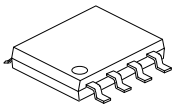
500kHz, 25μA, RAIL-TO-RAIL INPUT/OUTPUT, CMOS OPERATIONAL AMPLIFIER



SOP-8

■ DESCRIPTION

The UTC **ULV8532** (dual) is low cost, voltage feedback amplifier. The device can operate from 2.1V to 5.5V single supply, while consuming only 25μA quiescent current per amplifier. It provides rail-to-rail input with a wide input common mode voltage range and rail-to-rail output voltage swing. This feature makes UTC **ULV8532** appropriate for buffering ASIC.

The UTC **ULV8532** offers a gain-bandwidth product of 500kHz. It's well suited for piezoelectric sensors, integrators and photodiode amplifiers.

The UTC **ULV8532** is designed into a wide range of applications, such as battery-powered instrumentation, safety monitoring, portable systems, and transducer interface circuits in low power systems.

■ FEATURES

* Supply Voltage Range: 2.1V ~ 5.5V
* Low Cost
* Input Offset Voltage: 1.0mV (TYP)
* Unity-Gain Stable
* Gain-Bandwidth Product: 500kHz
* Rail-to-Rail Input and Output
* Input Voltage Range: -0.1V ~ 5.6V with V_S = 5.5V
* Low Supply Current: 25μA/Amplifier

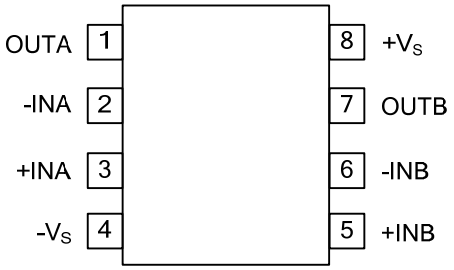
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV8532L-S08-R	ULV8532G-S08-R	SOP-8	Tape Reel

ULV8532G-S08-R
- (1)Packing Type
- (2)Packing Type
- (3)Green Package

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

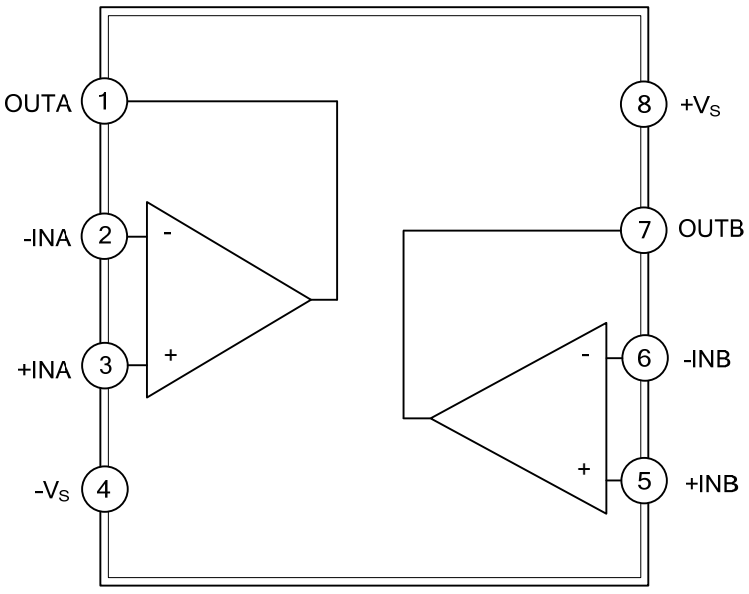
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUTA	Output pin of A AMP
2	-INA	Invert input pin of A AMP
3	+INA	Non-invert input of A AMP
4	$-V_S$	Negative power supply
5	+INB	Non-invert input of B AMP
6	-INB	Invert input pin of B AMP
7	OUTB	Output pin of B AMP
8	$+V_S$	Positive power supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$+V_S$ to $-V_S$	6	V
Input Common Mode Voltage Range	V_{ICM}	$(-V_S)$ - 0.3 ~$(+V_S)$ + 0.3	V
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. Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails must be current-limited to 10mA or less.
3. Short-circuit to ground.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Operating Temperature Range	T_A	-40 ~ +125	°C

■ THERMAL DATA (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction-to-Ambient Thermal Resistance	θ_{JA}	158	°C/W

