

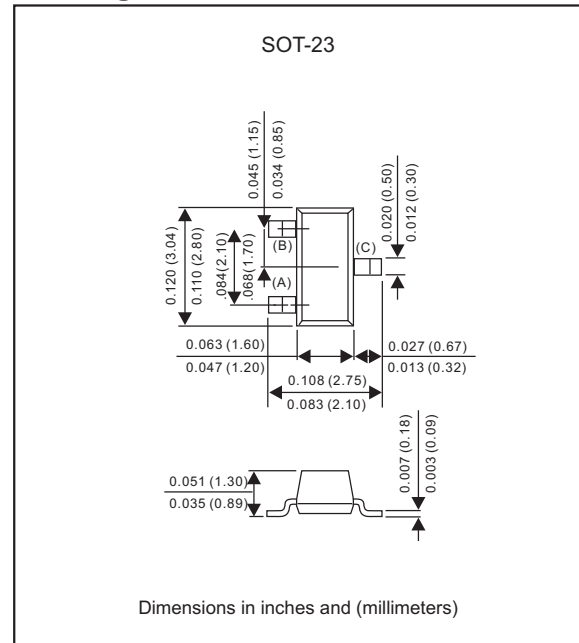
### Features

- High collector-emitter breakdown voltage.  
( $BV_{CEO} = 140V \sim 160V @ I_c = 1mA$ )
- This device is designed for general purpose high voltage amplifiers and gas discharge display driving.
- Epitaxial planar die construction.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 / 228
- Suffix "-H" indicates Halogen-free part, ex. MMBT5550-H.

### Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

### Package outline



### Maximum ratings (AT $T_A = 25^\circ C$ unless otherwise noted)

PARAMETER	Symbol	MMBT5550	MMBT5551	UNIT
Collector-base voltage	$V_{CBO}$	160	180	V
Collector-emitter voltage	$V_{CEO}$	140	160	V
Emitter-base voltage	$V_{EBO}$	6.0		V
Collector current - continuous	$I_C$	600		mA

### Thermal characteristics

Characteristics	Symbol	Max	UNIT
Total device dissipation FR-5 board $T_A = 25^\circ C$ (1)	$P_D$	225	mW
Derate above $25^\circ C$		1.8	mW/ $^\circ C$
Thermal resistance (1) Junction to ambient	$R_{\theta JA}$	556	$^\circ C/W$
Total device dissipation alumina substrate(2)	$P_D$	300	mW
Derate above $25^\circ C$		2.4	mW/ $^\circ C$
Thermal resistance (2) Junction to ambient	$R_{\theta JA}$	417	$^\circ C/W$
Operating junction temperature range	$T_J$	-55 to +150	$^\circ C$
Storage temperature range	$T_{STG}$	-55 to +150	$^\circ C$

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.

### Electrical characteristics (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

#### Off characteristics

PARAMETER	CONDITIONS	Symbol	Types	Min.	Max.	UNIT
Collector-base breakdown voltage	$I_C = 100\mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	MMBT5550	160	-	V
			MMBT5551	180	-	
Collector-emitter breakdown voltage(3)	$I_C = 1.0\text{mA}, I_B = 0$	$V_{(BR)CEO}$	MMBT5550	140	-	V
			MMBT5551	160	-	
Emitter-base breakdown voltage	$I_E = 10\mu\text{A}, I_C = 0$	$V_{(BR)EBO}$	Both Types	6.0	-	V
Collector cutoff current	$V_{CB} = 100\text{V}, I_E = 0$	$I_{CBO}$	MMBT5550	-	100	nA
	$V_{CB} = 120\text{V}, I_E = 0$		MMBT5551	-	50	
	$V_{CB} = 100\text{V}, I_E = 0, T_J = 100^\circ\text{C}$		MMBT5550	-	100	$\mu\text{A}$
	$V_{CB} = 120\text{V}, I_E = 0, T_J = 100^\circ\text{C}$		MMBT5551	-	50	
Emitter cutoff current	$V_{EB} = 4.0\text{V}, I_C = 0$	$I_{EBO}$	Both Types	-	50	nA

