

High Voltage NPN Transistors


SOT-23

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

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (1) TA=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, (2) TA=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

DEVICE MARKING

MMBT5550 = M1F ; MMBT5551 = G1

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

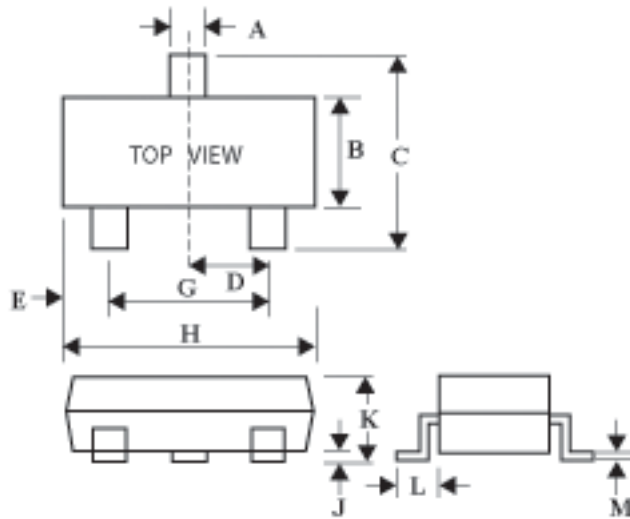
Characteristics	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ⁽³⁾ ($I_C=1.0\text{ mAdc}, I_B=0$)	MMBT5550 MMBT5551	$V_{(BR)CEO}$	140 160	- -	Vdc
Collector-Base Breakdown Voltage ($I_C=-100\mu\text{Adc}, I_E=0$)	MMBT5550 MMBT5551	$V_{(BR)CBO}$	160 180	- -	Vdc
Emitter-Base Breakdown Voltage ($I_E=10\mu\text{Adc}, I_C=0$)		$V_{(BR)EBO}$	6.0	-	Vdc

SOT-23 Package Outline Dimensions

Unit:mm



Dim	Min	Max
A	0.35	0.51
B	1.19	1.80
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.60
L	0.30	0.61
M	0.076	0.25

MMBT5550 MMBT5551

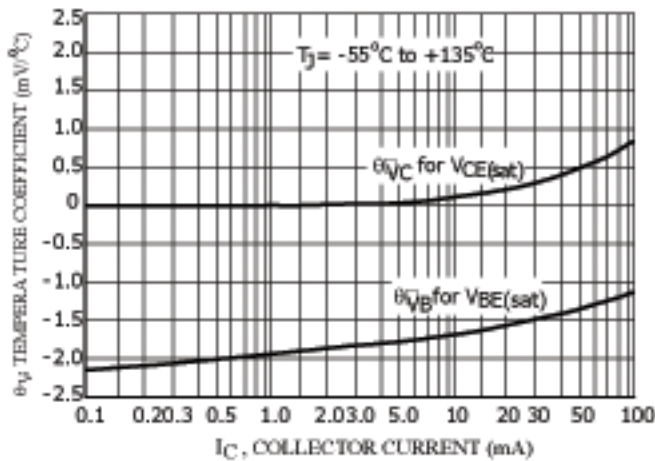
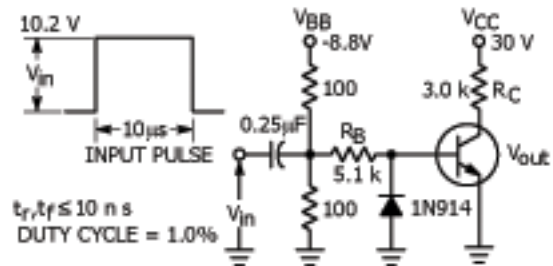


