

MMBT5550LT1, MMBT5551LT1

Preferred Device

High Voltage Transistors

NPN Silicon

Features

- Pb-Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage MMBT5550 MMBT5551	V_{CEO}	140 160	Vdc
Collector - Base Voltage MMBT5550 MMBT5551	V_{CBO}	160 180	Vdc
Emitter - Base Voltage	V_{EBO}	6.0	Vdc
Collector Current - Continuous	I_C	60	mAdc
Electrostatic Discharge Human Body Model Machine Model	ESD	> 8000 > 400	V

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (Note 1) @ $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate (Note 2) @ $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	300 2.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

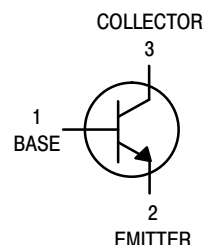
1. FR-5 = $1.0 \times 0.75 \times 0.062$ in.

2. Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.



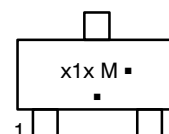
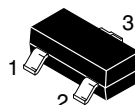
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MARKING DIAGRAM

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



x1x = Device Code
M1F = MMBT5550LT
G1 = MMBT5551LT

M = Date Code*
■ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping†
MMBT5550LT1	SOT-23	3,000 / Tape & Reel
MMBT5550LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBT5551LT1	SOT-23	3,000 / Tape & Reel
MMBT5551LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBT5551LT3	SOT-23	10,000/Tape & Reel
MMBT5551LT3G	SOT-23 (Pb-Free)	10,000/Tape & Reel

†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.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Breakdown Voltage (Note 3) ($I_C = 1.0\text{ mA}$, $I_E = 0$)	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 μAdc
Emitter Cutoff Current ($V_{EB} = 4.0\text{ Vdc}$, $I_C = 0$)		I_{EBO}	-	50	nAdc
ON CHARACTERISTICS					
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 μs , Duty Cycle = 2.0%.

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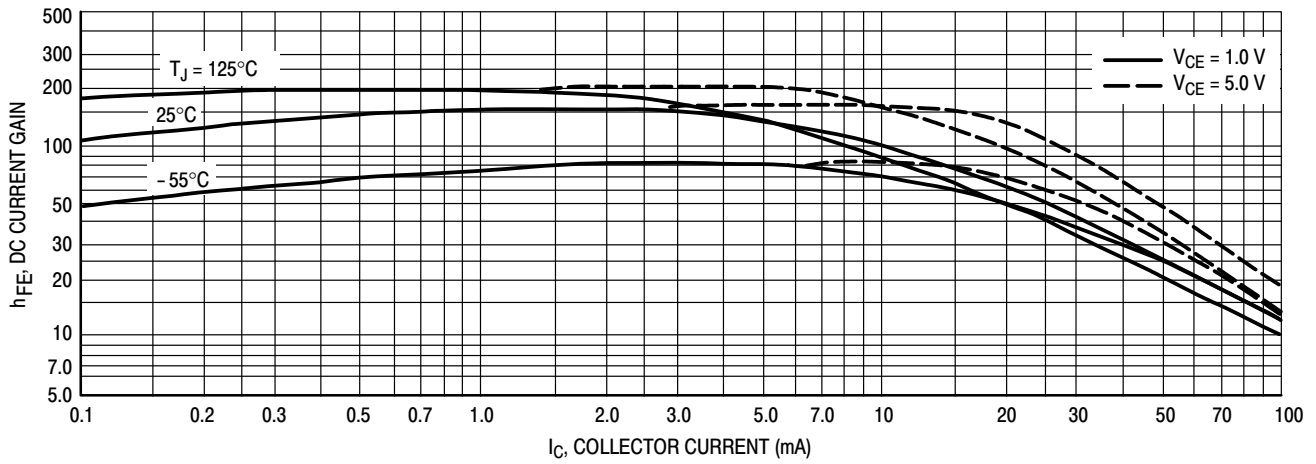


