

## High Voltage Transistors

### FEATURE

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

### DEVICE MARKING AND ORDERING INFORMATION

Device	Marking	Shipping
MMBT5550	M1F	3000/Tape&Reel
MMBT5550	M1F	10000/Tape&Reel
MMBT5551	G1	3000/Tape&Reel
MMBT5551	G1	10000/Tape&Reel

### 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
----------------	--------	-----	-----	------

### OFF CHARACTERISTICS

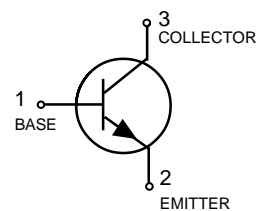
Collector–Emitter Breakdown Voltage(3) ( $I_C = 1.0 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CEO}$			Vdc
	MMBT5550	140	—	
	MMBT5551	160	—	
Collector–Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}, I_E = 0$ )	$V_{(BR)CBO}$			Vdc
	MMBT5550	160	—	
	MMBT5551	180	—	
Emitter–Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}, I_C = 0$ )	$V_{(BR)EBO}$			Vdc
		6.0	—	
Collector Cutoff Current ( $V_{CB} = 100\text{Vdc}, I_E = 0$ )	$I_{CBO}$			nAdc
	MMBT5550	—	100	
	MMBT5551	—	50	
	MMBT5550	—	100	$\mu\text{Adc}$
	MMBT5551	—	50	
Emitter Cutoff Current ( $V_{BE} = 4.0\text{Vdc}, I_C = 0$ )	$I_{EBO}$			nAdc
		—	50	

- 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%.

## Dimensions SOT-23



## Pin Configuration



**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, V <sub>CE</sub> = 5.0 Vdc)	MMBT5550		60	—	
	MMBT5551		80	—	
(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 Vdc)	MMBT5550		60	250	
	MMBT5551		80	250	
(I <sub>C</sub> = 50 mA, V <sub>CE</sub> = 5.0Vdc)	MMBT5550		20	—	
	MMBT5551		30	—	
Collector–Emitter Saturation Voltage		V <sub>CE(sat)</sub>			Vdc
(I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1.0 mA)	Both Types		—	0.15	
(I <sub>C</sub> = 50 mA, I <sub>B</sub> = 5.0 mA)	MMBT5550		—	0.25	
	MMBT5551		—	0.20	
Base–Emitter Saturation Voltage		V <sub>BE(sat)</sub>			Vdc
(I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1.0 mA)	Both Types		—	1.0	
(I <sub>C</sub> = 50 mA, I <sub>B</sub> = 5.0 mA)	MMBT5550		—	1.2	
	MMBT5551		—	1.0	