#### On characteristics

PARAMETER	CONDITIONS	Symbol	Types	Min.	Max.	UNIT
DC current gain	$I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}$	$h_{FE}$	MMBT5550	60	-	
			MMBT5551	80	-	
	$I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$		MMBT5550	60	250	
			MMBT5551	80	250	
	$I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$		MMBT5550	20	-	
			MMBT5551	30	-	
Collector-emitter saturation voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$	$V_{CE(sat)}$	Both Types	-	0.15	V
	$I_C = 50\text{mA}, I_B = 5.0\text{mA}$		MMBT5550	-	0.25	
			MMBT5551	-	0.20	
Base-emitter saturation voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$	$V_{BE(sat)}$	Both Types	-	1.0	V
	$I_C = 50\text{mA}, I_B = 5.0\text{mA}$		MMBT5550	-	1.2	
			MMBT5551	-	1.0	
Collector emitter cut-off	$V_{CB} = 10\text{V}$	$I_{CES}$	Both Types	-	50	nA
	$V_{CB} = 75\text{V}$			-	100	

3.Pulse test : pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

## Rating and characteristic curves

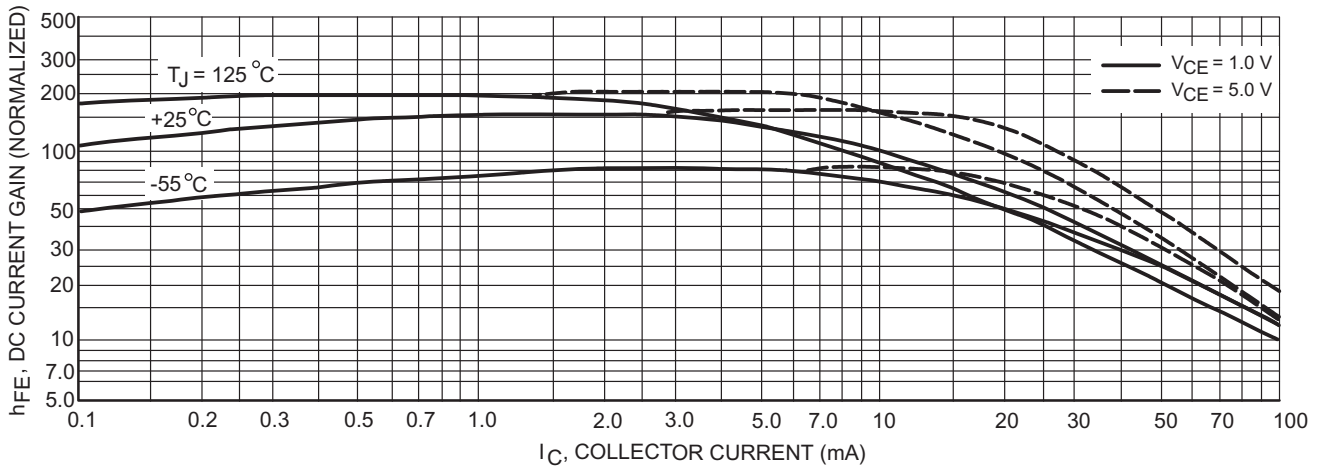


FIG.1 DC Current Gain

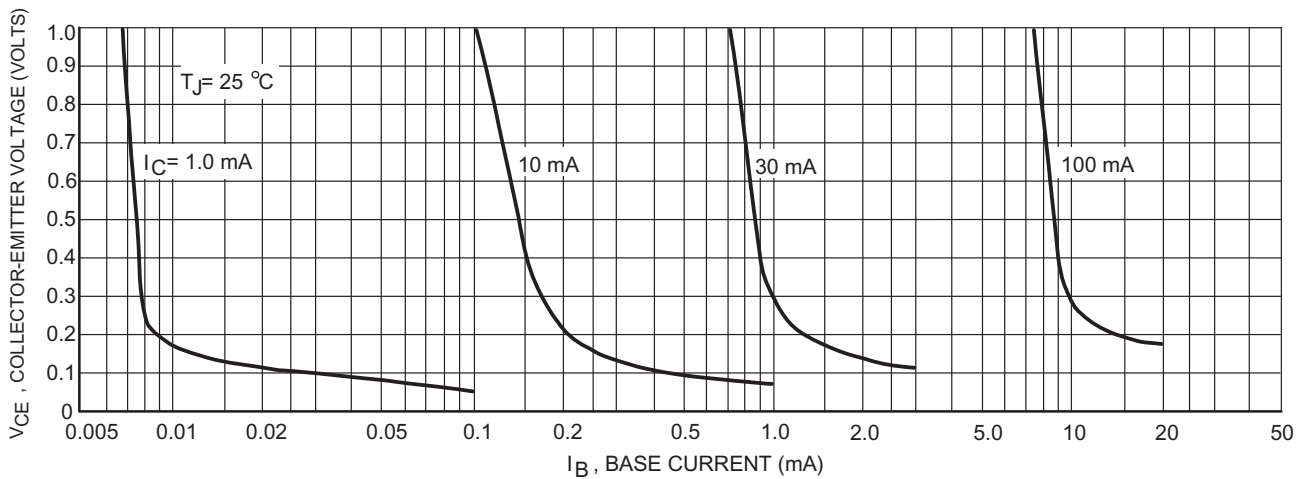


FIG. 2 Collector Saturation Region

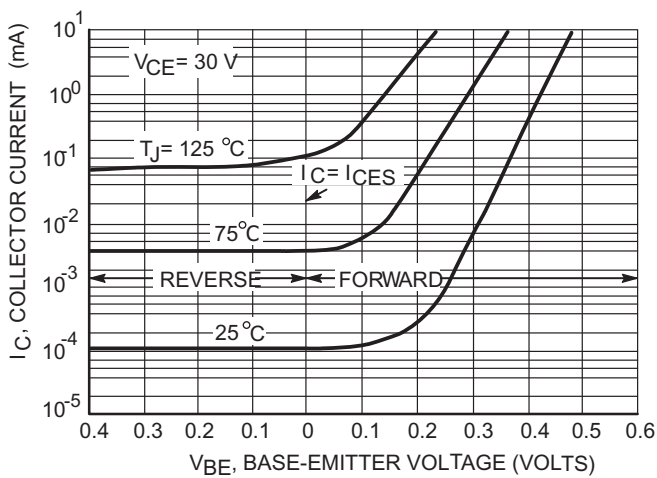


FIG. 3 Collector Cut-Off Region

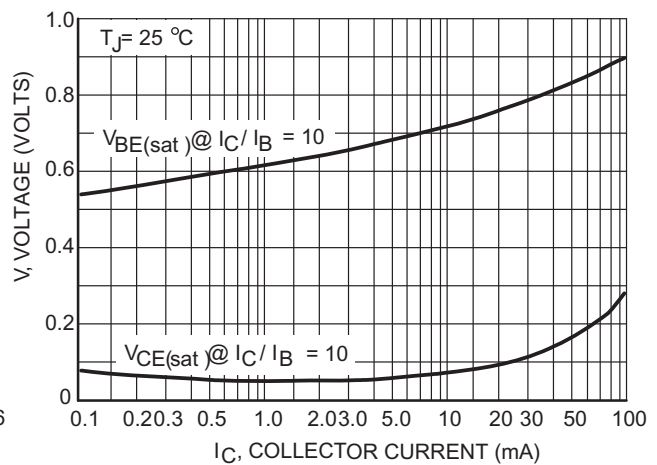


FIG. 4 "On" Voltages

## Rating and characteristic curves

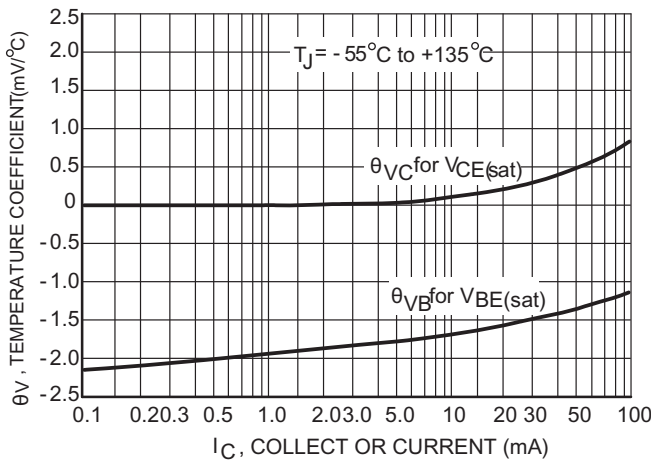
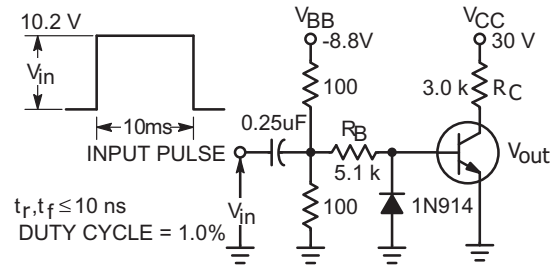


