

## NTE975 & NTE975SM Integrated Circuit Operational Amplifier

### Description:

The NTE975 and NTE975SM are general purpose operational amplifiers built on a single chip. The resulting close match and tight thermal coupling gives low offsets and temperature drift as well as fast recovery from thermal transients.

The unity-gain compensation specified makes the circuit stable for all feedback configurations, even with capacitive loads. However, it is possible to optimize compensation for the best high frequency performance at any gain. As a comparator, the output can be clamped at any desired level to make it compatible with logic circuits.

### Features:

- Available in 8-Lead Mini DIP (NTE975) and Surface Mount, SOIC-8 (NTE975SM)
- Frequency Compensation with a Single 30pF Capacitor
- Operation From  $\pm 5V$  to  $\pm 20V$
- Low Current Drain: 1.8mA @  $\pm 20V$
- Continuous Short-Circuit Protection
- Operation as a Comparator with Differential Inputs as High as  $\pm 30V$
- No Latch-Up when Common Mode Range is Exceeded

### Absolute Maximum Ratings:

|   |                               |
|---|-------------------------------|
| Supply Voltage, $V_S$ .....                             | $\pm 22V$                     |
| Power Dissipation (Note 1), $P_D$ .....                 | 500mW                         |
| Differential Input Voltage, $V_{ID}$ .....              | $\pm 30V$                     |
| Input Voltage (Note 2), $V_{IN}$ .....                  | $\pm 15V$                     |
| Output Short-Circuit Duration (Note 3), $t_s$ .....     | Indefinite                    |
| Operating Temperature Range, $T_A$ .....                | $0^\circ$ to $+70^\circ C$    |
| Storage Temperature Range, $T_{stg}$ .....              | $-65^\circ$ to $+150^\circ C$ |
| Lead Temperature (During Soldering, 10sec), $T_L$ ..... | $+300^\circ C$                |

Note 1. For operating at elevated temperatures the devices must be derated based on a maximum junction to case thermal resistance of  $+45^\circ C/W$ , or  $+150^\circ C/W$  junction to ambient.

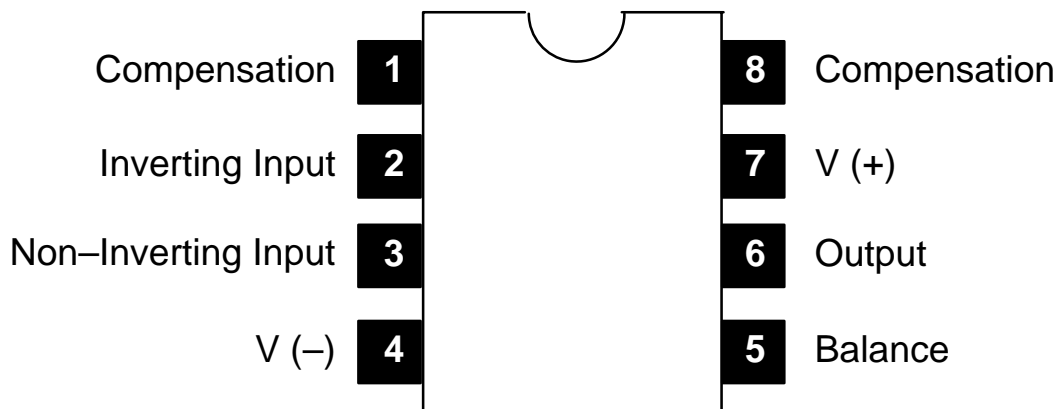
Note 2. For supply voltages less than  $\pm 15V$ , the absolute maximum input voltage is equal to the supply voltage.

Note 3. Continuous short circuit is allow for ambient temperatures to  $+70^\circ C$ .

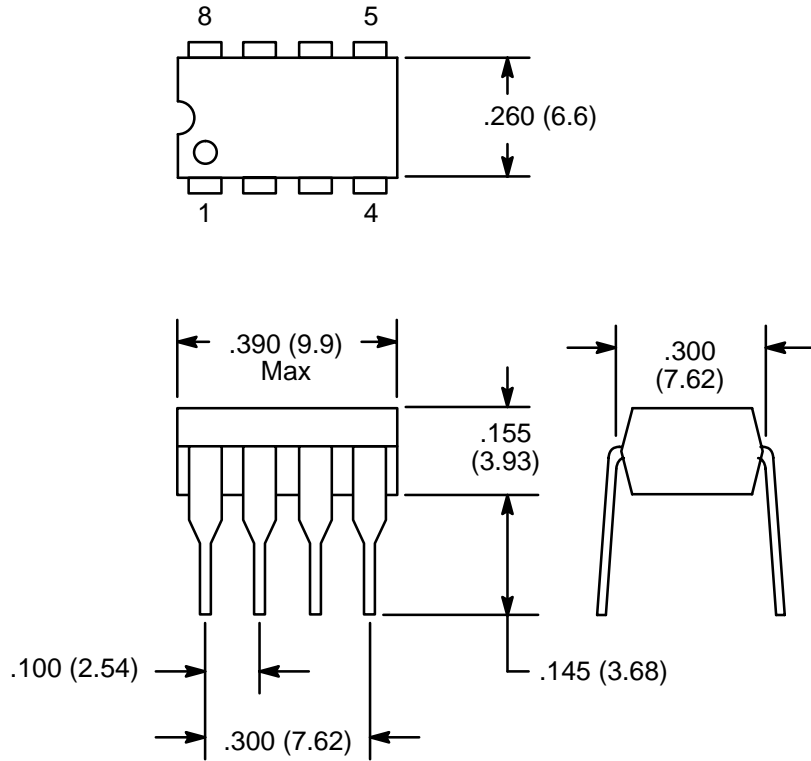
**Electrical Characteristics:** ( $0^{\circ} \leq T_A \leq +70^{\circ}\text{C}$ ,  $\pm 5\text{V} \leq V_S \leq \pm 15\text{V}$  unless otherwise specified)

