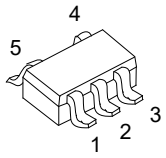
ULV721

CMOS IC

LOW-POWER RAIL-TO-RAIL I/O CMOS OPERATIONAL AMPLIFIER



SOT-25

■ DESCRIPTION

The UTC **ULV721** (single) is a low cost rail to rail input and output OP AMP. The UTC **ULV721** is low voltage, and low power supply current, that can be designed into a wide range of applications. The UTC **ULV721** is designed to provide optimal performance in low voltage and low noise systems. It provides rail-to-rail output swing into heavy loads.

Low quiescent current 1.2mA per channel at 5V can supply 8.5V/μs slew rate. The UTC **ULV721** suits for Sensors, Active Filters, Audio, A/D Converters, Test Equipment, Communications, Battery-Powered Instrumentation and photodiode amplifiers, Cellular and Cordless Phones, Laptops and PDAs.

■ FEATURES

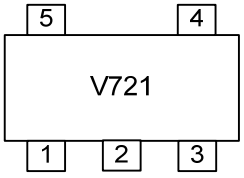
* Supply Voltage: 2.1V ~ 5.5V
* Supply Current/Amplifier: 1.6 mA (Max.)
* Input Offset Voltage:4mV (Max)
* Rail-to-Rail Input and Output
* Slew Rate: 8.5V/μs (Typ.)

■ ORDERING INFORMATION

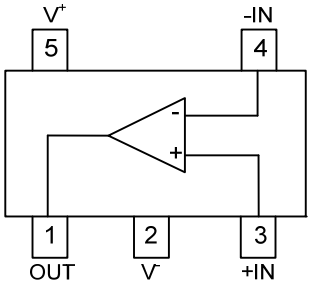
Ordering Number		Package	Packing
Lead Free	Halogen Free		
ULV721L-AF5-R	ULV721G-AF5-R	SOT-25	Tape Reel

ULV721G-AF5-R (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



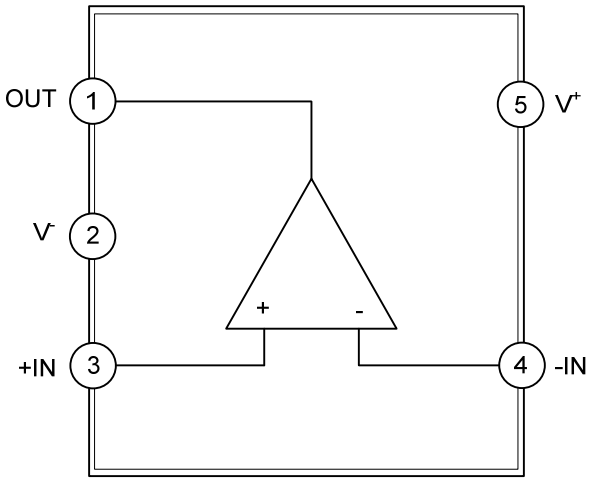
■ PIN CONFIGURATION



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

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage, $+V_S$ to $-V_S$	V_S	6	V
Input Common Mode Voltage Range	V_{CM}	(V^-)-0.3 ~ $(+V_S)$+0.3	V
Junction Temperature	T_J	+150	°C
Storage Temperature Range	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.

■ RECOMMENDED OPERATING CONDITIONS

Over operating free-air temperature range (Unless otherwise specified)

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

■ ELECTRICAL CHARACTERISTICS

(V_S=5V, V_{CM}=V_S/2, R_L=600Ω, T_A=+25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Supply Current/Amplifier	I_Q	I_{OUT}=0			1.2	1.6	mA
Power Supply Rejection Ratio	PSRR	V_S=2.1V ~ 5.5V, V_{CM} < (V^-)+0.5V		68	90		dB
Input Offset Voltage	V_{OS}				1.5	4	mV
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$				2.1		μV/°C
Input Bias Current	I_B				5		pA
Input Offset Current	I_{OS}				5		pA
Common-Mode Voltage Range	V_{CM}			V^-- 0.1		V^++0.1	V
Common-Mode Rejection Ratio	CMRR	V_S=5.5V, V_{CM}=-0.1V~4V		67	83		dB
		V_S=5.5V, V_{CM}=-0.1V~5.6V		60	75		dB
Large Signal Voltage Gain	A_V	V_O=0.15V~4.85V , R_L=600Ω		80	89		dB
		V_O=0.05V~4.95V , R_L=10kΩ		94	102		dB
Output Voltage	V_O	R_L=2kΩ	V_{OH}		V^+-0.15		V
			V_{OL}		0.007		V
		R_L=600Ω	V_{OH}		V^+-0.05		V
			V_{OL}		0.003		V
Short-Circuit Current	I_{SC}	Sourcing		53	75		mA
		Sinking		53	80		mA
Slew Rate	SR				8.5		V/μs
Gain-Bandwidth Product	GBW				7		MHz
Input Voltage Noise Density	e_n	f = 1kHz			15		nV/$\sqrt{Hz}$

■ TYPICAL APPLICATION CIRCUIT

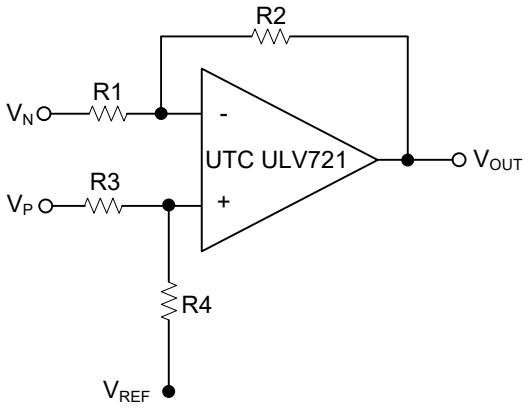


Figure 1. Differential Amplifier

Figure 1 Is the differential amplifier. If the resistors ratios are equal (R4/R3=R2/R1), then $V_{OUT}=(V_P-V_N)\times R2/R1+V_{REF}$.

