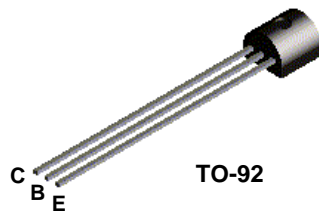
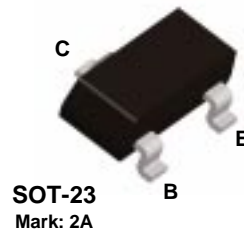


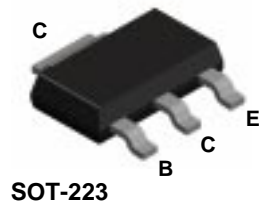
## 2N3906



## MMBT3906



## PZT3906



## PNP General Purpose Amplifier

This device is designed for general purpose amplifier and switching applications at collector currents of 10  $\mu$ A to 100 mA. Sourced from Process 66.

### Absolute Maximum Ratings\*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V <sub>CEO</sub>	Collector-Emitter Voltage	40	V
V <sub>CBO</sub>	Collector-Base Voltage	40	V
V <sub>EBO</sub>	Emitter-Base Voltage	5.0	V
I <sub>C</sub>	Collector Current - Continuous	200	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.

# 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 Breakdown Voltage*	$I_C = 1.0\text{ mA}, I_B = 0$	40		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\text{ }\mu\text{A}, I_E = 0$	40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}, I_C = 0$	5.0		V
$I_{BL}$	Base Cutoff Current	$V_{CE} = 30\text{ V}, V_{BE} = 3.0\text{ V}$		50	nA
$I_{CEX}$	Collector Cutoff Current	$V_{CE} = 30\text{ V}, V_{BE} = 3.0\text{ V}$		50	nA

## ON CHARACTERISTICS

$h_{FE}$	DC Current Gain *	$I_C = 0.1\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 1.0\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 10\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 50\text{ mA}, V_{CE} = 1.0\text{ V}$ $I_C = 100\text{ mA}, V_{CE} = 1.0\text{ V}$	60 80 100 60 30	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$ $I_C = 50\text{ mA}, I_B = 5.0\text{ mA}$		0.25 0.4	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$ $I_C = 50\text{ mA}, I_B = 5.0\text{ mA}$	0.65	0.85 0.95	V V

## SMALL SIGNAL CHARACTERISTICS

## SWITCHING CHARACTERISTICS (except MMPQ3906)

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

## Spice Model

PNP General Purpose Amplifier  
(continued)

2N3906 / MMBT3906 / PZT3906

Thermal Characteristics

TA = 25°C unless otherwise noted

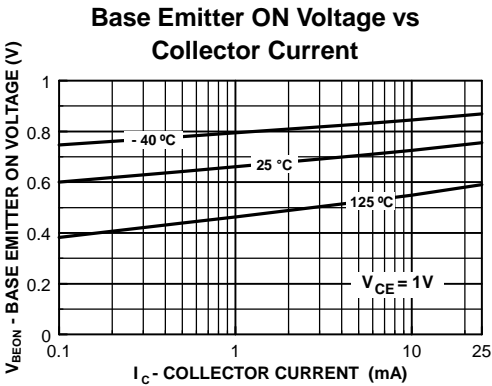
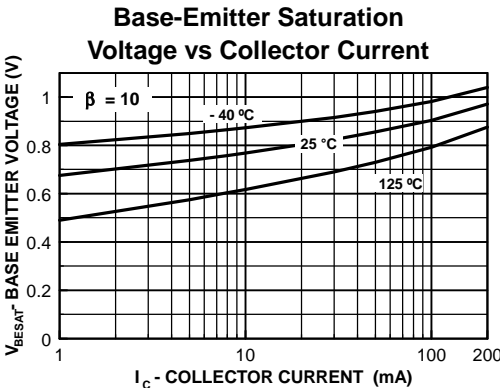
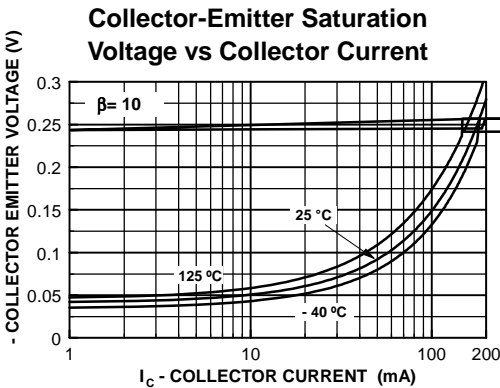
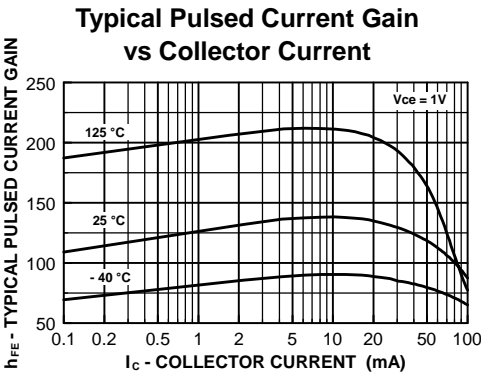
Symbol	Characteristic	Max		Units
		2N3906	*PZT3906	
P <sub>D</sub>	Total Device Dissipation Derate above 25°C	625	1,000	mW
		5.0	8.0	mW/°C
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	83.3		°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	200	125	°C/W

Symbol	Characteristic	Max		Units
		**MMBT3906	MMPQ3906	
P <sub>D</sub>	Total Device Dissipation Derate above 25°C	350	1,000	mW
		2.8	8.0	mW/°C
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient Effective 4 Die Each Die	357		°C/W
			125	°C/W
			240	°C/W

\* Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm<sup>2</sup>.

