MMBT5550LT1, MMBT5551LT1

Preferred Device

High Voltage Transistors

NPN Silicon

ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available

MAXIMUM RATINGS

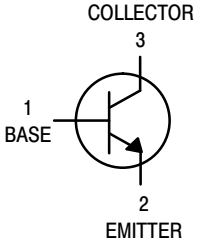
Rating	Symbol	Value	Unit
Collector − Emitter Voltage MMBT5550 MMBT5551	V_{CEO}	 140 160	Vdc
Collector − Base Voltage MMBT5550 MMBT5551	V_{CBO}	 160 180	Vdc
Emitter − Base Voltage	V_{EBO}	6.0	Vdc
Collector Current − Continuous	I_C	60	mAdc
Electrostatic Discharge Human Body Model Machine Model	ESD	 > 8000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

THERMAL CHARACTERISTICS

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

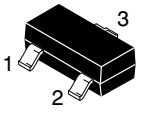
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

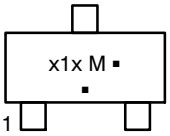
1. FR−5 = 1.0 × 0.75 × 0.062 in.
2. Alumina = 0.4 × 0.3 × 0.024 in. 99.5% alumina.



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.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (Note 3)		$V_{(BR)CEO}$			Vdc
(I_C = 1.0 mAdc, I_B = 0)	MMBT5550		140	–	
	MMBT5551		160	–	
Collector – Base Breakdown Voltage		$V_{(BR)CBO}$			Vdc
(I_C = 100 μAdc, I_E = 0)	MMBT5550		160	–	
	MMBT5551		180	–	
Emitter – Base Breakdown Voltage		$V_{(BR)EBO}$			Vdc
(I_E = 10 μAdc, I_C = 0)			6.0	–	
Collector Cutoff Current		I_{CBO}			
(V_{CB} = 100 Vdc, I_E = 0)	MMBT5550		–	100	nAdc
(V_{CB} = 120 Vdc, I_E = 0)	MMBT5551		–	50	
(V_{CB} = 100 Vdc, I_E = 0, T_A = 100°C)	MMBT5550		–	100	μAdc
(V_{CB} = 120 Vdc, I_E = 0, T_A = 100°C)	MMBT5551		–	50	
Emitter Cutoff Current		I_{EBO}			nAdc
(V_{EB} = 4.0 Vdc, I_C = 0)			–	50	
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			–
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	MMBT5550		60	–	
	MMBT5551		80	–	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	MMBT5550		60	250	
	MMBT5551		80	250	
(I_C = 50 mAdc, V_{CE} = 5.0 Vdc)	MMBT5550		20	–	
	MMBT5551		30	–	
Collector – Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc)	Both Types		–	0.15	
(I_C = 50 mAdc, I_B = 5.0 mAdc)	MMBT5550		–	0.25	
	MMBT5551		–	0.20	
Base – Emitter Saturation Voltage		$V_{BE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc)	Both Types		–	1.0	
(I_C = 50 mAdc, I_B = 5.0 mAdc)	MMBT5550		–	1.2	
	MMBT5551		–	1.0	
Collector Emitter Cut–off		I_{CES}			nA
(V_{CB} = 10 V)	Both Types		–	50	
(V_{CB} = 75 V)			–	100	

