

# MMBT5550LT1, MMBT5551LT1

MMBT5551LT1 is a Preferred Device

## High Voltage Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available

#### MAXIMUM RATINGS

Rating	Symbol	5550	5551	Unit
Collector-Emitter Voltage	$V_{CEO}$	140	160	Vdc
Collector-Base Voltage	$V_{CBO}$	160	180	Vdc
Emitter-Base Voltage	$V_{EBO}$	6.0		Vdc
Collector Current - Continuous	$I_C$	600		mAdc

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

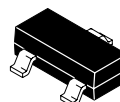
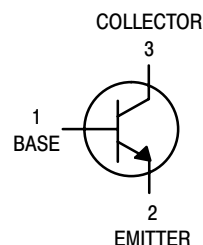
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	225	mW
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate (Note 2) $T_A = 25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	300	mW
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	$^\circ\text{C}$

- FR-5 =  $1.0 \times 0.75 \times 0.062$  in.
- Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.



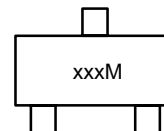
ON Semiconductor®

<http://onsemi.com>



SOT-23 (TO-236)  
CASE 318  
STYLE 6

#### MARKING DIAGRAM



xxx = MMBT5550LT1 = M1F,  
MMBT5551LT1, LT3, LT1G = G1  
M = Month Code

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MMBT5550LT1	SOT-23	3000 Tape & Reel
MMBT5550LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel
MMBT5551LT1	SOT-23	3000 Tape & Reel
MMBT5551LT1G	SOT-23 (Pb-Free)	3000 Tape & Reel
MMBT5551LT3	SOT-23	10,000 Tape & Reel
MMBT5551LT3G	SOT-23 (Pb-Free)	10,000 Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

**Preferred** devices are recommended choices for future use and best overall value.

# MMBT5550LT1, MMBT5551LT1

## 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) ( $I_C = 1.0\text{ mA}$ , $I_B = 0$ )	MMBT5550 MMBT5551	$V_{(BR)CEO}$	140 160	– –	Vdc
Collector – Base Breakdown Voltage ( $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ )	MMBT5550 MMBT5551	$V_{(BR)CBO}$	160 180	– –	Vdc
Emitter – Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )		$V_{(BR)EBO}$	6.0	–	Vdc
Collector Cutoff Current ( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 120\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$ ) ( $V_{CB} = 120\text{ Vdc}$ , $I_E = 0$ , $T_A = 100^\circ\text{C}$ )	MMBT5550 MMBT5551 MMBT5550 MMBT5551	$I_{CBO}$	– – – –	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 ( $I_C = 1.0\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )  ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )  ( $I_C = 50\text{ mA}$ , $V_{CE} = 5.0\text{ Vdc}$ )	MMBT5550 MMBT5551 MMBT5550 MMBT5551 MMBT5550 MMBT5551	$h_{FE}$	60 80 60 80 20 30	– – 250 250 – –	–
Collector – Emitter Saturation Voltage ( $I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$ ) ( $I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$ )	Both Types MMBT5550 MMBT5551	$V_{CE(sat)}$	– – –	0.15 0.25 0.20	Vdc
Base – Emitter Saturation Voltage ( $I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$ ) ( $I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$ )	Both Types MMBT5550 MMBT5551	$V_{BE(sat)}$	– – –	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

