FAIRCHILD SEMICONDUCTOR®

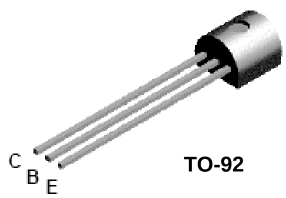
April 2006

2N5551- MMBT5551
NPN General Purpose Amplifier

Features

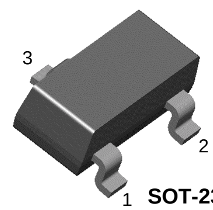
- This device is designed for general purpose high voltage amplifiers and gas discharge display drivers.
- Suffix "-C" means Center Collector in 2N5551 (1. Emitter 2. Collector 3. Base)
- Suffix "-Y" means h_{FE} 180~240 in 2N5551 (Test condition : I_C = 10mA, V_{CE} = 5.0V)

2N5551



TO-92

MMBT5551



SOT-23
Marking: 3S

1. Base 2. Emitter 3. Collector

Absolute Maximum Ratings * T_a = 25°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	°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°C unless otherwise noted

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

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

Electrical Characteristics T_a = 25°C unless otherwise noted

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

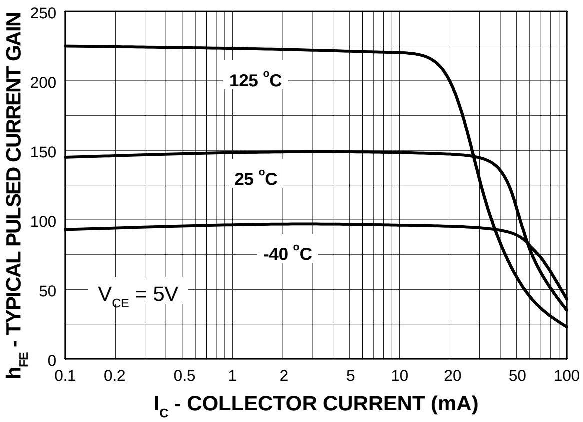


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

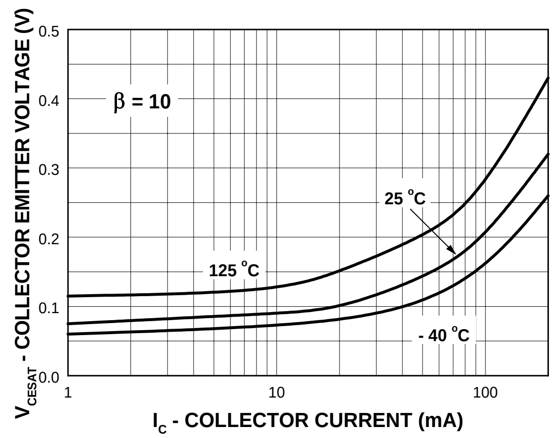


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

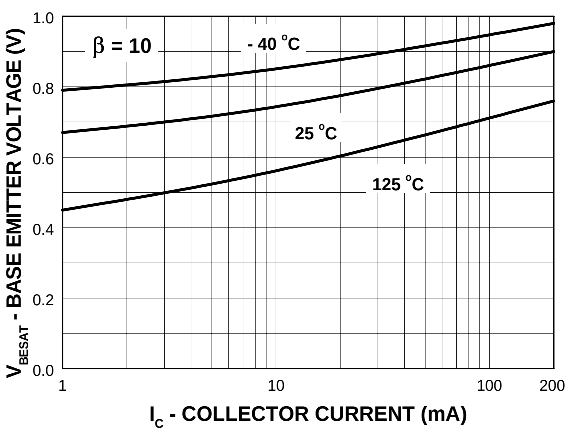


Figure 4. Base-Emitter On Voltage vs Collector Current

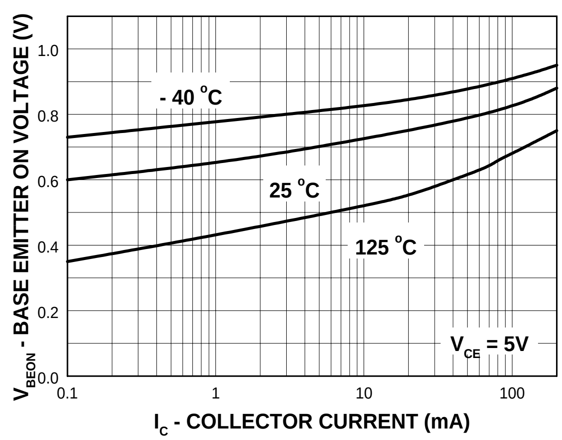


Figure 5. Collector Cutoff Current vs Ambient Temperature

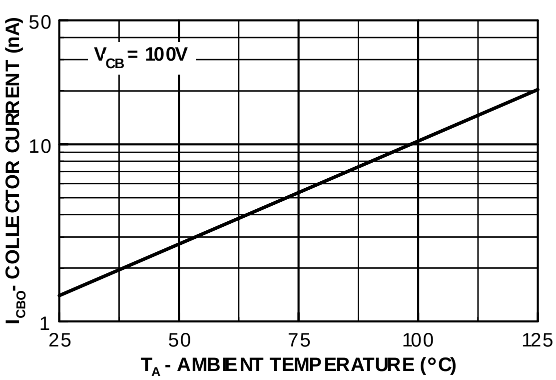
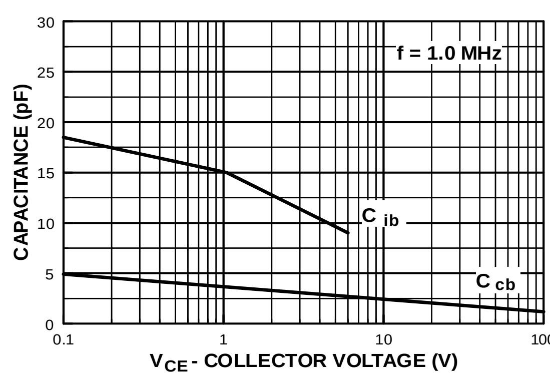


Figure 6. Input and Output Capacitance vs Reverse Voltage



Typical Performance Characteristics (Continued)

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

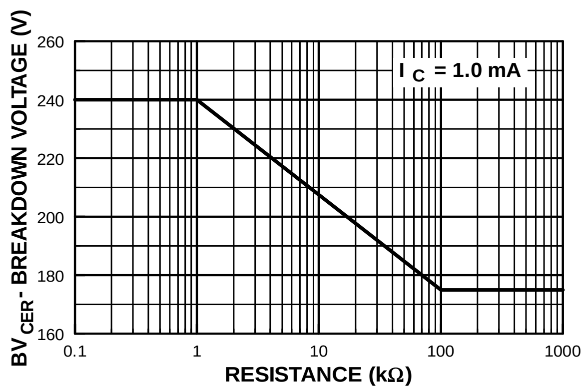


Figure 8. Small Signal Current Gain vs Collector Current

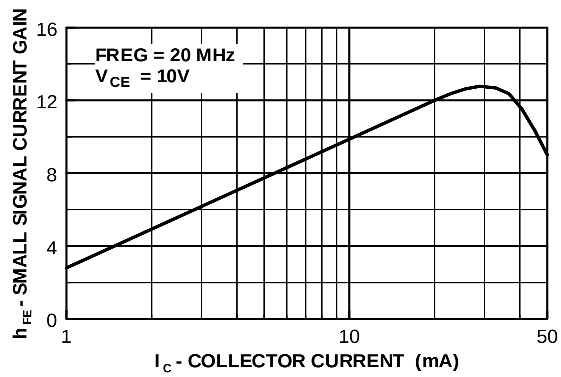
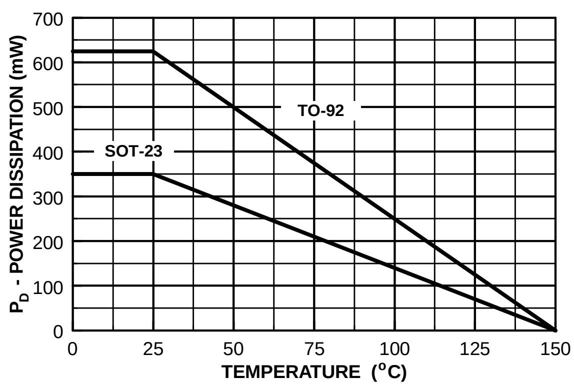


Figure 9. Power Dissipation vs Ambient Temperature



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