3. Pulse Test: Pulse Width = 300 μs, Duty Cycle = 2.0%.

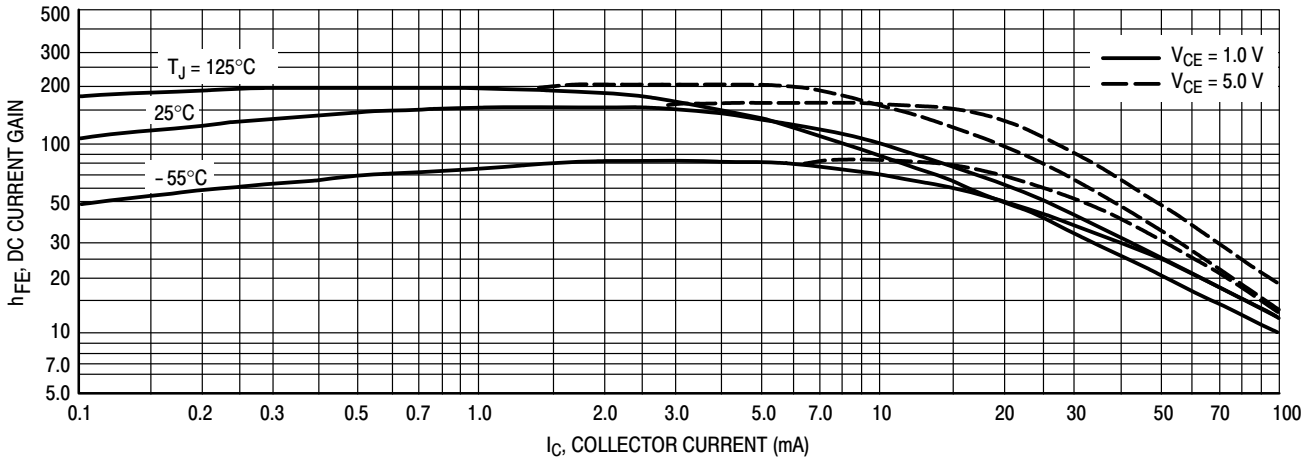


Figure 1. DC Current Gain

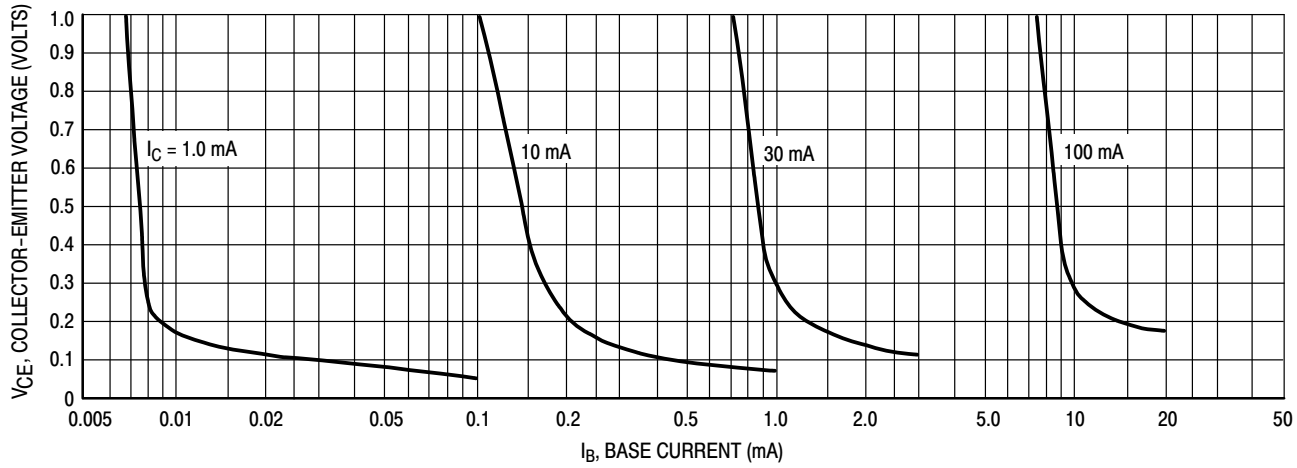


Figure 2. Collector Saturation Region