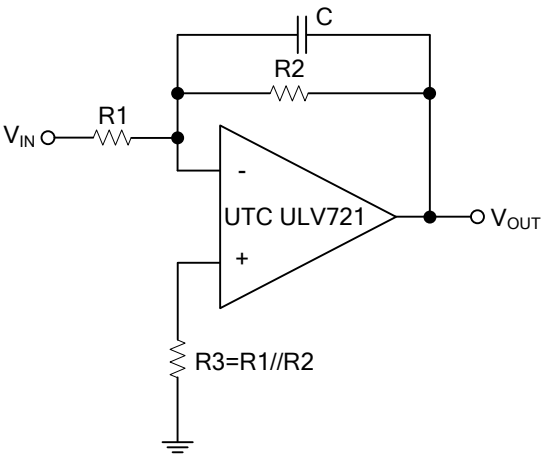
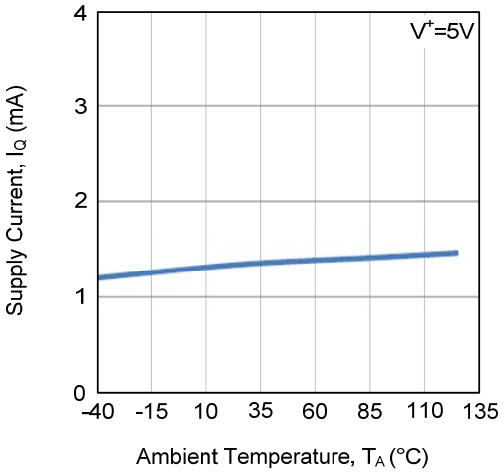


Figure 2. Low Pass Active Filter

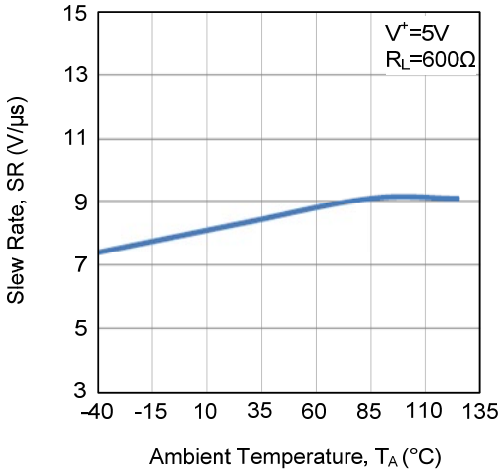
Figure 2 Is the low pass filter. It's DC gain is -R2/R1 and the -3dB corner frequency is $1/2\pi R_2C$.

■ TYPICAL CHARACTERISTICS

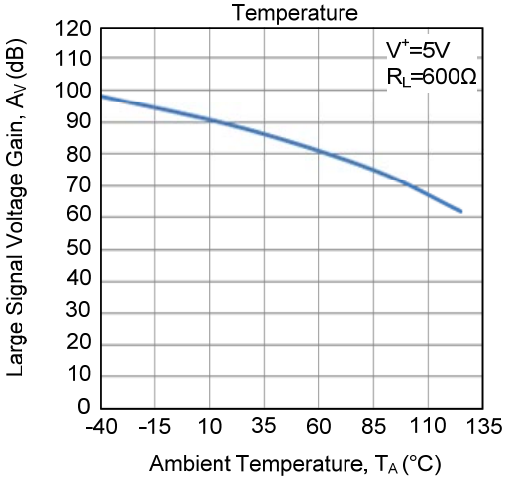
Supply Current vs. Temperature



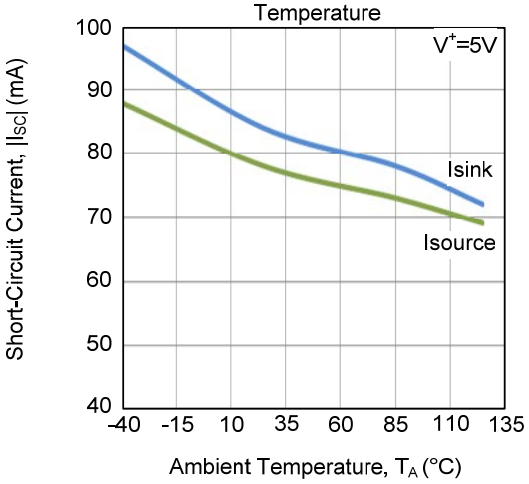
Slew Rate vs. Temperature



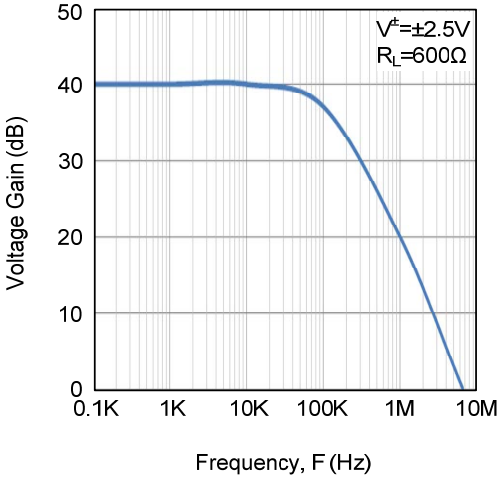
Large Signal Voltage Gain vs. Temperature



Output Short Circuit Current vs. Temperature



Voltage Gain vs. Frequency



Phase Shift vs. Frequency