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

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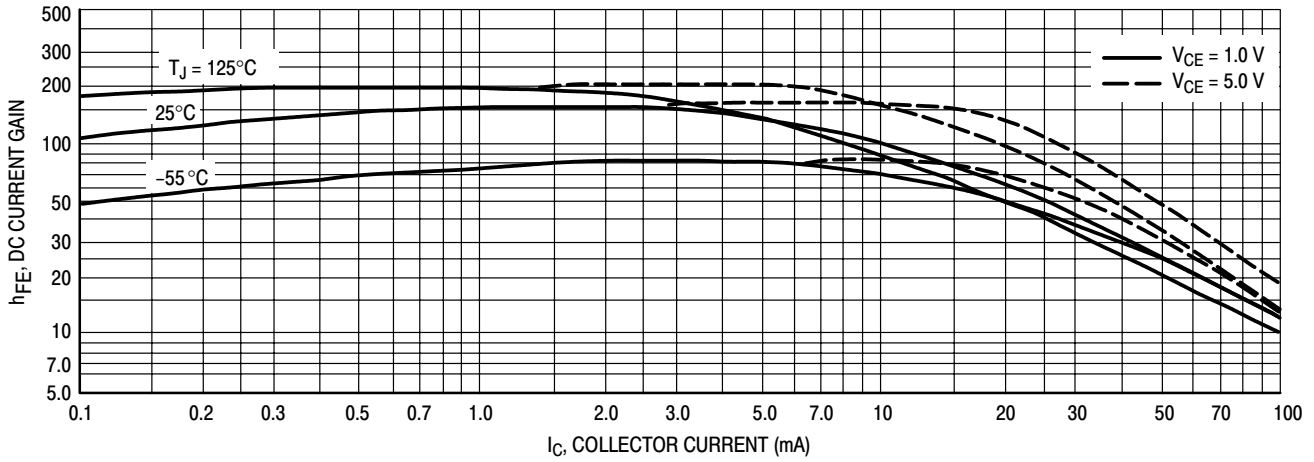


