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## NTE976 Integrated Circuit Operational Amplifier

**Description:**

The NTE976 is a general purpose operational amplifier with the necessary frequency compensation built into a single 8-Lead DIP type package. Advanced processing techniques make the input currents a factor of ten lower than industry standards like the NTE909. Yet, it is a direct plug-in replacement for the NTE909 and the NTE941M.

This device provides better accuracy and lower noise in high impedance circuitry. The low input currents also make it particularly well suited for long interval integrators or timers, sample and hold circuits, and low frequency waveform generators. Further, replacing circuits where matched transistor pairs buffer the inputs of conventional IC op amps, the NTE976 can give lower offset voltage and drift at a lower cost.

**Features:**

- Offset Voltage over Temperature: 3mV Max
- Input Current over Temperature: 100nA Max
- Offset Current over Temperature: 20nA Max
- Guaranteed Drift Characteristics

**Absolute Maximum Ratings:**

Supply Voltage,	
$V_{CC}$ .....	+18V
$V_{EE}$ .....	-18V
Power Dissipation (Note 1), $P_D$ .....	500mW
Differential Input Voltage, $V_{ID}$ .....	$\pm 30V$
Input Voltage (Note 2), $V_{IN}$ .....	15V
Output Short-Circuit Duration, $t_s$ .....	Indefinite
Operating Temperature Range, $T_A$ .....	0° to +70°C
Storage Temperature Range, $T_{stg}$ .....	-65° to +150°C
Lead Temperature (During Soldering, 10sec), $T_L$ .....	+300°C

Note 1. The maximum junction temperature of the NTE976 is +100°C. The thermal resistance junction to ambient is +100°C/W.

Note 2. For supply voltages less than -15V, the absolute maximum input voltage is equal to the supply voltage.

**Electrical Characteristics:** ( $0^{\circ} \leq T_A \leq +70^{\circ}\text{C}$ ,  $\pm 5\text{V} \leq V_S \leq \pm 15\text{V}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Offset Voltage	$V_{IO}$	$T_A = +25^{\circ}\text{C}$ , $R_S \leq 50\text{k}\Omega$	–	2.0	7.5	mV
		$R_S \leq 50\text{k}\Omega$	–	–	10	mV
Input Offset Current	$I_{IO}$	$T_A = +25^{\circ}\text{C}$	–	3.0	50	nA
			–	–	70	nA
Input Bias Current	$I_{IB}$	$T_A = +25^{\circ}\text{C}$	–	70	250	nA
			–	–	300	nA
Input Resistance	$r_i$	$T_A = +25^{\circ}\text{C}$	0.5	2.0	–	$\text{M}\Omega$
Supply Current	$I_D$	$T_A = +25^{\circ}\text{C}$ , $V_S = \pm 15\text{V}$	–	1.8	3.0	mA
Large Signal Voltage Gain	$A_v$	$T_A = +25^{\circ}\text{C}$ , $V_S = \pm 15\text{V}$ , $V_{OUT} = \pm 10\text{V}$ , $R_L \geq 2\text{k}\Omega$	25	160	–	V/mV
		$V_S = \pm 15\text{V}$ , $V_{OUT} = \pm 10\text{V}$ , $R_L \geq 2\text{k}\Omega$	15	–	–	V/mV
Average Temperature Coefficient of Input Offset Voltage	$\text{TCV}_{IO}$		–	6.0	30	$\mu\text{V}/^{\circ}\text{C}$
Average Temperature Coefficient of Input Offset Current	$\text{TCI}_{IO}$	$+25^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$	–	0.01	0.3	$\text{nA}/^{\circ}\text{C}$
		$0^{\circ}\text{C} \leq T_A \leq +25^{\circ}\text{C}$	–	0.02	0.6	$\text{nA}/^{\circ}\text{C}$
Output Voltage Swing	$V_O$	$V_S = \pm 15\text{V}$ , $R_L = 10\text{k}\Omega$	$\pm 12$	$\pm 14$	–	V
		$V_S = \pm 15\text{V}$ , $R_L = 2\text{k}\Omega$	$\pm 10$	$\pm 13$	–	V
Input Voltage Range	$V_{ICR}$	$V_S = \pm 15\text{V}$	$\pm 12$	+15 –13	–	V
Common Mode Rejection Ratio	CMRR	$R_S \leq 50\text{k}\Omega$	70	90	–	dB
Supply Voltage Rejection Ratio	PSRR	$R_S \leq 50\text{k}\Omega$	70	96	–	dB

