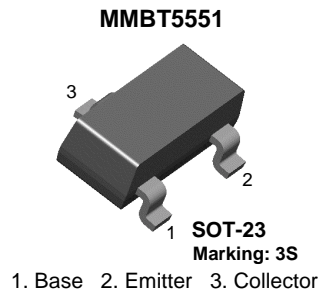


# 2N5551- MMBT5551 NPN General Purpose Amplifier

## Features

- This device is designed for general purpose high voltage amplifiers and gas discharge display drivers.
- Suffix "-C" means Center Collector in 2N5551 (1. Emitter 2. Collector 3. Base)
- Suffix "-Y" means  $h_{FE}$  180~240 in 2N5551 (Test condition :  $I_C = 10\text{mA}$ ,  $V_{CE} = 5.0\text{V}$ )



## Absolute Maximum Ratings \* $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	160	V
$V_{CBO}$	Collector-Base Voltage	180	V
$V_{EBO}$	Emitter-Base Voltage	6.0	V
$I_C$	Collector current - Continuous	600	mA
$T_J, T_{stg}$	Junction and Storage Temperature	-55 ~ +150	$^\circ\text{C}$

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

### NOTES:

1. These ratings are based on a maximum junction temperature of 150 degrees C.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

## Thermal Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Max		Units
		2N5551	*MMBT5551	
$P_D$	Total Device Dissipation	625	350	mW
	Derate above $25^\circ\text{C}$	5.0	2.8	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Case	83.3		$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	$^\circ\text{C}/\text{W}$

\* Device mounted on FR-4 PCB  $1.6'' \times 1.6'' \times 0.06''$ .

**Electrical Characteristics**  $T_a = 25^\circ\text{C}$  unless otherwise noted

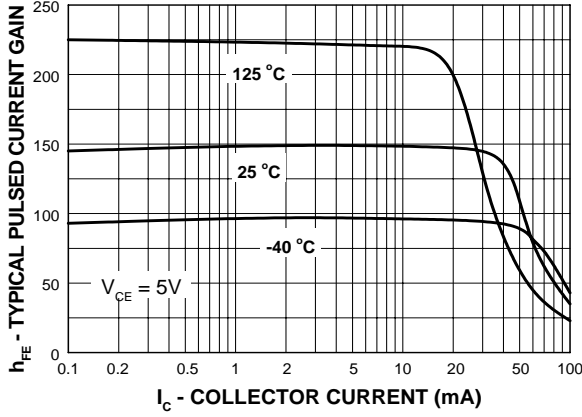
Symbol	Parameter	Test Condition	Min.	Max.	Units
<b>Off Characteristics</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage *	$I_C = 1.0\text{mA}, I_B = 0$	160		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\mu\text{A}, I_E = 0$	180		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	6.0		V
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = 120\text{V}, I_E = 0$ $V_{CB} = 120\text{V}, I_E = 0, T_a = 100^\circ\text{C}$		50 50	nA $\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 4.0\text{V}, I_C = 0$		50	nA
<b>On Characteristics</b>					
$h_{FE}$	DC Current Gain	$I_C = 1.0\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 10\text{mA}, V_{CE} = 5.0\text{V}$ $I_C = 50\text{mA}, V_{CE} = 5.0\text{V}$	80 80 30	250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$		0.15 0.20	V V
$V_{BE(sat)}$	Base-Emitter On Voltage	$I_C = 10\text{mA}, I_B = 1.0\text{mA}$ $I_C = 50\text{mA}, I_B = 5.0\text{mA}$		1.0 1.0	V V
<b>Small Signal Characteristics</b>					
$f_T$	Current Gain Bandwidth Product	$I_C = 10\text{mA}, V_{CE} = 10\text{V},$ $f = 100\text{MHz}$	100	300	MHz
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{V}, I_E = 0, f = 1.0\text{MHz}$		6.0	pF
$C_{ibo}$	Input Capacitance	$V_{BE} = 0.5\text{V}, I_C = 0, f = 1.0\text{MHz}$		20	pF
$H_{fe}$	Small-Signal Current Gain	$I_C = 1.0\text{mA}, V_{CE} = 10\text{V}, f = 1.0\text{kHz}$	50	250	
NF	Noise Figure	$I_C = 250\mu\text{A}, V_{CE} = 5.0\text{V},$ $R_S = 1.0\text{k}\Omega, f = 10\text{Hz to } 15.7\text{kHz}$		8.0	dB

**Spice Model**

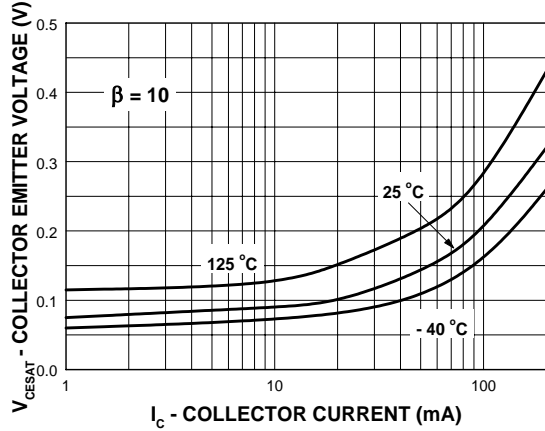
NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vtf=5 Xtf=8 Rb=10)

