



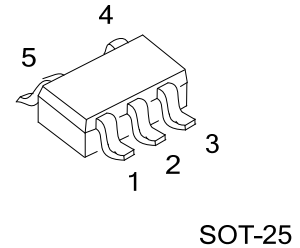
ULV2361

LINEAR INTEGRATED CIRCUIT

HIGH-PERFORMANCE LOW-VOLTAGE OPERATIONAL AMPLIFIERS

DESCRIPTION

The UTC **ULV2361** is a high-performance operational amplifier. This device can be operated at a very low supply voltage ($\pm 1V$), while maintaining a wide output swing. The UTC **ULV2361** offers a dramatically improved dynamic range of signal conditioning in low-voltage system. The UTC **ULV2361** also provides higher performance than other general-purpose operational amplifier by combining higher unity-gain bandwidth and faster slew rate. With its low distortion and low-noise performance, it is well suited for audio applications.



FEATURES

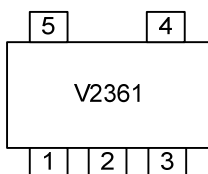
- * Low Supply-Voltage Operation: $V_{-} = \pm 1V$ (Min.)
- * Wide Bandwidth: 4MHz (Typ.) at $V_{CC} = \pm 2.5V$
- * High Slew Rate: $2V/\mu s$ (Typ.) at $V_{CC} = \pm 2.5V$
- * Wide Output Voltage Swing: $\pm 2.4V$ (Typ.) at $V_{CC} = \pm 2.5V$, $R_L = 10 k\Omega$

ORDERING INFORMATION

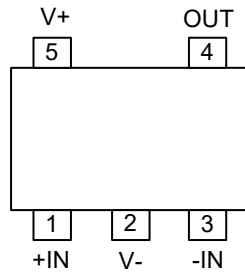
| Ordering Number | | Package | Packing |
|-----------------|----------------|---------|-----------|
| Lead Free | Halogen Free | | |
| ULV2361L-AF5-R | ULV2361G-AF5-R | SOT-25 | Tape Reel |

| | |
|--|---|
| <p>ULV2361G-AF5-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p> | <p>(1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free and Lead Free, L: Lead Free</p> |
|--|---|

MARKING



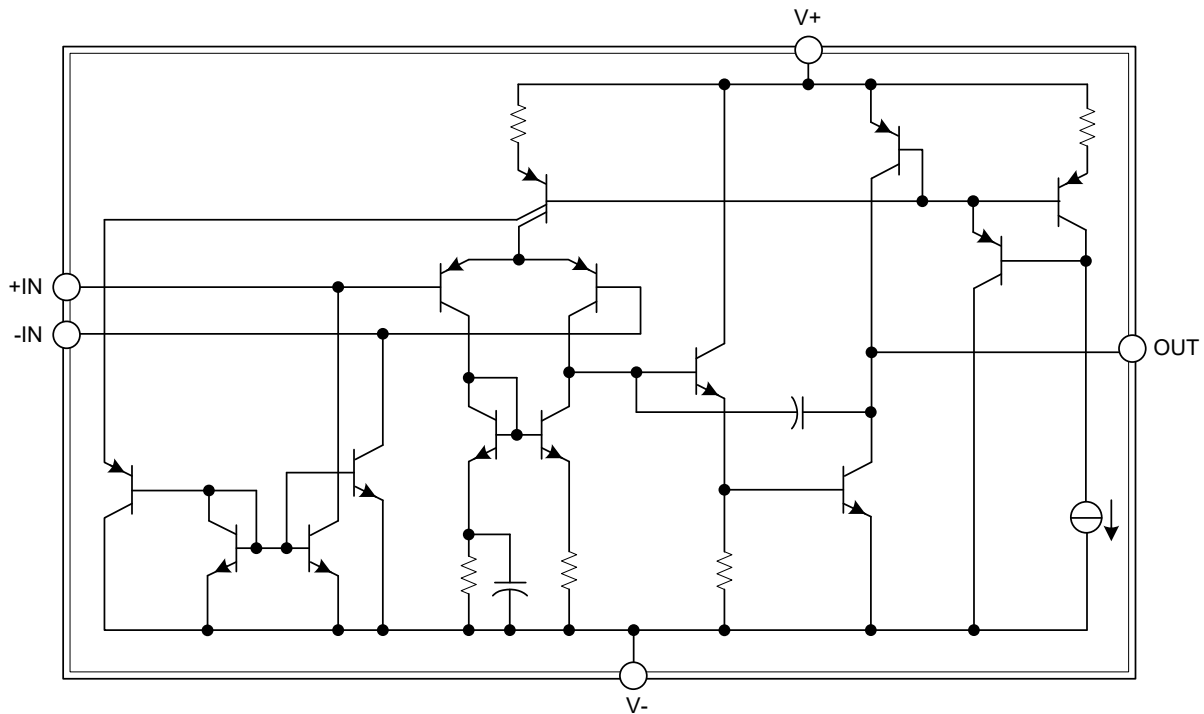
■ PIN CONFIGURATION



■ PIN DESCRIPTION

| PIN NO. | PIN NAME | DESCRIPTION |
|---------|----------|----------------------|
| 1 | +IN | Non inverting input. |
| 2 | V- | Negative supply. |
| 3 | -IN | Inverting input. |
| 4 | OUT | Output |
| 5 | V+ | Positive supply. |

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--|------------------|------------------|------|
| Supply Voltage (Note 2) | V+ | 3.5 | V |
| | V- | -3.5 | V |
| Differential Input Voltage (Note 3) | V _{ID} | ±3.5 | V |
| Input Voltage (any input) (Notes 2, 4) | V _I | ±V _{CC} | V |
| Output Voltage | V _O | ±3.5 | V |
| Output Current | I _O | 20 | mA |
| Operating Virtual Junction Temperature | T _J | +150 | °C |
| Storage Temperature Range | T _{STG} | -65 ~ +150 | °C |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. All voltage values, except differential voltages, are with respect to the midpoint between V+ and V-.

