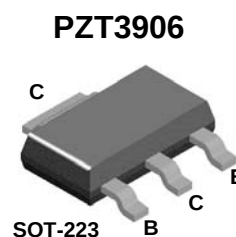
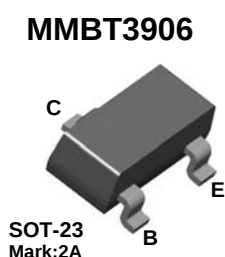


2N3906 / MMBT3906 / PZT3906

PNP General Purpose Amplifier

Features

- This device is designed for general purpose amplifier and switching applications at collector currents of 10 μ A to 100 mA.



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

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	-40	V
V_{CBO}	Collector-Base Voltage	-40	V
V_{EBO}	Emitter-Base Voltage	-5.0	V
I_C	Collector Current - Continuous	-200	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

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

NOTES:

- These ratings are based on a maximum junction temperature of 150 degrees C.
- 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
		2N3906	*MMBT3906	**PZT3906	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	1,000 8.0	mW mW/ $^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3			$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	125	$^\circ\text{C}/\text{W}$

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

** Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm².

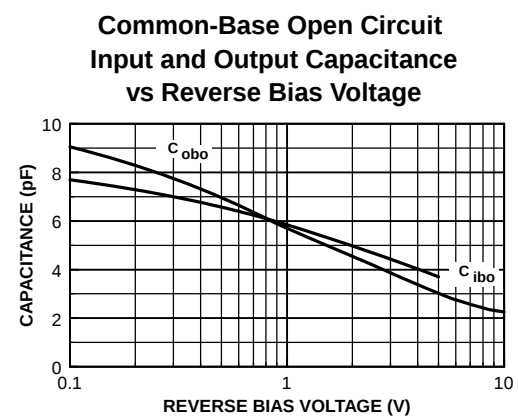
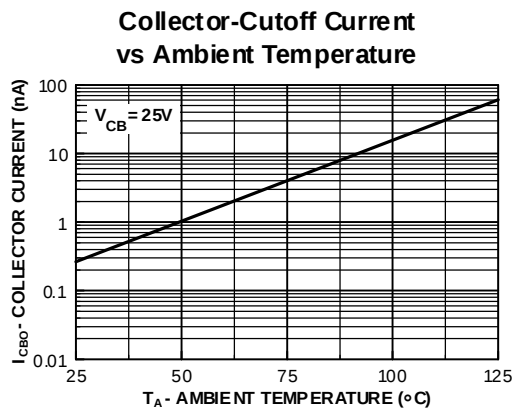
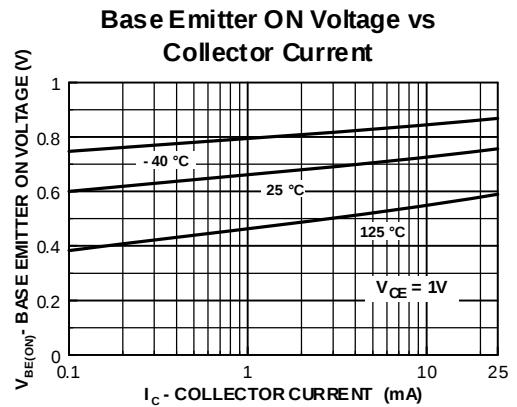
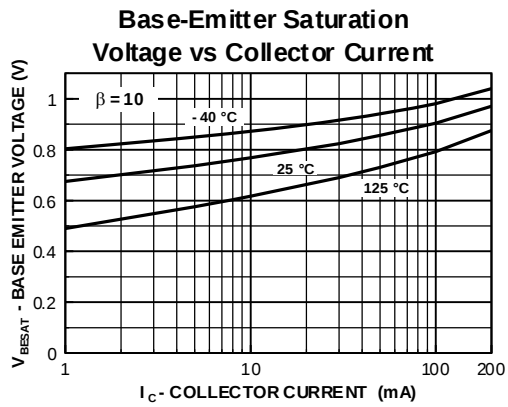
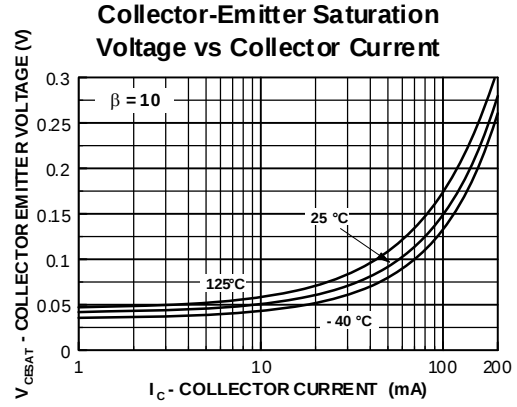
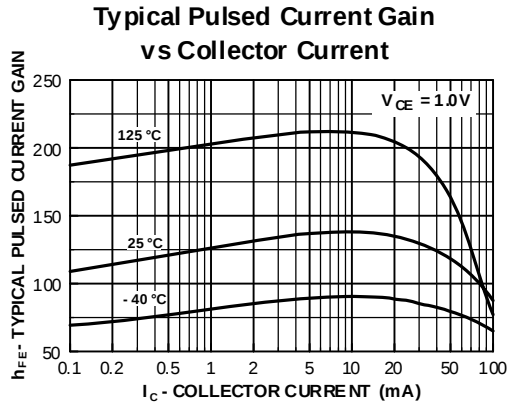
Electrical Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
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	$I_C = -10\mu\text{A}, I_E = 0$	-40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\mu\text{A}, I_C = 0$	-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					
f_T	Current Gain - Bandwidth Product	$I_C = -10\text{mA}, V_{CE} = -20\text{V},$ $f = 100\text{MHz}$	250		MHz
C_{obo}	Output Capacitance	$V_{CB} = -5.0\text{V}, I_E = 0,$ $f = 100\text{kHz}$		4.5	pF
C_{ibo}	Input Capacitance	$V_{EB} = -0.5\text{V}, I_C = 0,$ $f = 100\text{kHz}$		10.0	pF
NF	Noise Figure	$I_C = -100\mu\text{A}, V_{CE} = -5.0\text{V},$ $R_S = 1.0\text{k}\Omega,$ $f = 10\text{Hz to } 15.7\text{kHz}$		4.0	dB
SWITCHING CHARACTERISTICS					
t_d	Delay Time	$V_{CC} = -3.0\text{V}, V_{BE} = -0.5\text{V}$		35	ns
t_r	Rise Time	$I_C = -10\text{mA}, I_{B1} = -1.0\text{mA}$		35	ns
t_s	Storage Time	$V_{CC} = -3.0\text{V}, I_C = -10\text{mA},$		225	ns
t_f	Fall Time	$I_{B1} = I_{B2} = -1.0\text{mA}$		75	ns

