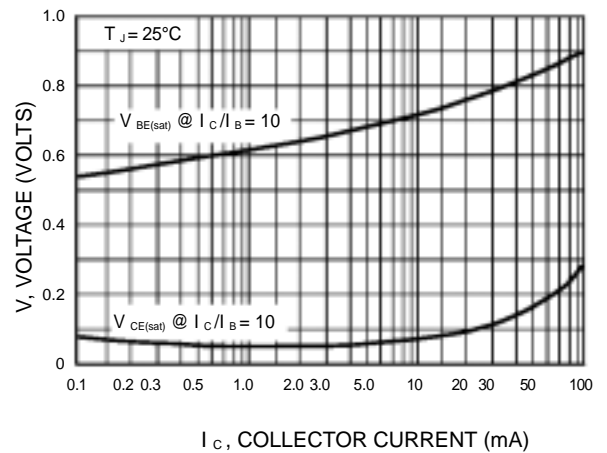
**Figure 15. DC Current Gain**



**Figure 16. Collector Saturation Region**

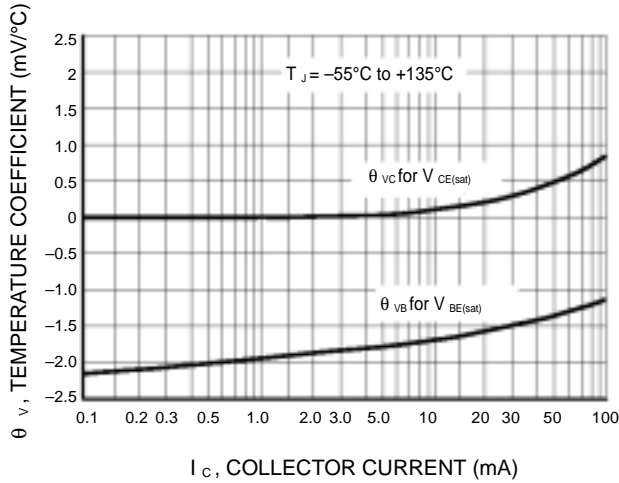


**Figure 3. Collector Cut-Off Region**

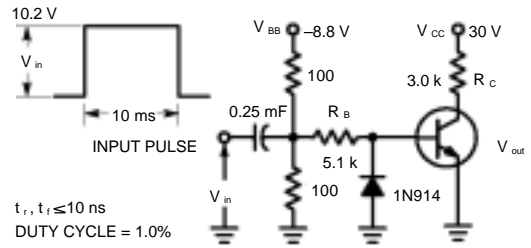


**Figure 4. "On" Voltages**

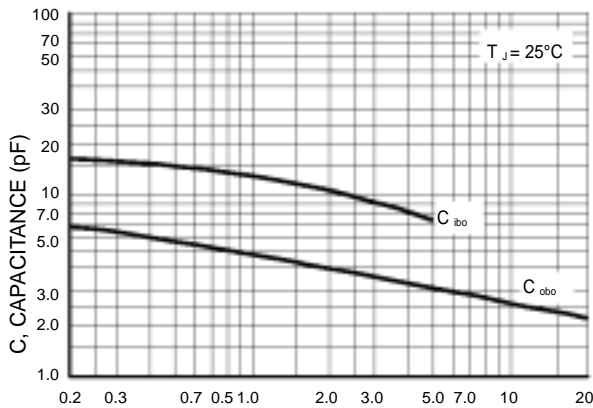
**LMBT5550LT1 LMBT5551LT1**



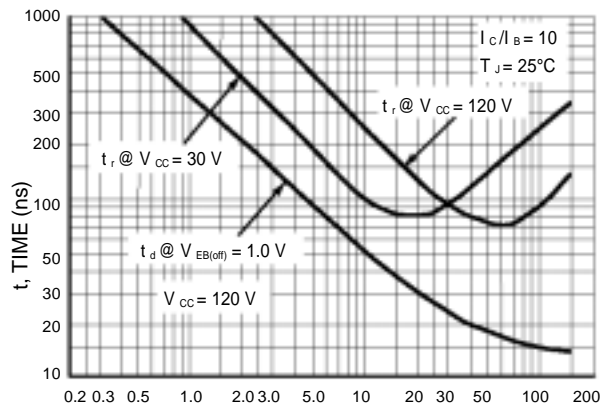
**Figure 5. Temperature Coefficients**



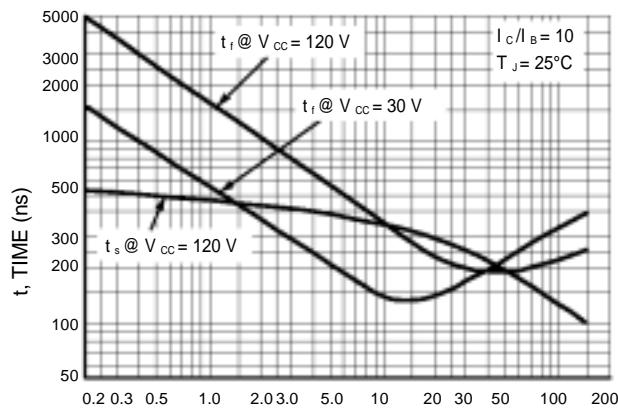
Values Shown are for  $I_c @ 10 \text{ mA}$   
**Figure 6. Switching Time Test Circuit**



**Figure 7. Capacitances Figure**



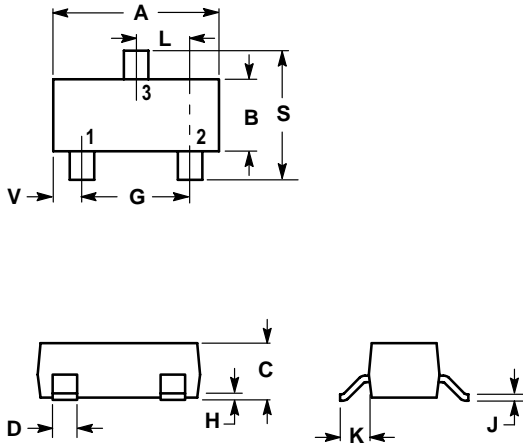
**8. Turn-On Time**



**Figure 9. Turn-Off Time**

**LMBT5550LT1 LMBT5551LT1**

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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  |

- PIN 1. BASE  
 2. EMITTER  
 3. COLLECTOR

