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# NTE940
# Integrated Circuit
# FET Input Operational Amplifier



**Description:**

The NTE940 is a high performance monolithic FET Input Operational Amplifier in an 8–Lead Metal Can type package. It is intended for a wide range of analog applications where very high input impedance is required and features very low input offset current and very low input bias current. High slew rate, high common mode voltage range and absence of latch–up make the NTE940 ideal for use as a voltage follower. The high gain and wide range of operating amplifiers, sample–and–hold circuits, transducer amplifiers, and other general feedback applications. The NTE940 is a short circuit protected and has the same pin configuration as the NTE941 operational amplifier. No external components for frequency compensation are required as the internal 6dB/octave roll–off insures stability in closed loop applications.

**Features:**

- High Input Impedance: 1,000,000MΩ
- No Frequency Compensation Required
- Short–Circuit Protection
- Offset Voltage Null Capability
- Large Common–Mode and Differential Voltage Ranges
- No Latch Up

**Absolute Maximum Ratings:**

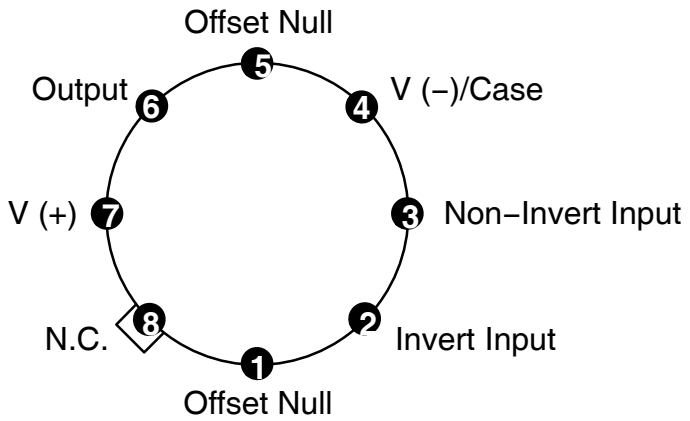
Supply Voltage . . . . . ±22V
Internal Power Dissipation ($T_A \leq +70°C$) . . . . . 500mW
Derate Linearly Above +70°C . . . . . 6.3mW/°C
Differential Input Voltage . . . . . ±30V
Input Voltage (Note 1) . . . . . ±15V
Voltage between Offset Null and V+ . . . . . ±0.5V
Storage Temperature Range . . . . . –65° to +150°C
Operating Temperature Range . . . . . 0° to +70°C
Lead Temperature (Soldering, 60sec) . . . . . 300°C
Output Short–Circuit Duration (Note 2) . . . . . Indefinite

