



ULV6001

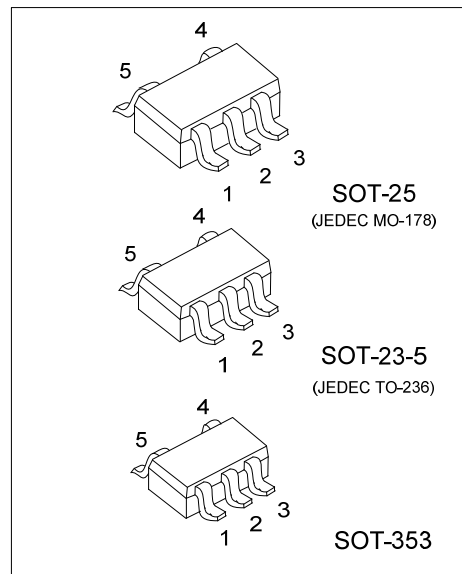
CMOS IC

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 $V^+ +300mV$ to $V^- -300mV$.

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

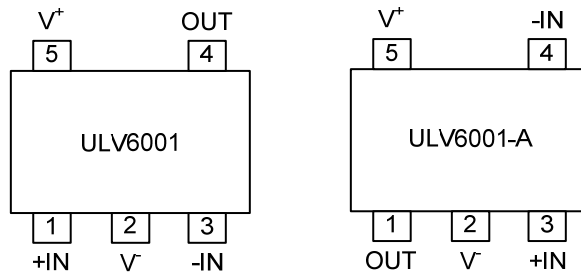
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV6001L-AE5-R	ULV6001G-AE5-R	SOT-23-5	Tape Reel
ULV6001L-AF5-R	ULV6001G-AF5-R	SOT-25	Tape Reel
ULV6001L-AF5-A-R	ULV6001G-AF5-A-R	SOT-25	Tape Reel
ULV6001L-AL5-R	ULV6001G-AL5-R	SOT-353	Tape Reel

<p>ULV6001G-AF5-A-R</p>	<p>(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</p>
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MARKING

<p>ULV6001</p>	<p>ULV6001-A</p>
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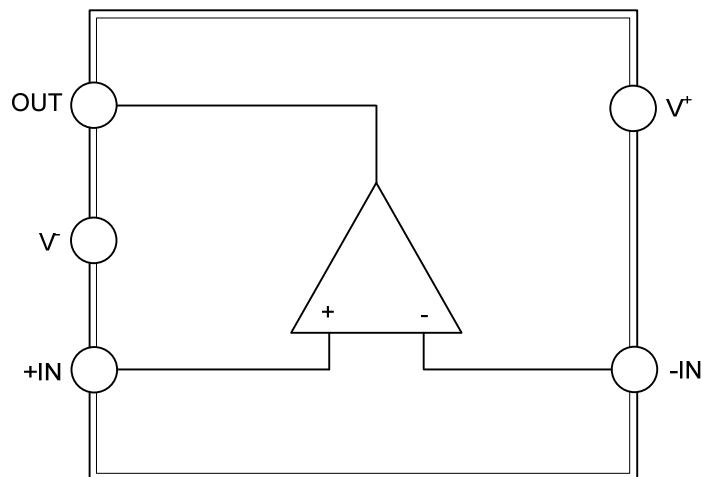
■ PIN CONFIGURATION



■ 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°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 ~ V ⁺ +1.0	V
All Inputs and Outputs		V ⁻ -0.3 ~ V ⁺ +0.3	V
Difference Input Voltage		V ⁺ - V ⁻	V
Operating Temperature Range	T _A	-40 ~ +85	°C
Maximum Junction Temperature	T _J	+150	°C
Storage Temperature	T _{STG}	-65 ~ +150	°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°C, unless otherwise specified)

(V⁺=+1.8V~+5.5V, V⁻=GND, V_{CM}= V⁺/2, R_L=10kΩ to V⁺/2, and V_{OUT} ≈ V⁺/2)

