

NTE172A Silicon NPN Transistor Darlington Preamp, Medium Speed Switch

Description:

The NTE172A is a silicon NPN Darlington transistor in a TO92 type case designed for preamplifier input stages requiring input impedances of several megohms or extremely low level, high gain, low noise amplifier applications.

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

Collector–Base Voltage, V_{CBO}	40V
Collector–Emitter Voltage, V_{CEO}	40V
Emitter–Base Voltage, V_{EBO}	12V
Collector Current, I_C	
Continuous	300mA
Pulsed (Note 1)	500mA
Base Current, I_B	50mA
Total Power Dissipation ($T_A = +25^\circ\text{C}$), P_D	400mW
Derate Above 25°C	4mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-65° to $+125^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+150^\circ\text{C}$
Lead Temperature (During Soldering, 1/16" $\pm$ 1/32" from case for 10sec max.), T_L	$+260^\circ\text{C}$

Note 1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 0.1\mu\text{A}$, $I_E = 0$	40	–	–	V
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$, $I_B = 0$	40	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 0.1\mu\text{A}$, $I_C = 0$	12	–	–	V
DC Current Gain	h_{FE}	$V_{CE} = 5\text{V}$, $I_C = 2\text{mA}$	7000	–	70000	
		$V_{CE} = 5\text{V}$, $I_C = 100\text{mA}$	20000	–	–	
Collector Cutoff Current	I_{CBO}	$V_{CB} = 40\text{V}$, $I_E = 0$	–	–	100	nA
		$V_{CB} = 40\text{V}$, $I_E = 0$, $T_A = +100^\circ\text{C}$	–	–	20	μA

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics (Cont'd)						
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 12V, I_C = 0$	–	–	100	nA
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 200mA, I_B = 0.2mA$	–	–	1.4	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 200mA, I_B = 0.2mA$	–	–	1.6	V
Base–Emitter Voltage	V_{BE}	$V_{CE} = 5V, I_C = 200mA$	–	–	1.5	V
Dynamic Characteristics						
Small–Signal Current Gain	h_{fe}	$V_{CE} = 5V, I_C = 2mA, f = 1kHz$	7000	–	–	
Current Gain–High Frequency	$ h_{fe} $	$V_{CE} = 5V, I_C = 2mA, f = 1kHz$	15.6	–	–	dB
Current Gain–Bandwidth Product	f_T	$V_{CE} = 5V, I_C = 2mA, f = 10MHz$	60	–	–	MHz
Input Impedance	h_{ie}	$V_{CE} = 5V, I_C = 2mA, f = 1kHz$	–	650	–	k Ω
Collector–Base Capacitance	C_{cb}	$V_{CB} = 10V, f = 1MHz$	–	7.6	10.0	pF
Emitter Capacitance	C_{eb}	$V_{EB} = 0.5V, f = 1MHz$	–	10.5	–	pF
Noise Voltage	e_n^-	$I_C = 0.6mA, V_{CE} = 5V,$ $R_G = 160k\Omega, f = 10Hz \text{ to } 10kHz,$ $B.W. = 15.7kHz$	–	195	230	nV/ $\sqrt{Hz}$

