



## **NTE927D & NTE927SM Integrated Circuit Differential Video Amplifier**

### **Description:**

The NTE927D and NTE927SM are two-stage, differential input, differential output, wide-band video amplifiers. The use of internal series-shunt feedback gives wide band bandwidth with low phase distortion and high gain stability. Emitter-follower outputs provide a high current drive, low impedance capability. Its 120MHz bandwidth and selectable gains of 10, 100, and 400, without need for frequency compensation, make it a very useful circuit for memory element drivers, pulse amplifiers, and wide band gain stages.

### **Features:**

- 120MHz Bandwidth
- 250k $\Omega$  Input Resistance
- No Frequency Compensation Required
- Selectable Gains of 10, 100 and 400
- High Common Mode Rejection Ratio at High Frequencies

### **Applications:**

- Magnetic Tape Systems
- Disk File Memories
- Thin and Thick Film Memories
- Woven and Plated Wire Memories
- Wide Band Video Amplifiers

### **Absolute Maximum Ratings:**

|                                            |                                  |
|--------------------------------------------|----------------------------------|
| Differential Input Voltage                 | $\pm 5V$                         |
| Common Mode Input Voltage                  | $\pm 6V$                         |
| Supply Voltage, $V_{CC}$                   | $\pm 8V$                         |
| Output Current, $I_O$                      | 10mA                             |
| Power Dissipation (Note 1), $P_D$          | 500mW                            |
| Junction Temperature, $T_J$                | $+100^{\circ}C$                  |
| Storage Temperature Range, $T_{stg}$       | $-65^{\circ}$ to $+150^{\circ}C$ |
| Operating Temperature Range, $T_{opr}$     | $0^{\circ}$ to $+70^{\circ}C$    |
| Lead Temperature (Soldering, 10sec), $T_L$ | $+260^{\circ}C$                  |

Note 1. For operation at elevated temperatures, derate device based on a thermal resistance of  $+150^{\circ}C/W$  junction to ambient or  $+45^{\circ}C/W$  junction to case.

**Electrical Characteristics:** ( $T_A = +25^{\circ}\text{C}$ , unless otherwise specified,  $V_S = \pm 6\text{V}$ )

| Parameter                                                                          | Test Conditions                                                                                   | Min              | Typ                | Max              | Unit                |
|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------|--------------------|------------------|---------------------|
| Differential Voltage Gain<br>Gain 1 (Note 2)<br>Gain 2 (Note 3)<br>Gain 3 (Note 4) | $R_L = 2\text{k}\Omega$ , $V_{OUT} = 3V_{p-p}$                                                    | 250<br>80<br>8.0 | 400<br>100<br>10   | 600<br>120<br>12 |                     |
| Bandwidth<br>Gain 1<br>Gain 2<br>Gain 3                                            |                                                                                                   | —<br>—<br>—      | 40<br>90<br>120    | —<br>—<br>—      | MHz                 |
| Rise Time<br>Gain 1<br>Gain 2<br>Gain 3                                            |                                                                                                   | —<br>—<br>—      | 10.5<br>4.5<br>2.5 | —<br>—<br>—      | ns                  |
| Propagation Delay<br>Gain 1<br>Gain 2<br>Gain 3                                    | $V_{OUT} = 1V_{p-p}$                                                                              | —<br>—<br>—      | 7.5<br>6.0<br>3.6  | —<br>10<br>—     | ns                  |
| Input Resistance<br>Gain 1<br>Gain 2<br>Gain 3                                     |                                                                                                   | —<br>10<br>—     | 4.0<br>30<br>250   | —<br>—<br>—      | k $\Omega$          |
| Input Capacitance                                                                  | Gain 2                                                                                            | —                | 2.0                | —                | pF                  |
| Input Offset Current                                                               |                                                                                                   | —                | 0.4                | 5.0              | $\mu\text{A}$       |
| Input Bias Current                                                                 |                                                                                                   | —                | 9.0                | 30               | $\mu\text{A}$       |
| Input Noise Voltage                                                                | BW = 1kHz to 10MHz                                                                                | —                | 12                 | —                | $\mu\text{V}_{rms}$ |
| Input Voltage Range                                                                |                                                                                                   | $\pm 1.0$        | —                  | —                | V                   |
| Common Mode Rejection Ratio<br>Gain 2<br>Gain 2                                    | $V_{CM} = \pm 1\text{V}$ , $f \leq 100\text{kHz}$<br>$V_{CM} = \pm 1\text{V}$ , $f = 5\text{MHz}$ | 60<br>—          | 86<br>60           | —<br>—           | dB                  |
| Supply Voltage Rejection Ratio<br>Gain 2                                           | $\Delta V_S = \pm 0.5\text{V}$                                                                    | 50               | 70                 | —                | dB                  |
| Output Offset Voltage<br>Gain 1<br>Gain 2 and 3                                    | $R_L = \infty$                                                                                    | —<br>—           | 0.6<br>0.35        | 1.5<br>1.5       | V                   |
| Output Common Mode Voltage                                                         | $R_L = \infty$                                                                                    | 2.4              | 2.9                | 3.4              | V                   |
| Output Voltage Swing                                                               | $R_L = 2\text{k}$                                                                                 | 3.0              | 4.0                | —                |                     |
| Output Sink Current                                                                |                                                                                                   | 2.5              | 3.6                | —                | mA                  |
| Output Resistance                                                                  |                                                                                                   | —                | 20                 | —                | $\Omega$            |
| Power Supply Current                                                               | $R_L = \infty$                                                                                    | —                | 18                 | 24               | mA                  |

