

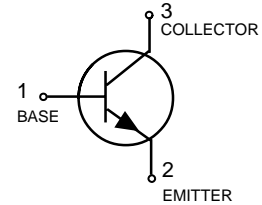
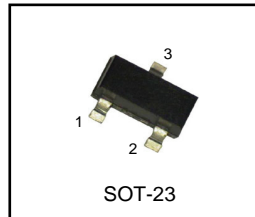
## High Voltage Transistors

### Lead free product

#### FEATURE

- We declare that the material of product compliance with RoHS requirements.

**MMBT5550G**  
**MMBT5551G**



#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	140	Vdc
Collector–Base Voltage	$V_{CBO}$	160	Vdc
Emitter–Base Voltage	$V_{EBO}$	6.0	Vdc
Collector Current — Continuous	$I_C$	600	mAdc

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board, (1) $T_A = 25^\circ\text{C}$	$P_D$	225	mW
Derate above $25^\circ\text{C}$		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Derate above $25^\circ\text{C}$		2.4	mW/ $^\circ\text{C}$
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	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Max	Unit
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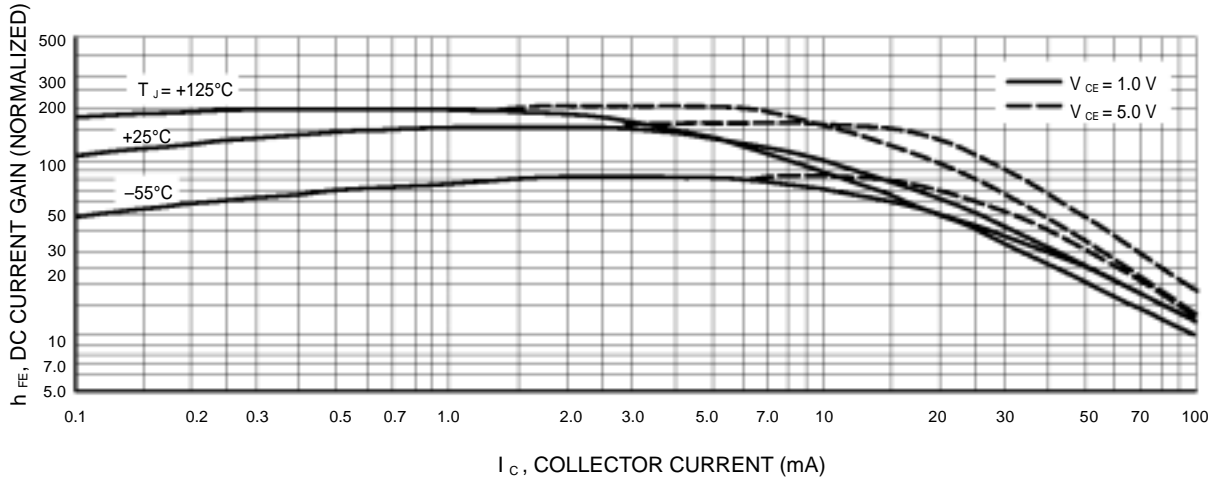
#### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage(3) ( $I_C = 1.0 \text{ mAdc}, I_B = 0$ )	MMBT5550G MMBT5551G	$V_{(BR)CEO}$	140 160	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}, I_E = 0$ )	MMBT5550G MMBT5551G	$V_{(BR)CBO}$	160 180	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )		$V_{(BR)EBO}$	6.0	—	Vdc
Collector Cutoff Current ( $V_{CB} = 100\text{Vdc}, I_E = 0$ )	MMBT5550G	$I_{CBO}$	—	100	nAdc
( $V_{CB} = 120\text{Vdc}, I_E = 0$ )	MMBT5551G		—	50	
( $V_{CB} = 100\text{Vdc}, I_E = 0, T_A = 100^\circ\text{C}$ )	MMBT5550G		—	100	$\mu\text{Adc}$
( $V_{CB} = 120\text{Vdc}, I_E = 0, T_A = 100^\circ\text{C}$ )	MMBT5551G		—	50	
Emitter Cutoff Current ( $V_{BE} = 4.0\text{Vdc}, I_C = 0$ )		$I_{EBO}$	—	50	nAdc

