

## NTE199 Silicon NPN Transistor Low Noise, High Gain Amplifier

**Description:**

The NTE199 is a silicon NPN transistor in a TO92 type package designed especially for low noise preamplifier and small signal industrial amplifier applications. This device features low collector saturation voltage, tight beta control, and excellent low noise characteristics.

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Collector–Emitter Voltage, $V_{CEO}$ .....	50V
Collector–Base Voltage, $V_{CBO}$ .....	70V
Emitter–Base Voltage, $V_{EBO}$ .....	5V
Steady State Collector Current (Note 1), $I_C$ .....	100mA
Total Power Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_T$ .....	360mW
Derate Above $+25^\circ\text{C}$ .....	3.3mW/ $^\circ\text{C}$
Total Power Dissipation ( $T_A = +55^\circ\text{C}$ ), $P_T$ .....	260mW
Derate Above $+25^\circ\text{C}$ .....	3.3mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+125^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Lead Temperature (During Soldering, 1/16" from case, 10sec max), $T_L$ .....	$+260^\circ\text{C}$

Note 1. Determined from power limitations due to saturation voltages at this current

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 50\text{V}$	–	–	30	nA
		$V_{CB} = 50\text{V}, T_A = +100^\circ\text{C}$	–	–	10	$\mu\text{A}$
Collector Cutoff Current	$I_{CES}$	$V_{CB} = 50\text{V}$	–	–	30	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 5\text{V}$	–	–	50	nA

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics (Cont'd)</b>						
Forward Current Transfer Ratio	$h_{FE}$	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$	400	–	800	
		$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}$ , Note 2	–	300	–	
Breakdown Voltage Collector-to-Emitter	$V_{(BR)CEO}$	$I_C = 10\text{mA}$ , Note 3	50	–	–	V
Breakdown Voltage Collector-to-Base	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$	70	–	–	V
Breakdown Voltage Emitter-to-Base	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$	5	–	–	V
Collector Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$ , Note 3	–	–	0.125	V
Base Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$ , Note 3	–	–	0.78	V
Base Emitter ON Voltage	$V_{BE(on)}$	$V_{CE} = 10\text{V}, I_C = 2\text{mA}$	0.5	–	0.9	V
<b>Dynamic Characteristics</b>						
Forward Current Transfer Ratio	$h_{fe}$	$V_{CE} = 5\text{V}, I_C = 2\text{mA}, f = 1\text{kHz}$	400	–	1200	
Output Capacitance, Common Base	$C_{cb}$	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{kHz}$	–	–	4	pF
Noise Figure	NF	$I_C = 100\mu\text{A}, V_{CE} = 5\text{V}, R_g = 5\text{k}\Omega, f = 1\text{kHz}$	–	–	3	dB

Note 2. Typically, a minimum of 95% of the distribution is above this value.

Note 3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