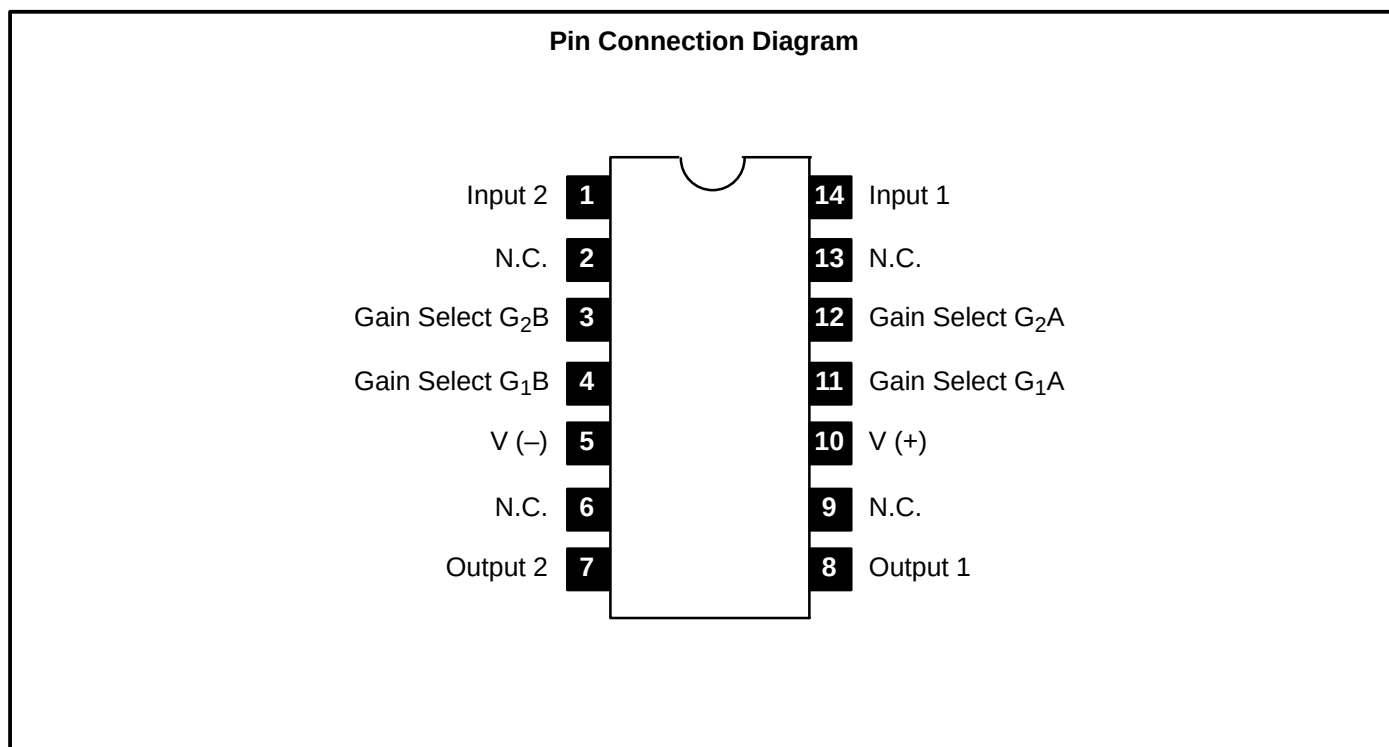
**Electrical Characteristics:** (The following specifications apply for  $0^{\circ} < T_A < +70^{\circ}\text{C}$ ,  $V_S = \pm 6\text{V}$ )