FIG. 5 Temperature Coefficients



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

FIG. 6 Switching Time Test Circuit

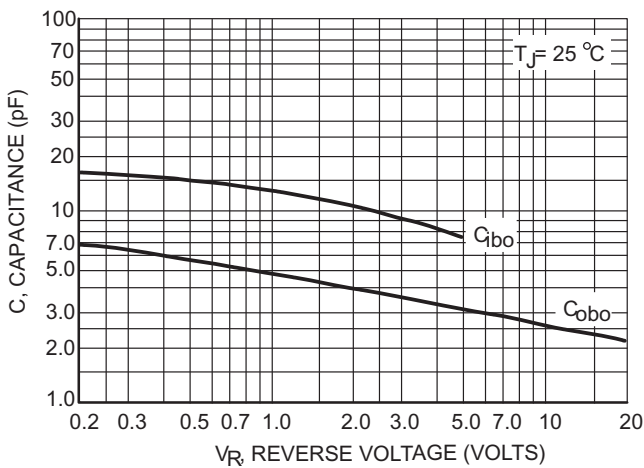


FIG. 7 Capacitances

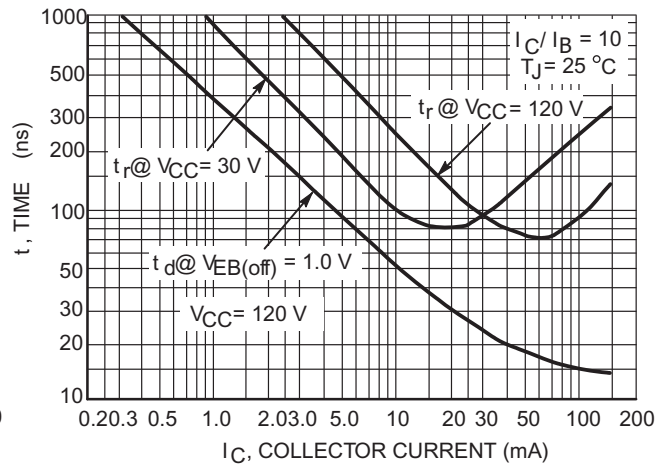


FIG. 8 Turn-On Time

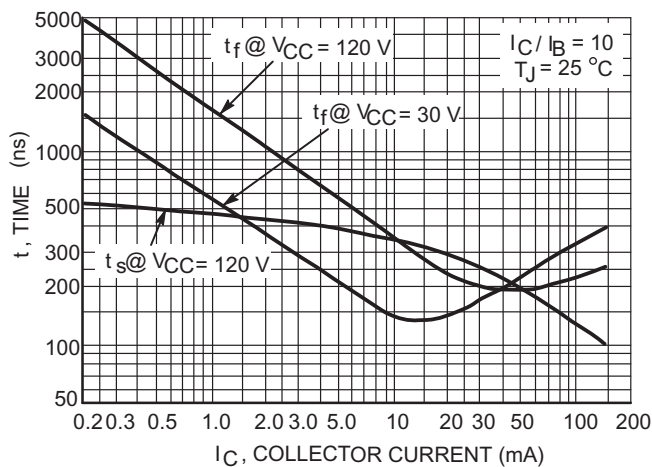
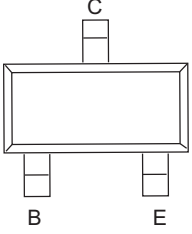
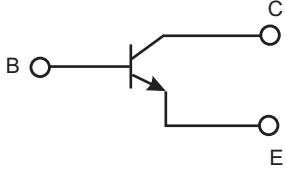


FIG. 9 Turn-Off Time

### Pinning information

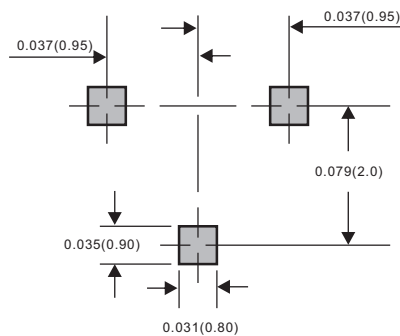
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

### Marking

Type number	Marking code
MMBT5550	M1F
MMBT5551	G1

### Suggested solder pad layout

#### SOT-23



Dimensions in inches and (millimeters)

### Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6

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