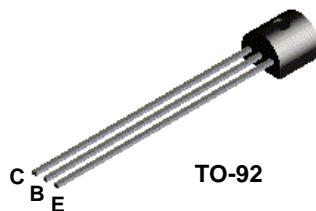


2N3905



PNP General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 100 mA.

Absolute Maximum Ratings*

TA = 25°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	°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
		2N3905	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	°C/W

PNP General Purpose Amplifier

(continued)

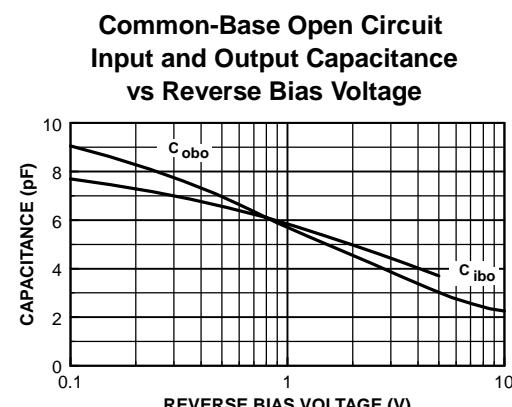
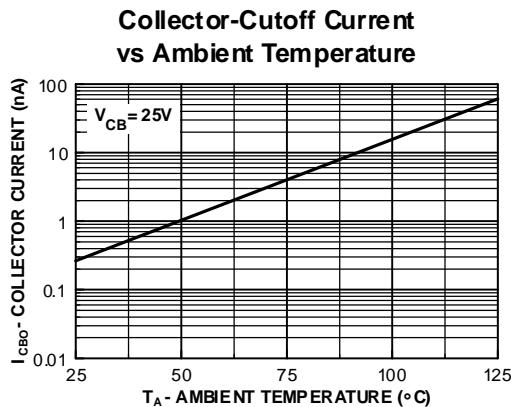
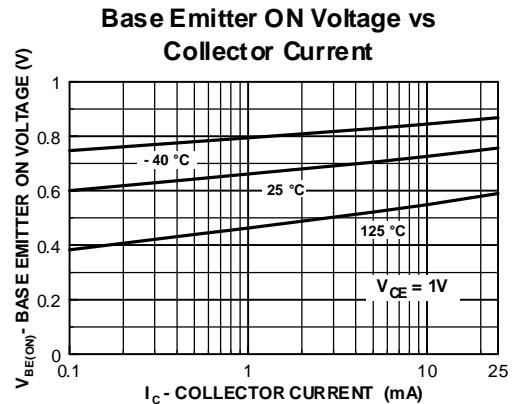
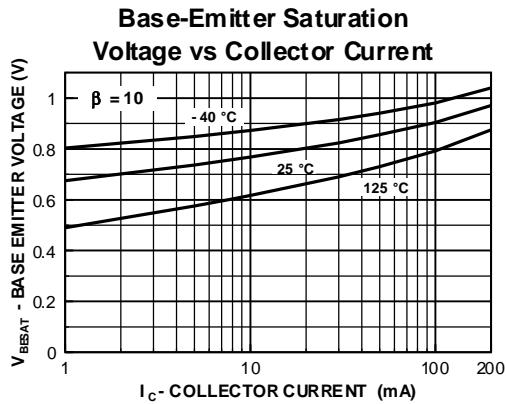
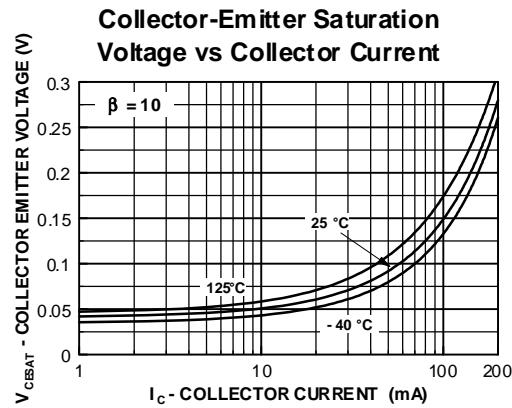
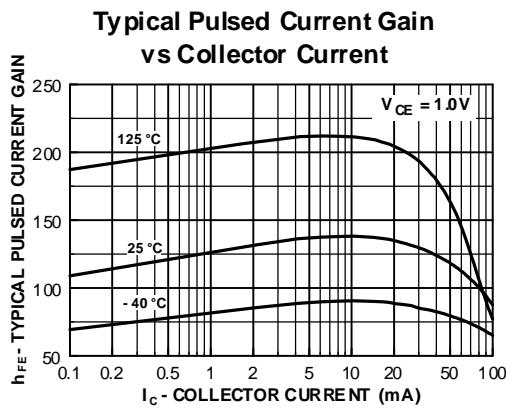
Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	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_{CEX}	Collector Cutoff Current	$V_{CE} = 30 \text{ V}, V_{OB} = 3.0 \text{ V}$		50	nA
I_{BL}	Base Cutoff Current	$V_{CE} = 30 \text{ V}, V_{OB} = 3.0 \text{ V}$		50	nA
ON CHARACTERISTICS*					
h_{FE}	DC Current Gain	$V_{CE} = 1.0 \text{ V}, I_C = 0.1 \text{ mA}$	30		
		$V_{CE} = 1.0 \text{ V}, I_C = 1.0 \text{ mA}$	40		
		$V_{CE} = 1.0 \text{ V}, I_C = 10 \text{ mA}$	50		
		$V_{CE} = 1.0 \text{ V}, I_C = 50 \text{ mA}$	30		
		$V_{CE} = 1.0 \text{ V}, I_C = 100 \text{ mA}$	15		
$V_{CE(\text{sat})}$	Collector-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$		0.25	V
