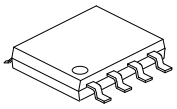
ULV607 **Advance** ***CMOS IC***

2.5V TO 6.0V MICROPOWER CMOS OP AMP



SOP-8

■ DESCRIPTION

The UTC **ULV607** is unity-gain stable operational amplifiers (op amps) with low offset voltage (950μV, maximum) and low input bias current. Performance characteristic include rail-to-rail output swing capability. These features make **ULV607** well suited for single-supply, precision, high-impedance, battery-powered applications.

■ FEATURES

* Power Supply Voltage: 2.5V~6.0V
* Low Input Offset Voltage: ±950μV (maximum)
* Rail-to-Rail Output
* Low Quiescent Current: 18.7μA (typical)
* Unity-Gain Stable
* No Phase Reversal

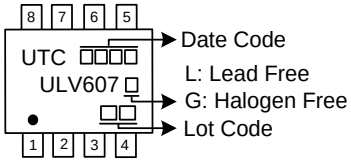
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV607L-S08-R	ULV607G-S08-R	SOP-8	Tape Reel

ULV607G-S08-R

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

■ MARKING



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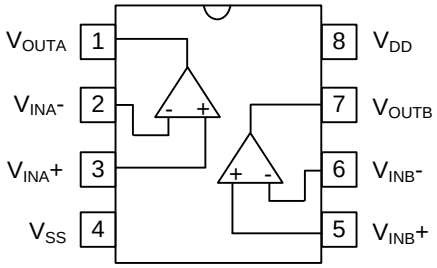
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_{OUTA}	Output (op amp A)
2	V_{INA}–	Inverting Input (op amp A)
3	V_{INA}+	Non-inverting Input (op amp A)
4	V_{SS}	Negative Power Supply
5	V_{INB}+	Non-inverting Input (op amp B)
6	V_{INB}–	Inverting Input (op amp B)
7	V_{OUTB}	Output (op amp B)
8	V_{DD}	Positive Power Supply

■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply	V_{DD}-V_{SS}	7.0	V
Current at Input Pin	I_{IN}	±2	mA
Analog Inputs	V_{IN}+, V_{IN}–	V_{SS}-1.0 ~ V_{DD}+1.0	V
All Other Inputs and Outputs		V_{SS}-0.3 ~ V_{DD}+0.3	V
Difference Input Voltage		$\|V_{DD}$-$V_{SS}\|$	V
Output Short Circuit Current		Continuous	
Current at Output and Supply Pins		±30	mA
Maximum Junction Temperature	T_J	+150	°C
Operating Temperature Range	T_{OPR}	-40 ~ +125	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction to Case	θ_{JA}		150		°C/W

■ DC ELECTRICAL CHARACTERISTICS

Unless otherwise indicated, V_{DD}=+2.5V~+5.5V, V_{SS}=GND, T_A=+25°C, V_{CM}=V_{DD}/2, V_{OUT}≈V_{DD}/2, V_L=V_{DD}/2, R_L=100kΩ to V_L (refer to Figure 1 and Figure 2).

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset						
Input Offset Voltage	V_{OS}		-950		+950	μV
Power Supply Rejection Ratio	PSRR		80	93		dB
Input Bias Current and Impedance						
Input Bias Current	I_B			1		pA
Input Offset Bias Current	I_{OS}			1		pA
Common Mode Input Impedance	Z_{CM}			10^{13}||6		Ω||pF
Differential Input Impedance	Z_{DIFF}			10^{13}||6		Ω||pF
Common Mode						
Common Mode Input Range	V_{CMR}	CMRR ≥75 dB	V_{SS}–0.3		V_{DD}– 1.1	V
Common Mode Rejection Ratio	CMRR	V_{DD}=5V, V_{CM}=-0.3V~3.9V	70	91		dB
Open-Loop Gain						
DC Open-Loop Gain (Large-signal)	A_{OL}	R=25kΩ to V_L, V_{OUT}=50mV to V_{DD}–50mV	72	121		dB
DC Open-Loop Gain (Large-signal)	A_{OL}	R=5kΩ to V_L, V_{OUT}=0.1V to V_{DD}–0.1V	70	118		dB
Output						
Maximum Output Voltage Swing	V_{OL}, V_{OH}	R_L=25kΩ to V_L, 0.5V input overdrive	V_{SS}+15		V_{DD}–20	mV
		R_L=5kΩ to V_L, 0.5V input overdrive	V_{SS} +45		V_{DD}–60	mV
Linear Output Voltage Range	V_{OUT}	R_L=25kΩ to V_L, A_{OL}≥105dB	V_{SS}+50		V_{DD}–50	mV
		R_L=5kΩ to V_L, A_{OL}≥100dB	V_{SS} +100		V_{DD}–100	mV
Output Short Circuit Current	I_{SC}	V_{DD}=2.5V		7		mA
		V_{DD}=5.5V		17		mA
Power Supply						
Supply Voltage	V_{DD}		2.5		6.0	V
Quiescent Current per Amplifier	I_Q	I_O= 0		18.7	50	μA