3. Differential voltages are at +IN with respect to -IN.

4. All input voltage values must not exceed V_{CC}.

■ RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--------------------------------|----------------|-----------|------|
| Supply Voltage | V+/V- | ±1 ~ ±2.5 | V |
| Operating Free Air Temperature | T _A | -40 ~ +85 | °C |

■ THERMAL DATA

| PARAMETER | SYMBOL | RATINGS | UNIT |
|---------------------|-----------------|---------|------|
| Junction to Ambient | θ _{JA} | 230 | °C/W |

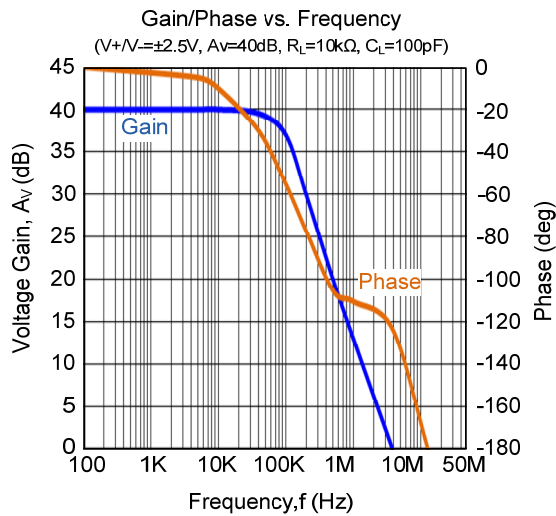
■ ELECTRICAL CHARACTERISTICS (V_{CC}=±2.5V, unless otherwise specified.)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------------------|------------------|--|------|-------|-----|--------|
| Supply Current | I _{CC} | V _O =0, No load | | 2.5 | 5 | mA |
| Supply-Voltage Rejection Ratio | PSRR | V+/V- = ±1.5V ~ ±2.5V | | 75 | | dB |
| Input Offset Voltage | V _{OS} | V _O =0, V _{CM} =0 | | 1 | 6 | mV |
| Input Bias Current | I _B | V _O =0, V _{CM} =0 | | 35 | 150 | nA |
| Input Offset Current | I _{OS} | V _O =0, V _{CM} =0 | | 10 | 100 | nA |
| Common-Mode Voltage Range | V _{CM} | V _{OS} ≤ 7.5mV | ±1.5 | | | V |
| Common-Mode Rejection Ratio | CMRR | V _{CM} =±0.5V | | 85 | | dB |
| Large-Signal Voltage Amplification | A _V | V _O =±1V, R _L =10kΩ | 60 | 85 | | dB |
| Maximum Positive-Peak Output Voltage | V _{OM+} | R _L =10kΩ | 2 | 2.4 | | V |
| Maximum Negative-Peak Output Voltage | V _{OM-} | R _L =10kΩ | -2 | -2.4 | | V |
| Slew Rate | SR | A _V =1, V _I =±0.5V | | 2 | | V/μs |
| Gain-Bandwidth Product | GBW | A _V =40, R _L =10kΩ, C _L =100pF | | 4 | | MHz |
| Equivalent Input Noise Voltage | V _n | R _S =100Ω, R _F =10kΩ, f=1kHz | | 10 | | nV/√Hz |
| Total Harmonic Distortion, Plus Noise | THD+N | A _V =1, V _O =±1.2V, R _L =10kΩ, f=3kHz | | 0.004 | | % |

■ ELECTRICAL CHARACTERISTICS ($V_{CC}=\pm 1.5V$, unless otherwise specified.)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------------|-----------|--|-----------|------|-----|-----------------|
| Supply Current | I_{CC} | $V_O=0$, No load | | 2.5 | 4 | mA |
| Supply-Voltage Rejection Ratio | PSRR | $V_+/V_- = \pm 1.5V \sim \pm 2.5V$ | | 75 | | dB |
| Input Offset Voltage | V_{OS} | $V_O=0$, $V_{CM}=0$ | | 1 | 6 | mV |
| Input Bias Current | I_B | $V_O=0$, $V_{CM}=0$ | | 35 | 150 | nA |
| Input Offset Current | I_{OS} | $V_O=0$, $V_{CM}=0$ | | 10 | 100 | nA |
| Common-Mode Voltage Range | V_{CM} | $ V_{OS} \leq 7.5mV$ | ± 0.5 | | | V |
| Common-Mode Rejection Ratio | CMRR | $V_{CM}=\pm 0.5V$ | | 75 | | dB |
| Large-Signal Voltage Amplification | A_V | $V_O=\pm 1V$, $R_L=10k\Omega$ | 60 | 80 | | dB |
| Maximum Positive-Peak Output Voltage | V_{OM+} | $R_L=10k\Omega$ | 1.2 | 1.4 | | V |
| Maximum Negative-Peak Output Voltage | V_{OM-} | $R_L=10k\Omega$ | -1.2 | -1.4 | | V |
| Slew Rate | SR | $A_V=1$, $V_I=\pm 0.5V$ | | 1.8 | | V/ μs |
| Gain-Bandwidth Product | GBW | $A_V=40$, $R_L=10k\Omega$, $C_L=100pF$ | | 3.5 | | MHz |
| Equivalent Input Noise Voltage | V_n | $R_S=100\Omega$, $R_F=10k\Omega$, $f=1kHz$ | | 12 | | nV/ \sqrt{Hz} |

■ TYPICAL CHARACTERISTICS



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