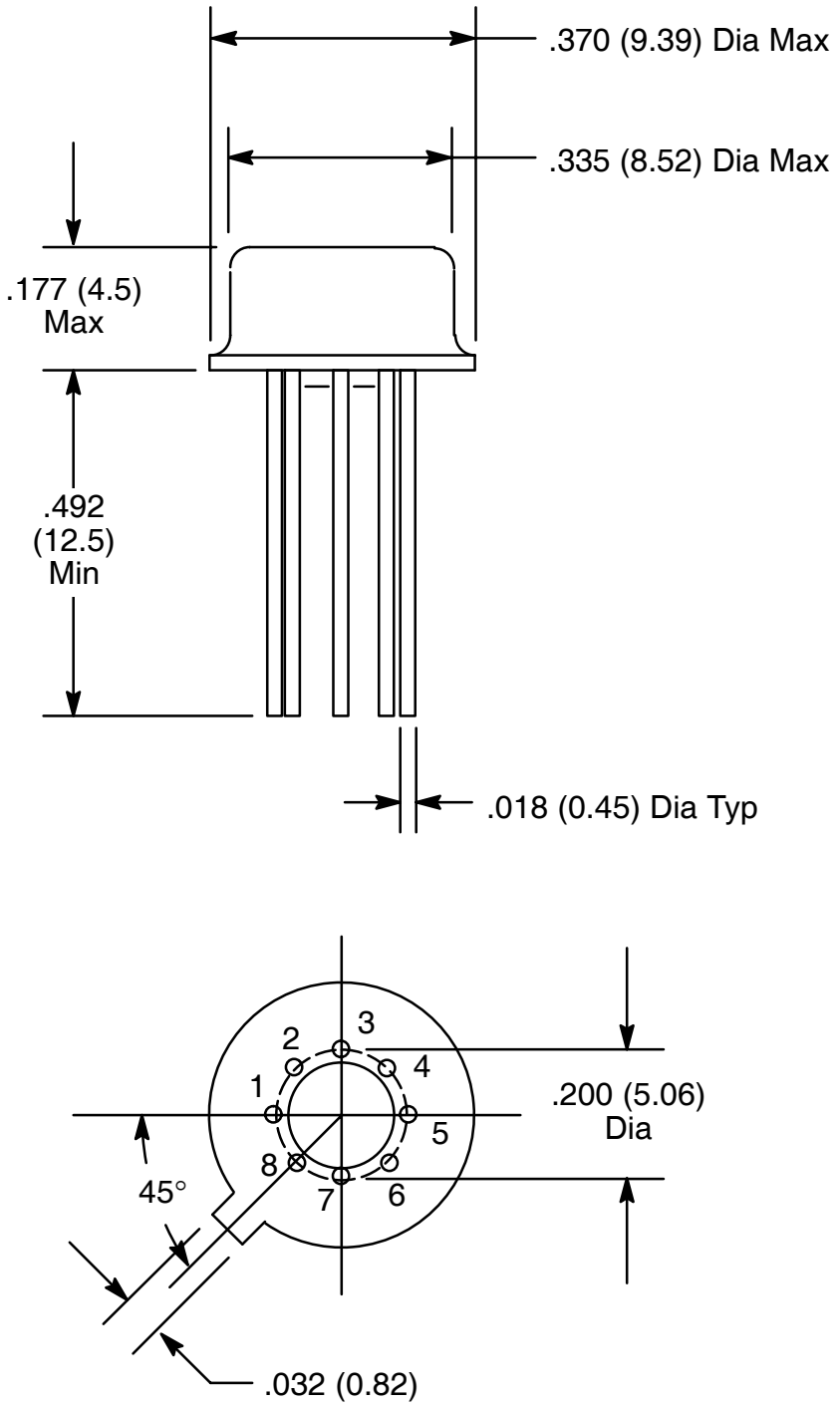
Note 1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
Note 2. Short circuit may be to GND or either supply. Rating to +125°C case temperature or +70°C ambient temperature.

**Electrical Characteristics:** ($V_S$ = ±15V, $T_C$ = +25°C unless otherwise specified)

| Parameter | Test Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Input Offset Voltage | $R_S \le 100k\Omega$ | | – | 30 | – | mV |
| | | $0°C \le T_A \le +70°C$ | – | 30 | – | mV |
| Input Offset Current | | | – | 60 | – | pA |
| | $0°C \le T_A \le +70°C$ | | – | 60 | – | pA |
| Input Current (Either Input) | | | – | 0.1 | 2.0 | nA |
| | $0°C \le T_A \le +70°C$ | | – | 1.1 | 10 | nA |
| Input Resistance | | | – | 1,000,000 | – | MΩ |
| Large Signal Voltage Gain | $R_L \ge 2k\Omega$, $V_{out} = \pm 10V$ | | – | 1,000,000 | – | |
| | | $0°C \le T_A \le +70°C$ | – | 500,000 | – | |
| Output Resistance | | | – | 75 | – | Ω |
| Output Short−Circuit Current | | | – | 20 | – | mA |
| Supply Current | | | – | 4.2 | 8.0 | mA |
| Power Consumption | | | – | 126 | 240 | mW |
| Slew Rate | | | – | 6.0 | – | V/μs |
| Unity Gain Bandwidth | | | – | 1.0 | – | MHz |
| Transient Response (Unity Gain) Risetime | $C_L \le 100pF$, $R_L \ge 2k\Omega$, $V_{in} = 100mV$ | | – | 300 | – | ns |
| Overshoot | | | – | 10 | – | % |
| Input Voltage Range | $0°C \le T_A \le +70°C$ | | – | ±12 | – | V |
| Common Mode Rejection Ratio | $0°C \le T_A \le +70°C$ | | – | 80 | – | dB |
| Supply Voltage Rejection Ratio | $0°C \le T_A \le +70°C$ | | – | 70 | – | μV/V |
| Output Voltage Swing | $R_L \ge 10k\Omega$ | $0°C \le T_A \le +70°C$ | ±12 | ±12 | – | V |
| | $R_L \ge 2k\Omega$ | | ±12 | ±12 | – | V |

**Pin Connection Diagram**
(Top View)




.370 (9.39) Dia Max
.335 (8.52) Dia Max
.177 (4.5)
Max
.492
(12.5)
Min
.018 (0.45) Dia Typ
1
2
3
4
5
6
7
8
.200 (5.06)
Dia
45°
.032 (0.82)