

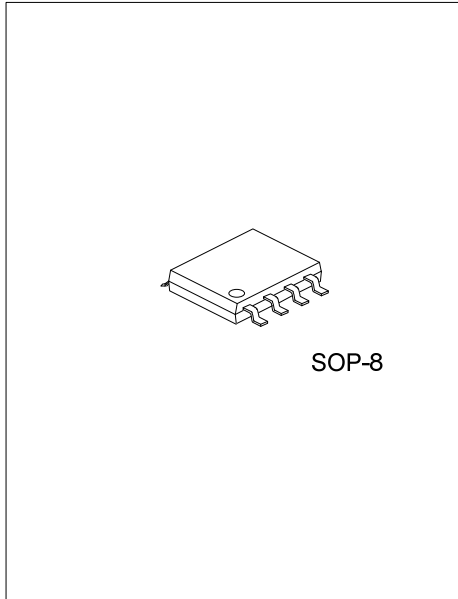


ULV661

Preliminary

CMOS IC

2.5V, 50MHz, RAIL TO RAIL OUTPUT, CMOS SINGLE OP AMPS



DESCRIPTION

The UTC **ULV661** of operational amplifiers features high gain bandwidth product (50MHz, typical) and high output short circuit current (90mA, typical). This amplifier is optimized for high speed, low noise and distortion, single-supply operation with rail-to-rail output and an input that includes the negative rail.

FEATURES

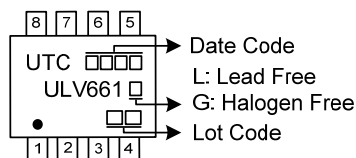
- * Gain Bandwidth Product: 50MHz (typical)
- * Short Circuit Current: 90mA (typical)
- * Rail-to-Rail Output
- * Slew Rate: 32V/μs (typical)
- * Power Supply: 2.5V~5.5V
- * Extended Temperature Range: -40°C ~ +125°C

ORDERING INFORMATION

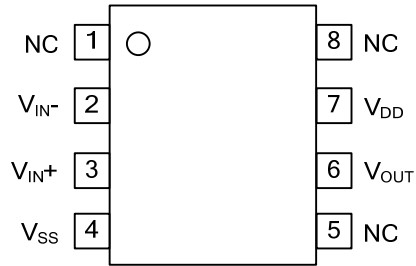
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV661L-S08-R	ULV661G-S08-R	SOP-8	Tape Reel

<p>ULV661G-S08-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



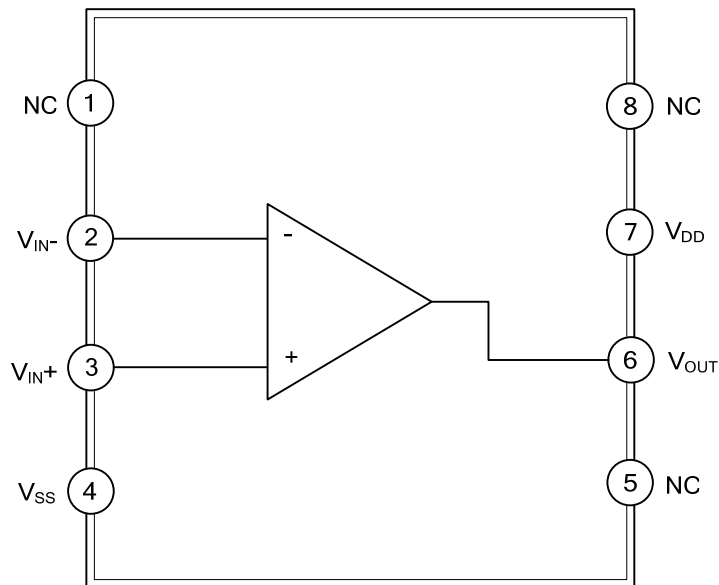
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1, 5, 8	NC	No connect
2	V_{IN-}	Inverting Input
3	V_{IN+}	Non-inverting Input
4	V_{SS}	Negative Power Supply
6	V_{OUT}	Output
7	V_{DD}	Positive Power Supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
$V_{DD}-V_{SS}$		6.5	V
Current at Input Pins		± 2	mA
Analog Inputs (V_{IN+} and V_{IN-})		$V_{SS} - 1.0 \sim V_{DD} + 1.0$	V
All other Inputs and Outputs		$V_{SS} - 0.3 \sim V_{DD} + 0.3$	V
Output Short Circuit Current		Continuous	
Current at Output and Supply Pins		± 150	mA
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Operating Temperature Range	T_{OPR}	-40 ~ +125	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

Note: 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.

