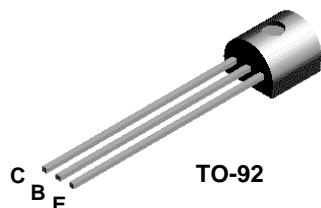
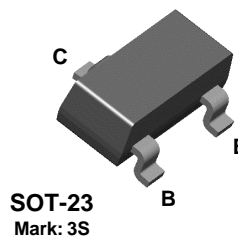


## 2N5551



## MMBT5551



### NPN General Purpose Amplifier

This device is designed for general purpose high voltage amplifiers and gas discharge display drivers.

#### Absolute Maximum Ratings\*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>CEO</sub>	Collector-Emitter Voltage	160	V
V <sub>CBO</sub>	Collector-Base Voltage	180	V
V <sub>EBO</sub>	Emitter-Base Voltage	6.0	V
I <sub>C</sub>	Collector Current - Continuous	600	mA
T <sub>J</sub> , T <sub>stg</sub>	Operating and Storage Junction Temperature Range	-55 to +150	°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

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		2N5551	*MMBT5551	
P <sub>D</sub>	Total Device Dissipation Derate above 25°C	625	350	mW
		5.0	2.8	mW/°C
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	83.3		°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	200	357	°C/W

\* Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

# NPN General Purpose Amplifier

(continued)

## Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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### OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Sustaining 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	nA
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 4.0 \text{ V}, I_C = 0$		50	nA

### ON CHARACTERISTICS

$h_{FE}$	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	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	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$		1.0	V

### SMALL SIGNAL CHARACTERISTICS

$f_T$	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

\*Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

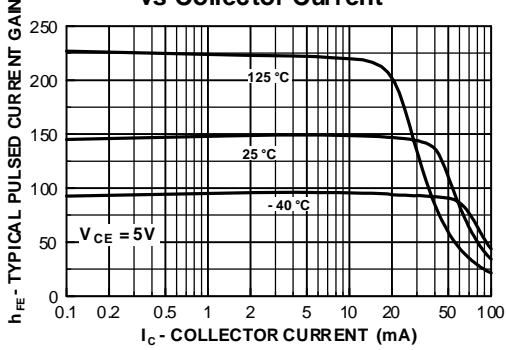
### Spice Model

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)

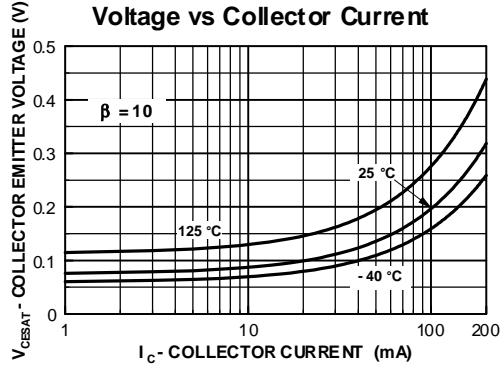
2N5551 / MMBT5551

Typical Characteristics

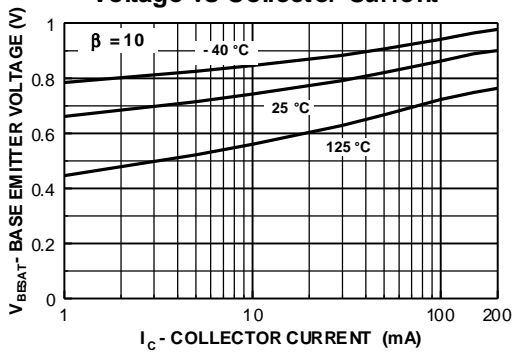
Typical Pulsed Current Gain vs Collector Current



