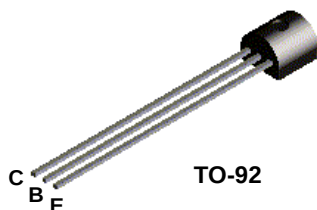


2N4123



NPN 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	30	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
		2N4123	
P _D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
R _{θJC}	Thermal Resistance, Junction to Case	83.3	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	200	°C/W

NPN 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*	$I_C = 1.0\text{ mA}, I_B = 0$	30		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_{CBO}	Collector Cutoff Current	$V_{CB} = 20\text{ V}, I_E = 0$		50	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 3.0\text{ V}, I_C = 0$		50	nA
ON CHARACTERISTICS*					
h_{FE}	DC Current Gain	$V_{CE} = 1.0\text{ V}, I_C = 2.0\text{ mA}$ $V_{CE} = 1.0\text{ V}, I_C = 50\text{ mA}$	50 25	150	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 50\text{ mA}, I_B = 5.0\text{ mA}$		0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 50\text{ mA}, I_B = 5.0\text{ mA}$		0.95	V
SMALL SIGNAL CHARACTERISTICS					
C_{ob}	Output Capacitance	$V_{CB} = 5.0\text{ V}, f = 100\text{ kHz}$		4.0	pF
C_{ib}	Input Capacitance	$V_{EB} = 0.5\text{ V}, f = 0.1\text{ MHz}$		8.0	pF
h_{fe}	Small-Signal Current Gain	$I_C = 2.0\text{ mA}, V_{CE} = 10\text{ V},$ $f = 1.0\text{ kHz}$ $I_C = 10\text{ mA}, V_{CE} = 20\text{ V},$ $f = 100\text{ MHz}$	50 2.5	200	
f_T	Current Gain - Bandwidth Product	$I_C = 10\text{ mA}, V_{CE} = 20\text{ V}$ $f = 100\text{ MHz}$	250		MHz
NF	Noise Figure	$V_{CE} = 5.0\text{ V}, I_C = 100\text{ }\mu\text{A},$ $R_S = 1.0\text{ k}\Omega,$ $B_W = 10\text{ Hz to }15.7\text{ kHz}$		6.0	dB

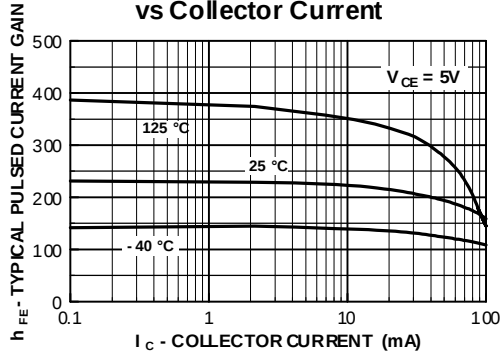
*Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$

NPN General Purpose Amplifier (continued)

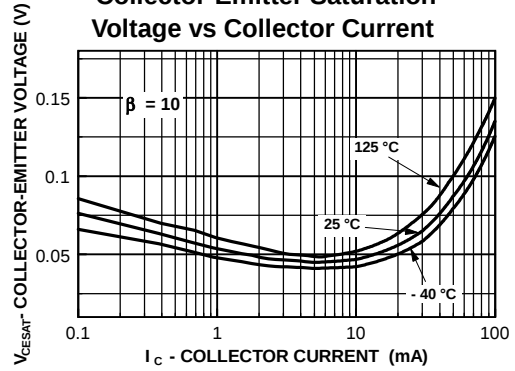
2N4123

Typical Characteristics

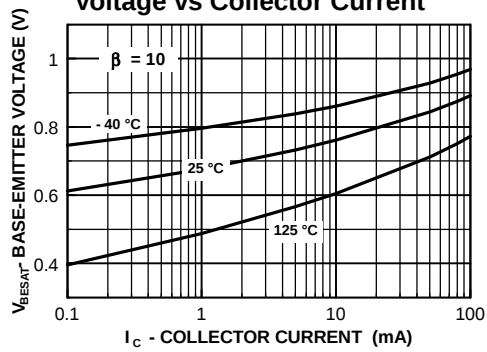
Typical Pulsed Current Gain
vs Collector Current