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

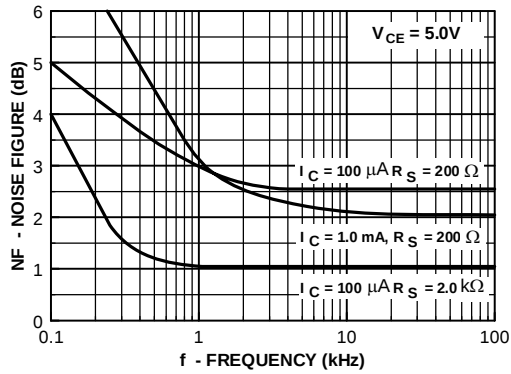
Part Number	Marking	Package	Packing Method	Pack Qty
2N3906BU	2N3906	TO-92	BULK	10000
2N3906TA	2N3906	TO-92	AMMO	2000
2N3906TAR	2N3906	TO-92	AMMO	2000
2N3906TF	2N3906	TO-92	TAPE REEL	2000
2N3906TFR	2N3906	TO-92	TAPE REEL	2000
MMBT3906	2A	SOT-23	TAPE REEL	3000
PZT3906	3906	SOT-223	TAPE REEL	2500

Typical Performance Characteristics

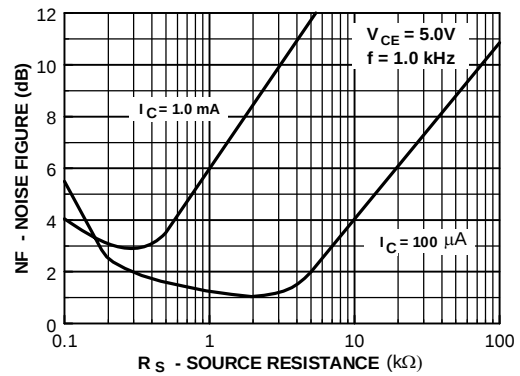


Typical Performance Characteristics (continued)

