



Discrete POWER & Signal Technologies

PN4122



PNP General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 100 mA. Sourced from Process 66. See 2N3906 for characteristics.

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
		PN4122	
P _D	Total Device Dissipation Derate above 25°C	625	mW
		5.0	mW/°C
R _{θJC}	Thermal Resistance, Junction to Case	83.3	°C/W
R _{θJA}	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
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OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	$I_C = 10 \text{ mA}, I_B = 0$	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
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$I_C = 10 \text{ } \mu\text{A}$	40		nA
I_B	Base Cutoff Current	$V_{CE} = 30 \text{ V}$		25	nA
I_{CES}	Collector Cutoff Current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 30 \text{ V}, T_A = 65 \text{ }^\circ\text{C}$		25 25	nA μA

ON CHARACTERISTICS*

h_{FE}	DC Current Gain	$V_{CE} = 1.0 \text{ V}, I_C = 100 \text{ } \mu\text{A}$ $V_{CE} = 1.0 \text{ V}, I_C = 1.0 \text{ mA}$ $V_{CE} = 1.0 \text{ V}, I_C = 10 \text{ mA}$ $V_{CE} = 1.0 \text{ V}, I_C = 50 \text{ mA}$	100 150 150 30	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 1.0 \text{ mA}, I_B = 0.1 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$		0.13 0.14 0.30	V V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 1.0 \text{ mA}, I_B = 0.1 \text{ mA}$ $I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA}$ $I_C = 50 \text{ mA}, I_B = 5.0 \text{ mA}$	0.70	0.75 0.90 1.10	V V V

SMALL SIGNAL CHARACTERISTICS

C_{ob}	Output Capacitance	$V_{CB} = 10 \text{ V}, f = 1.0 \text{ MHz}$		4.5	pF
C_{ib}	Input Capacitance	$V_{EB} = 0.5 \text{ V}, f = 1.0 \text{ MHz}$		8.0	pF
h_{fe}	Small-Signal Current Gain	$I_C = 10 \text{ mA}, V_{CE} = 20 \text{ V},$ $f = 100 \text{ MHz}$ $I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ V},$ $f = 1 \text{ kHz}$	4.5 150	450	
h_{ie}	Input Impedance	$I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ V},$	4.0	12	k Ω
h_{re}	Voltage Feedback Ratio	$f = 1.0 \text{ kHz}$		4.0	$\times 10^{-4}$
h_{oe}	Output Admittance		8.0	40	μmhos
$r_b' C_c$	Collector-Base Time Constant	$V_{CE} = 20 \text{ V}, I_C = 10 \text{ mA}$ $f = 80 \text{ MHz}$		50	ps
NF	Noise Figure	$V_{CE} = 5.0 \text{ V}, I_C = 1.0 \text{ mA},$ $R_S = 100 \text{ } \Omega, f = 100 \text{ MHz},$ $B_W = 15 \text{ MHz}$ $V_{CE} = 5.0 \text{ V}, I_C = 100 \text{ } \mu\text{A},$ $R_S = 1.0 \text{ k}\Omega, P_{B_W} = 15.7 \text{ kHz}$		6.0 4.0	dB dB

SWITCHING CHARACTERISTICS

t_{on}	Turn-on Time	$V_{CC} = 30 \text{ V}, I_C = 50 \text{ mA},$		40	ns
t_d	Delay Time	$I_{B1} = 5.0 \text{ mA}, V_{BE(off)} = 3.0 \text{ V}$		15	ns
t_r	Rise Time			40	ns
t_{off}	Turn-off Time	$V_{CC} = 30 \text{ V}, I_C = 50 \text{ mA}$		150	ns
t_s	Storage Time	$I_{B1} = I_{B2} = 5.0 \text{ mA}$		140	ns
t_f	Fall Time			40	ns

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