		$I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$		0.40	V
$V_{BE(\text{sat})}$	Base-Emitter Saturation Voltage	$I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$	0.65	0.85	V
		$I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$		0.95	V
SMALL SIGNAL CHARACTERISTICS					
C_{ob}	Output Capacitance	$V_{CB} = 5.0 \text{ V}, f = 1.0 \text{ MHz}$		4.5	pF
C_{ib}	Input Capacitance	$V_{EB} = 0.5 \text{ V}, f = 1.0 \text{ MHz}$		10	pF
h_{fe}	Small-Signal Current Gain	$I_C = 10 \text{ mA}, V_{CE} = 20 \text{ V}, f = 100 \text{ MHz}$	2.0		
h_{re}	Small-Signal Current Gain	$I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ V}, f = 1.0 \text{ kHz}$	50	200	
h_{re}	Voltage Feedback Ratio		0.1	5.0	$\times 10^{-4}$
h_{ie}	Input Impedance		0.5	8.0	kΩ
h_{oe}	Output Impedance		1.0	40	μmhos
NF	Noise Figure	$V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A}, R_S = 1.0 \text{ kΩ}, B_W = 10 \text{ Hz to } 15.7 \text{ kHz}$		5.0	dB
SWITCHING CHARACTERISTICS					
t_d	Delay Time	$V_{CC} = 3.0 \text{ V}, I_{CS} = 10 \text{ mA}, I_{B1} = 1.0 \text{ mA}, V_{OB(\text{off})} = 3.0 \text{ V}$		35	ns
t_r	Rise Time			35	ns
t_s	Storage Time	$V_{CC} = 3.0 \text{ V}, I_{CS} = 10 \text{ mA}, I_{B1} = I_{B2} = 1.0 \text{ mA}$		200	ns
t_f	Fall Time			60	ns