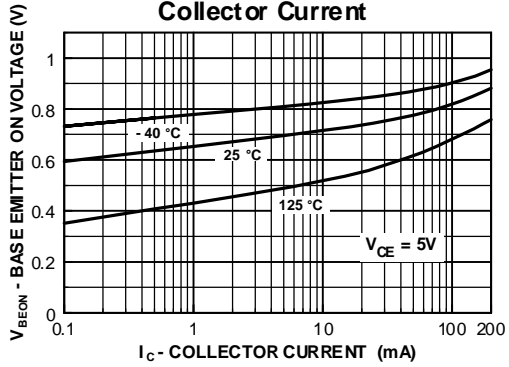
Collector-Emitter Saturation Voltage vs Collector Current



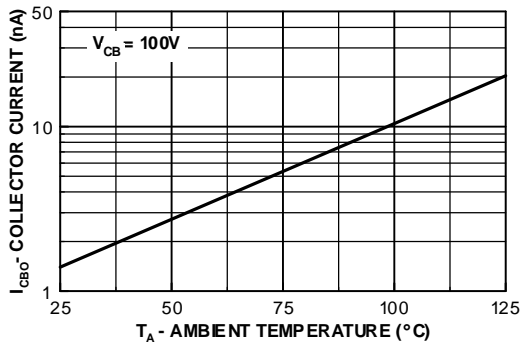
Base-Emitter Saturation Voltage vs Collector Current



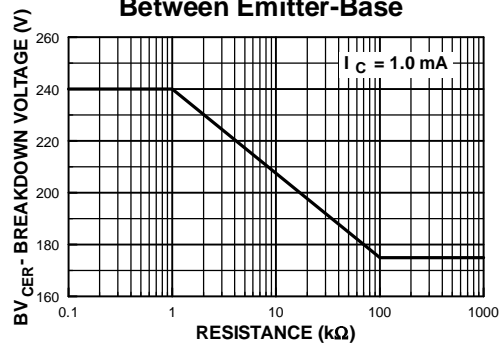
Base Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs. Ambient Temperature



Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base



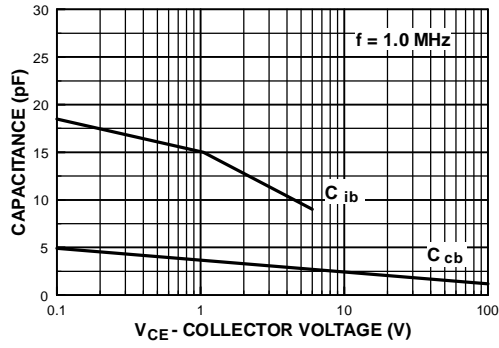
# NPN General Purpose Amplifier

(continued)

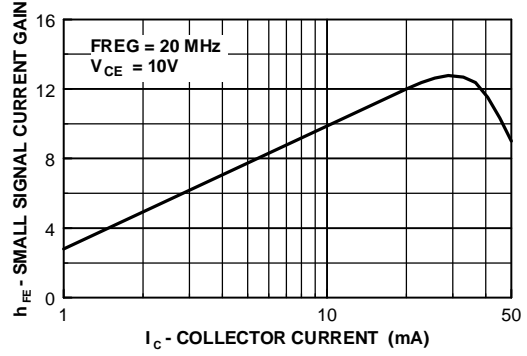
2N5551 / MMBT5551

## Typical Characteristics (continued)

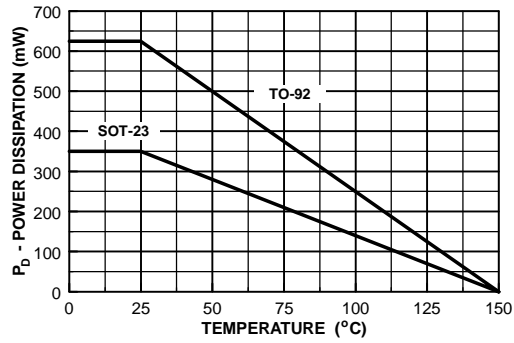
### Input and Output Capacitance vs Reverse Voltage



### Small Signal Current Gain vs Collector Current



### Power Dissipation vs Ambient Temperature



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