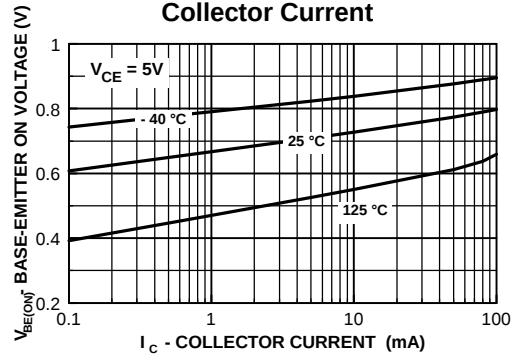
Collector-Emitter Saturation
Voltage vs Collector Current



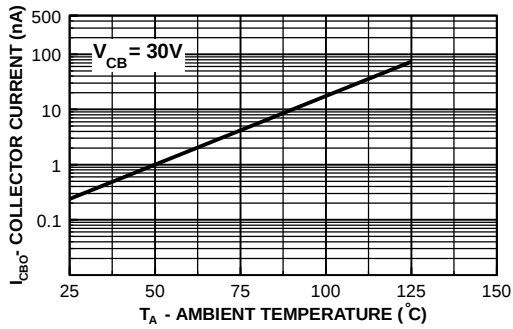
Base-Emitter Saturation
Voltage vs Collector Current



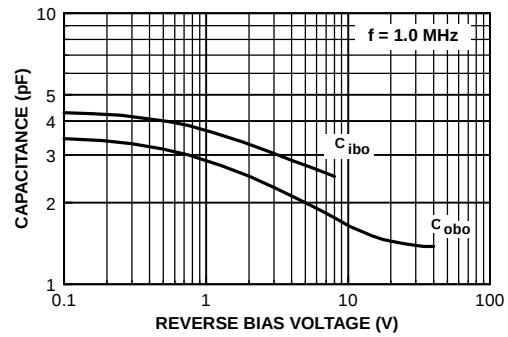
Base-Emitter ON Voltage vs
Collector Current



Collector-Cutoff Current
vs Ambient Temperature



Capacitance vs
Reverse Bias Voltage

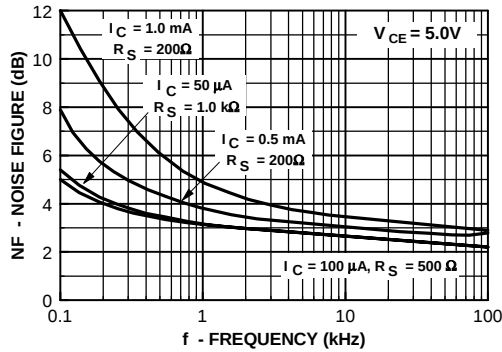


NPN General Purpose Amplifier

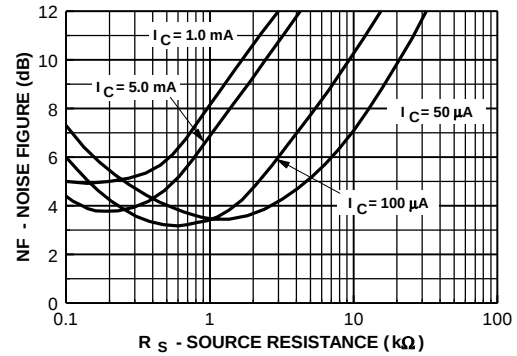
(continued)

Typical Characteristics (continued)

