



ULV6001

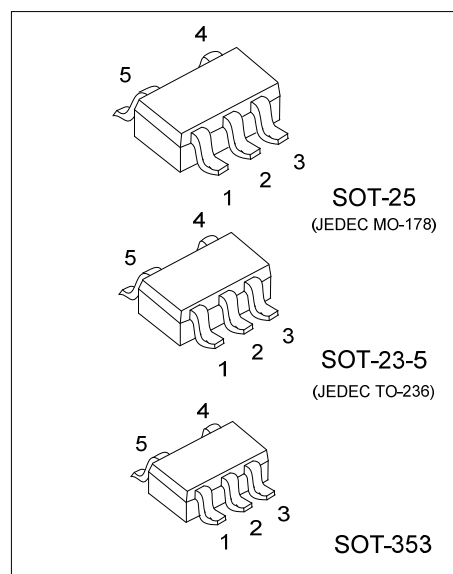
CMOS IC

LOW POWER RAIL TO RAIL INPUT / OUTPUT OP AMP

DESCRIPTION

The UTC **ULV6001** of operational amplifiers (op amps) with low operational voltage (1.8V, min.) is specifically designed for general-purpose applications. This amplifier will draw 100μA (typ.) quiescent current when the single supply voltage is as low as 1.8V. It also has a power supply range of 1.8V to 5.5V. Additionally, the UTC **ULV6001** supports rail-to-rail input and output swing, with a common mode input voltage range of $V^+ + 300\text{mV}$ to $V^- - 300\text{mV}$.

The UTC **ULV6001** is available in the industrial and extended temperature ranges.



FEATURES

- * Rail-to-Rail Input/Output
- * Supply Voltage: 1.8V~5.5V
- * Quiescent Current: 100μA (typ.)

ORDERING INFORMATION

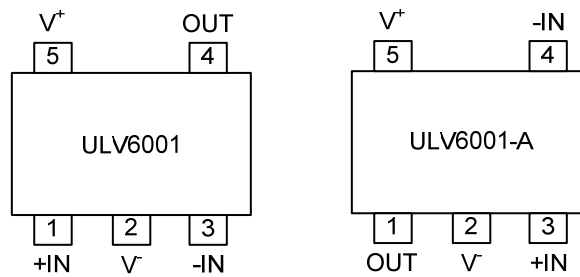
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV6001L-AE5-R	ULV6001G-AE5-R	SOT-23-5	Tape Reel
ULV6001L-AF5-R	ULV6001G-AF5-R	SOT-25	Tape Reel
ULV6001L-AF5-A-R	ULV6001G-AF5-A-R	SOT-25	Tape Reel
ULV6001L-AL5-R	ULV6001G-AL5-R	SOT-353	Tape Reel

ULV6001G-AF5-A-R (1) Packing Type (2) Pin Code (3) Package Type (4) Green Package	(1) R: Tape Reel (2) A: refer to PIN CONFIGURATIONS (3) AE5: SOT-23-5, AF5: SOT-25, AL5: SOT-353 (4) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

ULV6001	ULV6001-A

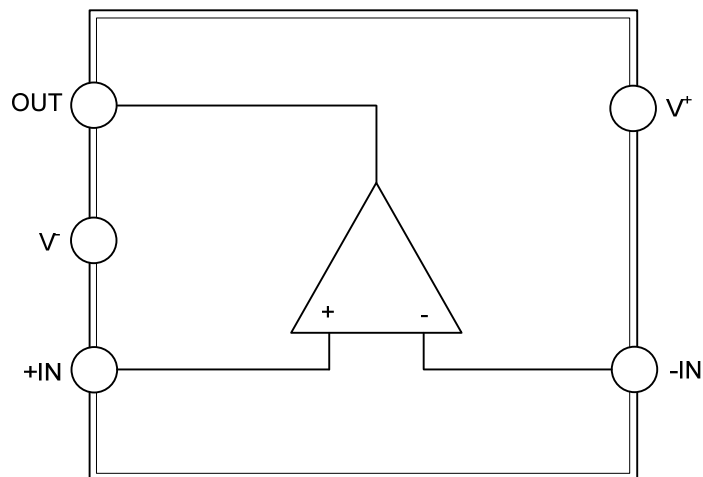
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NAME	DESCRIPTION
+IN	Non-inverting Input
V^-	Negative Power Supply
-IN	Inverting Input
OUT	Output
V^+	Positive Power Supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply	$V^+ - V^-$	7.0	V
Current at Input Pins	I_{IN}	± 2	mA
Analog Inputs (V_{IN+} , V_{IN-})		$V^- - 1.0 \sim V^+ + 1.0$	V
All Inputs and Outputs		$V^- - 0.3 \sim V^+ + 0.3$	V
Difference Input Voltage		$ V^+ - V^- $	V
Operating Temperature Range	T_A	$-40 \sim +85$	$^{\circ}\text{C}$
Maximum Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-65 \sim +150$	$^{\circ}\text{C}$