Figure 1. DC Current Gain

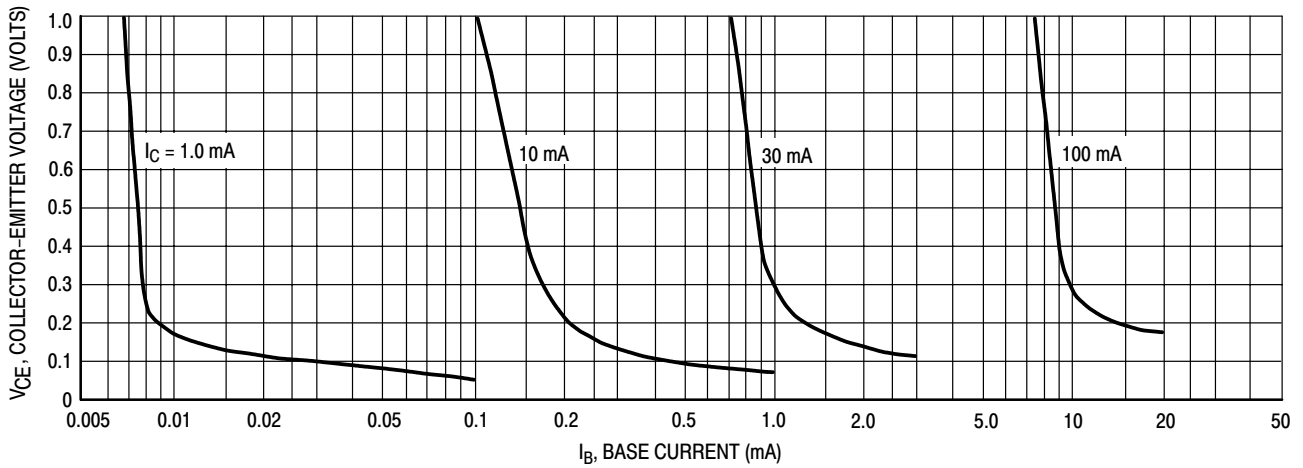


Figure 2. Collector Saturation Region

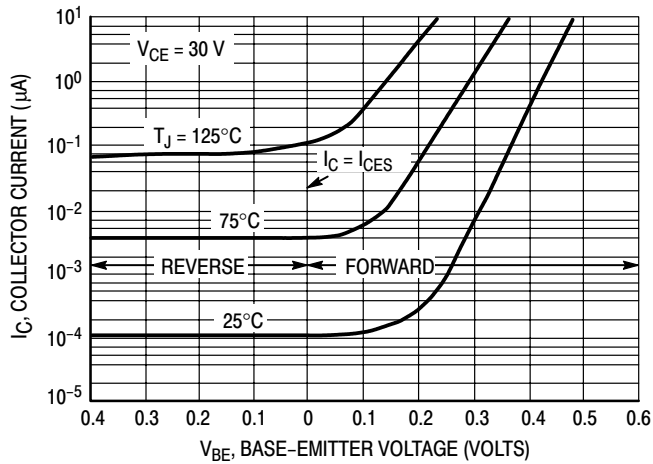


Figure 3. Collector Cut-Off Region

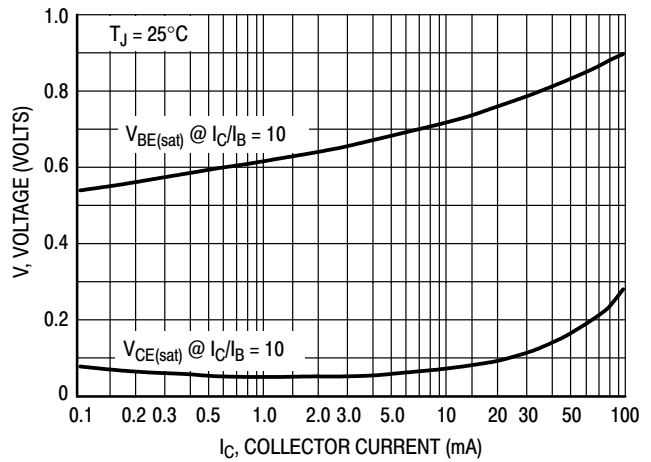


Figure 4. "On" Voltages

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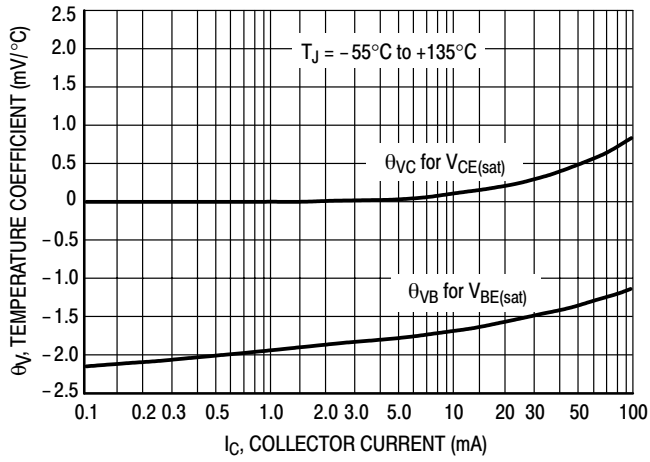
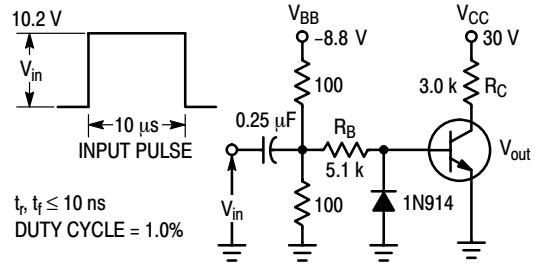


