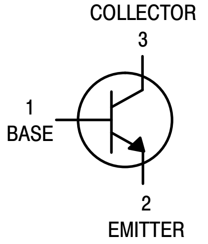
MMBT5550L, MMBT5551L, SMMBT5551L

High Voltage Transistors

NPN Silicon

ON Semiconductor®

http://onsemi.com



Features

- AEC−Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

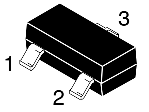
Rating	Symbol	Value	Unit
Collector − Emitter Voltage MMBT5550 MMBT5551, SMMBT5551	V_{CEO}	 140 160	Vdc
Collector − Base Voltage MMBT5550 MMBT5551, SMMBT5551	V_{CBO}	 160 180	Vdc
Emitter − Base Voltage	V_{EBO}	6.0	Vdc
Collector Current − Continuous	I_C	600	mAdc
Electrostatic Discharge Human Body Model 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

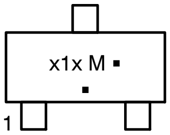
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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



SOT−23 (TO−236)
CASE 318
STYLE 6

MARKING DIAGRAM



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†
MMBT5550LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
MMBT5551LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SMMBT5551LT1G	SOT−23 (Pb−Free)	10,000/Tape & Reel
MMBT5551LT1G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SMMBT5551LT3G	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.

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, SMMBT551		160	–	
Collector – Base Breakdown Voltage	$V_{(BR)CBO}$			Vdc
(I_C = 100 μAdc, I_E = 0) MMBT5550		160	–	
MMBT5551, SMMBT551		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, SMMBT551		–	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, SMMBT551		–	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, SMMBT551		80	–	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc) MMBT5550		60	250	
MMBT5551, SMMBT551		80	250	
(I_C = 50 mAdc, V_{CE} = 5.0 Vdc) MMBT5550		20	–	
MMBT5551, SMMBT551		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, SMMBT551		–	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, SMMBT551		–	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%.