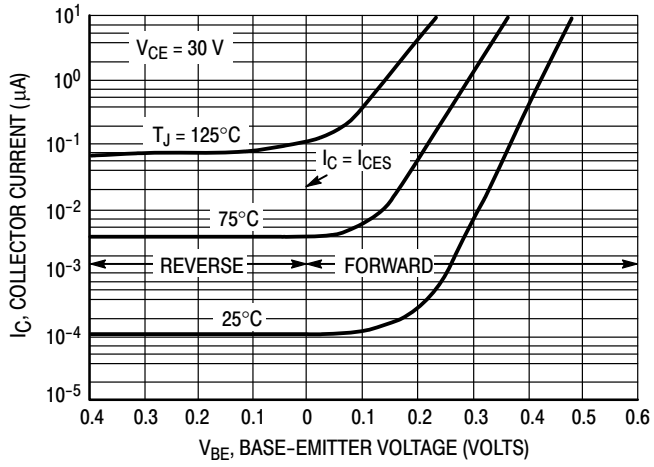


Figure 3. Collector Cut−Off Region

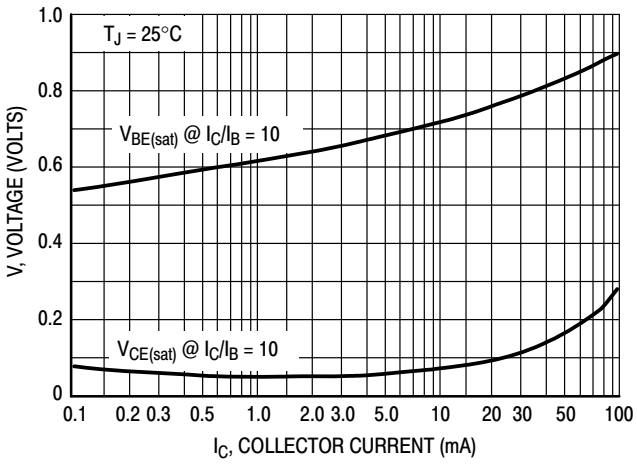


Figure 4. “On” Voltages

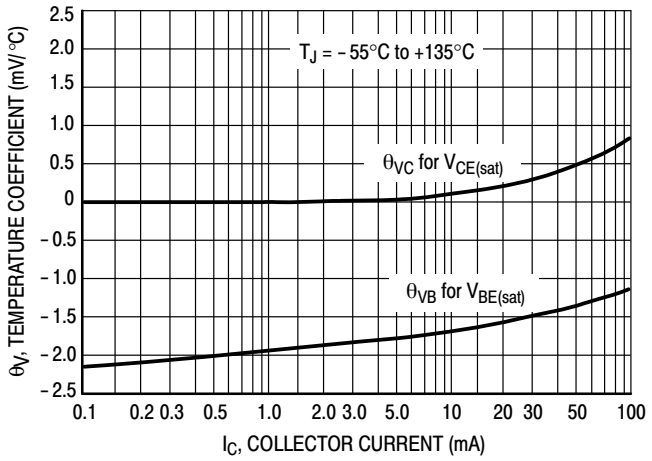
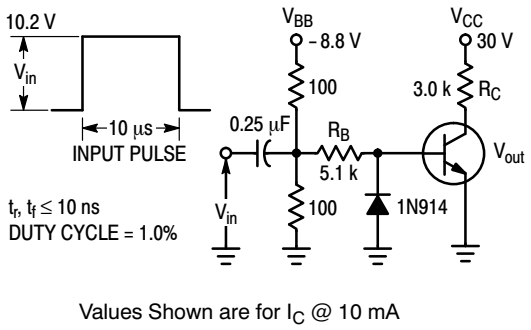


