Dual, Low Power CMOS Operational Amplifiers

The ICL761X/762X series is a family of monolithic CMOS operational amplifiers. These devices provide the designer with high performance operation at low supply voltages and selectable quiescent currents. They are an ideal design tool when ultra low input current and low power dissipation are desired.

The basic amplifier will operate at supply voltages ranging from ±1V to ±8V, and may be operated from a single Lithium cell. The output swing ranges to within a few millivolts of the supply voltages.

The quiescent supply current of these amplifiers is set to 100µA at the factory. This results in power consumption as low as 200µW per amplifier.

Of particular significance is the extremely low (1pA) input current, input noise current of 0.01pA/$\sqrt{Hz}$, and $10^{12}\Omega$ input impedance. These features optimize performance in very high source impedance applications.

The inputs are internally protected. Outputs are fully protected against short circuits to ground or to either supply.

Because of the low power dissipation, junction temperature rise and drift are quite low. Applications utilizing these features may include stable instruments, extended life designs, or high density packages.

Ordering Information

PART NUMBER	TEMP. RANGE (^{O}C)	PACKAGE	PKG. NO.
ICL7621BCPA	0 to 70	8 Ld PDIP - B Grade - I_Q = 100µA	E8.3
ICL7621DCPA	0 to 70	8 Ld PDIP - D Grade - I_Q = 100µA	E8.3
ICL7621DCBA	0 to 70	8 Ld SOIC - D Grade - I_Q = 100µA	M8.15
ICL7621DCBA-T	0 to 70	8 Ld SOIC - D Grade - Tape and Reel - I_Q = 100µA	M8.15

Features

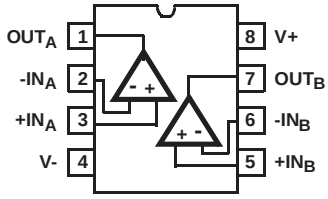
- Wide Operating Voltage Range . . . . . ±1V to ±8V
- High Input Impedance . . . . . $10^{12}\Omega$
- Input Current Lower Than BIFETs . . . . . 1pA (Typ)
- Output Voltage Swing . . . . . V+ and V-
- Available as Duals (Refer to ICL7611 for Singles)
- Low Power Replacement for Many Standard Op Amps

Applications

- Portable Instruments
- Telephone Headsets
- Hearing Aid/Microphone Amplifiers
- Meter Amplifiers
- Medical Instruments
- High Impedance Buffers

Pinouts

ICL7621 (PDIP, SOIC)
TOP VIEW



Absolute Maximum Ratings

Supply Voltage V+ to V- 18V
Input Voltage . . . . . V- -0.3 to V+ +0.3V
Differential Input Voltage (Note 1) . . . . . [(V+ +0.3) - (V- -0.3)]V
Duration of Output Short Circuit (Note 2). . . . . Unlimited

Operating Conditions

Temperature Range
ICL7621C . . . . . 0^oC to 70^oC

Thermal Information

Thermal Resistance (Typical, Note 3)	θ_{JA} ($^oC/W$)	θ_{JC} ($^oC/W$)
PDIP Package	120	N/A
SOIC Package	160	N/A

Maximum Junction Temperature (Plastic Package) . . . . . 150^oC
Maximum Storage Temperature Range. . . . . -65^oC to 150^oC
Maximum Lead Temperature (Soldering 10s) . . . . . 300^oC
(SOIC - Lead Tips Only)

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTES:

1. Long term offset voltage stability will be degraded if large input differential voltages are applied for long periods of time.
2. The outputs may be shorted to ground or to either supply, for $V_{SUPPLY} \leq 10V$. Care must be taken to insure that the dissipation rating is not exceeded.
3. θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications $V_{SUPPLY} = \pm 5V$, Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	TEMP. (^oC)	ICL7621B			ICL7621D			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	V_{OS}	$R_S \leq 100k\Omega$	25	-	-	5	-	-	15	mV
			Full	-	-	7	-	-	20	mV
Temperature Coefficient of V_{OS}	$\Delta V_{OS}/\Delta T$	$R_S \leq 100k\Omega$	-	-	15	-	-	25	-	$\mu V/^oC$
Input Offset Current	I_{OS}		25	-	0.5	30	-	0.5	30	pA
			0 to 70	-	-	300	-	-	300	pA
			-55 to 125	-		800	-		800	pA
Input Bias Current	I_{BIAS}		25	-	1.0	50	-	1.0	50	pA
			0 to 70	-	-	400	-	-	400	pA
			-55 to 125	-	-	4000	-	-	4000	pA
Common Mode Voltage Range	V_{CMR}	$I_Q = 100\mu A$	25	± 4.2	-	-	± 4.2	-	-	V
Output Voltage Swing	V_{OUT}	$I_Q = 100\mu A$, $R_L = 100k\Omega$	25	± 4.9	-	-	± 4.9	-	-	V
			0 to 70	± 4.8	-	-	± 4.8	-	-	V
			-55 to 125	± 4.5	-	-	± 4.5	-	-	V
Large Signal Voltage Gain	A_{VOL}	$V_O = \pm 4.0V$, $R_L = 100k\Omega$, $I_Q = 100\mu A$	25	80	102	-	80	102	-	dB
			0 to 70	75	-	-	75	-	-	dB
			-55 to 125	68	-	-	68	-	-	dB
Unity Gain Bandwidth	GBW	$I_Q = 100\mu A$	25	-	0.48	-	-	0.48	-	MHz
Input Resistance	R_{IN}		25	-	10^{12}	-	-	10^{12}	-	Ω
Common Mode Rejection Ratio	CMRR	$R_S \leq 100k\Omega$, $I_Q = 100\mu A$	25	70	91	-	70	91	-	dB
Power Supply Rejection Ratio ($V_{SUPPLY} = \pm 8V$ to $\pm 2V$)	PSRR	$R_S \leq 100k\Omega$, $I_Q = 100\mu A$	25	80	86	-	80	86	-	dB
Input Referred Noise Voltage	e_N	$R_S = 100\Omega$, f = 1kHz	25	-	100	-	-	100	-	$nV/\sqrt{Hz}$
Input Referred Noise Current	i_N	$R_S = 100\Omega$, f = 1kHz	25	-	0.01	-	-	0.01	-	$pA/\sqrt{Hz}$
Supply Current (Per Amplifier)	I_{SUPPLY}	No Signal, No Load, $I_Q = 100\mu A$	25	-	0.1	0.25	-	0.1	0.25	mA
Channel Separation	V_{O1}/V_{O2}	$A_V = 100$	25	-	120	-	-	120	-	dB
Slew Rate	SR	$A_V = 1$, $C_L = 100pF$, $V_{IN} = 8V_{P-P}$, $I_Q = 100\mu A$, $R_L = 100k\Omega$	25	-	0.16	-	-	0.16	-	V/µs
Rise Time	t_R	$V_{IN} = 50mV$, $C_L = 100pF$, $I_Q = 100\mu A$, $R_L = 100k\Omega$	25	-	2	-	-	2	-	µs
Overshoot Factor	OS	$V_{IN} = 50mV$, $C_L = 100pF$, $I_Q = 100\mu A$, $R_L = 100k\Omega$	25	-	10	-	-	10	-	%