

**DUAL LOW POWER CMOS OPERATIONAL AMPLIFIER**
**DESCRIPTION**

The HT277 is a dual low power CMOS operational amplifiers IC which provides high performance operation at low supply voltages. The basic amplifier can operate at supply voltage as low as 1.4V with very low power consumption

and makes it perfect for battery-powered application. The input common-mode voltage extends to the negative rail. The output swings to both rails with light load. The input bias current is inherently low and the input impedance is extremely high. The devices are ideal upgrades for industrial standards operational amplifiers.

**FEATURES**

- Low Power Replacement for Standard OP Amps
- Wide supply operating range (1.4V to 7V)
- Input common-mode voltage range includes negative rail
- Output swing to rail
- Low input bias current (typical 1pA)
- High input impedance
- Single supply operation
- Internal compensated
- Output short circuit protection

**APPLICATIONS**

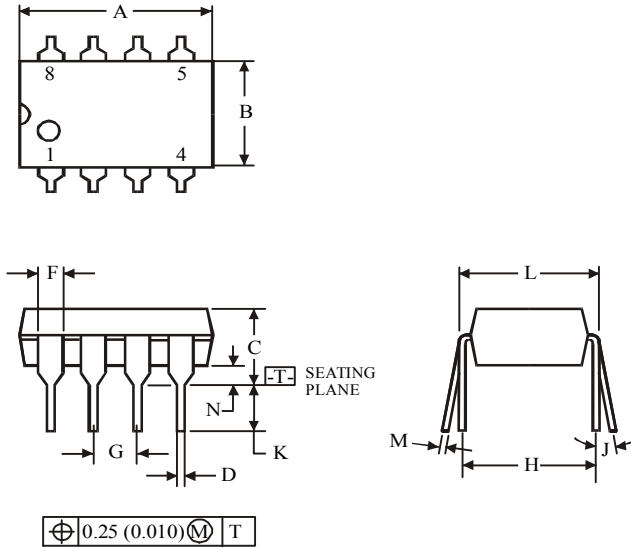
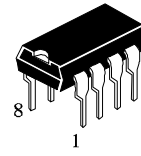
- Portable Instruments
- Battery-Powered Systems
- Transducer Interfacing
- Active Filter
- High Impedance Buffer

**ABSOLUTE MAXIMUM RATINGS**

| Characteristic              | Symbol    | Value                  | Unit |
|-----------------------------|-----------|------------------------|------|
| Power Supply Voltage        | $V_{CC}$  | 8.5                    | V    |
| Input Voltage               | $V_{IN}$  | -0.3 to $V_{CC} + 0.3$ | V    |
| Output Short Circuit to GND | $I_{SC}$  | Continuous             |      |
| Operating Temperature Range | $T_{opr}$ | 0 ~ +70                | °C   |
| Storage Temperature Range   | $T_{stg}$ | -65 ~ +150             | °C   |

**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 3.0V$ ,  $T_A = 25^\circ C$ , unless otherwise specified)

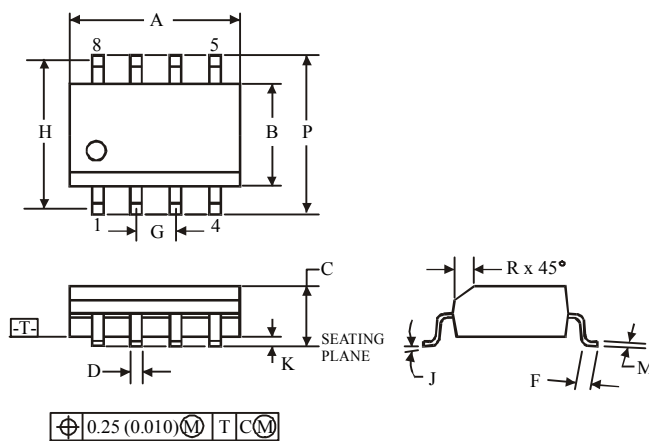
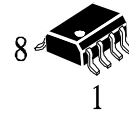
| Characteristic                  | Symbol                   | Test Condition                                       | Min  | Typ  | Max          | Unit             |
|---------------------------------|--------------------------|--|------|------|--------------|------------------|
| Input Offset Voltage            | $V_{IO}$                 | $V_{ICM}=0V$ to $V_{CC}-1.5V$                        |      | 1.5  | 5.0          | mV               |
| Input Offset Voltage Drift      | $\Delta V_{IO}/\Delta T$ |  |      | 0.7  |              | $\mu V/^\circ C$ |
| Input Offset Current            | $I_{IO}$                 |  |      | 1    |              | $\rho A$         |
| Input Bias Current              | $I_{IB}$                 |  |      | 1    |              | $\rho A$         |
| Input Common Mode Voltage Range | $V_{ICR}$                |  | 0    |      | $V_{CC}-1.3$ | V                |
| Supply Current (per amplifier)  | $I_{CC}$                 |  |      | 5    | 9            | $\mu A$          |
| Large Signal Voltage Gain       | $A_V$                    | $V_O=1V$ to $2V$ ; $V_{IN}=1.4V$ ;<br>$R_L=1M\Omega$ | 20   | 100  |              | V/mV             |
| Output Voltage Swing            | $V_{OH}$                 | $V_{IN}=10mV$ ; $R_L=1M\Omega$ (to V-)               | 2.95 | 2.99 |              | V                |
|                                 |                          | $V_{IN}=10mV$ ; $R_L=10K\Omega$ (to V-)              |      | 2.6  |              |                  |
|                                 |                          | $V_{IN}=10mV$ ; $R_L=1M\Omega$ (to V+)               |      | 0.2  | 0.5          |                  |
| Common Mode Rejection Ratio     | CMRR                     | $V_O=1V$ ; $V_{IN}=0V$ to $2.0V$ ;                   | 60   | 80   |              | dB               |
| Output Current                  | $I_{source}$             |  | 1.5  | 2.5  |              | mA               |
|                                 | $I_{sink}$               |  | 3    | 5    |              | $\mu A$          |
| Differential Input Voltage      | $V_{ID}$                 |  |      |      | $V_{CC}$     | V                |

**(DIP8)**


| Symbol | Dimension, mm |       |
|--------|---------------|-------|
|        | MIN           | MAX   |
| A      | 8.51          | 10.16 |
| B      | 6.1           | 7.11  |
| C      |               | 5.33  |
| D      | 0.36          | 0.56  |
| F      | 1.14          | 1.78  |
| G      | 2.54          |       |
| H      | 7.62          |       |
| J      | 0°            | 10°   |
| K      | 2.92          | 3.81  |
| L      | 7.62          | 8.26  |
| M      | 0.2           | 0.36  |
| N      | 0.38          |       |

**NOTES:**

- Dimensions "A", "B" do not include mold flash or protrusions.  
Maximum mold flash or protrusions 0.25 mm (0.010) per side.

**(SOP8)**


| Symbol | Dimension, mm |      |
|--------|---------------|------|
|        | MIN           | MAX  |
| A      | 4.8           | 5    |
| B      | 3.8           | 4    |
| C      | 1.35          | 1.75 |
| D      | 0.33          | 0.51 |
| F      | 0.4           | 1.27 |
| G      | 1.27          |      |
| H      | 5.72          |      |
| J      | 0°            | 8°   |
| K      | 0.1           | 0.25 |
| M      | 0.19          | 0.25 |
| P      | 5.8           | 6.2  |
| R      | 0.25          | 0.5  |

**NOTES:**

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B - 0.25 mm (0.010) per side.