

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	1.0A
Total Device Dissipation ($T_A = 25^\circ\text{C}$), P_D	625mW
Derate Above 25°C	5mW/ $^\circ\text{C}$
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, $R_{\theta JC}$	83.3 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient, $R_{\theta JA}$	200 $^\circ\text{C}/\text{W}$

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
OFF Characteristics						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$, $I_B = 0$	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	μA
Emitter Cutoff Current	I_{EBO}		–	–	100	nA

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	$V_{CE} = 10\text{V}, I_C = 0.1\text{mA}$	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	$V_{CE(sat)}$	$I_C = 150\text{mA}, I_B = 15\text{mA}, \text{Note 2}$	–	–	0.15	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}, \text{Note 2}$	–	–	0.5	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 150\text{mA}, I_B = 15\text{mA}, \text{Note 2}$	–	–	0.9	V
		$I_C = 500\text{mA}, I_B = 50\text{mA}, \text{Note 2}$	–	–	1.1	V
Base–Emitter ON Voltage	$V_{BE(on)}$	$I_C = 500\text{mA}, V_{CE} = 500\text{mV}$	–	–	1.1	V
Small–Signal Characteristics						
Current Gain–Bandwidth Product	f_T	$I_C = 50\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$	100	–	500	MHz
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 100\text{kHz}$	–	–	30	pF
Input Capacitance	C_{ib}	$V_{CB} = 10\text{V}, I_E = 0, f = 100\text{kHz}$	–	–	110	pF
Input Impedance	h_{ie}	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	–	550	–	$\text{k}\Omega$
Voltage Feedback Ratio	h_{re}	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	–	100	–	$\times 10^{-6}$
Small–Signal Current Gain	h_{fe}	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	–	200	–	
Output Admittance	h_{oe}	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 1\text{kHz}$	–	100	–	μmhos
Noise Figure	NF	$I_C = 100\mu\text{A}, V_{CE} = 10\text{V}, R_S = 1\text{k}\Omega, f = 1\text{kHz}$	–	–	3	dB
Switching Characteristics						
Turn–On Time	t_{on}	$V_{CC} = 30\text{V}, V_{BE(off)} = 3.8\text{V}, I_C = 500\text{mA}, I_{B1} = 50\text{mA}$	–	–	100	ns
Turn–Off Time	t_{off}	$V_{CC} = 30\text{V}, I_C = 500\text{mA}, I_{B1} = I_{B2} = 50\text{mA}$	–	–	400	ns

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