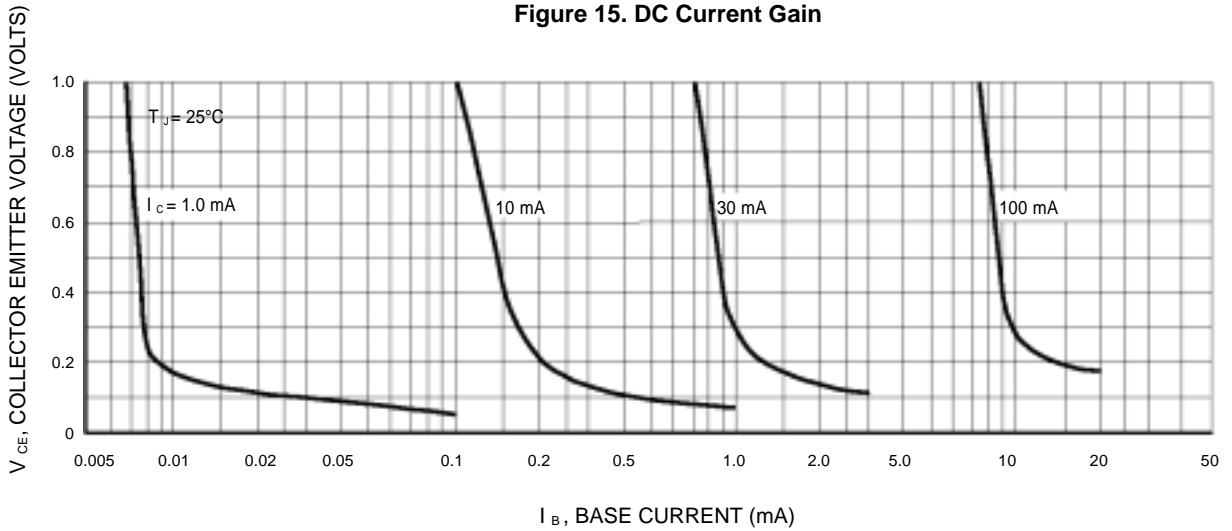
- FR–5 = 1.0 x 0.75 x 0.062 in.
- Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.
- Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2.0%.

**ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

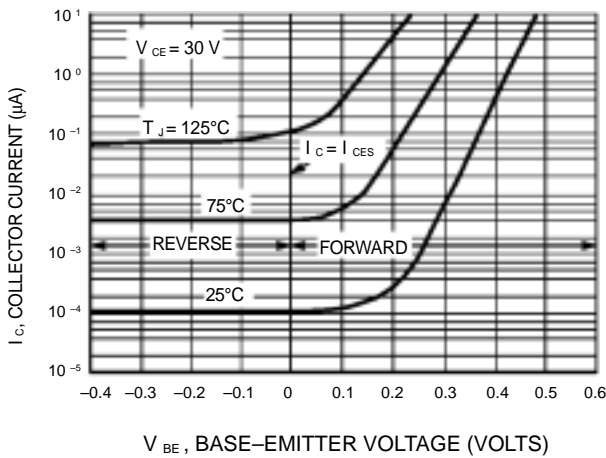
Characteristic		Symbol	Min	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain		$h_{FE}$			—
(I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	MMBT5550G		60	—	
	MMBT5551G		80	—	
(I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	MMBT5550G		60	250	
	MMBT5551G		80	250	
(I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0V <sub>dc</sub> )	MMBT5550G		20	—	
	MMBT5551G		30	—	
Collector–Emitter Saturation Voltage		$V_{CE(sat)}$			V <sub>dc</sub>
(I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )	Both Types		—	0.15	
(I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )	MMBT5550G		—	0.25	
	MMBT5551G		—	0.20	
Base–Emitter Saturation Voltage		$V_{BE(sat)}$			V <sub>dc</sub>
(I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )	Both Types		—	1.0	
(I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )	MMBT5550G		—	1.2	
	MMBT5551G		—	1.0	