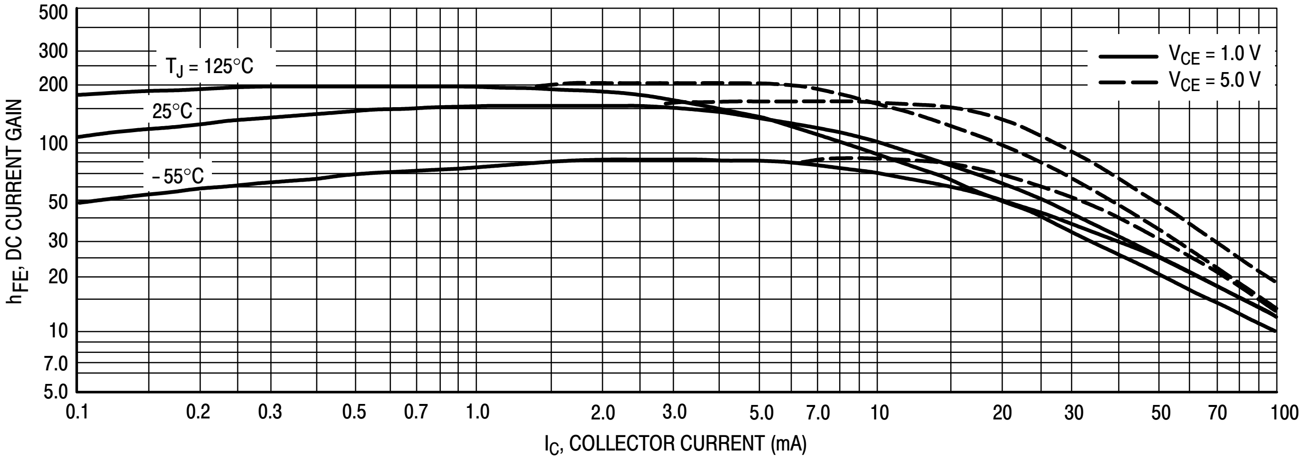


Figure 1. DC Current Gain

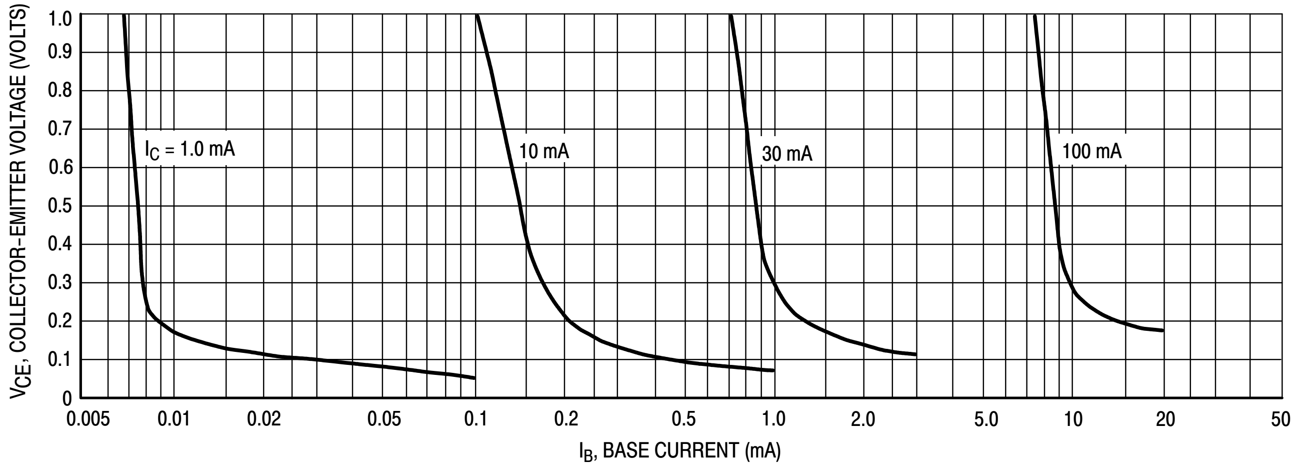


Figure 2. Collector Saturation Region

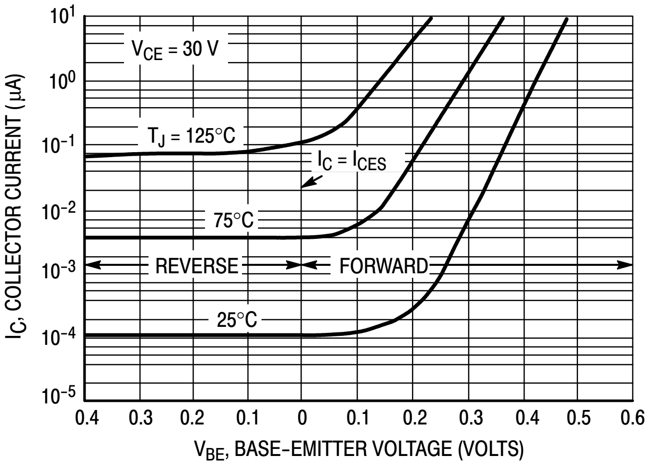


Figure 3. Collector Cut−Off Region

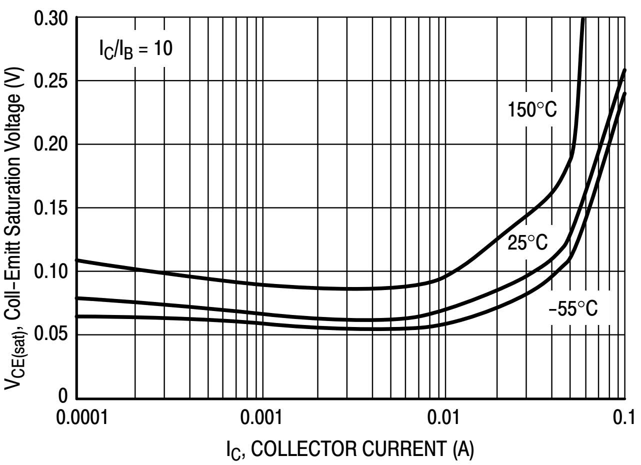


Figure 4. $V_{CE(sat)}$

