



## **NTE924 & NTE924M**

### **Integrated Circuit**

### **Voltage Follower, Operational Amplifier**

#### **Description:**

The NTE924 and NTE924M are monolithic operational amplifiers internally connected as unity-gain non-inverting amplifiers. These devices use super-gain transistors in the input stage to get low bias current without sacrificing speed. Directly interchangeable with the NTE909 and NTE941 series in voltage follower applications, these devices have internal frequency compensation and provision for offset balancing.

#### **Features:**

- Available in 8-Lead DIP (NTE924M) and 8-Lead Metal Can (NTE924) Packages
- Input Current: 10nA Max Over Temperature
- Small Signal Bandwidth: 20MHz
- Slew Rate: 30V/μs
- Supply Voltage Range: ±5V to ±18V

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

Supply Voltage	±18V
Power Dissipation (Note 2), $P_D$	500mW
Input Voltage (Note 3)	±15V
Output Short-Circuit Duration (Note 4)	Indefinite
Operating Temperature Range, $T_{opr}$	0° to +70°C
Storage Temperature Range, $T_{stg}$	-65° to +150°C
Lead Temperature (During Soldering, 10sec), $T_L$	+260°C

Note 1. The **NTE924M** is a **discontinued** device and no longer available.

Note 2. For operating at elevated temperatures, the NTE924 must be derated based on a thermal resistance of +150°C/W, junction-to-ambient, or +45°C/W, junction-to-case. The thermal resistance of the NTE924M is +100°C/W, junction-to-ambient.

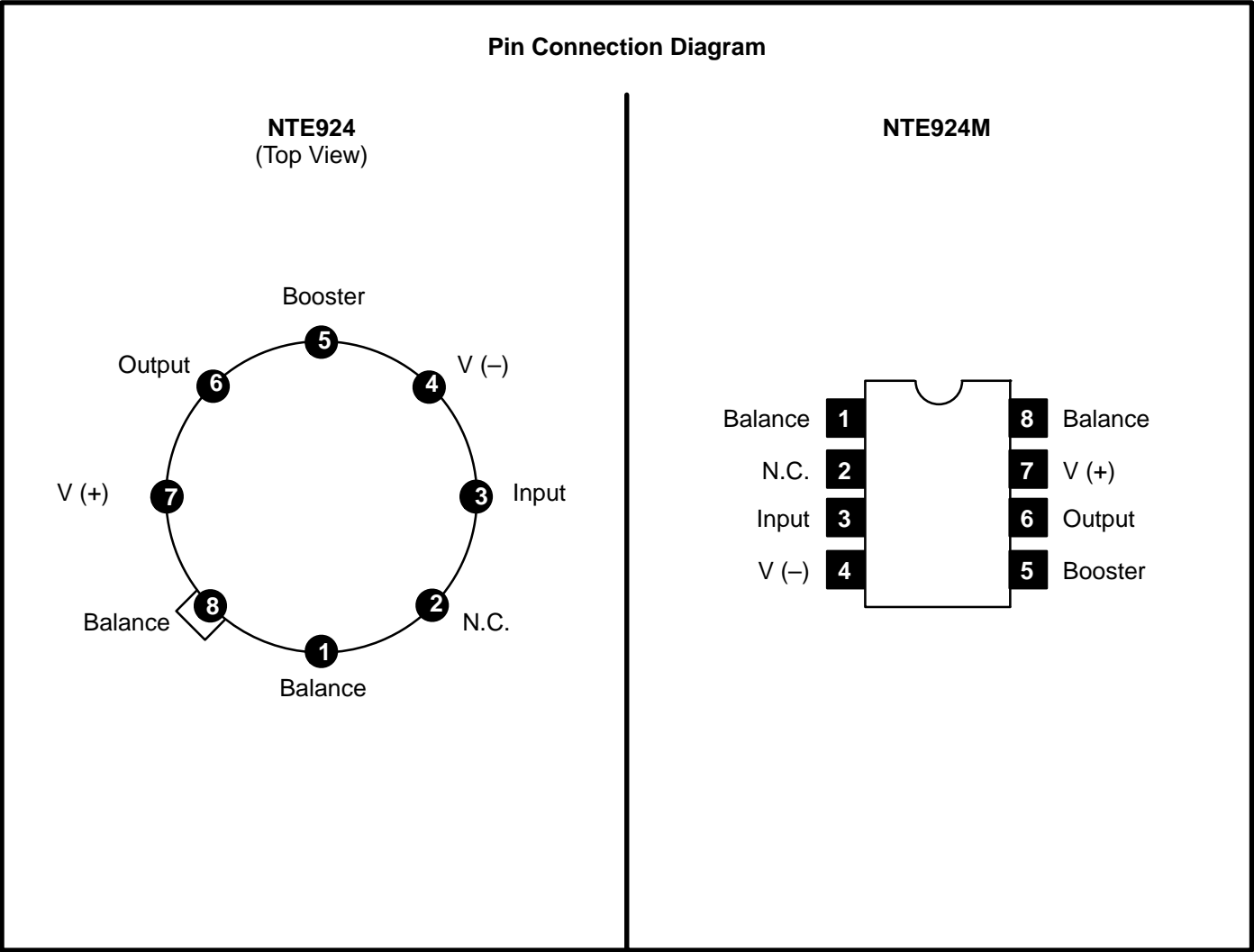
Note 3. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

Note 4. Continuous short-circuit is allowed for case temperatures to +70°C or +55°C ambient temperature. It is necessary to insert a resistor greater than 2kΩ in series with the input when the amplifier is driven from low impedance sources to prevent damage when the output is shorted.  $R_S = 5k$  min, 14k typical is recommended for dynamic stability in all applications.