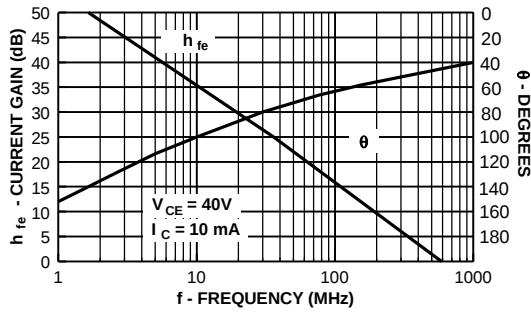
Noise Figure vs Frequency



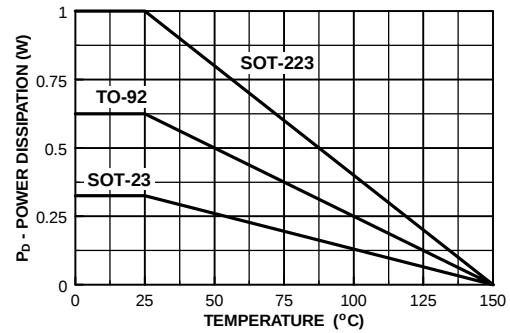
Noise Figure vs Source Resistance



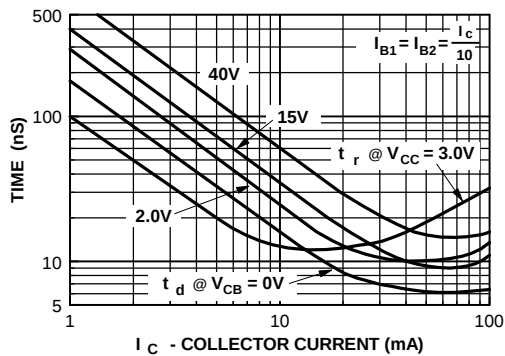
Current Gain and Phase Angle vs Frequency



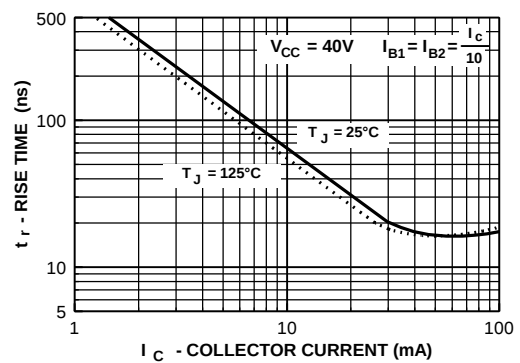
Power Dissipation vs Ambient Temperature



Turn-On Time vs Collector Current



Rise Time vs Collector Current

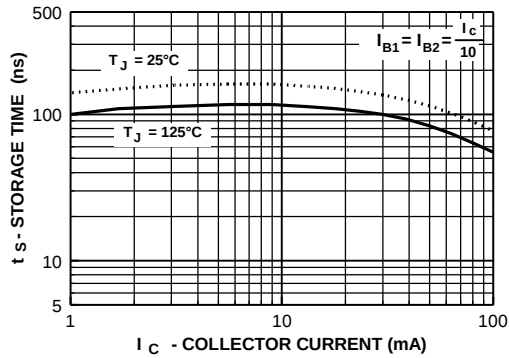


NPN General Purpose Amplifier (continued)

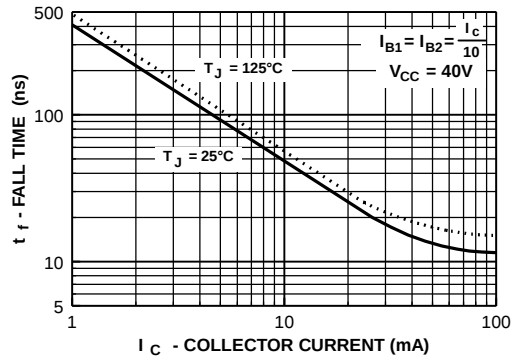
2N4123

Typical Characteristics (continued)