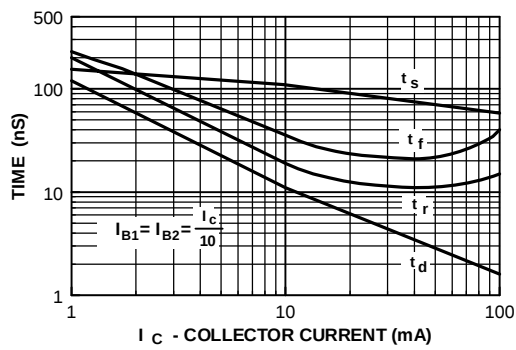
Noise Figure vs Frequency



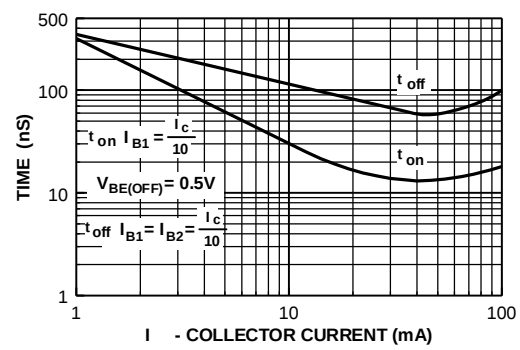
Noise Figure vs Source Resistance



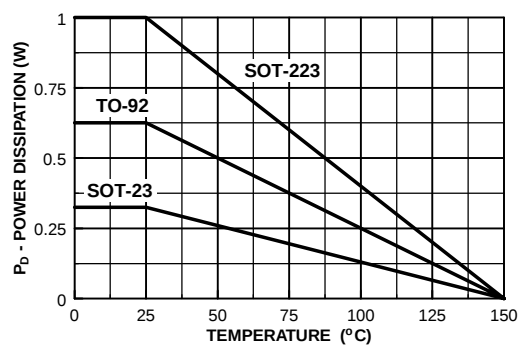
Switching Times vs Collector Current



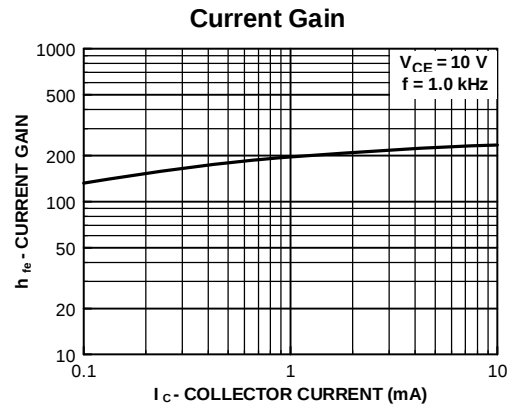
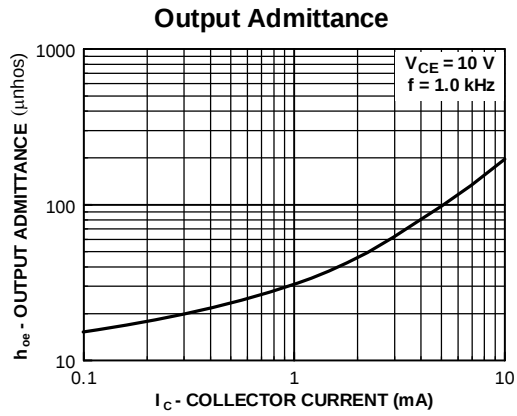
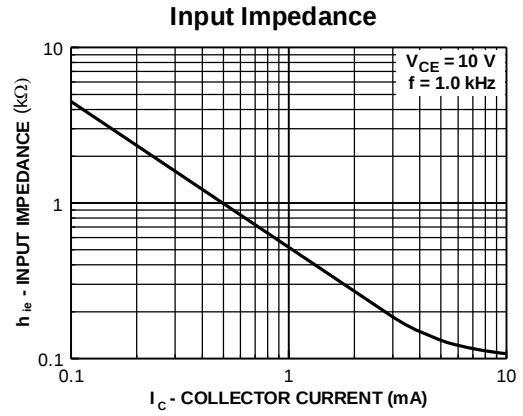
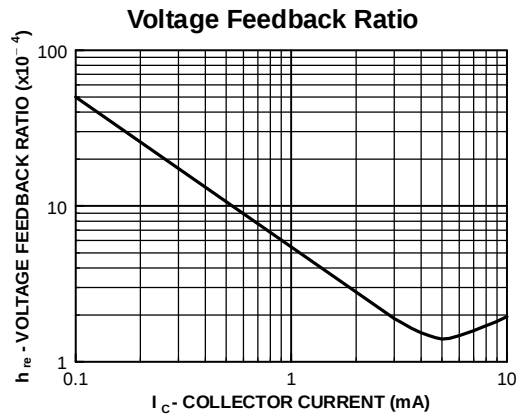
Turn On and Turn Off Times vs Collector Current



Power Dissipation vs Ambient Temperature



Typical Performance Characteristics (continued)





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