ELECTRONICS, INC.
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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°C), P_D 625mW
Derate Above 25°C . . . . . 5.0mW/°C
Total Device Dissipation (T_C = +25°C), P_D 1.5W
Derate Above 25°C . . . . . 12mW/°C
Operating Junction Temperature Range, T_J . . . . . –55° to +150°C
Storage Temperature Range, T_{stg} . . . . . –55° to +150°C
Thermal Resistance, Junction to Case, R_{thJC} . . . . . 83.3°C/W
Thermal Resistance, Junction to Ambient, R_{thJA} . . . . . 200°C/W

Electrical Characteristics: (T_A = +25°C unless otherwise specified)

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

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Electrical Characteristics (Cont'd): (T_A = +25°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 ≤ 300μs, Duty Cycle ≤ 2%.