| Parameter                                               | Test Conditions                                              | Min              | Typ         | Max                | Unit             |
|---------------------------------------------------------|--------------------------------------------------------------|------------------|-------------|--------------------|------------------|
| Differential Voltage Gain<br>Gain 1<br>Gain 2<br>Gain 3 | $R_L = 2\text{k}\Omega$ , $V_{\text{OUT}} = 3V_{\text{p-p}}$ | 250<br>80<br>8.0 | –<br>–<br>– | 600<br>120<br>12.0 |                  |
| Input Resistance                                        | Gain 2                                                       | 8                | –           | –                  | $\text{k}\Omega$ |
| Input Offset Current                                    |                                                              | –                | –           | 6                  | $\mu\text{A}$    |
| Input Bias Current                                      |                                                              | –                | –           | 40                 | $\mu\text{A}$    |
| Input Voltage Range                                     |                                                              | $\pm 1.0$        | –           | –                  | V                |
| Common Mode Rejection Ratio<br>Gain 2                   | $V_{\text{CM}} = \pm 1\text{V}$ , $f \leq 100\text{kHz}$     | 50               | –           | –                  | dB               |
| Supply Voltage Rejection Ratio<br>Gain 2                | $\Delta V_S = \pm 0.5\text{V}$                               | 50               | –           | –                  | dB               |
| Output Offset Voltage<br>Gain 1<br>Gain 2 and 3         | $R_L = \infty$                                               | –<br>–           | –<br>–      | 1.5<br>1.5         | V                |
| Output Voltage Swing                                    | $R_L = 2\text{k}$                                            | 2.8              | –           | –                  | $V_{\text{pp}}$  |
| Output Sink Current                                     |                                                              | 2.5              | –           | –                  | mA               |
| Power Supply Current                                    | $R_L = \infty$                                               | –                | –           | 27                 | mA               |