## Typical Performance Characteristics

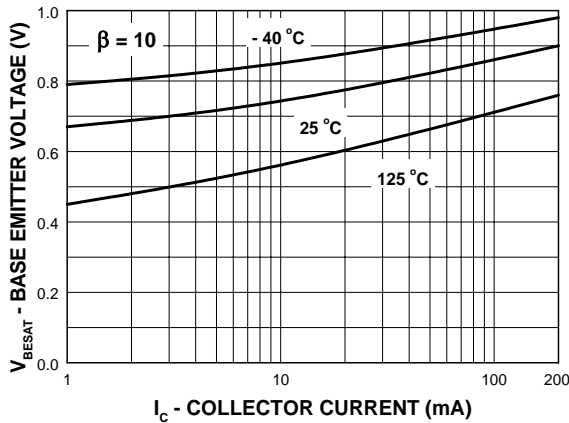
**Figure 1. Typical Pulsed Current Gain vs Collector Current**



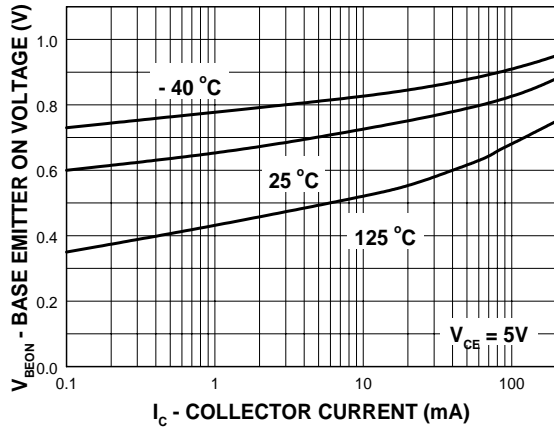
**Figure 2. Collector-Emitter Saturation Voltage vs Collector Current**



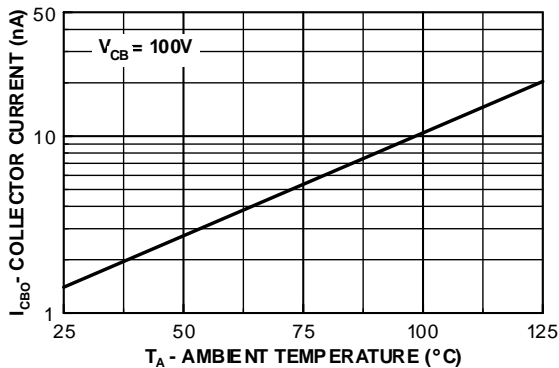
**Figure 3. Base-Emitter Saturation Voltage vs Collector Current**



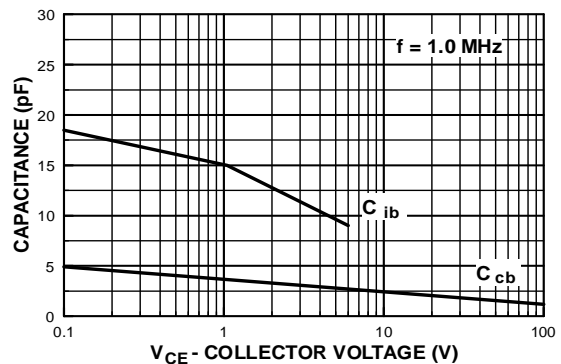
**Figure 4. Base-Emitter On Voltage vs Collector Current**



**Figure 5. Collector Cutoff Current vs Ambient Temperature**

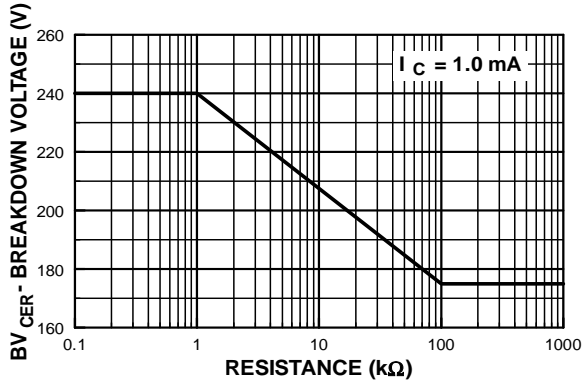


**Figure 6. Input and Output Capacitance vs Reverse Voltage**

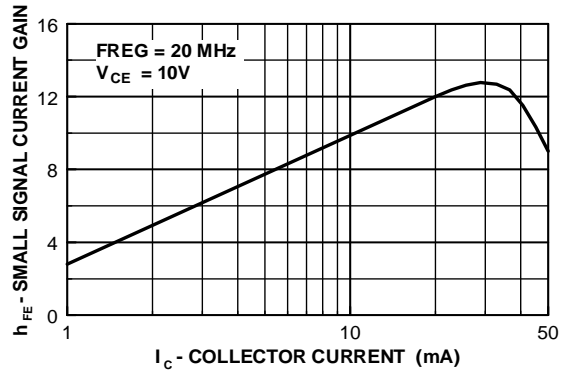


**Typical Performance Characteristics** (Continued)

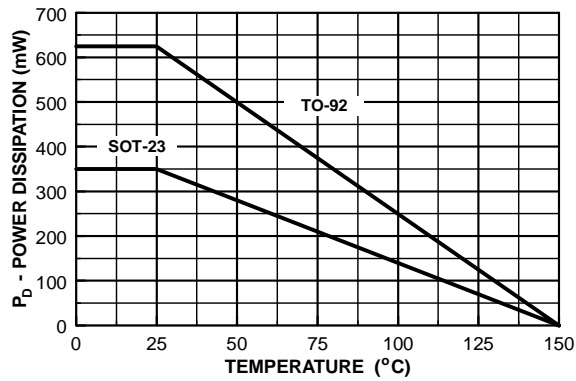
**Figure 7. Collector- Emitter Breakdown Voltage with Resistance Between Emitter-Base**



**Figure 8. Small Signal Current Gain vs Collector Current**



**Figure 9. Power Dissipation vs Ambient Temperature**



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Rev. 119