

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 |

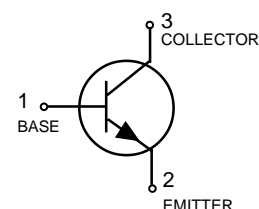
LMBT5550LT1
LMBT5551LT1



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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°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°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) ($I_C = 1.0 \text{ mAdc}, I_E = 0$) | $V_{(BR)CEO}$ | | | 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 | | | μAdc |
| ($V_{CB} = 120\text{Vdc}, I_E = 0, T_A = 100^\circ\text{C}$) | LMBT5551 | | | μAdc |
| 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 μs , Duty Cycle = 2.0%.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

| Characteristic | Symbol | Min | Max | Unit |
|---|----------------------|------------|------|-----------------|
| ON CHARACTERISTICS | | | | |
| DC Current Gain (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc}) | h _{FE} | 60 | — | — |
| | | LMBT5550 | 80 | — |
| (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc}) | h _{FE} | 60 | 250 | — |
| | | LMBT5550 | 80 | 250 |
| (I _C = 50 mA _{dc} , V _{CE} = 5.0V _{dc}) | h _{FE} | 20 | — | — |
| | | LMBT5550 | 30 | — |
| | LMBT5551 | 30 | — | — |
| Collector–Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}) | V _{CE(sat)} | — | 0.15 | V _{dc} |
| | | Both Types | — | 0.15 |
| (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc}) | V _{CE(sat)} | — | 0.25 | V _{dc} |
| | | LMBT5550 | — | 0.25 |
| | LMBT5551 | — | 0.20 | V _{dc} |
| Base–Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}) | V _{BE(sat)} | — | 1.0 | V _{dc} |
| | | Both Types | — | 1.0 |
| (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc}) | V _{BE(sat)} | — | 1.2 | V _{dc} |
| | | LMBT5550 | — | 1.2 |
| | LMBT5551 | — | 1.0 | V _{dc} |

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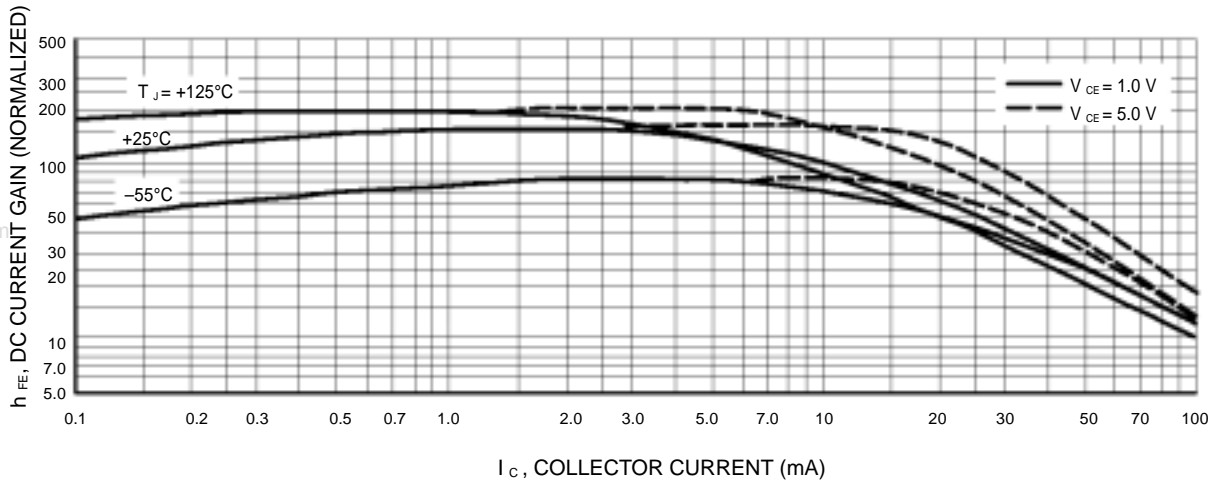


