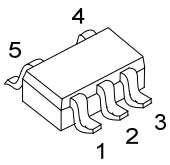
LV8541

CMOS IC

RAIL-TO-RAIL I/O CMOS SINGLE AMP



SOT-353

■ DESCRIPTION

The UTC **LV8541** is a low cost rail to rail input and output single 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 **LV8541** suit for piezoelectric sensors, integrators, and photodiode amplifiers. 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

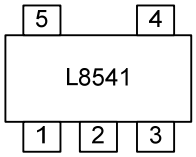
* Operating voltage range: 2.1 V ~ 5.5 V
* Supply Current/Amplifier: 120 μA (Max.)
* Low offset voltage: ±3.5 mV (Max.)
* Rail-to-Rail Input and Output
* Slew Rate: 0.6 V/μs (Typ.)

■ ORDERING INFORMATION

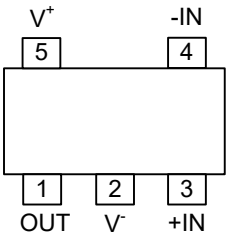
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LV8541L-AL5-R	LV8541G-AL5-R	SOT-353	Tape Reel

LV8541G-AL5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AL5: SOT-353 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



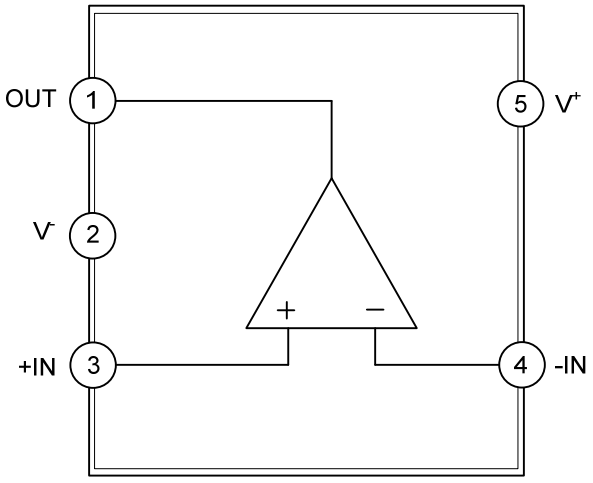
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUT	Output
2	V^-	Negative power supply
3	+IN	Non-inverting input
4	-IN	Inverting input
5	V^+	Positive power supply

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (NOTE 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$(V^+ - V^-)$	7	V
Differential Input Voltage	V_{ID}	Supply Voltage	
Junction Temperature (Note 3)	T_J	+150	°C
Storage Temperature	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. Applies to both single-supply and split-supply operation. Continuous short circuit operation at elevated ambient temperature can result in exceeding the maximum allowed junction temperature of 150˚C. Output currents in excess of 45mA over long term may adversely affect reliability.
3. The maximum power dissipation is a function of $T_{J(max)}$, θ_{JA}, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D=(T_{J(max)} - T_A)/\theta_{JA}$. All numbers apply for packages soldered directly into a PC board.

■ RECOMMENDED OPWRAING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	2.1 ~ 5.5	V
Operating Free-Air Temperature	T_{OPR}	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS

(V_S=+5V, R_L=100kΩ, and $V_{OUT}=V_S$ / 2, T_A=25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Supply Current/Amplifier	I_Q	I_{OUT}=0			58	120	μA
Power Supply Rejection Ratio	PSRR	V_S=+2.5V ~ +5.5V $V_{CM}=(-V_S)$+0.5V		76	92		dB
Input Offset Voltage	V_{OS}					±3.5	mV
Input Bias Current	I_B				1		pA
Input Offset Current	I_{OS}				1		pA
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 ~ 5.6V		60	85		dB
Large Signal Voltage Gain	A_V	R_L=5kΩ,V_O= 0.1V ~4.9V		80	98		dB
Output Voltage	V_O	R_L=100kΩ	V_{OH}		4.994		V
			V_{OL}		0.005		V
Short-Circuit Current	I_{SC}	Sourcing, V_O=0V		20	60		mA
		Sinking, V_O= V^+		20	60		mA
Slew Rate	SR	G=+1, 2V Output Step			0.6		V/μs
Gain-Bandwidth Product	GBW				0.7		MHz
Input-Referred Voltage Noise	e_n	f=1kHz			27		nV/$\sqrt{Hz}$
		f=10kHz			20		nV/$\sqrt{Hz}$