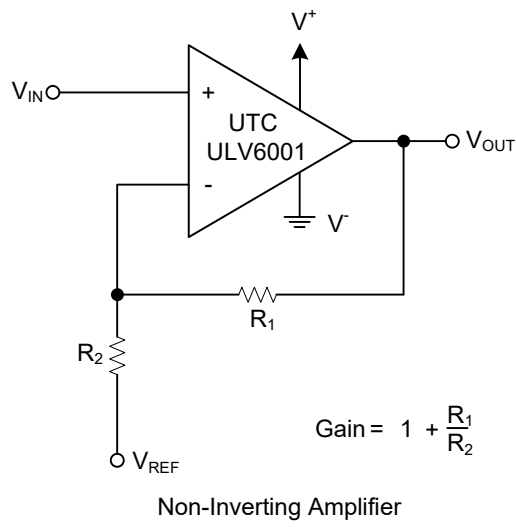
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset						
Input Offset Voltage	V _{OS}				7	mV
Power Supply Rejection	PSRR	V _{CM} = V ⁻		76		dB
Input Bias Current and Impedance						
Input Bias Current	I _B			±1.0		pA
Input Offset Current	I _{OS}			±1.0		pA
Common Mode Input Impedance	Z _{CM}			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		±10		mA
		V ⁺ =5.5V		±80		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°C, unless otherwise specified)

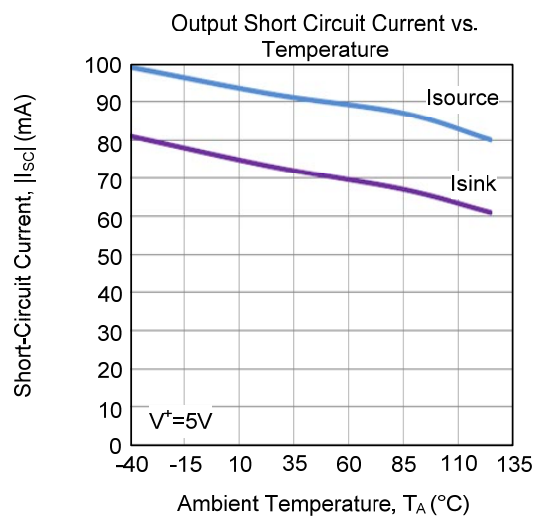
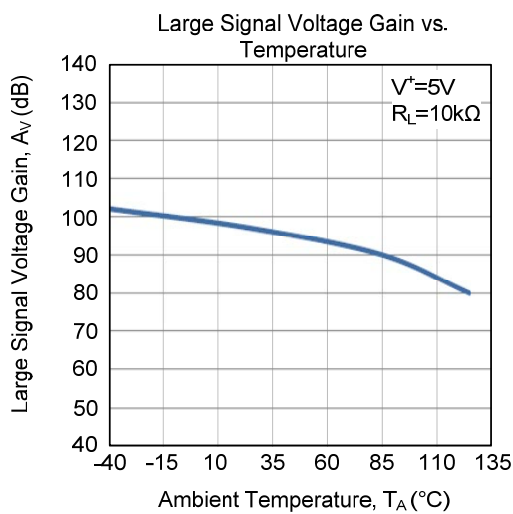
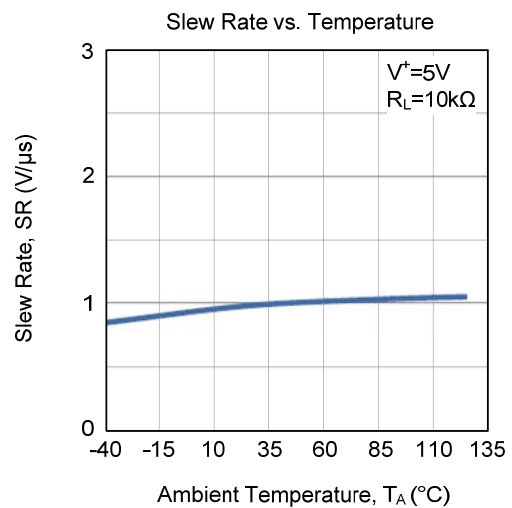
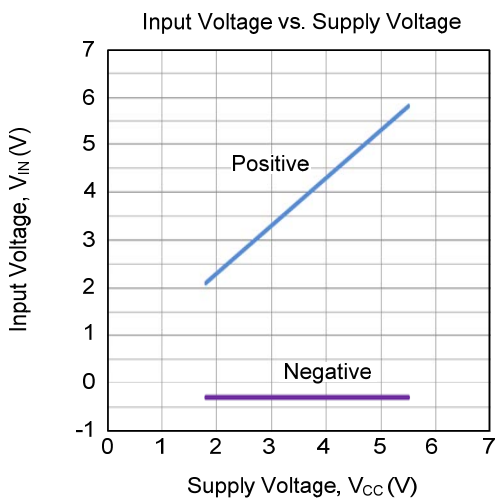
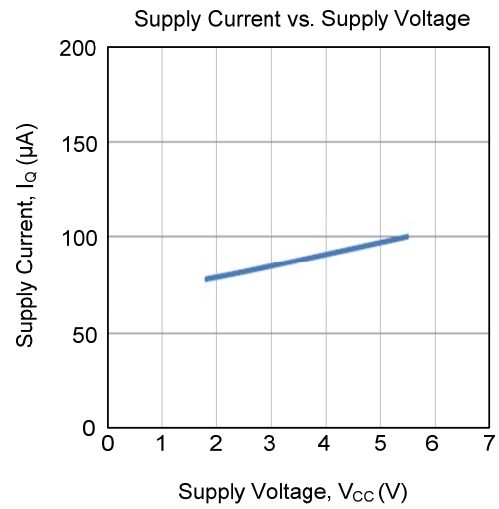
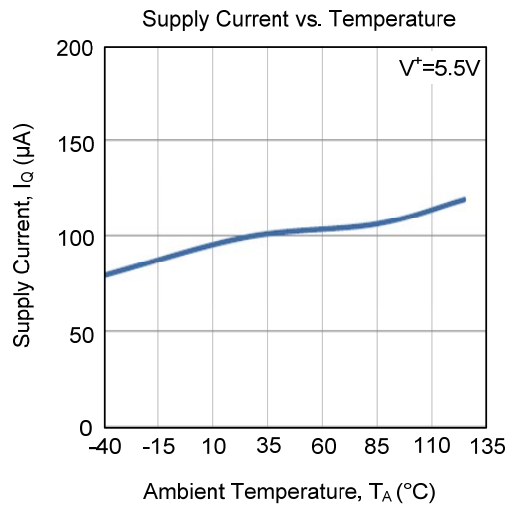
(V⁺=+1.8V~+5.5V, V⁻=GND, V_{CM}= V⁺/2, V_{OUT} ≈ V⁺/2, R_L=10kΩ to V⁺/2, and C_L=60pF)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC Response						
Gain Bandwidth Product	GBWP			1.5		MHz
Phase Margin	PM	G=+1V/V		110		°
Slew Rate	SR			0.9		V/μs
Noise						
Input Noise Voltage	E _{ni}	f=0.1Hz~10Hz		6.1		μVp-p
Input Noise Voltage Density	e _{ni}	f=1kHz		28		nV/√Hz
Input Noise Current Density	i _{ni}	f=1kHz		0.6		fA/√Hz