Figure 5. Temperature Coefficients



Values Shown are for  $I_C @ 10$  mA

Figure 6. Switching Time Test Circuit

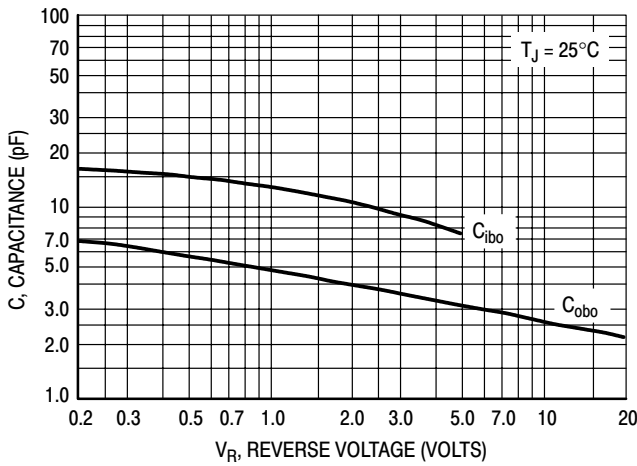


Figure 7. Capacitances

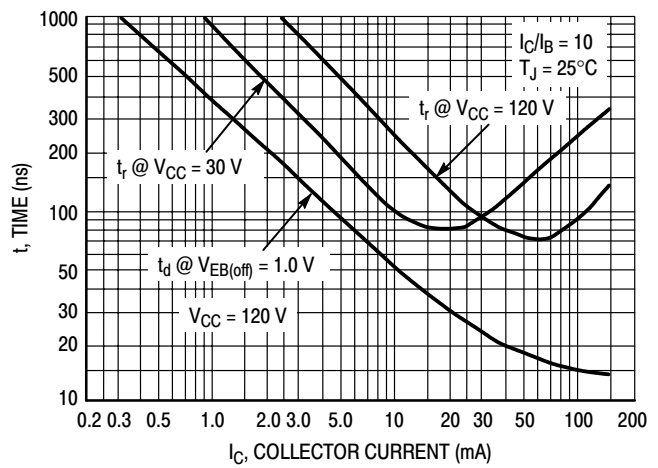


Figure 8. Turn-On Time

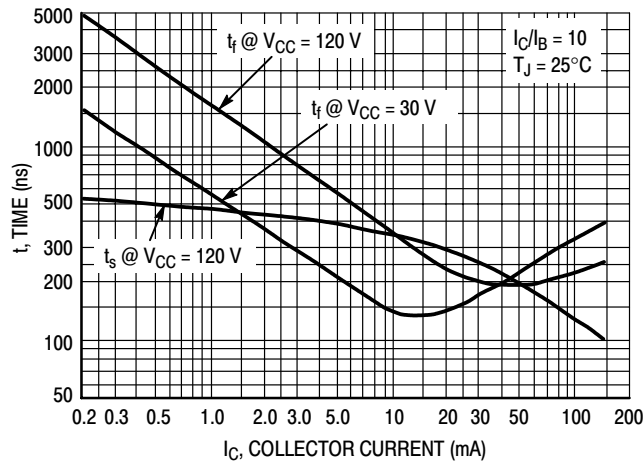
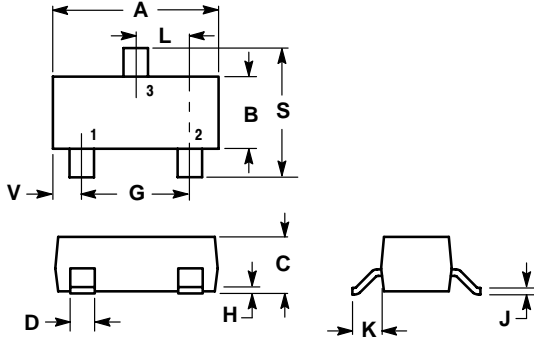


Figure 9. Turn-Off Time

# MMBT5550LT1, MMBT5551LT1

## PACKAGE DIMENSIONS

SOT-23-3 (TO-236)  
CASE 318-08  
ISSUE AK

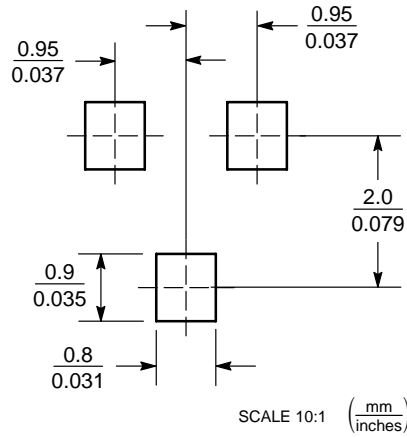


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
  4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

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


- STYLE 6:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

## SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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