■ TYPICAL APPLICATION CIRCUIT

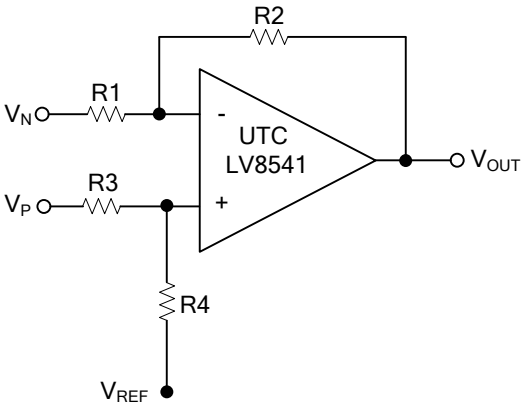


Figure 1. Differential Amplifier

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

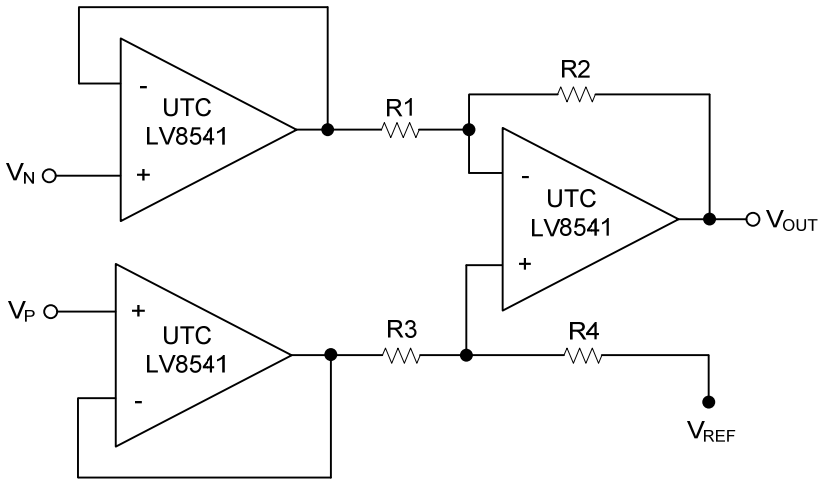


Figure 2. Instrumentation Amplifier

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.)

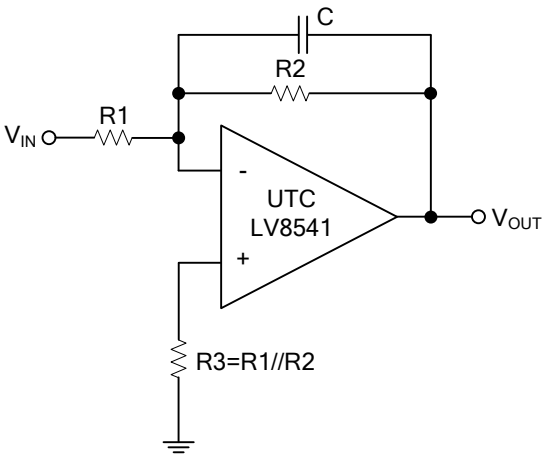
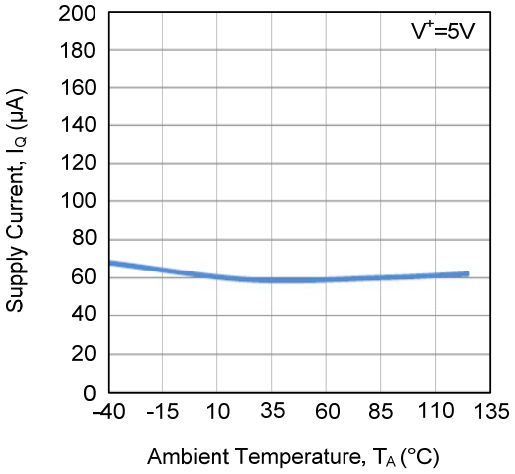


