

MMBT5551M3T5G

NPN High Voltage Transistor

The MMBT5551M3T5G device is a spin-off of our popular SOT-23 three-leaded device. It is designed for general purpose high voltage applications and is housed in the SOT-723 surface mount package. This device is ideal for low-power surface mount applications where board space is at a premium.

Features

- Reduces Board Space
- This is a Halide-Free Device
- This is a Pb-Free Device

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	160	Vdc
Collector-Base Voltage	V_{CBO}	180	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	Vdc
Collector Current - Continuous	I_C	60	mA _{dc}

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	265 2.1	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	470	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (Note 2) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	640 5.1	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	195	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

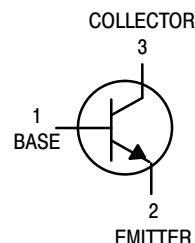
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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.

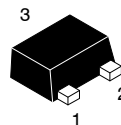


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MARKING DIAGRAM



SOT-723
CASE 631AA
STYLE 1



AH = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
MMBT5551M3T5G	SOT-723 (Pb-Free)	8000/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.

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector – Emitter Breakdown Voltage (Note 3) (I _C = 1.0 mA _{dc} , I _B = 0)	V _{(BR)CEO}	160	–	V _{dc}
Collector – Base Breakdown Voltage (I _C = 100 μA _{dc} , I _E = 0)	V _{(BR)CBO}	180	–	V _{dc}
Emitter – Base Breakdown Voltage (I _E = 10 μA _{dc} , I _C = 0)	V _{(BR)EBO}	6.0	–	V _{dc}
Collector Cutoff Current (V _{CB} = 120 V _{dc} , I _E = 0) (V _{CB} = 120 V _{dc} , I _E = 0, T _A = 100°C)	I _{CBO}	– –	100 100	nA _{dc} μA _{dc}
Emitter Cutoff Current (V _{EB} = 4.0 V _{dc} , I _C = 0)	I _{EBO}	–	50	nA _{dc}
ON CHARACTERISTICS				
DC Current Gain (I _C = 1.0 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc}) (I _C = 50 mA _{dc} , V _{CE} = 5.0 V _{dc})	h _{FE}	80 80 30	– 250 –	–
Collector – Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}) (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc})	V _{CE(sat)}	– –	0.15 0.20	V _{dc}
Base – Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc}) (I _C = 50 mA _{dc} , I _B = 5.0 mA _{dc})	V _{BE(sat)}	– –	1.0 1.0	V _{dc}
Collector Emitter Cut-off (V _{CB} = 10 V) (V _{CB} = 75 V)	I _{CES}	– –	50 100	nA

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

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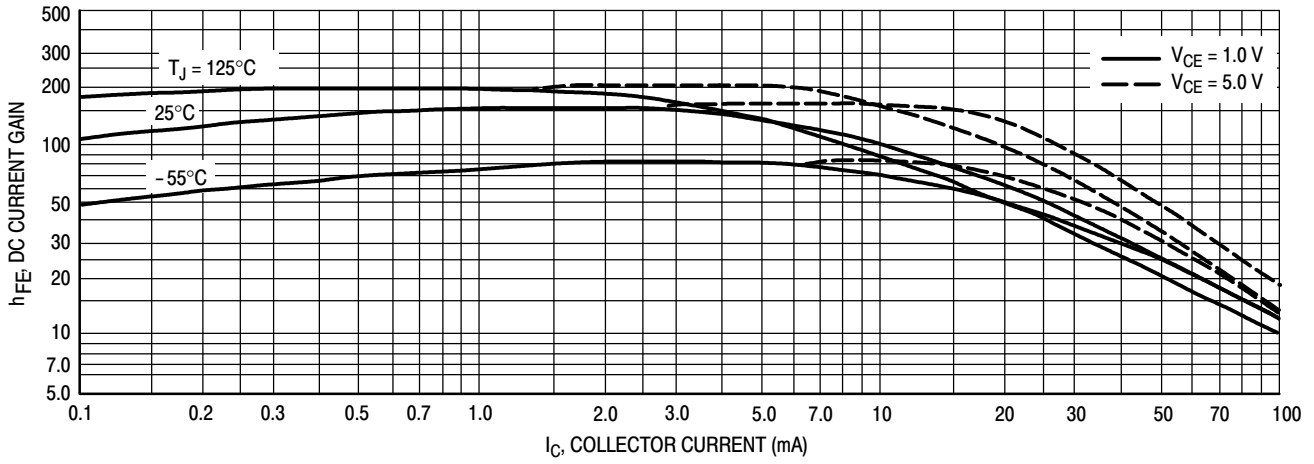