■ AC ELECTRICAL CHARACTERISTICS

Unless otherwise indicated, V_{DD}=+2.5V~+5.5V, V_{SS}=GND, T_A=+25°C, V_{CM}=V_{DD}/2, V_{OUT}≈V_{DD}/2, V_L=V_{DD}/2, R_L=100kΩ to V_L and C_L=60pF (refer to Figure 1 and Figure 2).

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Gain Bandwidth Product	GBWP			155		kHz
Phase Margin	PM	G=+1V/V		62		°
Slew Rate	SR			0.08		V/μs
Noise						
Input Noise Voltage	E_{ni}	f=0.1Hz~10Hz		2.8		μVP-P
Input Noise Voltage Density	e_{ni}	f=1kHz		38		nV/√Hz
Input Noise Current Density	i_{ni}	f=1kHz		3		fA/√Hz

■ TEST CIRCUIT

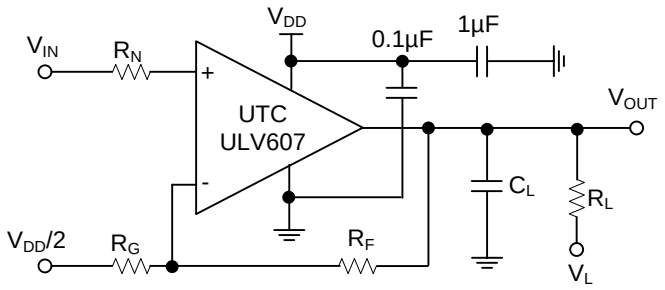


Figure 1. AC and DC Test Circuit for Most Non-Inverting Gain Conditions.

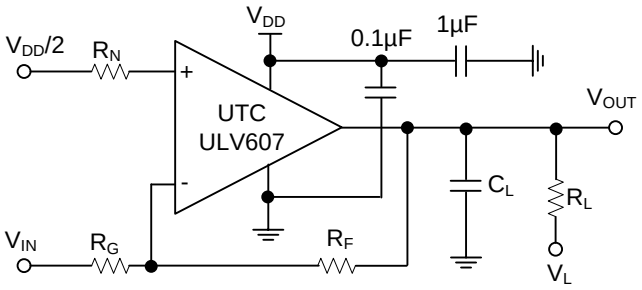
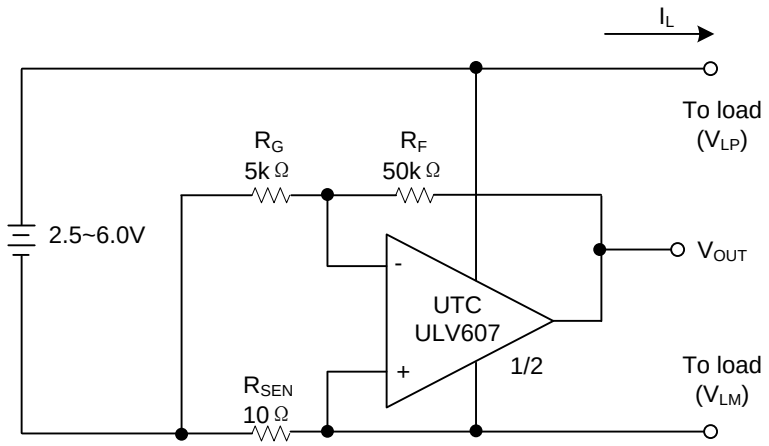


Figure 2. AC and DC Test Circuit for Most Inverting Gain Conditions.

■ TYPICAL APPLICATION CIRCUIT



Low-Side Battery Current Sensor

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