■ ELECTRICAL CHARACTERISTICS

(T_A=25°C, V_S=5V, R_L =200kΩ connected to V_S/2 and V_{OUT} =V_S/2, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Characteristics						
Input Offset Voltage	V_{OS}	V_{CM} = V_S/2		1.0	5.5	mV
		V_{CM} = V_S/2, T_A = -40°C~125°C			7.4	mV
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			2.0		μV/°C
Input Bias Current	I_B			1		pA
Input Offset Current	I_{OS}			1		pA
Input Common Mode Voltage Range	V_{CM}	V_S = 5.5V		-0.1~ 5.6		V
Common Mode Rejection Ratio	CMRR	V_S = 5.5V, V_{CM} = -0.1V ~ 4V	71	92		dB
		T_A = -40°C~125°C	68			dB
		V_S = 5.5V, V_{CM} = -0.1V ~ 5.6V	60	78		dB
		T_A = -40°C~125°C	57			dB
Open-Loop Voltage Gain	A_V	R_L = 5kΩ, V_{OUT} = 0.1V ~ 4.9V	72	88		dB
		T_A = -40°C~125°C	68			dB
		R_L = 100kΩ, V_{OUT} = 0.035V ~ 4.965V	82	92		dB
		T_A = -40°C~125°C	78			dB
Power Supply						
Quiescent Current/Amplifier	I_Q			25	53	μA
		T_A = -40°C~125°C			59	μA
Power Supply Rejection Ratio	PSRR	V_S = 2.5V ~ 5.5V, V_{CM} = 0.5V	70	90		dB
		T_A = -40°C~125°C	66			dB
Operating Voltage Range			2.1		5.5	V
		T_A = -40°C~125°C	2.5		5.5	V
Output Characteristics						
Output Voltage Swing	V_{OH}	R_L = 100kΩ	4.980	4.997		V
		T_A = -40°C~125°C	4.970			V
	V_{OL}	R_L = 100kΩ		3	20	mV
		T_A = -40°C~125°C			30	mV
	V_{OH}	R_L = 10kΩ	4.970	4.994		V
		T_A = -40°C~125°C	4.960			V
	V_{OL}	R_L = 10kΩ		6	30	mV
		T_A = -40°C~125°C			40	mV
Output Current	I_{SOURCE}	R_L = 10Ω to V_S/2	60	85		mA
		T_A = -40°C~125°C	45			mA
	I_{SINK}	R_L = 10Ω to V_S/2	60	72		mA
		T_A = -40°C~125°C	45			mA
Dynamic Performance (C_L = 100pF)						
Slew Rate	SR	G = +1, 2V Output Step		0.2		V/μs
Gain-Bandwidth Product	GBW			500		kHz
Settling Time to 0.1%	t_S	G = +1, 2V Output Step		19		μs
Overload Recovery Time		V_{IN} ·G = V_S		18		μs
Noise Performance						
Input Voltage Noise Density	e_n	f = 1kHz		35		nV $\sqrt{Hz}$
		f = 10kHz		25		nV $\sqrt{Hz}$

■ TYPICAL APPLICATION CIRCUIT

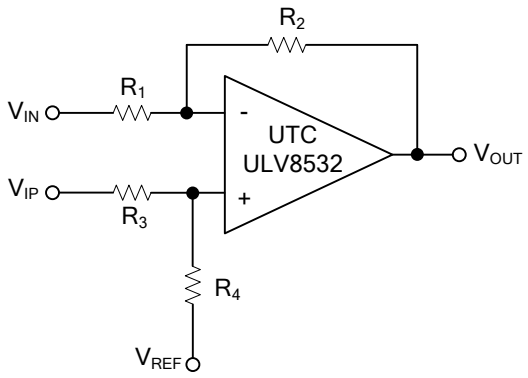


Figure 1: Differential Amplifier

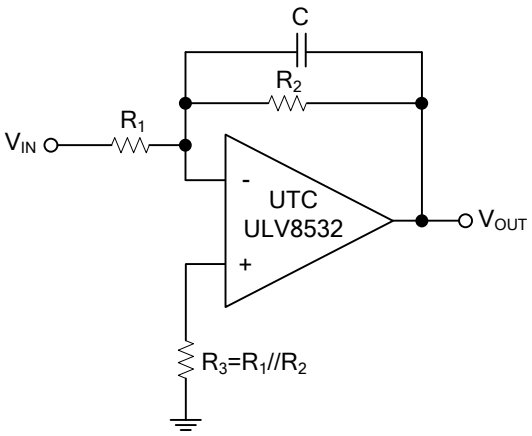


Figure 2: Active Low-Pass Filter