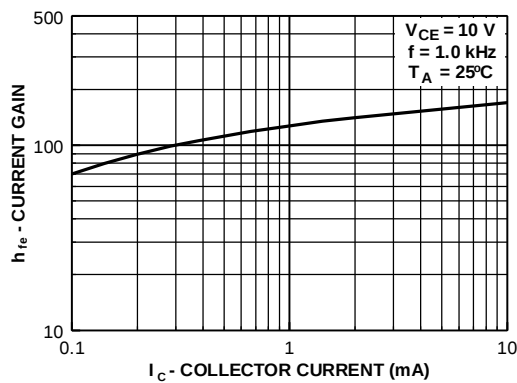
Storage Time vs Collector Current



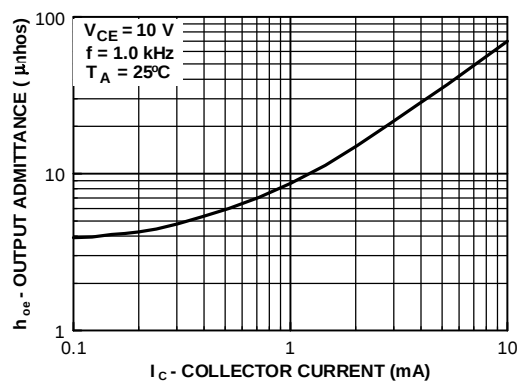
Fall Time vs Collector Current



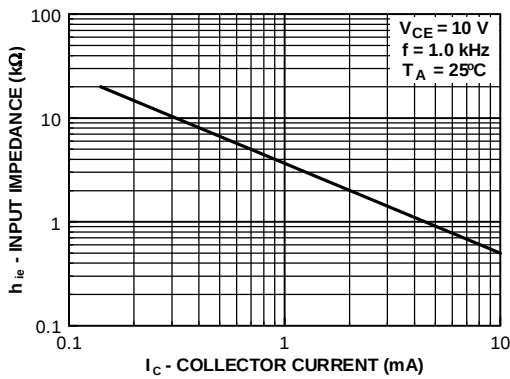
Current Gain



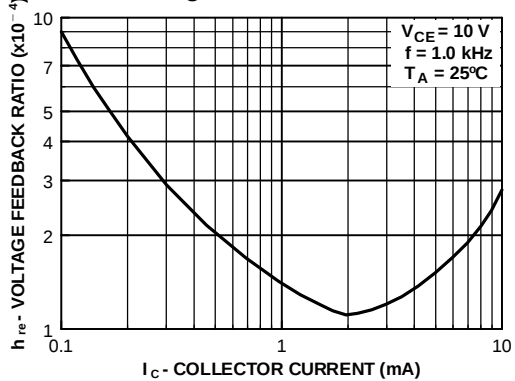
Output Admittance



Input Impedance



Voltage Feedback Ratio



Test Circuits

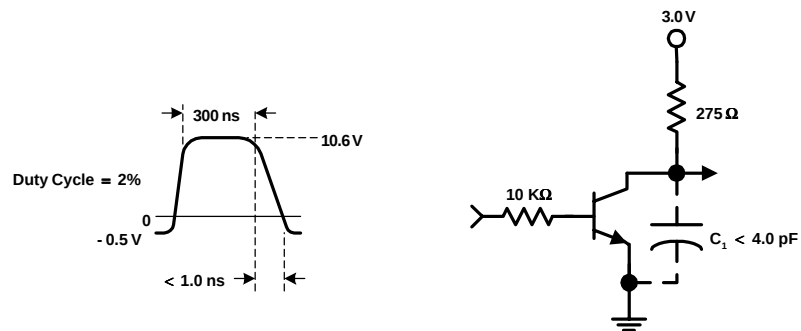


FIGURE 1: Delay and Rise Time Equivalent Test Circuit

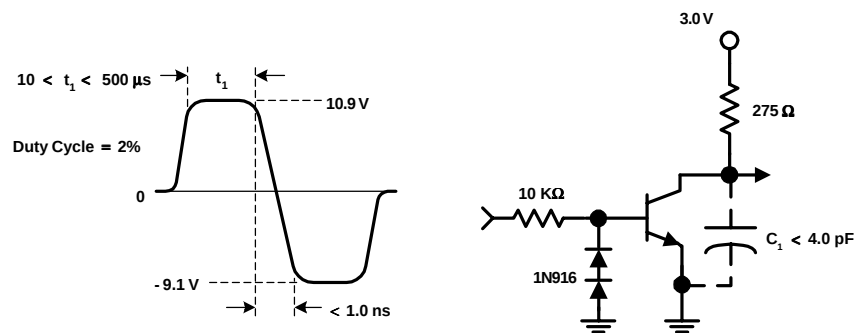


FIGURE 2: Storage and Fall Time Equivalent Test Circuit

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