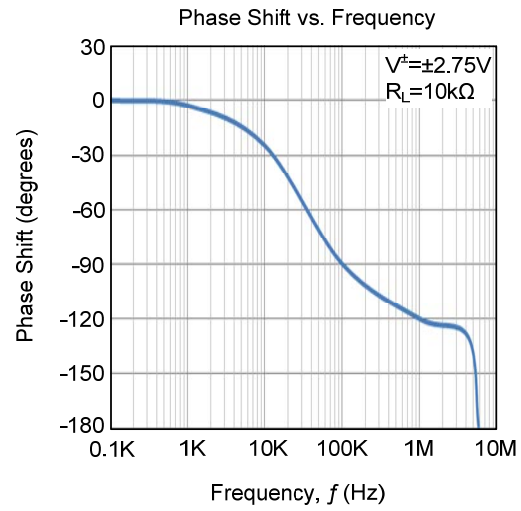
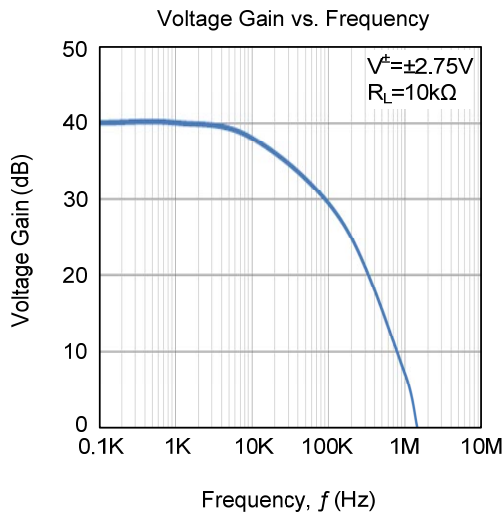
■ TYPICAL APPLICATION CIRCUIT



■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



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