Figure 1. DC Current Gain

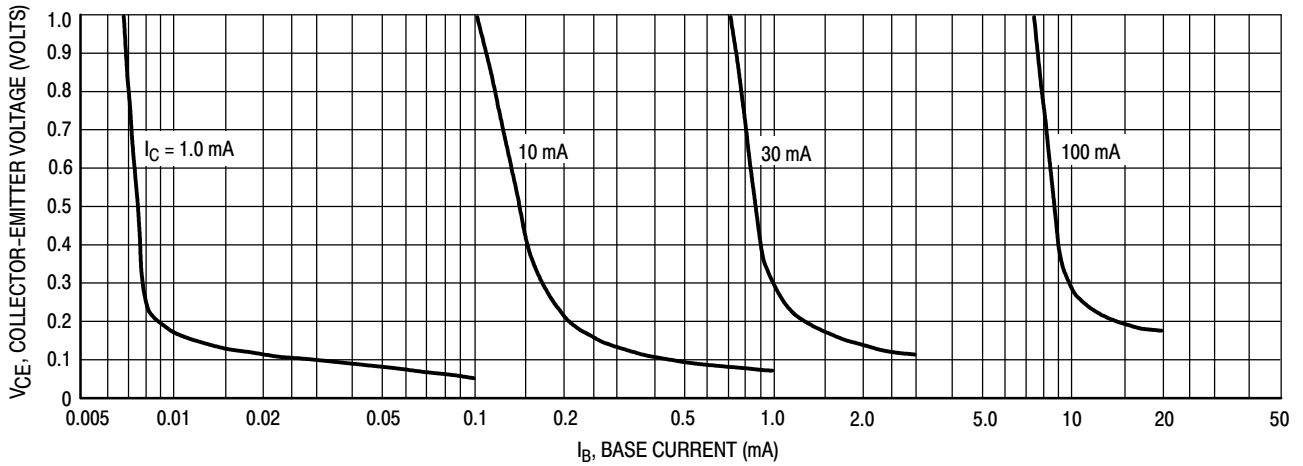


Figure 2. Collector Saturation Region

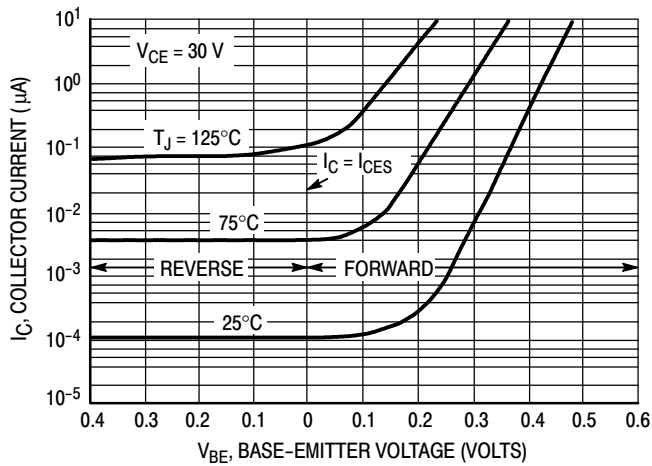


Figure 3. Collector Cut-Off Region

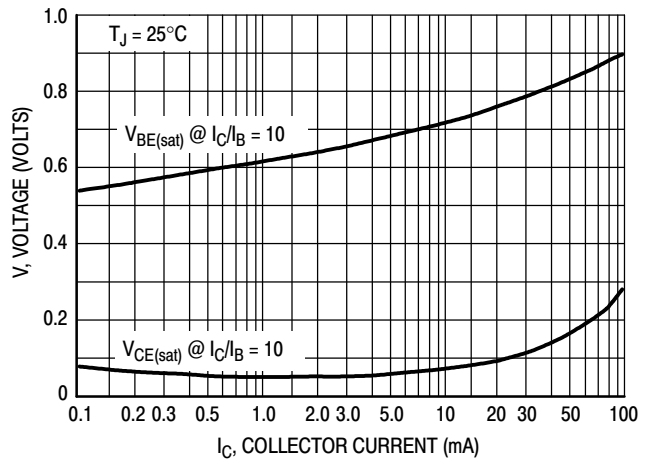


Figure 4. "On" Voltages

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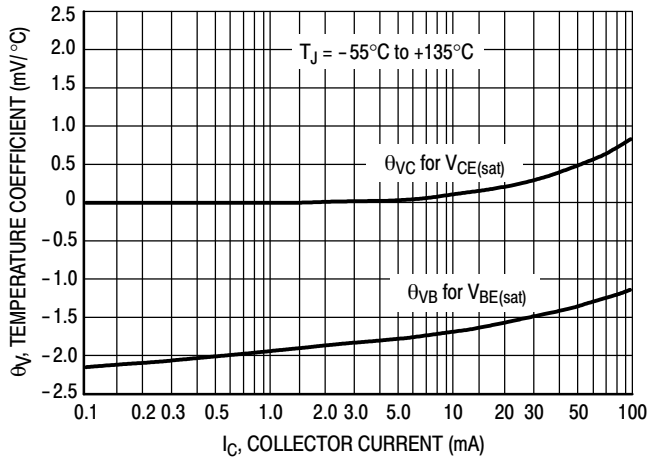
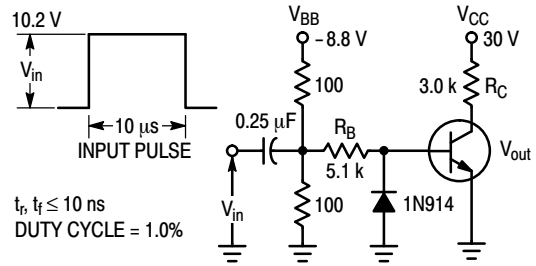