Figure 1. DC Current Gain

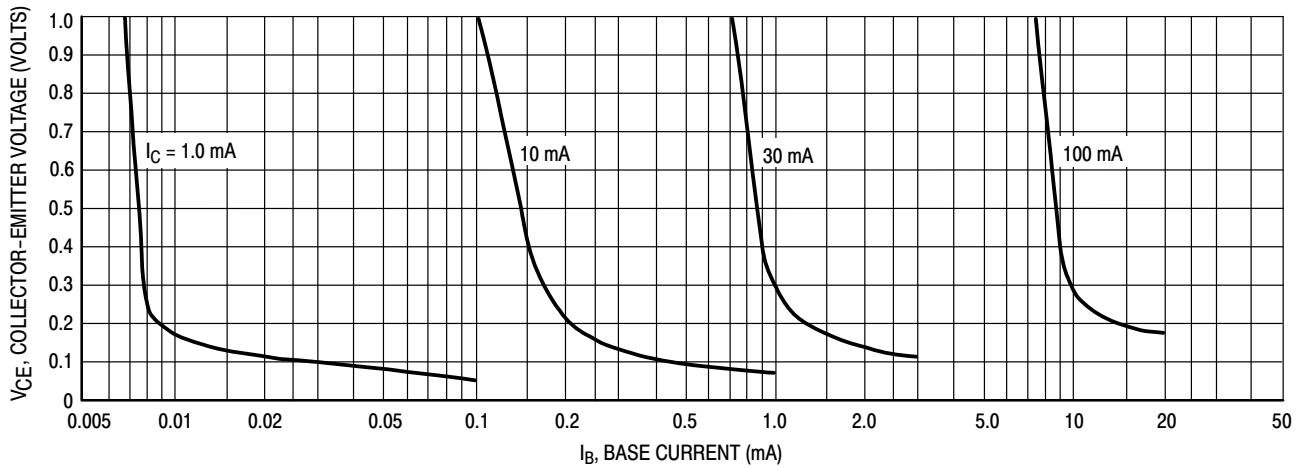


Figure 2. Collector Saturation Region

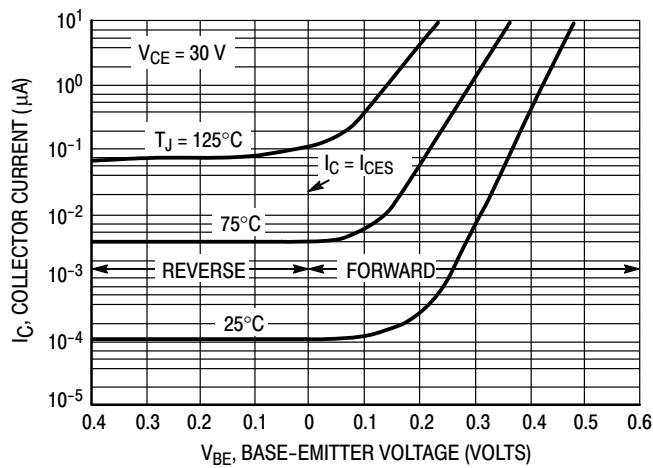


Figure 3. Collector Cut-Off Region

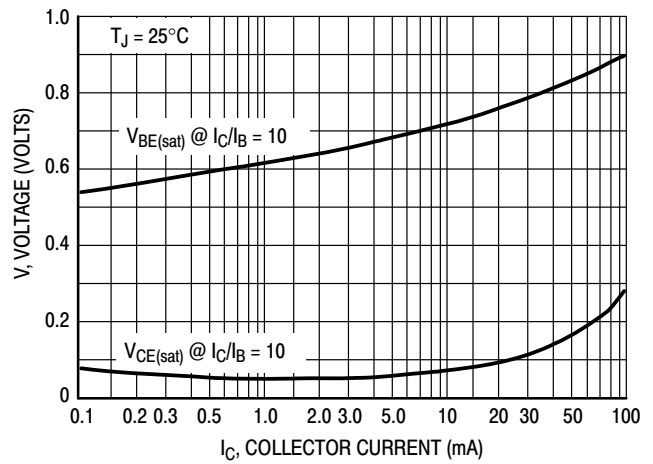


Figure 4. "On" Voltages

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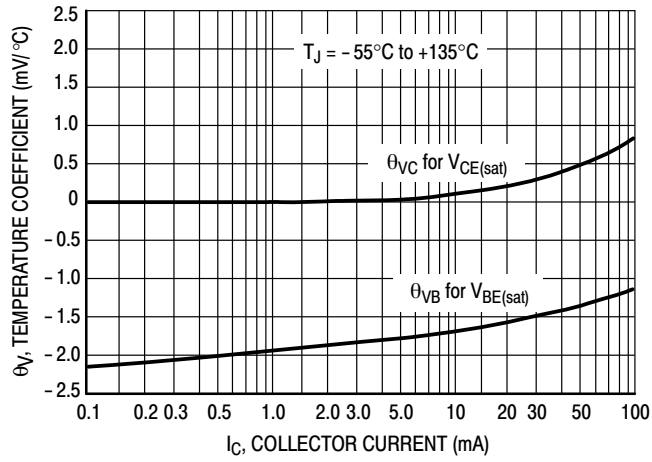
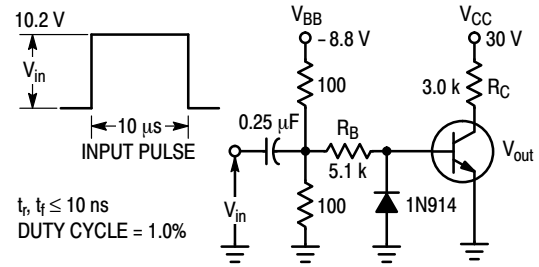