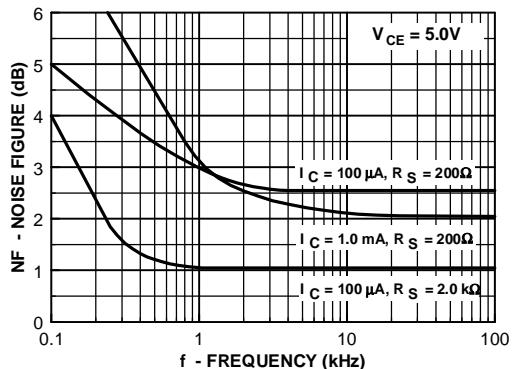
* Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$

Typical Characteristics

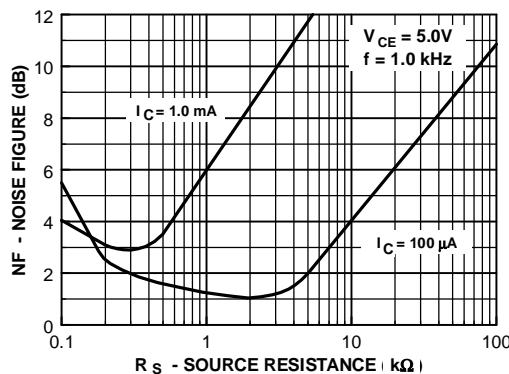
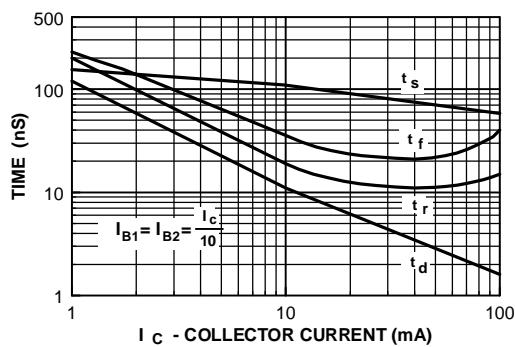
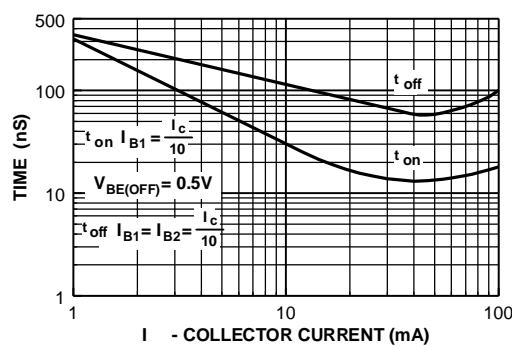
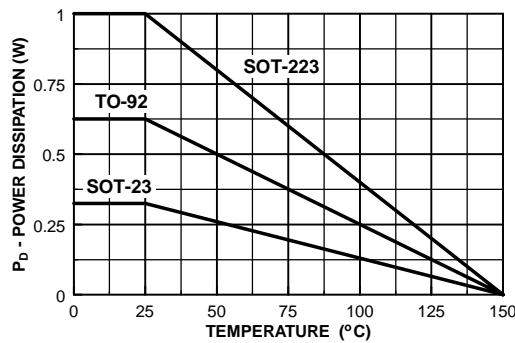


Typical Characteristics (continued)

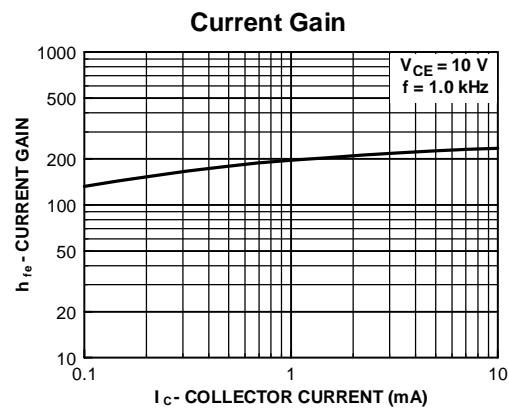
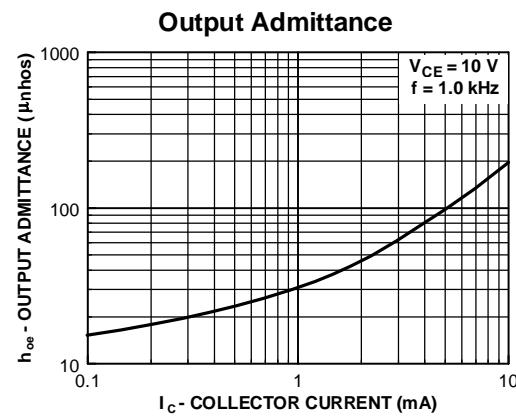
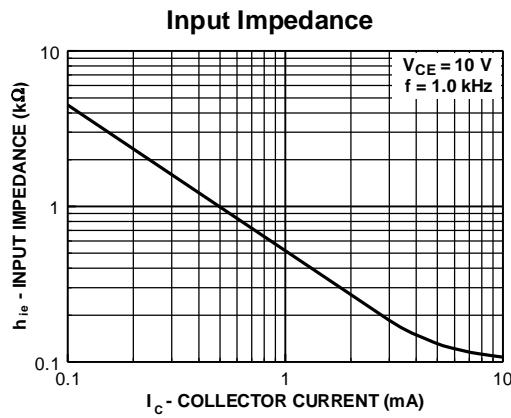
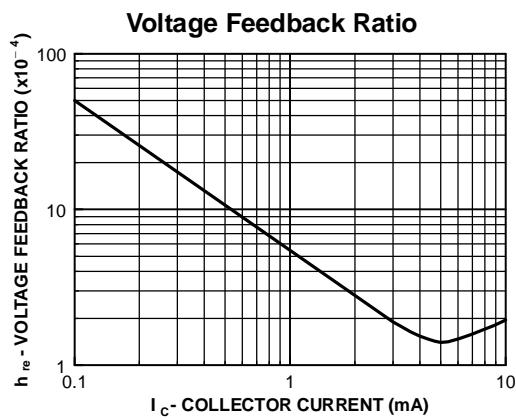
Noise Figure vs Frequency



Noise Figure vs Source Resistance

Switching Times
vs Collector CurrentTurn On and Turn Off Times
vs Collector CurrentPower Dissipation vs
Ambient Temperature

Typical Characteristics (continued)



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