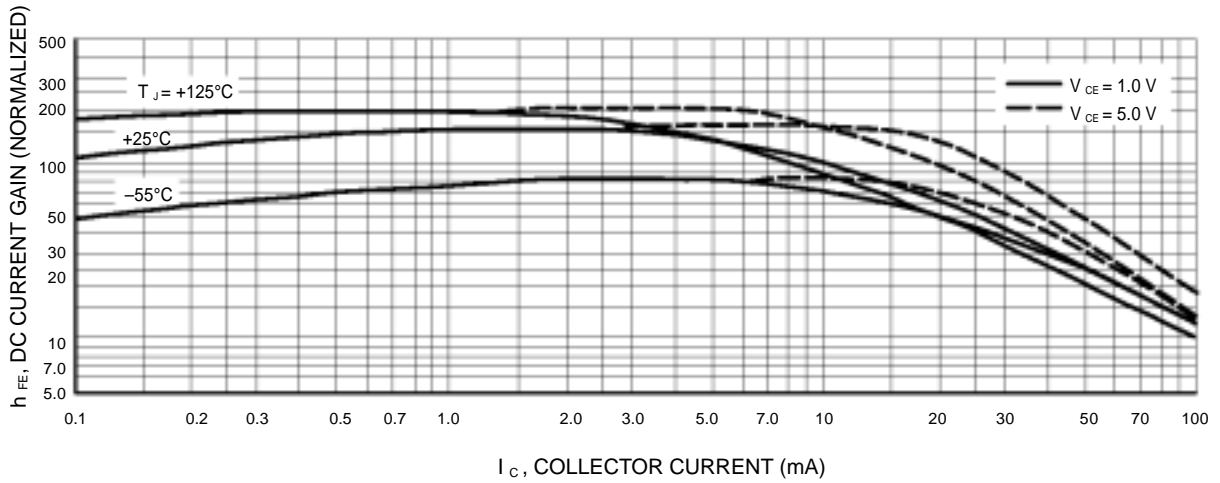


Figure 15. DC Current Gain

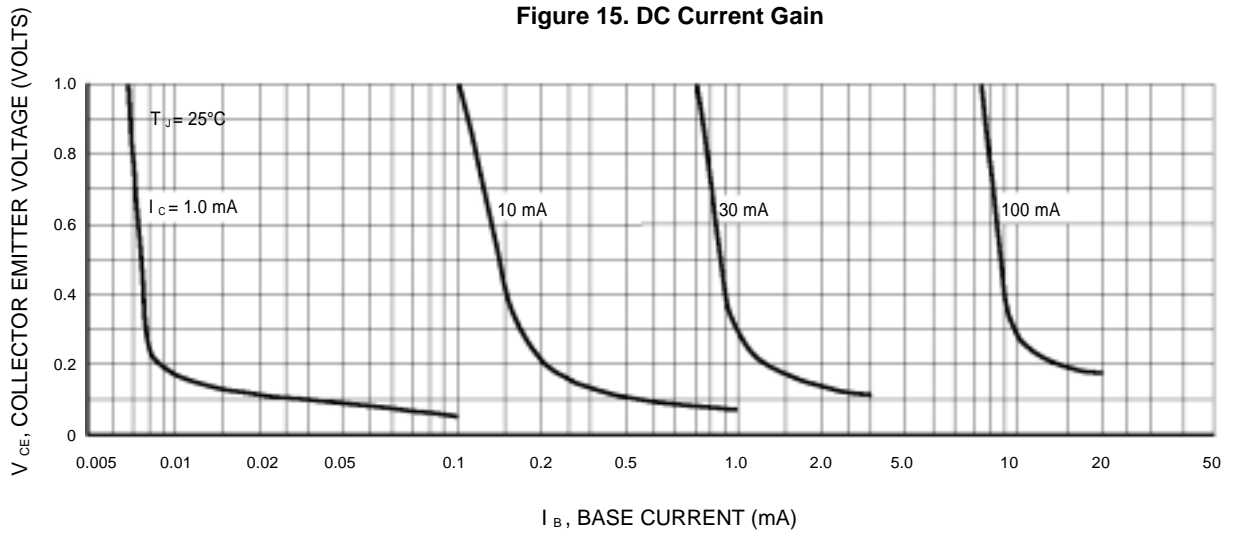


Figure 16. Collector Saturation Region

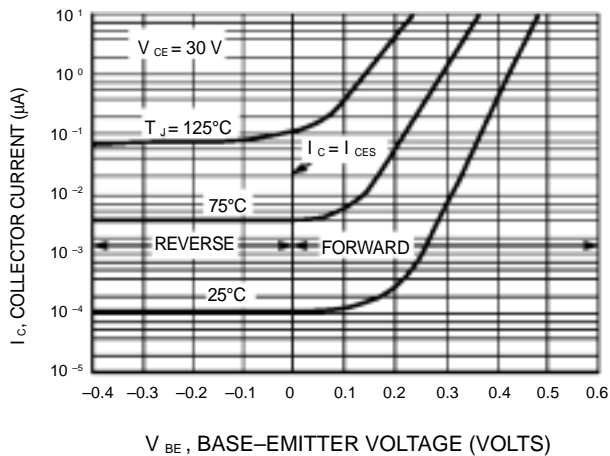


Figure 3. Collector Cut-Off Region

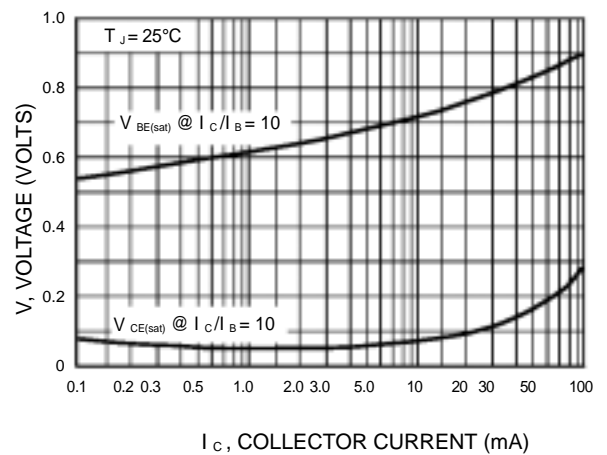


Figure 4. "On" Voltages

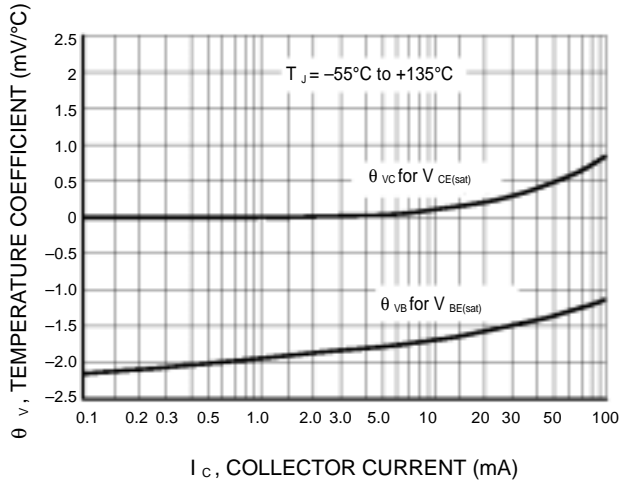
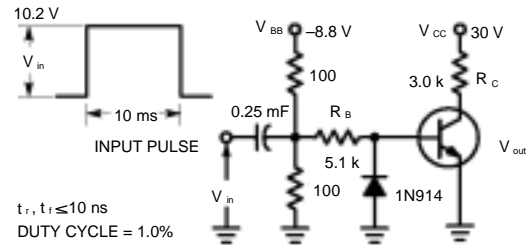


Figure 5. Temperature Coefficients