Figure 5. Temperature Coefficients



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

Figure 6. Switching Time Test Circuit

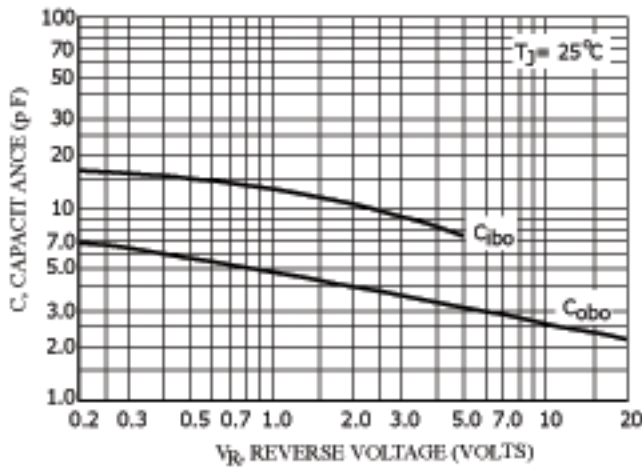


Figure 7. Capacitances

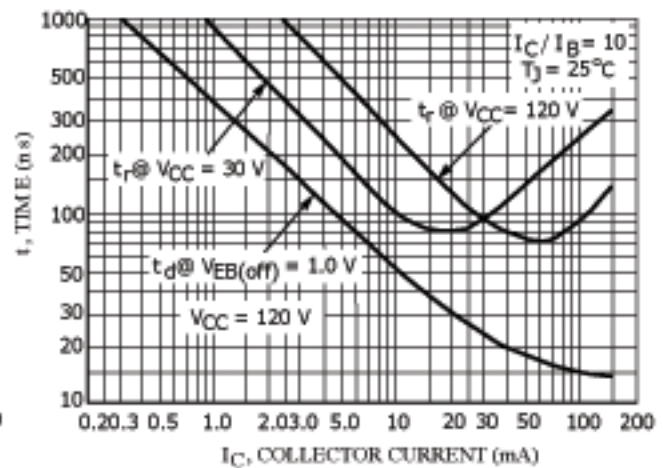


Figure 8. Turn-On Time

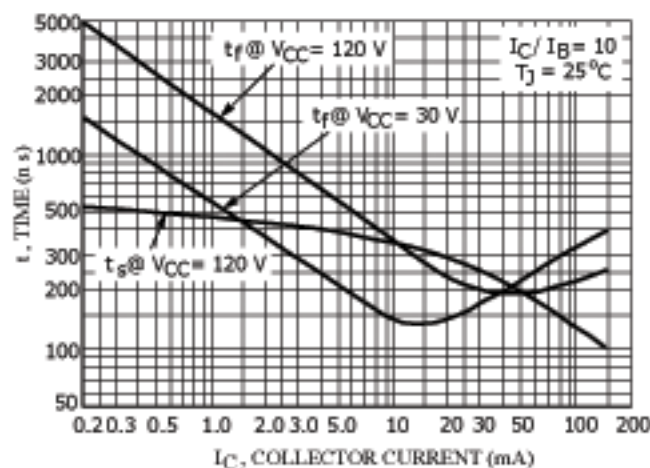


Figure 9. Turn-Off Time

MMBT5550 MMBT5551

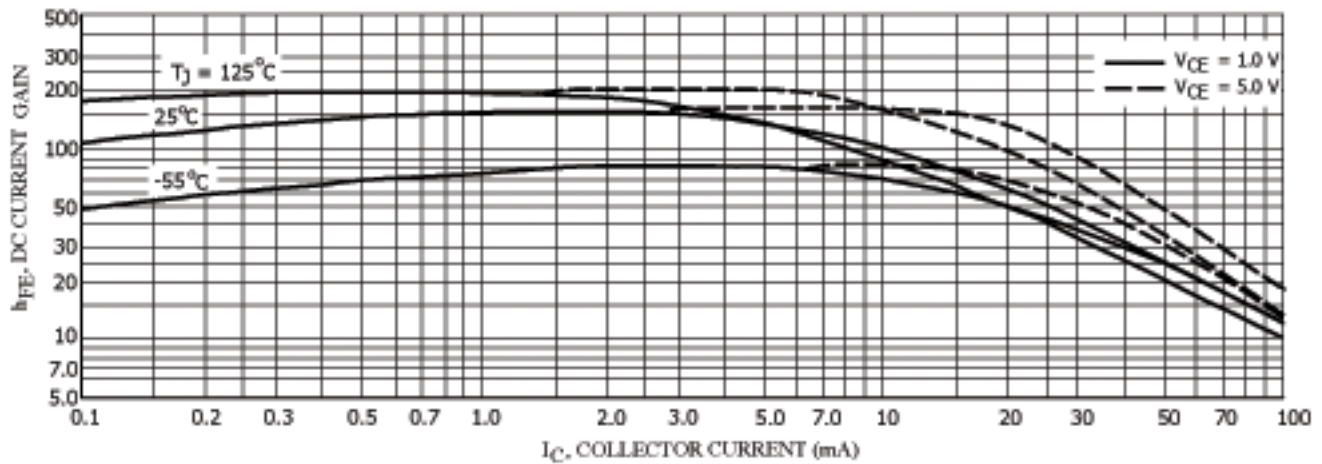


Figure 1. DC Current Gain

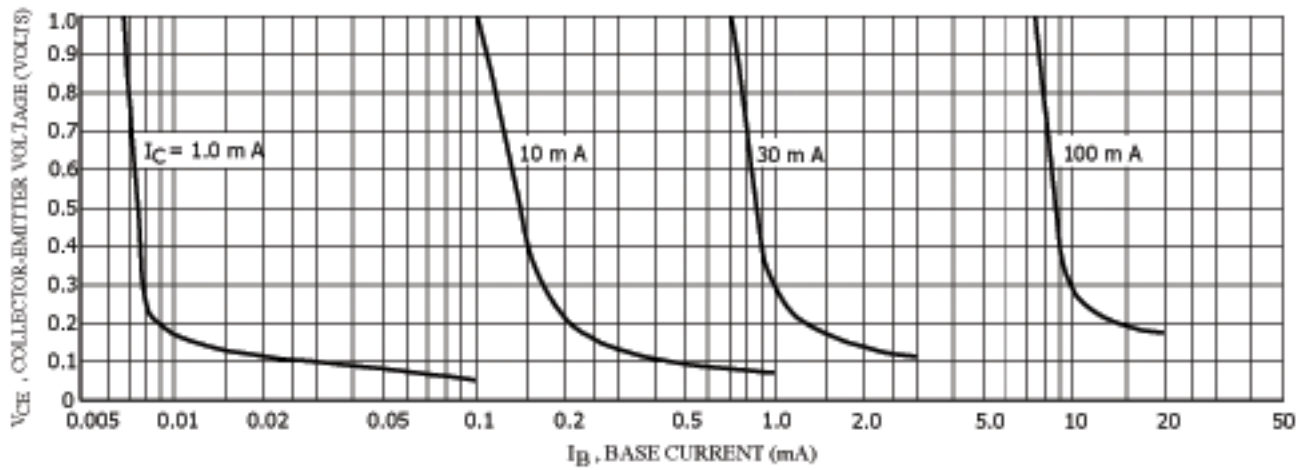


Figure 2. Collector Saturation Region

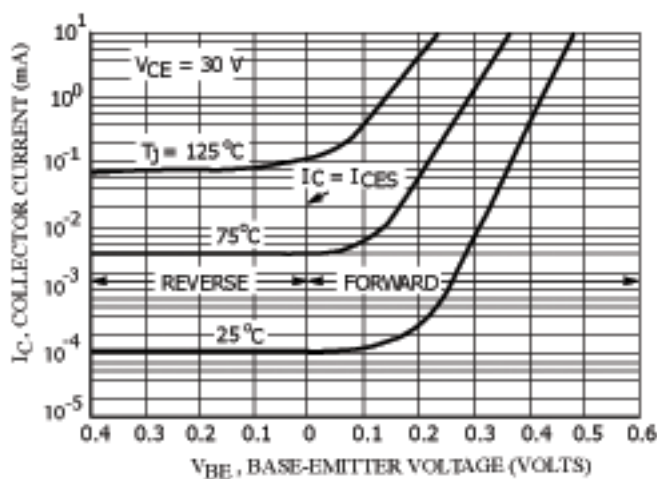


Figure 3. Collector Cut-Off Region

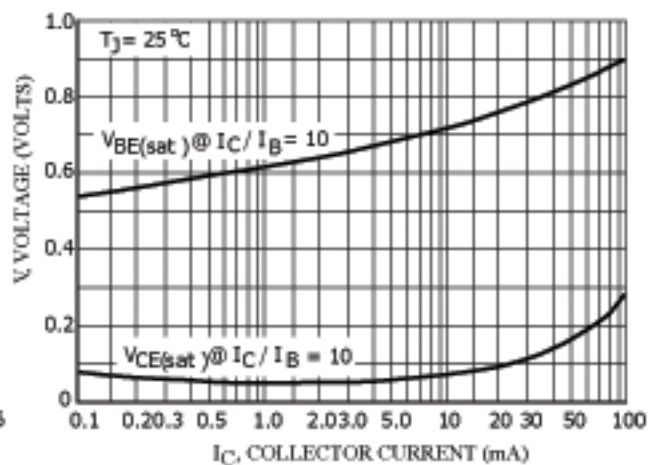


Figure 4. "On" Voltages

MMBT5550 MMBT5551

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

Characteristics	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector Cutoff Current ($V_{CB}=100\text{V}_{dc}, I_E=0$)	MMBT5550	I_{CBO}	-	100	nAdc
($V_{CB}=120\text{V}_{dc}, I_E=0$)	MMBT5551		-	50	
($V_{CB}=100\text{V}_{dc}, I_E=0, T_A=100^\circ\text{C}$)	MMBT5550		-	100	uAdc