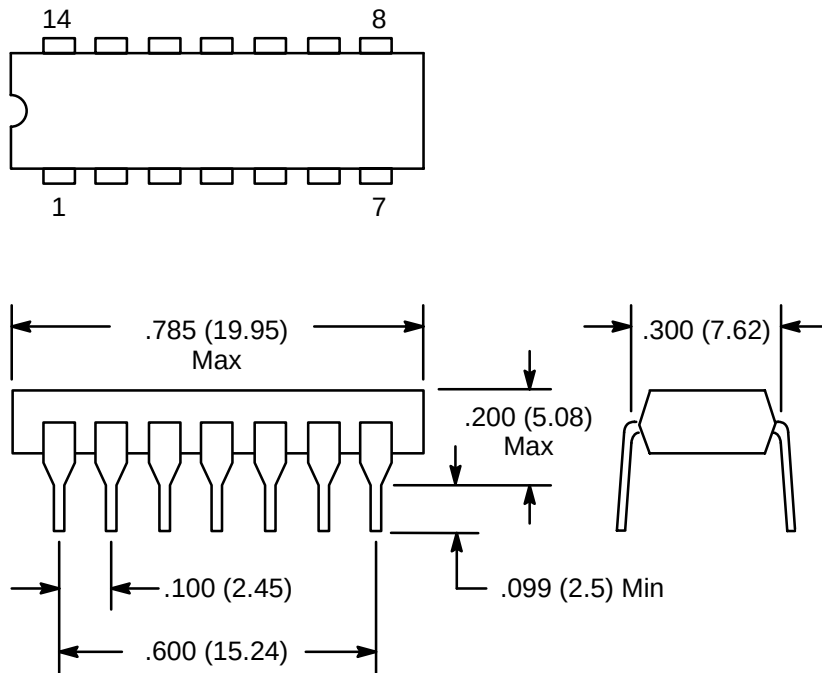
Note 2. Pins G1A and G1B connected together.

Note 3. Pins G2A and G2B connected together.

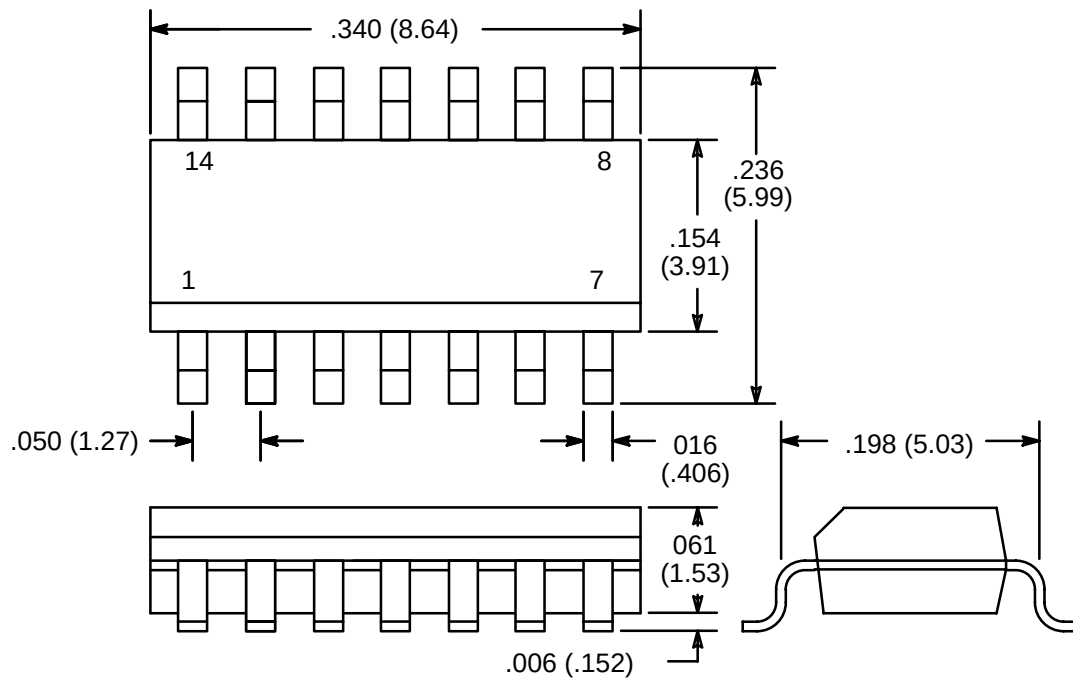
Note 4. Gain select pins open.



# NTE927D



# NTE927SM



NOTE: Pin1 on Beveled Edge

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