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 ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

($V^+=+1.8\text{V} \sim +5.5\text{V}$, $V^-=\text{GND}$, $V_{CM}=V^+/2$, $R_L=10\text{k}\Omega$ to $V^+/2$, and $V_{OUT} \approx V^+/2$)

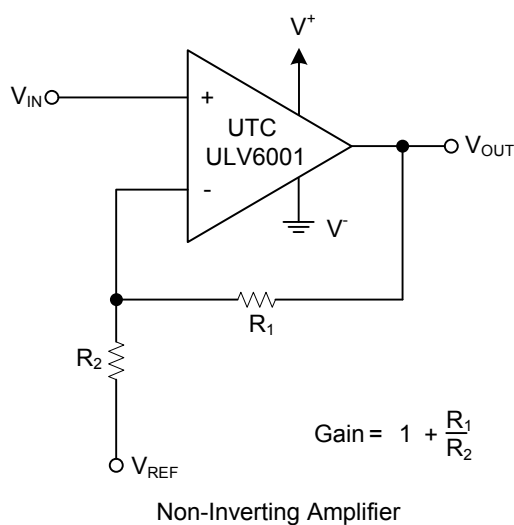
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset						
Input Offset Voltage	V _{OS}		-7		+7	mV
Power Supply Rejection	PSRR	V _{CM} = V ⁻		76		dB
Input Bias Current and Impedance						
Input Bias Current	I _B			±1.0		pA
Input Offset Current	I _{OS}			±1.0		pA
Common Mode Input Impedance	Z _{CM}			10 ¹³ 6		Ω pF
Differential Input Impedance	Z _{DIFF}			10 ¹³ 3		Ω pF
Common Mode						
Common Mode Input Range	V _{CMR}		V ⁻ -0.3		V ⁺ +0.3	V
Common Mode Rejection Ratio	CMRR	V _{CM} =-0.3V~5.3V, V ⁺ =5V	60	76		dB
Open-Loop Gain						
DC Open-Loop Gain (Large Signal)	A _{OL}	V _{OUT} =0.3V~ V ⁺ - 0.3V, V _{CM} = V ⁻	88	112		dB
Output						
Maximum Output Voltage Swing	V _{OL} , V _{OH}	V ⁺ =5.5V	V ⁻ +0.1		V ⁺ -0.1	V
Output Short-Circuit Current	I _{SC}	V ⁺ =1.8V		±12		mA
		V ⁺ =5.5V		±50		mA
Power Supply						
Supply Voltage	V _{DD}		1.8		5.5	V
Quiescent Current per Amplifier	I _Q	I _O =0, V ⁺ =5.5V		100	315	μA

■ AC ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

($V^+=+1.8\text{V} \sim +5.5\text{V}$, $V^-=\text{GND}$, $V_{CM}=V^+/2$, $V_{OUT} \approx V^+/2$, $R_L=10\text{k}\Omega$ to $V^+/2$, and $C_L=60\text{pF}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC Response						
Gain Bandwidth Product	GBWP			1.5		MHz
Phase Margin	PM	$G=+1\text{V/V}$		110		$^{\circ}$
Slew Rate	SR			0.9		$\text{V}/\mu\text{s}$
Noise						
Input Noise Voltage	E_{ni}	$f=0.1\text{Hz} \sim 10\text{Hz}$		6.1		$\mu\text{Vp-p}$
Input Noise Voltage Density	e_{ni}	$f=1\text{kHz}$		28		$\text{nV}/\sqrt{\text{Hz}}$
Input Noise Current Density	i_{ni}	$f=1\text{kHz}$		0.6		$\text{fA}/\sqrt{\text{Hz}}$

■ TYPICAL APPLICATION CIRCUIT



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