Figure 15. DC Current Gain

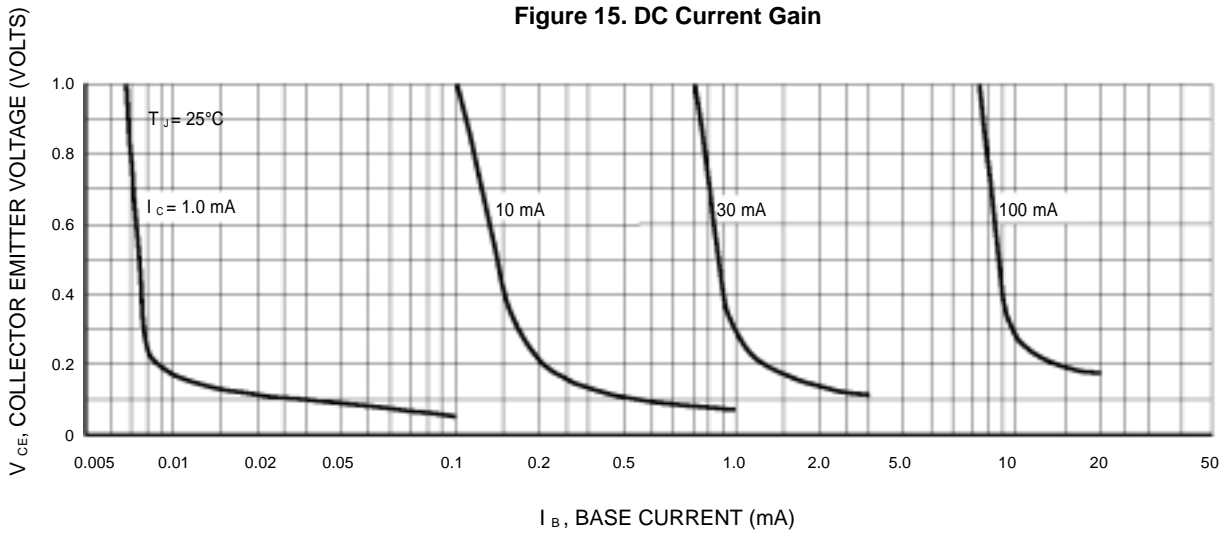


Figure 16. Collector Saturation Region

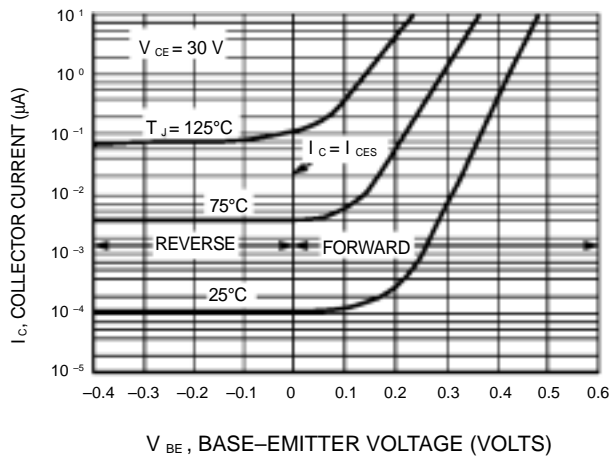


Figure 3. Collector Cut-Off Region

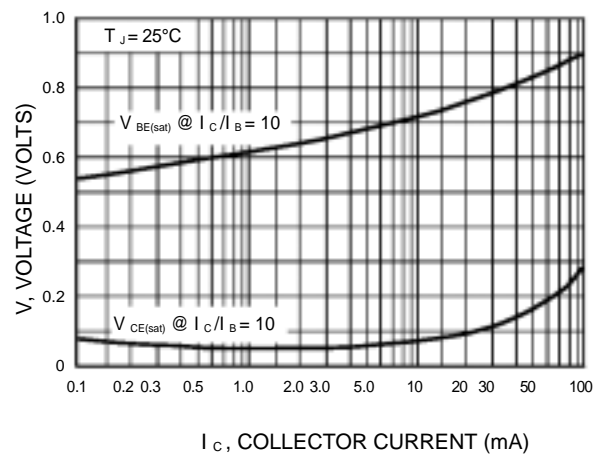


Figure 4. "On" Voltages

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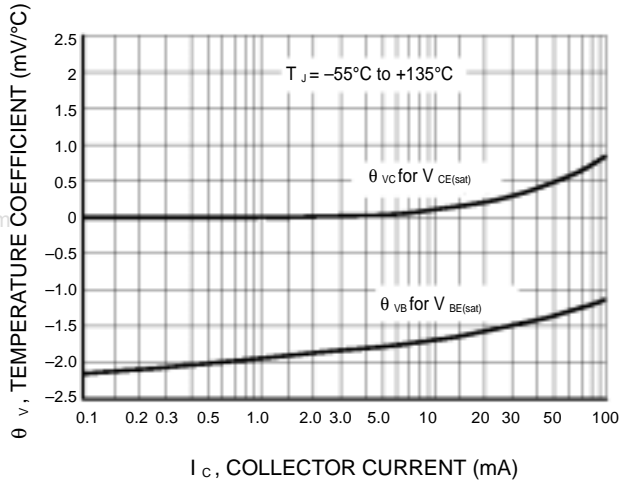
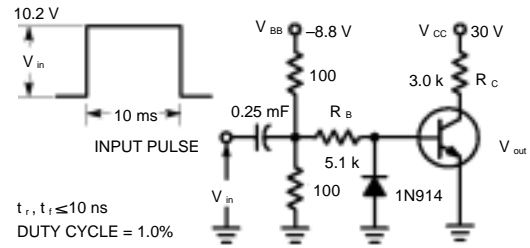


Figure 5. Temperature Coefficients