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

Typical Characteristics

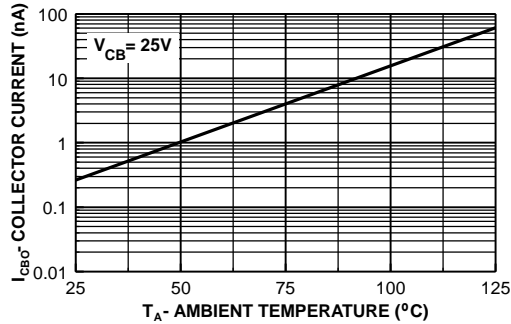


# PNP General Purpose Amplifier (continued)

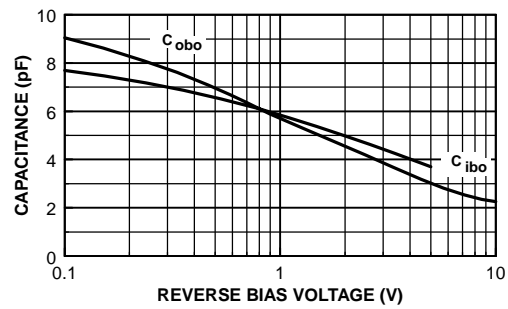
2N3906 / MMBT3906 / PZT3906

## Typical Characteristics (continued)

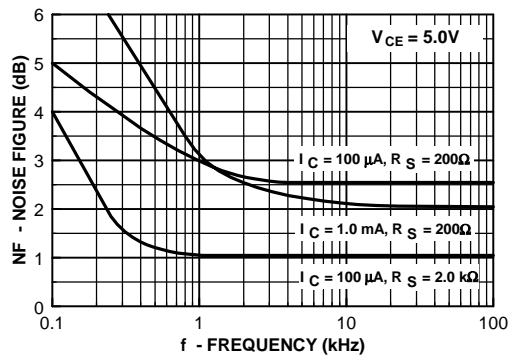
**Collector-Cutoff Current  
vs. Ambient Temperature**



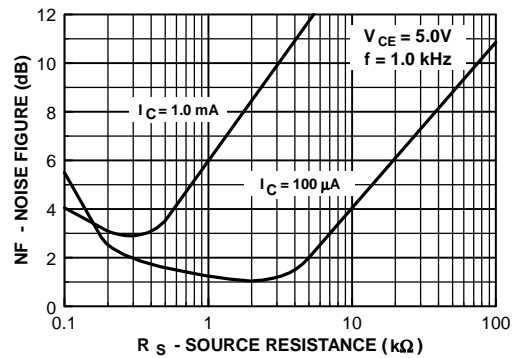
**Common-Base Open Circuit  
Input and Output Capacitance  
vs Reverse Bias Voltage**



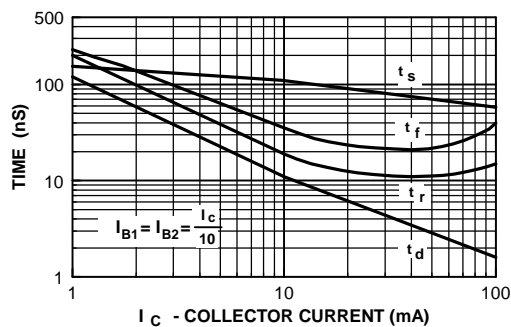
**Noise Figure vs Frequency**



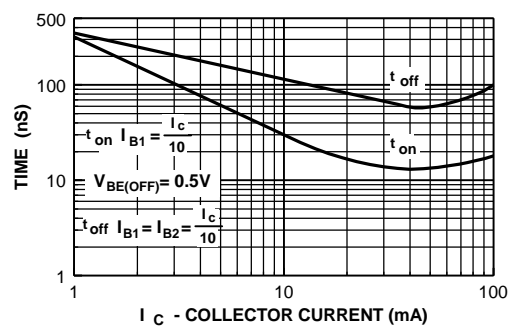
**Noise Figure vs Source Resistance**



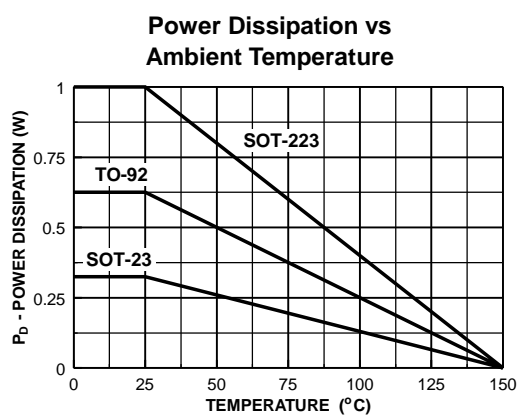
**Switching Times  
vs Collector Current**



**Turn On and Turn Off Times  
vs Collector Current**



Typical Characteristics (continued)



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FACT™	QS™
FACT Quiet Series™	Quiet Series™
FAST®	SuperSOT™-3
FASTr™	SuperSOT™-6
GTO™	SuperSOT™-8
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