



## ULV8542

Preliminary

CMOS IC

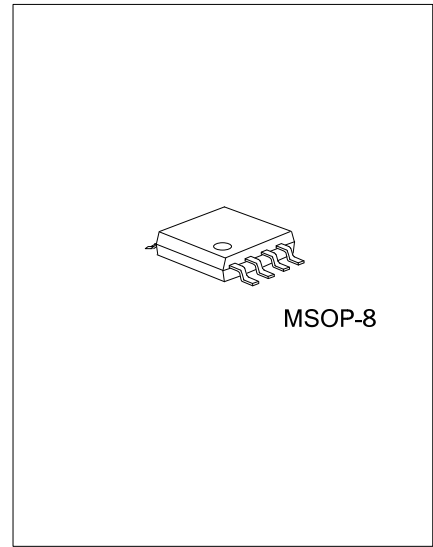
### 1.1MHz, 42µA RAIL-TO-RAIL I/O CMOS DUAL AMPS

#### DESCRIPTION

The UTC **ULV8542** is a low cost rail to rail input and output dual OP AMP, Features in a wide input common-mode voltage range and output voltage swing. The minimum operating supply voltage down to 2.1V and the maximum recommended supply voltage is 5.5V. The operating temperature range extended -40°C to +125°C.

UTC **ULV8542** suit for piezoelectric sensors, integrators, and photodiode amplifiers based on very low input bias currents of 0.5pA. Rail-to-rail inputs and outputs are useful to design buffering ASIC in single-supply systems.

The common applications for this device especially in very low power systems such as safety monitoring, portable equipment.



#### FEATURES

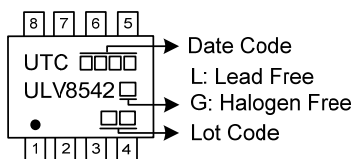
- \* Low Cost
- \* Operating voltage range:2.1V~ 5.5V
- \* Low offset voltage:0.8mV Typical
- \* Very low input bias currents: 0.5pA
- \* Rail-to-Rail Input and Output
- \* Unity Gain Stable
- \* Gain Bandwidth Product: 1.1MHz

#### ORDERING INFORMATION

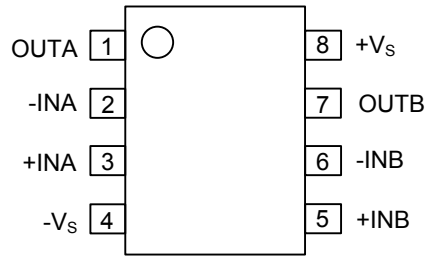
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV8542L-SM1-R	ULV8542G-SM1-R	MSOP-8	Tape Reel

ULV8542G-SM1-R	
<ul style="list-style-type: none"> <li>(1)Packing Type</li> <li>(2)Package Type</li> <li>(3)Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) SM1: MSOP-8</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>

#### MARKING



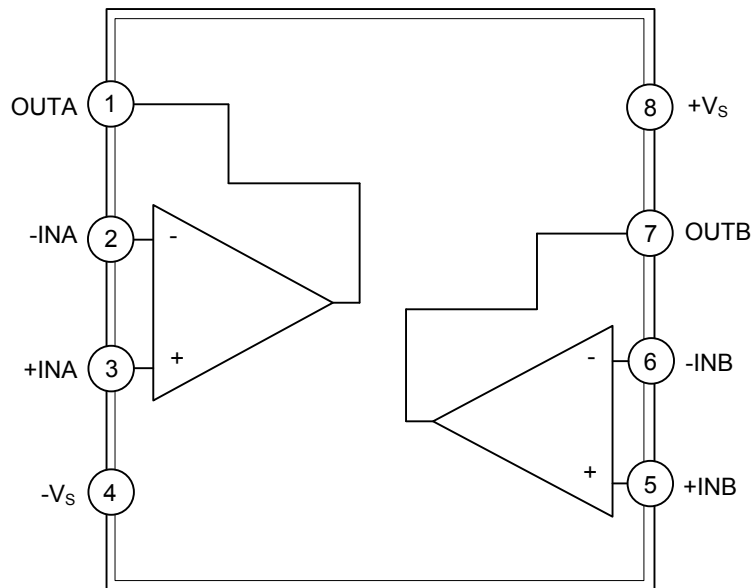
#### PIN CONFIGURATION



■ 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	-Vs	Negative 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	+Vs	Positive supply

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage, Vs to -Vs	V <sub>S</sub>	7.5	V
Common-Mode Input Voltage	V <sub>CM</sub>	(-V <sub>S</sub> )-0.5 ~ (+V <sub>S</sub> )+0.5	V
Junction Temperature	T <sub>J</sub>	+150	°C
Operating Temperature Range	T <sub>OPR</sub>	-40 ~ +125	°C
Storage Temperature Range	T <sub>STG</sub>	-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.