Figure 3. Low Pass Active Filter

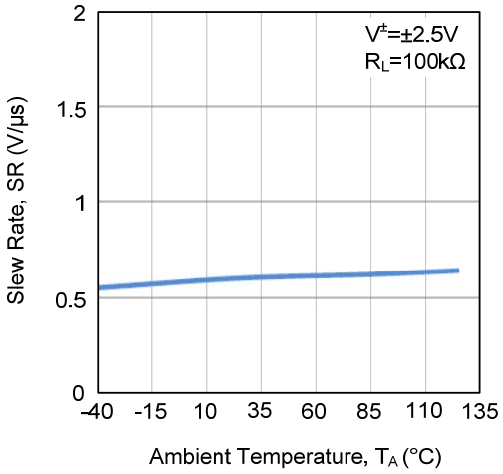
Note: Figure 3 is the low pass filter. It's DC gain is -R2/R1 and the -3dB corner frequency is $1/2\pi R_2C$.

■ TYPICAL CHARACTERISTICS

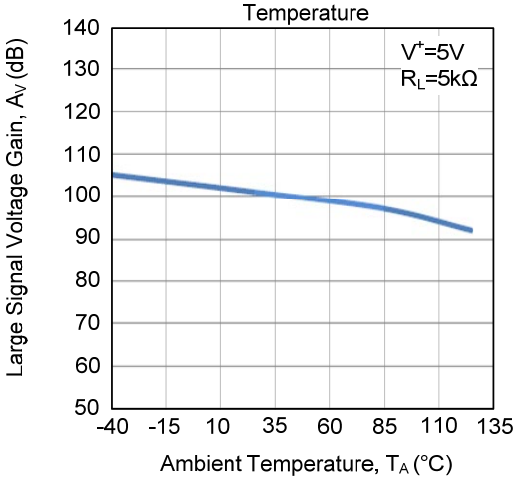
Supply Current vs. Temperature



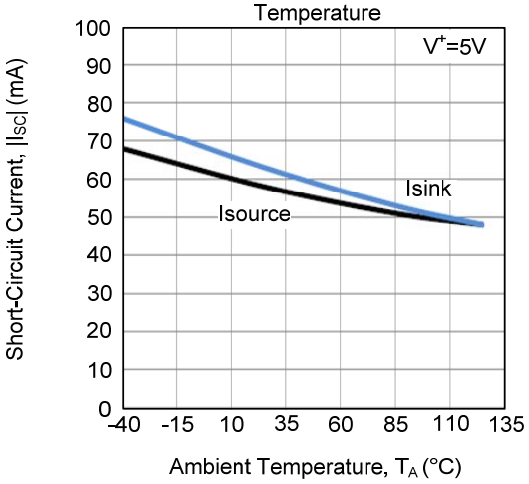
Slew Rate vs. Temperature



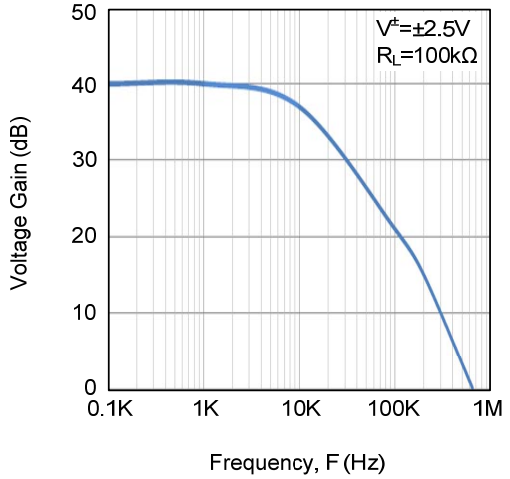
Large Signal Voltage Gain vs. Temperature



Output Short Circuit Current vs. Temperature



Voltage Gain vs. Frequency



Phase Shift vs. Frequency