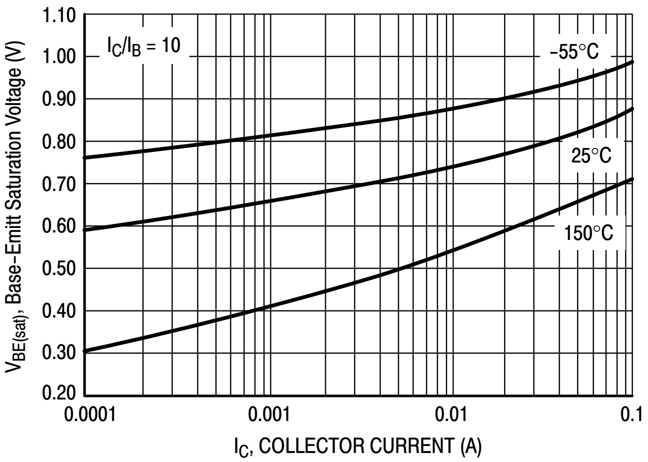


Figure 5. $V_{BE(sat)}$

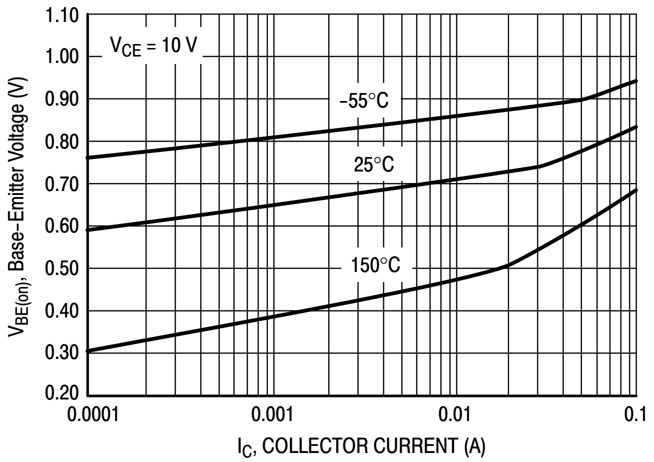


Figure 6. $V_{BE(on)}$

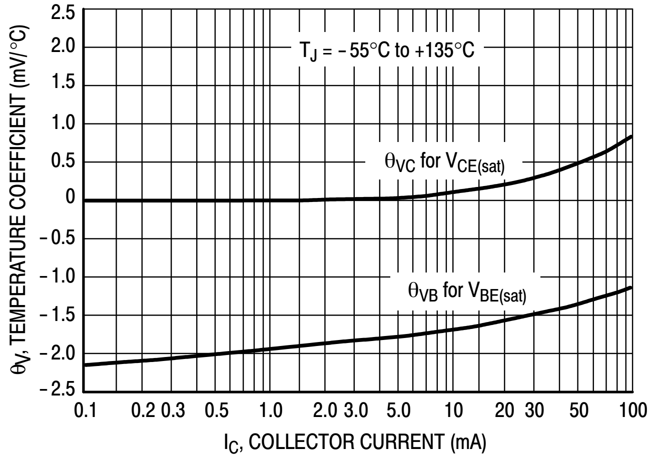


Figure 7. Temperature Coefficients

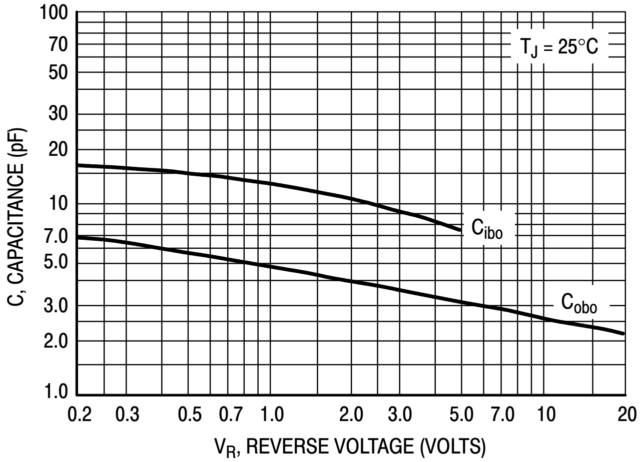
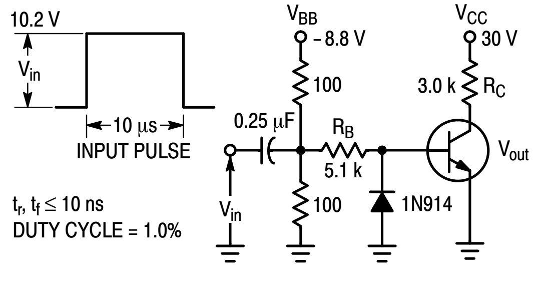