■ DC ELECTRICAL CHARACTERISTICS

($V_{DD}=+2.5\text{V}\sim+5.5\text{V}$, $V_{SS}=\text{GND}$, $V_{CM}=V_{DD}/3$, $V_{OUT}\approx V_{DD}/2$, $V_L=V_{DD}/2$, $R_L=1\text{k}\Omega\sim V_L$, $T_A=25^{\circ}\text{C}$ unless otherwise indicated)

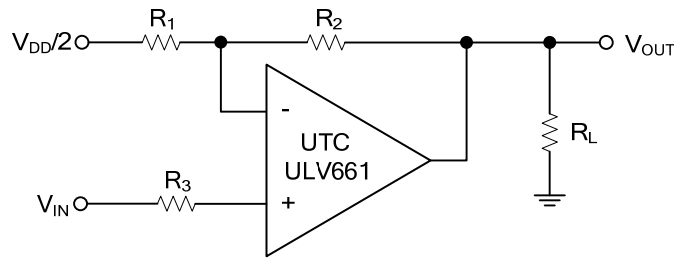
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
INPUT OFFSET						
Input Offset Voltage	V_{OS}		-8		+8	mV
Power Supply Rejection Ratio	PSRR		61	95		dB
INPUT CURRENT AND IMPEDANCE						
Input Bias Current	I_B			6		pA
Input Offset Current	I_{OS}			± 10		pA
Common Mode Input Impedance	Z_{CM}			$10^{13} 9$		$\Omega \mu\text{F}$
Differential Input Impedance	Z_{DIFF}			$10^{13} 2$		$\Omega \mu\text{F}$
COMMON MODE						
Common-Mode Input Voltage Range	V_{CMR}		$V_{SS} - 0.3$		$V_{DD} - 1.3$	V
Common-Mode Rejection Ratio	CMRR	$V_{DD}=2.5\text{V}$, $V_{CM}=-0.3\sim 1.2\text{V}$	64	79		dB
		$V_{DD}=5.5\text{V}$, $V_{CM}=-0.3\sim 4.2\text{V}$	66	81		dB
OPEN LOOP GAIN						
DC Open Loop Gain (Large Signal)	A_{OL}	$V_{DD}=2.5\text{V}$, $V_{OUT}=0.3\text{V}\sim 2.2\text{V}$	88	117		dB
		$V_{DD}=5.5\text{V}$, $V_{OUT}=0.3\text{V}\sim 5.2\text{V}$	94	126		dB
OUTPUT						
Maximum Output Voltage Swing	V_{OL} , V_{OH}	$V_{DD}=2.5\text{V}$, $G=+2$, 0.5V Input Overdrive	$V_{SS}+25$		$V_{DD} - 25$	mV
		$V_{DD}=5.5\text{V}$, $G=+2$, 0.5V Input Overdrive	$V_{SS}+50$		$V_{DD} - 50$	mV
Output Short Circuit Current	I_{SC}	$V_{DD}=2.5\text{V}$	± 45	± 50		mA
		$V_{DD}=5.5\text{V}$	± 40	± 90		mA
POWER SUPPLY						
Supply Voltage	V_{DD}		2.5		5.5	V
Quiescent Current per Amplifier	I_Q	No Load Current		6.5	9.0	mA
POR DYNAMIC SPECIFICATIONS						
V_{DD} Low to Amplifier Off Time (Output Goes High Z)	t_{POFF}	$G=+1\text{V/V}$, $V_L=V_{SS}$, $V_{DD}=2.5\text{V}$ to 0V Step to $V_{OUT}=0.1$ (2.5V)		200		ns
V_{DD} High to Amplifier Off Time (Including Calibration Z)	t_{PON}	$G=+1\text{V/V}$, $V_L=V_{SS}$, $V_{DD}=0\text{V}$ to 2.5V Step to $V_{OUT}=0.9$ (2.5V)		100	300	ms

■ AC ELECTRICAL CHARACTERISTICS

($V_{DD}=+2.5V\sim+5.5V$, $V_{SS}=GND$, $V_{CM}=V_{DD}/2$, $V_{OUT}\approx V_{DD}/2$, $V_L=V_{DD}/2$, $R_L=1k\Omega\sim V_L$, $C_L=20pF$, $T_A=25^\circ C$, Unless otherwise indicated)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC Response						
Gain Bandwidth Product	GBWP			50		MHz
Phase Margin	PM	G=+1		70		°
Open Loop Output Impedance	R_{OUT}			10		Ω
AC Distortion						
Total Harmonic Distortion plus Noise	THD+N	G=+1, $V_{OUT}=2V_{P-P}$, f=1kHz, $V_{DD}=5.5V$, BW=80kHz		0.003		%
Step Response						
Rise Time, 10% to 90%	t_r	G =+1, $V_{OUT}=100mV_{P-P}$		5		ns
Slew Rate	SR	G =+1		32		V/ μs

■ TYPICAL APPLICATION CIRCUIT



Power Driver with High Gain

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