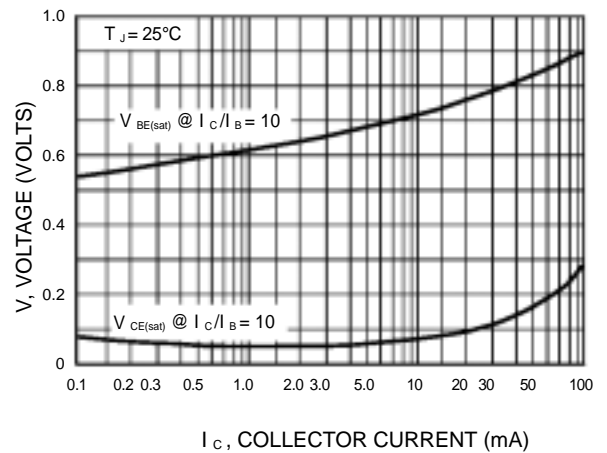
**Figure 15. DC Current Gain**



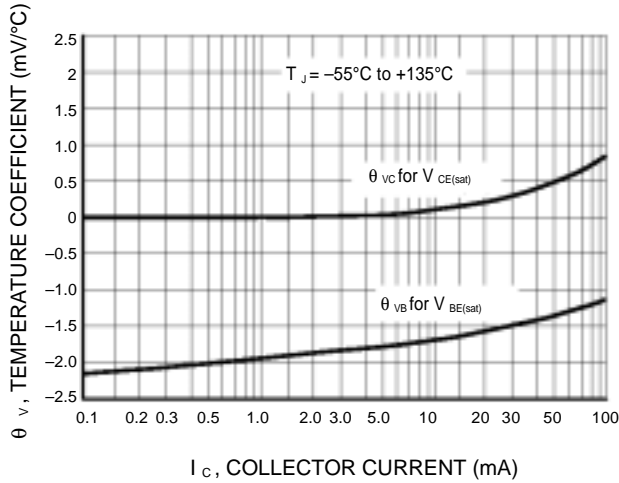
**Figure 16. Collector Saturation Region**



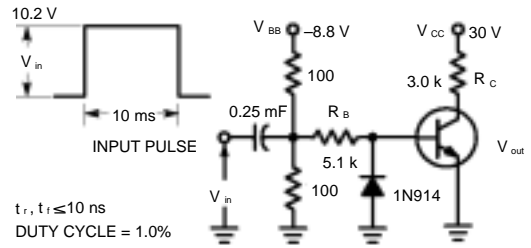
**Figure 3. Collector Cut-Off Region**



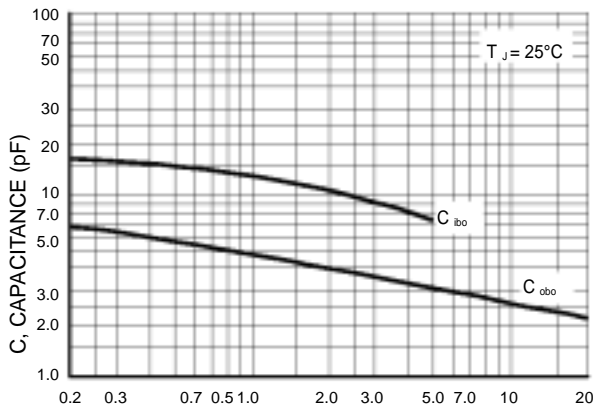
**Figure 4. "On" Voltages**



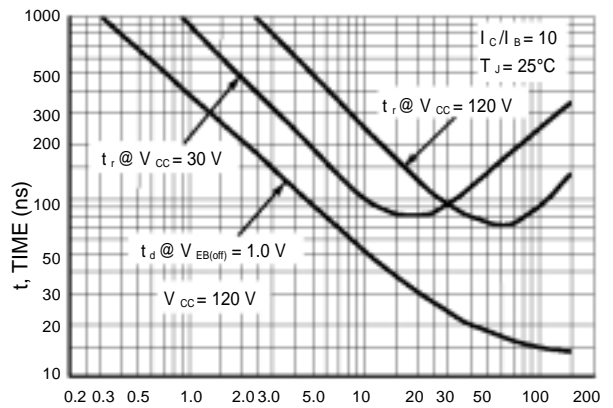
**Figure 5. Temperature Coefficients**



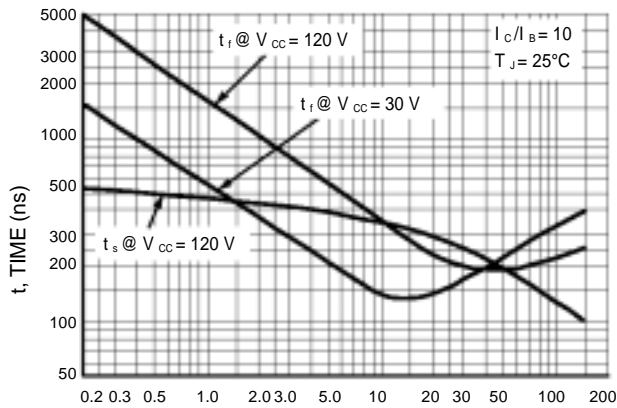
Values Shown are for  $I_C @ 10 \text{ mA}$   
**Figure 6. Switching Time Test Circuit**



**Figure 7. Capacitances**



**8. Turn-On Time**



**Figure 9. Turn-Off Time**