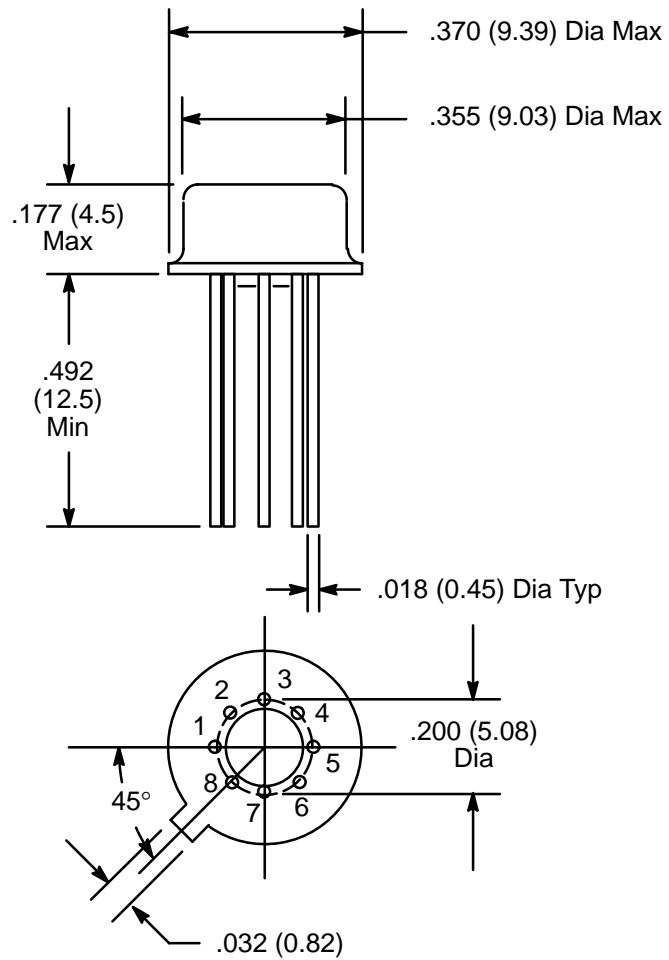
**Electrical Characteristics:** ( $\pm 5V \leq V_S \leq \pm 18V$ ,  $0^\circ \leq T_A \leq +70^\circ C$  unless otherwise specified)

Parameter	Test Conditions	Min	Typ	Max	Unit
Input Offset Voltage	$T_A = +25^\circ C$	–	2.5	7.5	mV
		–	–	10	mV
Input Bias Current	$T_A = +25^\circ C$	–	2.0	7.0	nA
		–	–	10	nA
Input Resistance	$T_A = +25^\circ C$	$10^{10}$	$10^{12}$	–	$\Omega$
Input Capacitance		–	1.5	–	pF
Large Signal Voltage Gain	$T_A = +25^\circ C$ , $V_S = \pm 15V$ , $V_{OUT} = \pm 10V$ , $R_L = 8k\Omega$	0.999	0.9999	–	V/V
	$V_S = \pm 15V$ , $V_{OUT} = \pm 10V$ , $R_L = 10k\Omega$	0.999	–	–	V/V
Output Resistance	$T_A = +25^\circ C$	–	0.75	2.5	$\Omega$
Supply Current	$T_A = +25^\circ C$	–	3.9	5.5	mV
Temperature Drift		–	10	–	$\mu V/^\circ C$
Output Voltage Swing	$V_S = \pm 15V$ , $R_L = 10k\Omega$ , Note 5	$\pm 10$	–	–	V
Supply Voltage Rejection Ratio	$\pm 5V \leq V_S \leq \pm 18V$	70	80	–	dB

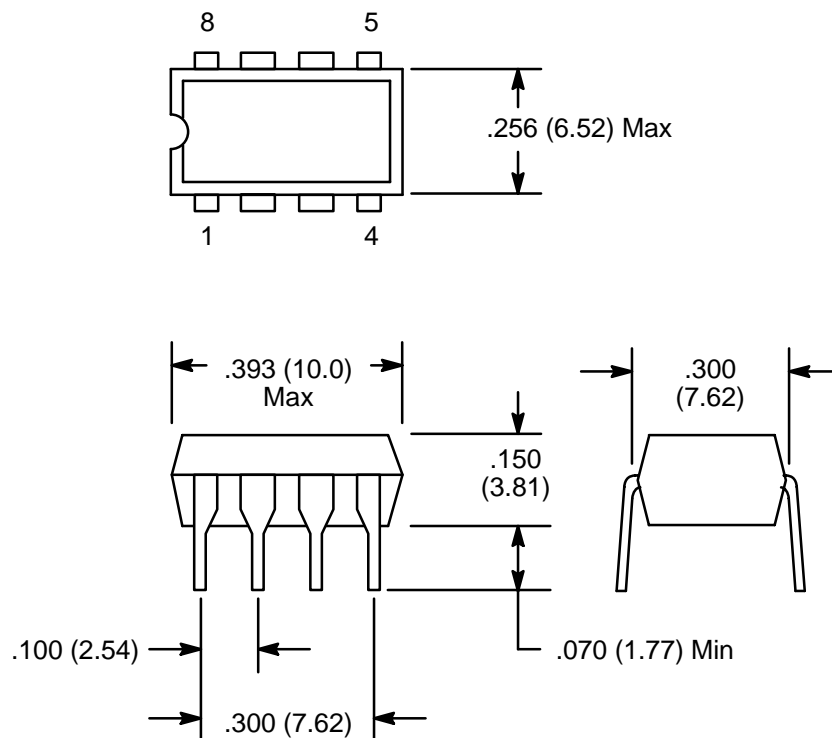
Note 5. Increased output swing under load can be obtained by connecting an external resistor between the booster and V (–) terminals.



**NTE924**



**NTE924M**



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