Figure 5. Temperature Coefficients



Values Shown are for $I_C @ 10\text{ mA}$

Figure 6. Switching Time Test Circuit

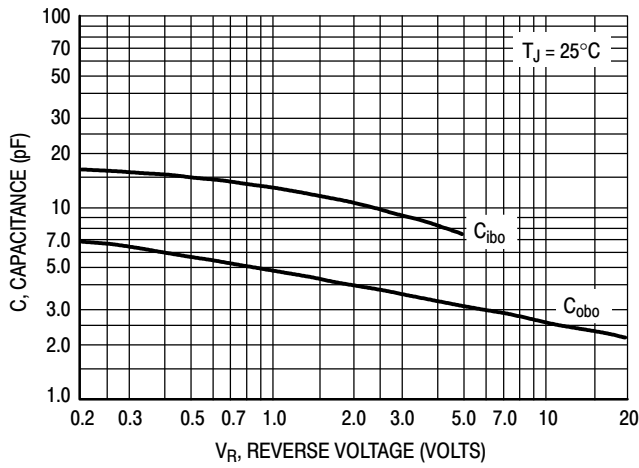


Figure 7. Capacitances

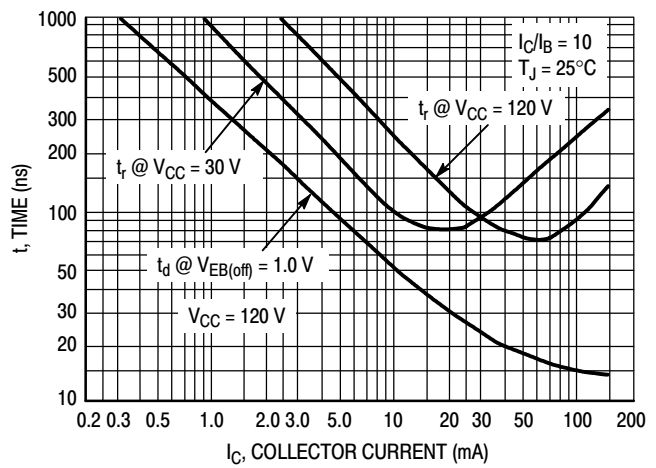


Figure 8. Turn-On Time

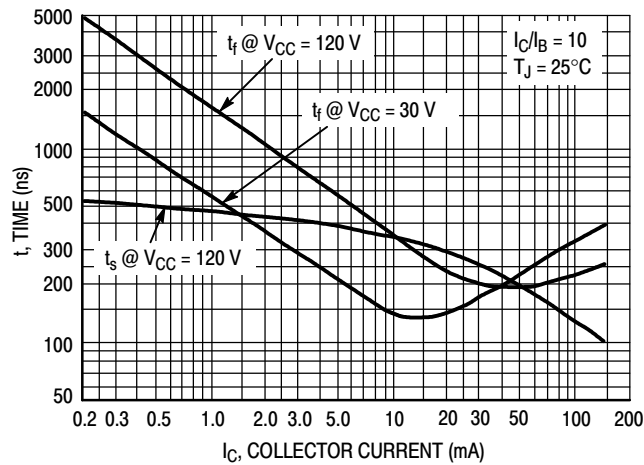
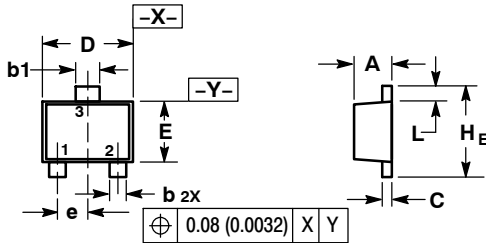


Figure 9. Turn-Off Time

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PACKAGE DIMENSIONS

SOT-723
CASE 631AA-01
ISSUE C



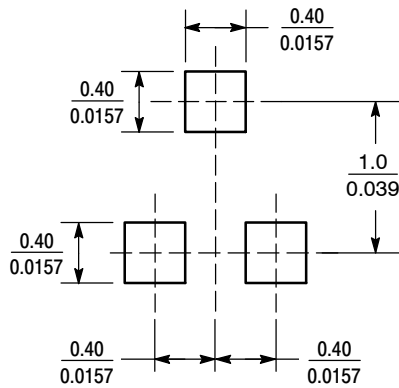
NOTES:

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

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.55	0.018	0.020	0.022
b	0.15	0.21	0.27	0.0059	0.0083	0.0106
b1	0.25	0.31	0.37	0.010	0.012	0.015
C	0.07	0.12	0.17	0.0028	0.0047	0.0067
D	1.15	1.20	1.25	0.045	0.047	0.049
E	0.75	0.80	0.85	0.03	0.032	0.034
e	0.40 BSC			0.016 BSC		
H e	1.15	1.20	1.25	0.045	0.047	0.049
L	0.15	0.20	0.25	0.0059	0.0079	0.0098

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

SOLDERING FOOTPRINT*



SCALE 20:1 (mm/inches)

*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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