Figure 5. Temperature Coefficients



Values Shown are for I_C @ 10 mA

Figure 6. Switching Time Test Circuit

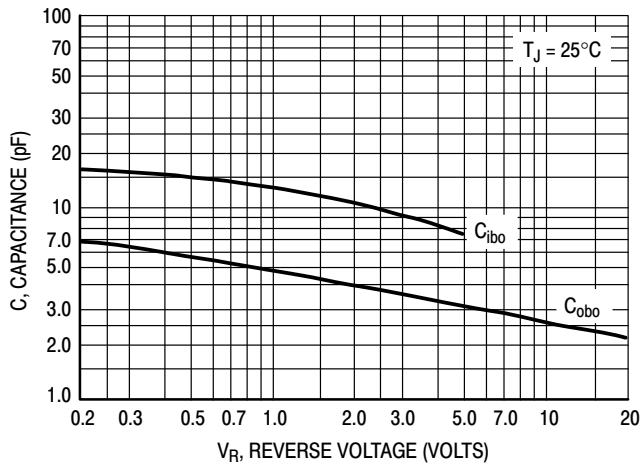


Figure 7. Capacitances

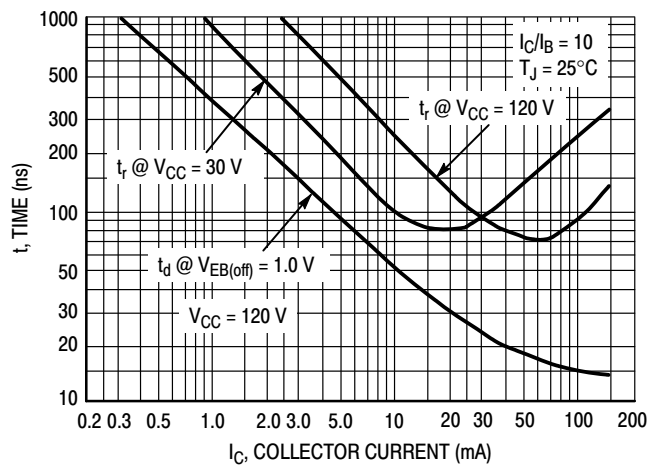


Figure 8. Turn-On Time

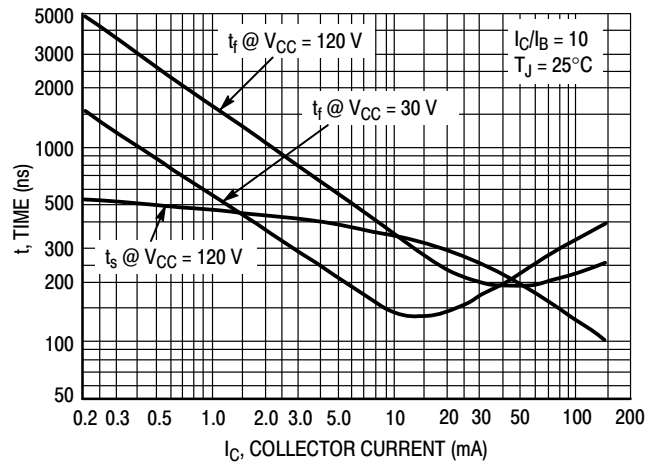
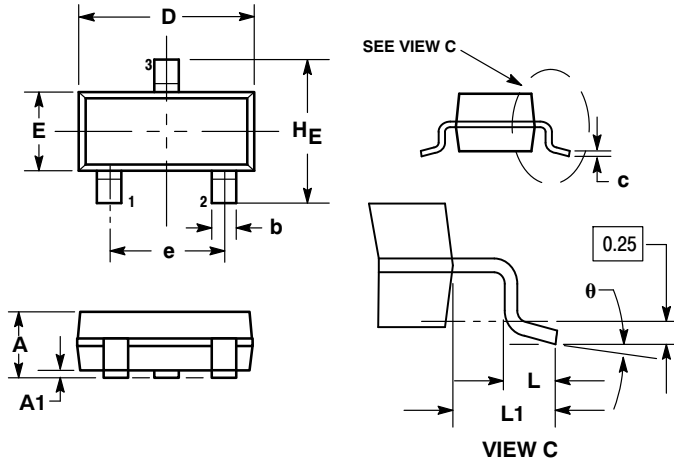


Figure 9. Turn-Off Time

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PACKAGE DIMENSIONS

SOT-23 (TO-236)
CASE 318-08
ISSUE AN

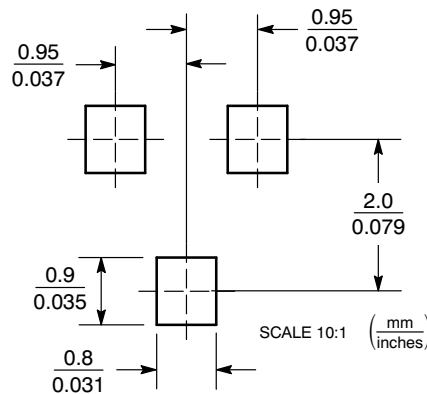


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
 4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104

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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