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## NTE159

### Silicon PNP Transistor Audio Amplifier, Switch (Compl to NTE123AP)

**Absolute Maximum Ratings:**

Collector-Emitter Voltage, $V_{CEO}$ .....	80V
Collector-Base Voltage, $V_{CBO}$ .....	80V
Emitter-Base Voltage, $V_{EBO}$ .....	5V
Continuous Collector Current, $I_C$ .....	800mA
Total Device Dissipation ( $T_A = 25^\circ\text{C}$ ), $P_D$ .....	625mW
Derate Above $25^\circ\text{C}$ .....	5mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Thermal Resistance, Junction to Case, $R_{\theta JC}$ .....	83.3 $^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient, $R_{\theta JA}$ .....	200 $^\circ\text{C/W}$

Note 1. Matched complementary pairs are available upon request (NTE159MCP). Matched complementary pairs have their gain specification ( $h_{FE}$ ) matched to within 10% of each other.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$ , $I_B = 0$ , Note 2	80	-	-	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$ , $I_E = 0$	80	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$ , $I_C = 0$	5	-	-	V
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 50\text{V}$ , $I_E = 0$	-	-	50	nA
		$V_{CB} = 50\text{V}$ , $I_E = 0$ , $T_A = +75^\circ\text{C}$	-	-	5	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$		-	-	100	nA
<b>ON Characteristics (Note 2)</b>						
DC Current Gain	$h_{FE}$	$V_{CE} = 10\text{V}$ , $I_C = 100\mu\text{A}$	25	-	-	
		$V_{CE} = 10\text{V}$ , $I_C = 1\text{mA}$	40	-	-	
		$V_{CE} = 10\text{V}$ , $I_C = 10\text{mA}$	50	-	250	
		$V_{CE} = 10\text{V}$ , $I_C = 100\text{mA}$	40	-	-	
		$V_{CE} = 10\text{V}$ , $I_C = 500\text{mA}$	30	-	-	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 150\text{mA}$ , $I_B = 15\text{mA}$	-	-	0.15	V
		$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$	-	-	0.5	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 150\text{mA}$ , $I_B = 15\text{mA}$	-	-	0.9	V
		$I_C = 500\text{mA}$ , $I_B = 50\text{mA}$	-	-	1.1	V

Note 2. 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
<b>Dynamic Characteristics</b>						
Output Capacitance	$C_{ob}$	$V_{CB} = 20\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	30	pF
Input Capacitance	$C_{ib}$	$V_{BE} = 500\text{mV}, f = 1\text{MHz}$	-	-	110	pF
Small-Signal Current Gain	$h_{fe}$	$I_C = 500\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$	1	-	5	
Noise Figure	NF	$I_C = 100\text{mA}, V_{CE} = 10\text{V}, R_S = 1\text{k}\Omega, f = 1\text{kHz}, B_W = 1\text{Hz}$	-	-	3	dB
<b>Switching Characteristics</b>						
Turn-On Time	$t_{on}$	$V_{CC} = 30\text{V}, I_C = 500\text{mA}, I_{B1} = I_{B2} = 50\text{mA}$	-	-	100	ns
Turn-Off Time	$t_{off}$		-	-	400	ns

