

## NTE996

### Linear Integrated Circuit

### Operational Transconductance Amplifier

#### **Description:**

The NTE996 is a programmable transconductance block intended to fulfill a wide variety of variable gain applications. This device has differential inputs and high impedance push-pull outputs. The NTE996 has high input impedance and its transconductance ( $g_m$ ) is directly proportional to the amplifier bias current ( $I_{ABC}$ ).

High slew rate together with programmable gain make the NTE996 an ideal choice for variable gain applications such as sample and hold, multiplexing, filtering, and multiplying,

#### **Features:**

- Slew Rate (Unity Gain Compensated): 50V/ $\mu$ s
- Fully Adjustable Gain: 0 to  $g_m \cdot R_L$  Limit
- Extended  $g_m$  Linearity: 3 Decades
- Flexible Supply Voltage Range:  $\pm 2V$  to  $\pm 18V$
- Adjustable Power Consumption

#### **Absolute Maximum Ratings:**

|                                                         |                               |
|---------------------------------------------------------|-------------------------------|
| DC Supply Voltage, $V_S$ .....                          | $\pm 18V$                     |
| Power Dissipation, $P_D$ .....                          | 250mW                         |
| Differential Input Voltage .....                        | $\pm 5V$                      |
| Amplifier Bias Current, $I_{ABC}$ .....                 | 2mA                           |
| DC Input Voltage .....                                  | $+V_S$ to $-V_S$              |
| Output Short Circuit Duration .....                     | Indefinite                    |
| Operating Temperature Range, $T_{opr}$ .....            | $0^\circ$ to $+70^\circ C$    |
| Storage Temperature Range, $T_{stg}$ .....              | $-65^\circ$ to $+150^\circ C$ |
| Lead Temperature (During Soldering, 10sec), $T_L$ ..... | $+260^\circ C$                |

**Electrical Characteristics:** ( $V_S = \pm 15V$ ,  $I_{ABC} = 500\mu A$ ,  $T_A = +25^\circ C$  unless otherwise specified)

| Parameter                                 | Test Conditions                                              | Min      | Typ      | Max   | Unit       |
|-------------------------------------------|--------------------------------------------------------------|----------|----------|-------|------------|
| Input Offset Voltage                      |                                                              | –        | 0.4      | 5.0   | mV         |
|                                           | $T_A = 0^\circ \text{ to } +70^\circ C$ , $I_{ABC} = 5\mu A$ | –        | 0.3      | –     |            |
| Input Offset Voltage Charge               | $5\mu A \leq I_{ABC} \leq 500\mu A$                          | –        | 0.1      | –     | mV         |
| Input Offset Current                      |                                                              | –        | 0.1      | –     | $\mu A$    |
| Input Bias Current                        |                                                              | –        | 0.4      | 5.0   | $\mu A$    |
|                                           | $T_A = 0^\circ \text{ to } +70^\circ C$                      | –        | 1.0      | 7.0   |            |
| Forward Transconductance ( $g_m$ )        |                                                              | 6700     | 9600     | 13000 | $\mu mho$  |
|                                           | $T_A = 0^\circ \text{ to } +70^\circ C$                      | 5400     | –        | –     |            |
| Peak Output Current                       | $R_L = 0$ , $I_{ABC} = 5\mu A$                               | –        | 5        | –     | $\mu A$    |
|                                           | $R_L = 0$                                                    | 350      | 500      | 650   |            |
|                                           | $R_L = 0$ , $T_A = 0^\circ \text{ to } +70^\circ C$          | 300      | –        | –     |            |
| Peak Output Voltage Positive              | $R_L = \infty$ , $5\mu A \leq I_{ABC} \leq 500\mu A$         | +12.0    | +14.2    | –     | V          |
| Negative                                  | $R_L = \infty$ , $5\mu A \leq I_{ABC} \leq 500\mu A$         | –12.0    | –14.4    | –     |            |
| Amplifier Supply Current                  |                                                              | –        | 1.1      | –     | mA         |
| Input Offset Voltage Sensitivity Positive | $\Delta V_{OFFSET}/\Delta V+$                                | –        | 20       | 150   | $\mu V/V$  |
| Negative                                  | $\Delta V_{OFFSET}/\Delta V-$                                | –        | 20       | 150   |            |
| Common Mode Rejection Ratio               |                                                              | 80       | 110      | –     | dB         |
| Common Mode Range                         |                                                              | $\pm 12$ | $\pm 14$ | –     | V          |
| Input Resistance                          |                                                              | 10       | 26       | –     | $k\Omega$  |
| Magnitude of Leakage Current              | $I_{ABC} = 0$                                                | –        | 0.2      | 100   | nA         |
| Differential Input Current                | $I_{ABC} = 0$ , Input = $\pm 4V$                             | –        | 0.02     | 100   | nA         |
| Open Loop Bandwidth                       |                                                              | –        | 2.0      | –     | MHz        |
| Slew Rate                                 | Unity Gain Compensated                                       | –        | 50       | –     | V/ $\mu s$ |

# Pin Connection Diagram