($V_{CB}=100\text{V}_{dc}, I_E=0, T_A=100^\circ\text{C}$)	MMBT5551		-	50	
Emitter Cutoff Current ($V_{EB}=4.0\text{V}_{dc}, I_C=0$)		I_{EBO}	-	50	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C=1.0\text{ mAdc}, V_{CE}=5.0\text{ Vdc}$)	MMBT5550 MMBT5551	hFE	60 80	- -	-
($I_C=10\text{ mAdc}, V_{CE}=5.0\text{ Vdc}$)	MMBT5550 MMBT5551		60 80	250 250	
($I_C=50\text{ mAdc}, V_{CE}=5.0\text{ Vdc}$)	MMBT5550 MMBT5551		20 30	- -	
Collector-Emitter Saturation Voltage ($I_C=10\text{ mAdc}, I_B=1.0\text{ mAdc}$)	Both Types	$V_{CE(sat)}$	-	0.15	Vdc
($I_C=50\text{ mAdc}, I_B=5.0\text{ mAdc}$)	MMBT5550 MMBT5551		- -	0.25 0.20	
Base-Emitter Saturation Voltage ($I_C=10\text{ mAdc}, I_B=1.0\text{ mAdc}$)	Both Types	$V_{BE(sat)}$	-	1.0	Vdc
($I_C=50\text{ mAdc}, I_B=5.0\text{ mAdc}$)	MMBT5550 MMBT5551		- -	1.2 1.0	

1. FR-5=1.0 x 0.75 x 0.062 in

2. Alumina=0.4 x 0.3 x 0.024 in. 99.5% alumina

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