Figure 8. Capacitances



Values Shown are for I_C @ 10 mA

Figure 9. Switching Time Test Circuit

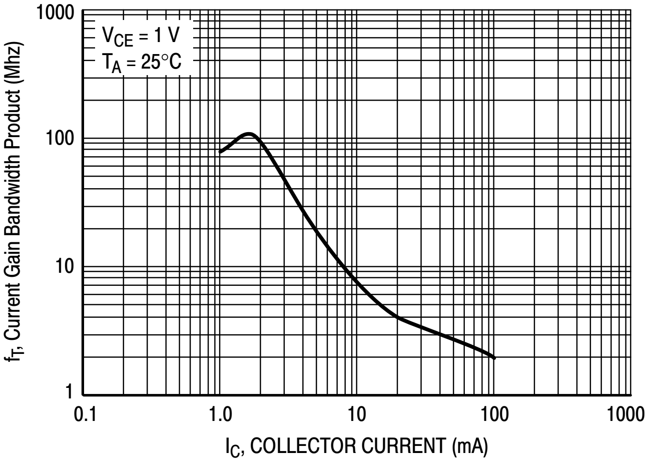


Figure 10. Current Gain Bandwidth Product

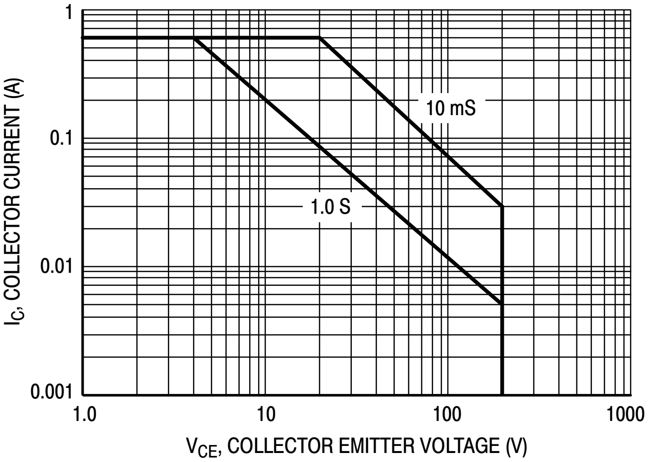


Figure 11. Safe Operating Area

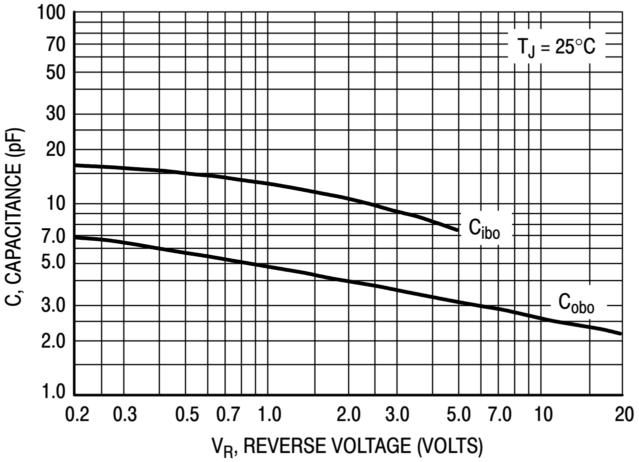


Figure 12. Capacitances

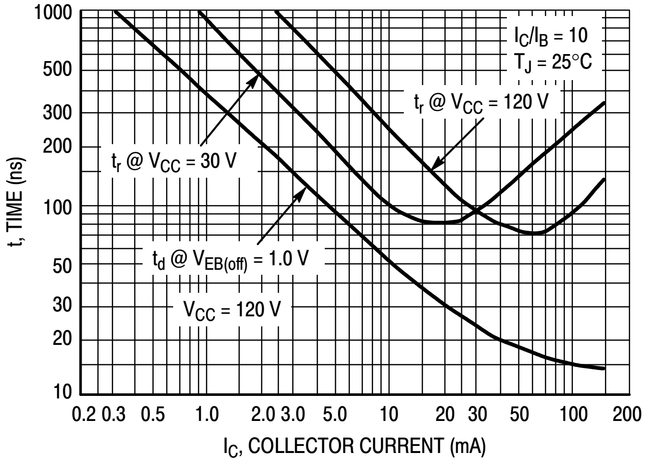
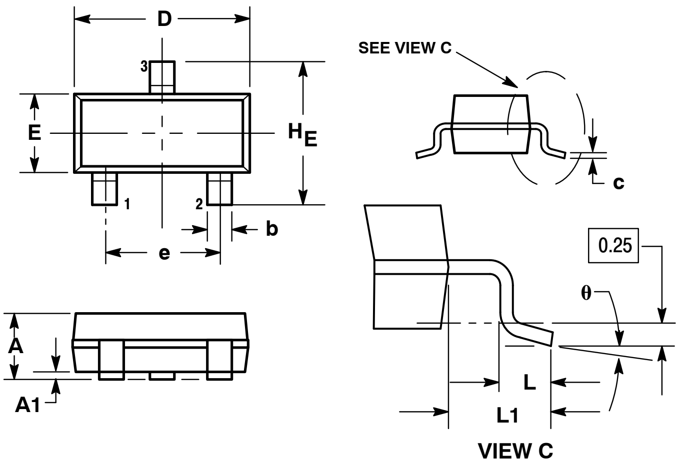


Figure 13. Turn−On Time

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP

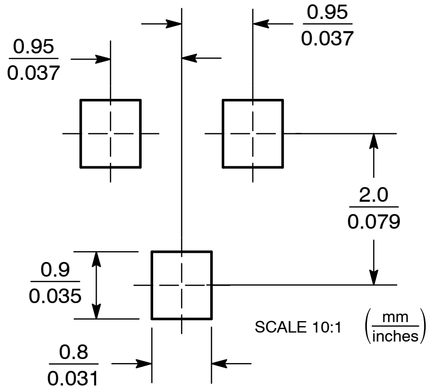


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	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
θ	0°	−−−	10°	0°	−−−	10°

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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Электрон
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