



ELECTRONICS, INC.
 44 FARRAND STREET
 BLOOMFIELD, NJ 07003
 (973) 748-5089
<http://www.nteinc.com>

NTE123AP

Silicon NPN Transistor

Audio Amplifier, Switch

(Compl to NTE159)

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CEO}	40V
Collector-Base Voltage, V_{CB}	60V
Emitter-Base Voltage, V_{EB}	6V
Continuous Collector Current, I_C	600mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	625mW
Derate Above 25°C	5.0mW/ $^\circ\text{C}$
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	1.5W
Derate Above 25°C	12mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$
Thermal Resistance, Junction to Case, R_{thJC}	83.3 $^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient, R_{thJA}	200 $^\circ\text{C/W}$

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$, $I_B = 0$, Note 1	40	–	–	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 0.1\text{mA}$, $I_E = 0$	60	–	–	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 0.1\text{mA}$, $I_C = 0$	6	–	–	V
Collector Cutoff Current	I_{CEV}	$V_{CE} = 35\text{V}$, $V_{EB(off)} = 0.4\text{V}$	–	–	0.1	μA
Base Cutoff Current	I_{BEV}	$V_{CE} = 35\text{V}$, $V_{EB(off)} = 0.4\text{V}$	–	–	0.1	μA
ON Characteristics (Note 1)						
DC Current Gain	h_{FE}	$V_{CE} = 1\text{V}$, $I_C = 0.1\text{mA}$	20	–	–	
		$V_{CE} = 1\text{V}$, $I_C = 1\text{mA}$	40	–	–	
		$V_{CE} = 1\text{V}$, $I_C = 10\text{mA}$	80	–	–	
		$V_{CE} = 1\text{V}$, $I_C = 150\text{mA}$	100	–	300	
		$V_{CE} = 1\text{V}$, $I_C = 500\text{mA}$	40	–	–	

Note 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Note 1) (Cont'd)						
Collector–Emitter Saturation Voltage	V _{CE(sat)}	I _C = 150mA, I _B = 15mA	–	–	0.4	V
		I _C = 500mA, I _B = 50mA	–	–	0.75	V
Base–Emitter Saturation Voltage	V _{BE(sat)}	I _C = 150mA, I _B = 15mA	0.75	–	0.95	V
		I _C = 500mA, I _B = 50mA	–	–	1.2	V
Small–Signal Characteristics						
Current Gain–Bandwidth Product	f _T	I _C = 20mA, V _{CE} = 10V, f = 100MHz	250	–	–	MHz
Collector–Base Capacitance	C _{cb}	V _{CB} = 5V, I _E = 0, f = 100kHz	–	–	6.5	pF
Emitter–Base Capacitance	C _{eb}	V _{CB} = 0.5V, I _C = 0, f = 100kHz	–	–	30	pF
Input Impedance	h _{ie}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	1.0	–	15	kΩ
Voltage Feedback Ratio	h _{re}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	0.1	–	8.0	x 10 ^{–6}
Small–Signal Current Gain	h _{fe}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	40	–	500	
Output Admittance	h _{oe}	I _C = 1mA, V _{CE} = 10V, f = 1kHz	1.0	–	30	μmhos
Switching Characteristics						
Delay Time	t _d	V _{CC} = 30V, V _{EB(off)} = 2V, I _C = 150mA, I _{B1} = 15mA	–	–	15	ns
Rise Time	t _r		–	–	20	ns
Storage Time	t _s	V _{CC} = 30V, I _C = 150mA, I _{B1} = I _{B2} = 15mA	–	–	225	ns
Fall Time	t _f		–	–	30	ns

Note 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