### ■ ELECTRICAL CHARACTERISTICS

(V<sub>S</sub>=+5V, R<sub>L</sub>=100kΩ connected to Vs/2, and V<sub>OUT</sub>=Vs/2, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>INPUT CHARACTERISTICS</b>						
Input Offset Voltage	V <sub>OS</sub>			±0.8	±3.5	mV
		(Note)			±5.4	mV
Input Offset Voltage Drift	ΔV <sub>OS</sub> /ΔT			2.7		μV/°C
Input Bias Current	I <sub>B</sub>			0.5		pA
Input Offset Current	I <sub>OS</sub>			0.5		pA
Common-Mode Voltage Range	V <sub>CM</sub>	V <sub>S</sub> =5.5V	-0.1		5.6	V
Common-Mode Rejection Ratio	CMRR	V <sub>S</sub> =5.5V, V <sub>CM</sub> =-0.1V~4V	72	88		dB
		(Note)	72			dB
		V <sub>S</sub> =5.5V, V <sub>CM</sub> =-0.1V~5.6V	60	78		dB
		(Note)	57			dB
Open-Loop Voltage Gain	A <sub>OL</sub>	R <sub>L</sub> =5KΩ, V <sub>O</sub> =0.1V~4.9V	80	90		dB
		(Note)	78			dB
		R <sub>L</sub> =100KΩ, V <sub>O</sub> =0.035V~4.965V	85	94		dB
		(Note)	82			dB
<b>OUTPUT CHARACTERISTICS</b>						
Output Voltage Swing from Rail	V <sub>O</sub>	R <sub>L</sub> =100KΩ		0.008		V
Output Current	I <sub>OUT</sub>		20	23		mA
		(Note)	18			mA
<b>POWER SUPPLY</b>						
Operating Voltage Range	V <sub>S</sub>		2.1		5.5	V
		(Note)	2.5		5.5	V
Power Supply Rejection Ratio	PSRR	V <sub>S</sub> =+2.5V~+5.5V V <sub>CM</sub> =(-V <sub>S</sub> )+0.5V	76	92		dB
		(Note)	70			dB
Quiescent Current / Amplifier	I <sub>Q</sub>	I <sub>OUT</sub> =0		70	90	μA
		(Note)			100	μA
<b>DYNAMIC PERFORMANCE (C<sub>L</sub>=100pF)</b>						
Gain-Bandwidth Product	GBP			1.1		MHz
Slew Rate	SR	G=+1, 2V Output Step		0.8		V/μs
Settling Time to 0.1%	t <sub>S</sub>	G=+1, 2 V Output Step		5.3		μs
Overload Recovery Time	t <sub>OR</sub>	V <sub>IN</sub> · Gain=Vs		2.6		μs
<b>NOISE PERFORMANCE</b>						
Voltage Noise Density	e <sub>N</sub>	f=1kHz		27		nV/√Hz
		f=10kHz		20		nV/√Hz

Note: Denotes the specifications which apply over the operating temperature range (-40°C~125°C).

■ TYPICAL APPLICATION CIRCUIT

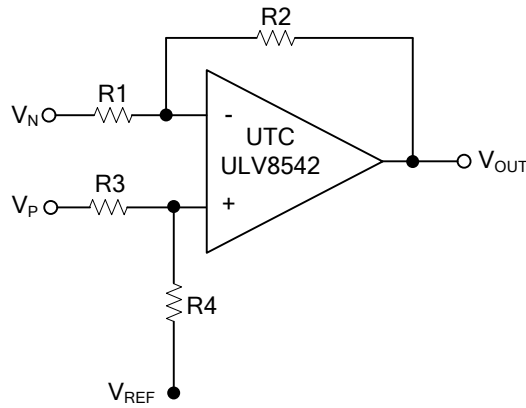


Figure 1. Differential Amplifier

Note: Figure 1 is the differential amplifier.  $V_{OUT}=(V_P-V_N)\times R2/R1+V_{ref}$  (when  $R4/R3=R2/R1$ ).

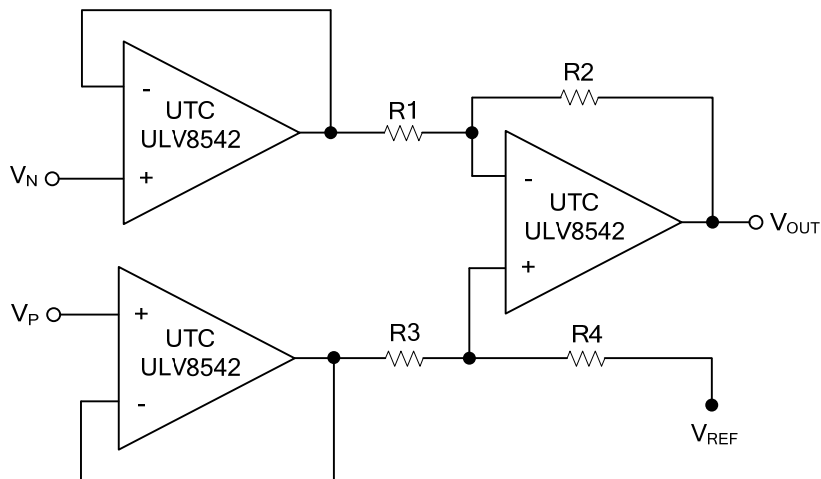


Figure 2. Instrumentation Amplifier

Note: The circuit in Figure 2 performs the same function as that in Figure 1 but with the high input impedance.

■ TYPICAL APPLICATION CIRCUIT (Cont.)

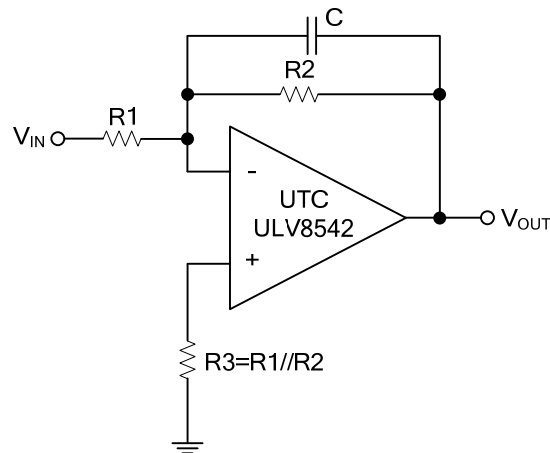


Figure 3. Low Pass Active Filter

Note: Figure 3 is the low pass filter. It's DC gain is  $-R2/R1$  and the  $-3\text{dB}$  corner frequency is  $1/2\pi R_2 C$ .

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