| Parameter  | Symbol            | Test Conditions   | Min      | Typ      | Max  | Unit                           |
|--|-------------------|---|----------|----------|------|--------------------------------|
| Input Offset Voltage                                       | $V_{IO}$          | $T_A = +25^{\circ}\text{C}$ , $R_S \leq 10\text{k}\Omega$   | –        | 1.0      | 5.0  | mV                             |
|  |                   | $R_S \leq 10\text{k}\Omega$   | –        | –        | 6.0  | mV                             |
| Input Offset Current                                       | $I_{IO}$          | $T_A = +25^{\circ}\text{C}$   | –        | 40       | 200  | nA                             |
|  |                   |   | –        | –        | 300  | nA                             |
| Input Bias Current   | $I_{IB}$          | $T_A = +25^{\circ}\text{C}$   | –        | 120      | 500  | nA                             |
|  |                   |   | –        | –        | 0.8  | $\mu\text{A}$                  |
| Input Resistance   | $r_i$             | $T_A = +25^{\circ}\text{C}$   | 300      | 800      | –    | $\text{k}\Omega$               |
| Supply Current   | $I_D$             | $T_A = +25^{\circ}\text{C}$ , $V_S = \pm 15\text{V}$  | –        | 1.8      | 2.8  | mA                             |
|  |                   | $T_A = +125^{\circ}\text{C}$ , $V_S = \pm 15\text{V}$   | –        | 1.2      | 2.25 | mA                             |
| Large Signal Voltage Gain                                  | $A_v$             | $T_A = +25^{\circ}\text{C}$ , $V_S = \pm 15\text{V}$ ,<br>$V_{OUT} = \pm 10\text{V}$ , $R_L \geq 2\text{k}\Omega$ | 50       | 160      | –    | V/mV                           |
|  |                   | $V_S = \pm 15\text{V}$ , $V_{OUT} = \pm 10\text{V}$ ,<br>$R_L \geq 2\text{k}\Omega$                               | 25       | –        | –    | V/mV                           |
| Average Temperature Coefficient<br>of Input Offset Voltage | $\text{TCV}_{IO}$ | $R_S \leq 50\Omega$   | –        | 3.0      | –    | $\mu\text{V}/^{\circ}\text{C}$ |
|  |                   | $R_S \leq 10\text{k}\Omega$   | –        | 6.0      | –    | $\mu\text{V}/^{\circ}\text{C}$ |
| Output Voltage Swing                                       | $V_O$             | $V_S = \pm 15\text{V}$ , $R_L = 10\Omega$   | $\pm 12$ | $\pm 14$ | –    | V                              |
|  |                   | $V_S = \pm 15\text{V}$ , $R_L = 2\text{k}\Omega$  | $\pm 10$ | $\pm 13$ | –    | V                              |
| Input Voltage Range  | $V_{ICR}$         | $V_S = \pm 15\text{V}$  | $\pm 12$ | –        | –    | V                              |
| Common Mode Rejection Ratio                                | CMRR              | $R_S \leq 10\text{k}\Omega$   | 70       | 90       | –    | dB                             |
| Supply Voltage Rejection Ratio                             | PSRR              | $R_S \leq 10\text{k}\Omega$   | 77       | 90       | –    | dB                             |

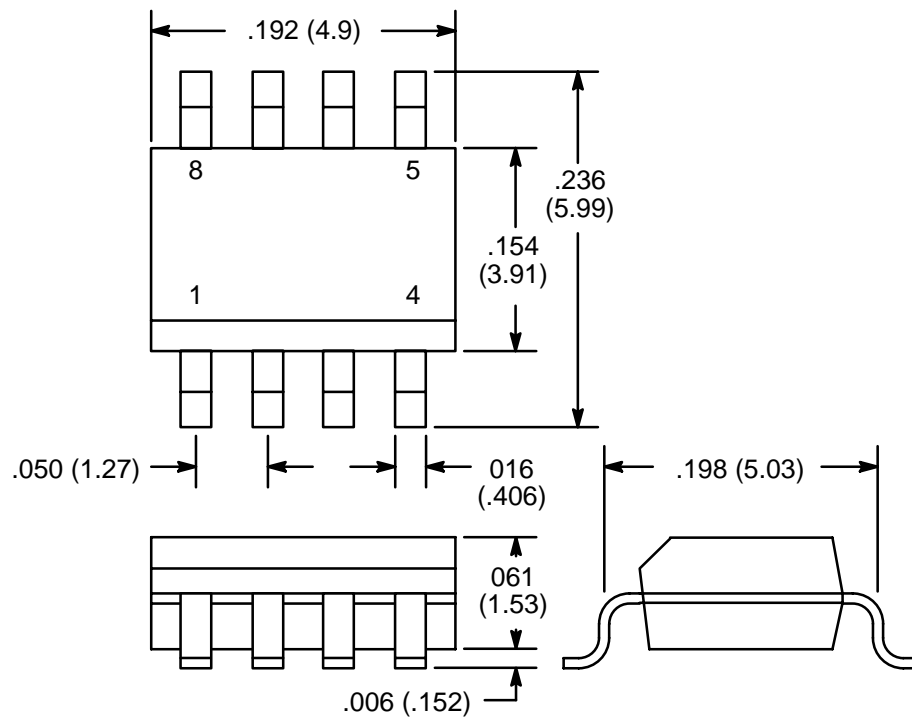
**Pin Connection Diagram**



### NTE975



### NTE975SM



NOTE: Pin1 on Beveled Edge