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

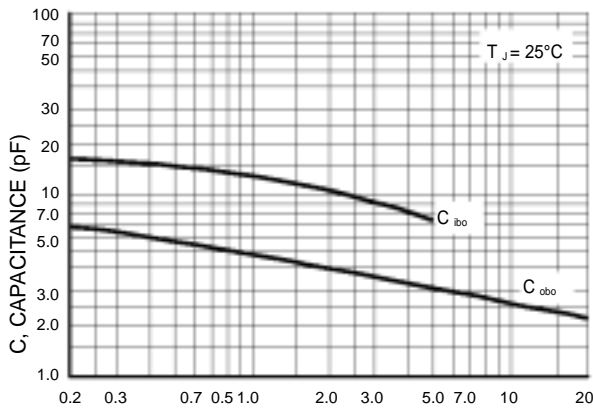
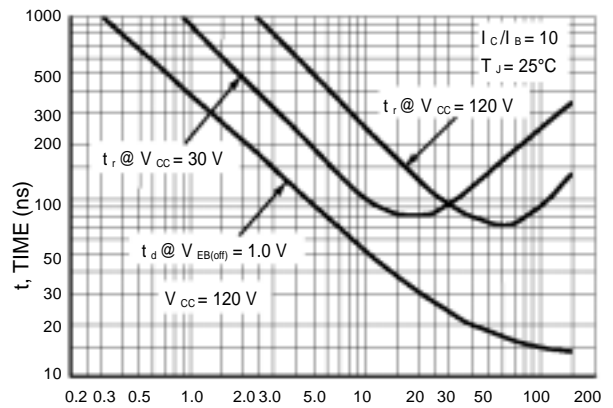


Figure 7. Capacitances Figure



8. Turn-On Time

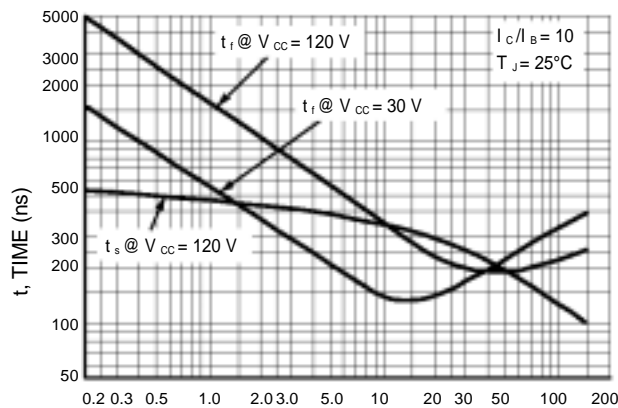


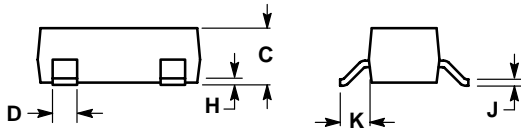
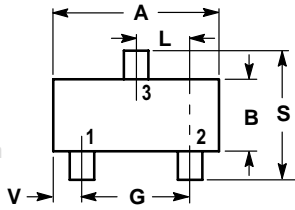
Figure 9. Turn-Off Time

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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