Figure 5. Temperature Coefficients



Values Shown are for I_C @ 10 mA

Figure 6. Switching Time Test Circuit

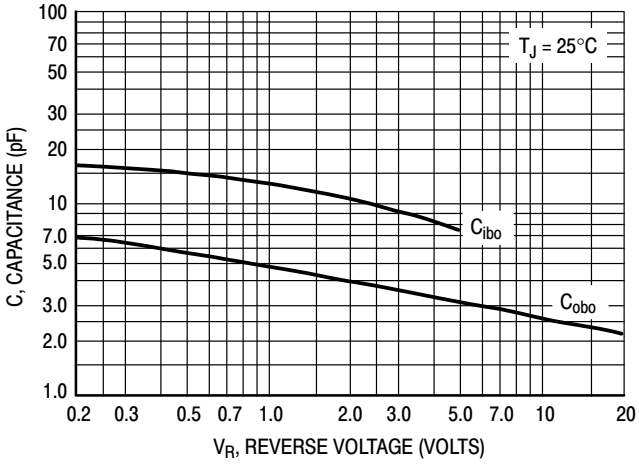


Figure 7. Capacitances

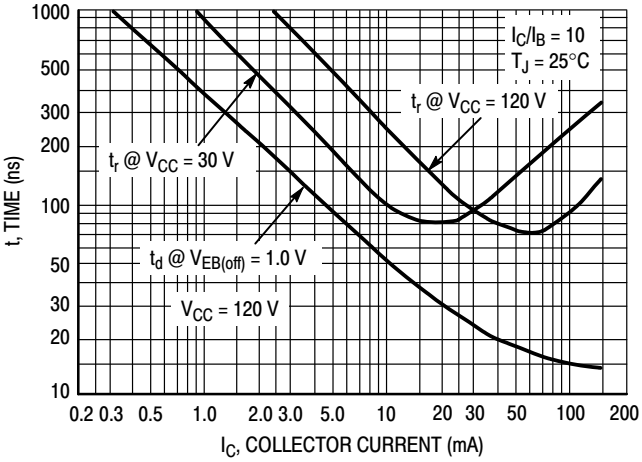


Figure 8. Turn−On Time

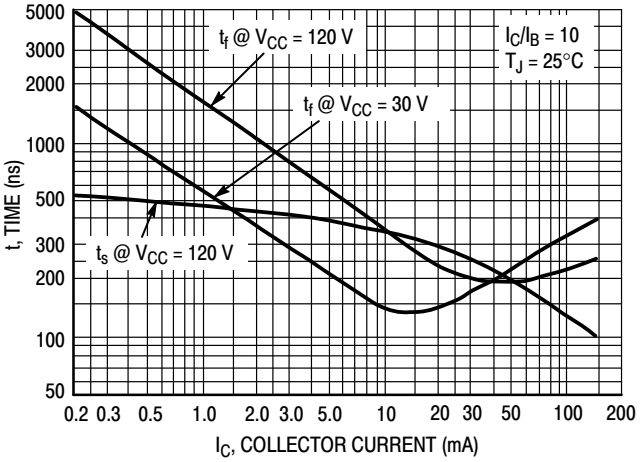
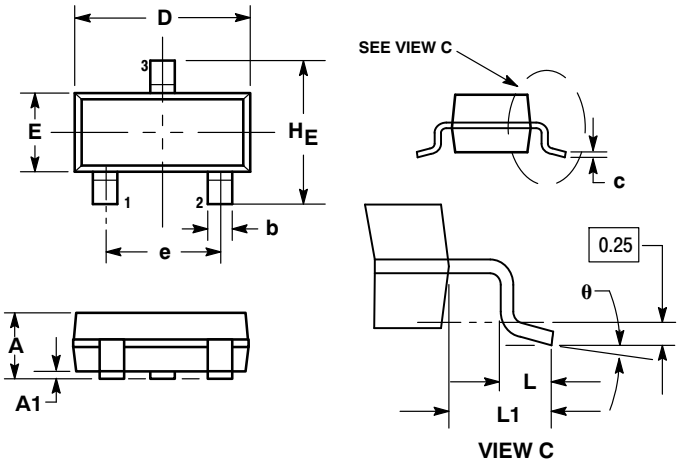


Figure 9. Turn−Off Time

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AN

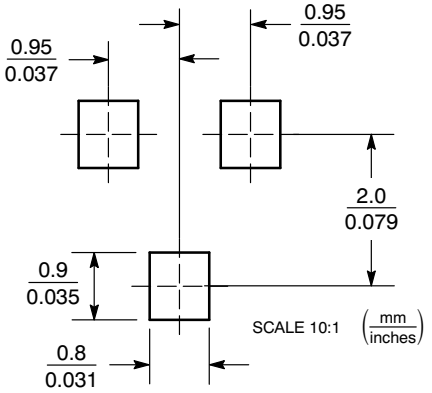


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

	MILLIMETERS			INCHES		
DIM	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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
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