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

Figure 6. Switching Time Test Circuit

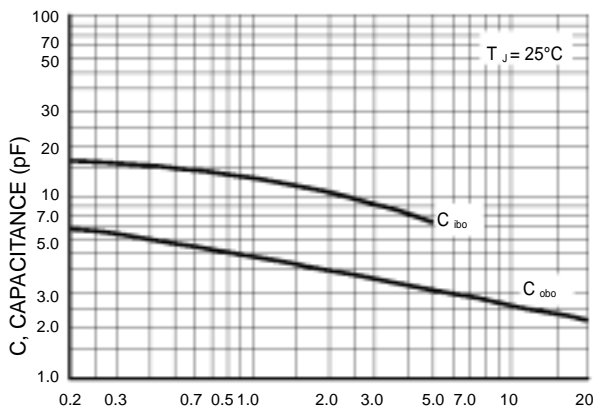
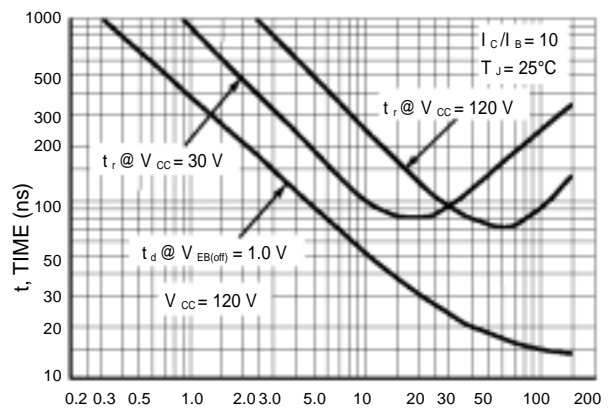


Figure 7. Capacitances Figure



8. Turn-On Time

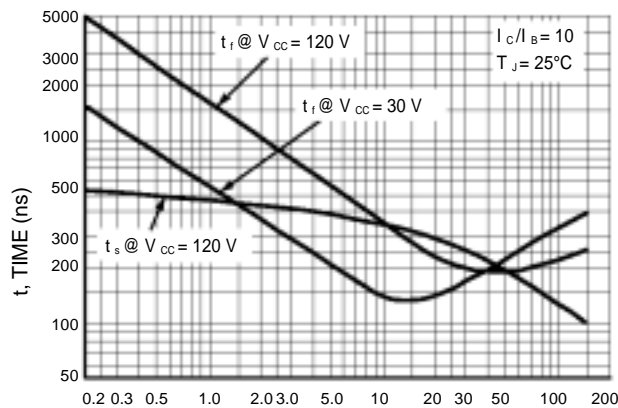
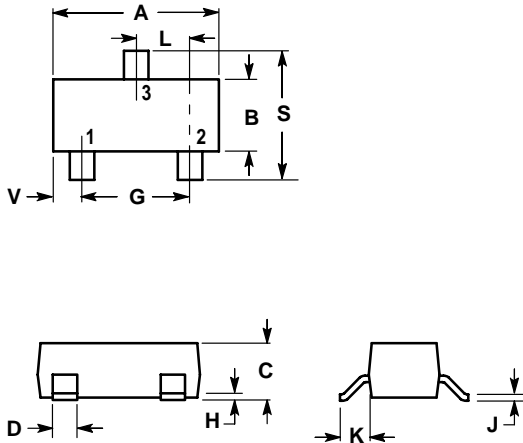


Figure 9. Turn-Off Time

SOT-23



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

- PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

