

## NTE194 Silicon NPN Transistor Audio Power Amplifier

**Description:**

The NTE194 is a silicon NPN amplifier transistor packaged in a standard TO92 case.

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO}$ .....	160V
Collector–Base Voltage, $V_{CBO}$ .....	180V
Emitter–Base Voltage, $V_{EBO}$ .....	6V
Continuous Collector Current, $I_C$ .....	600mA
Total Device Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ .....	350mW
Derate above $25^\circ\text{C}$ .....	2.8mW/ $^\circ\text{C}$
Total Device Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ .....	1.0W
Derate above $25^\circ\text{C}$ .....	8.0mW/ $^\circ\text{C}$
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, $R_{thJC}$ .....	125 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Ambient (Note 1), $R_{thJA}$ .....	357 $^\circ\text{C}/\text{W}$

Note 1  $R_{thJA}$  is measured with the device soldered into a typical printed circuit board.

**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	$V_{(BR)CEO}$	$I_C = 1\text{mA}$ , $I_B = 0$ , Note 2	180	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$ , $I_E = 0$	180	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$ , $I_C = 0$	6	–	–	V
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 120\text{V}$ , $I_E = 0$	–	–	50	nA
		$V_{CB} = 120\text{V}$ , $I_E = 0$ , $T_A = +100^\circ\text{C}$	–	–	50	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 4\text{V}$ , $I_C = 0$	–	–	50	nA

Note 2 Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle = 2.0%.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>ON Characteristics (Note 2)</b>						
DC Current Gain	$h_{FE}$	$V_{CE} = 5\text{V}, I_C = 1\text{mA}$	80	–	–	
		$V_{CE} = 5\text{V}, I_C = 10\text{mA}$	80	–	250	
		$V_{CE} = 5\text{V}, I_C = 50\text{mA}$	30	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	–	–	0.15	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	–	–	0.20	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	–	–	1.0	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}$	–	–	1.0	V
<b>Small–Signal Characteristics</b>						
Current Gain–Bandwidth Product	$f_T$	$V_{CE} = 10\text{V}, I_C = 10\text{mA}, f = 100\text{MHz}$	100	–	300	MHz
Output Capacitance	$C_{obo}$	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	–	–	6	pF
Input Capacitance	$C_{ibo}$	$V_{BE} = 0.5\text{V}, I_C = 0, f = 1\text{MHz}$	–	–	20	pF
Small–Signal Current Gain	$h_{fe}$	$V_{CE} = 10\text{V}, I_C = 1\text{mA}, f = 1\text{kHz}$	50	–	200	
Noise Figure	NF	$V_{CE} = 5\text{V}, I_C = 250\mu\text{A}, R_S = 1\text{k}\Omega, f = 10\text{Hz to } 15.7\text{kHz}$	–	–	8.0	dB

Note 2 Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle = 2.0%.

