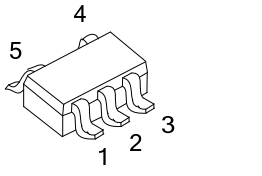
LOW VOLTAGE, LOW POWER, RAIL TO RAIL, OUTPUT, 5 MHz OP AMP



SOT-25

■ DESCRIPTION

The UTC **LV821** brings performance and economy to low voltage / low power system. With a 5MHz unity-gain frequency and a guaranteed 1.4 V/μs slew rate, the quiescent current is only 220μA (2.7V). It provides rail-to-rail output swing into heavy load (600Ω Guarantees). The input common-mode voltage range includes ground, and the maximum input offset voltage is 3.5mV (Guaranteed). It's also capable of comfortably driving large capacitive load.

■ FEATURES

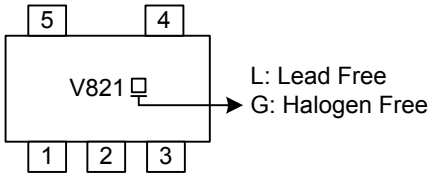
* Guaranteed 2.5V, 2.7V and 5V Performance
* Maximum V_{OS}: 3.5mV
* GBW product : 5MHz V^+=2.7V
* I_q : 220μA V^+=2.7V
* Minimum SR: 1.4 V/μs
* Rail-to-Rail Output Swing:
  600Ω Load: 160mV from rail
  10kΩ Load: 55mV from rail
* V_{CM}: -0.3V ~ 4.3V V^+=5V

■ ORDERING INFORMATION

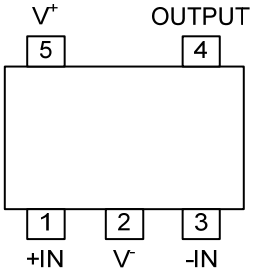
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LV821L-AF5-R	LV821G-AF5-R	SOT-25	Tape Reel

LV821G-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



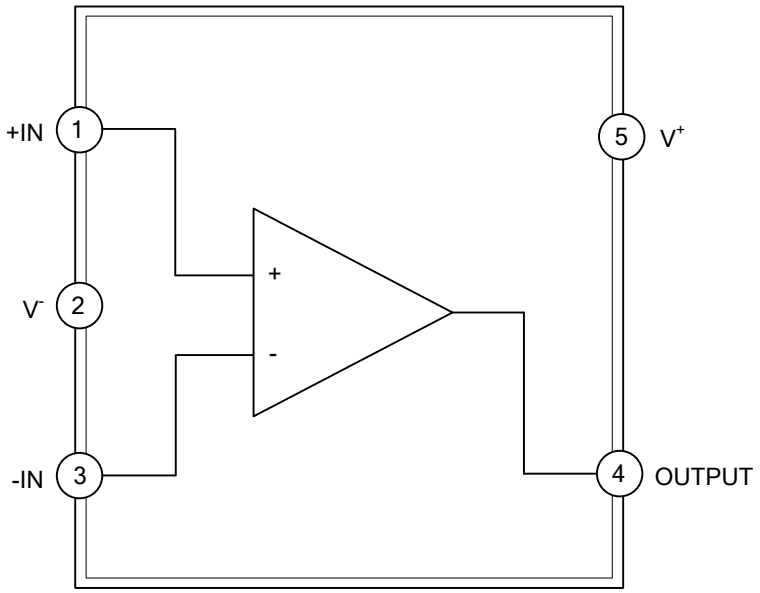
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	+IN	Non-inverting Input
2	V^-	Negative Supply Input
3	-IN	Inverting Input
4	OUTPUT	Output
5	V^+	Positive Supply Input

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (NOTE 1)

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage (V^+ - V^-)	Output Short Circuit to V^+ (Note 2)		5.5	V
	Output Short Circuit to V^- (Note 2)			
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^+	2.5 ~ 5.5	V
Temperature Range	T_{OPR}	-40 ~ +125	°C

■ 2.5V DC ELECTRICAL CHARACTERISTICS

(T_J=25°C. V^+=2.5V, V^-=0V, V_{CM}=1.0V, V_O=1.25V and R_L > 1MΩ.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}			1	3.5	mV
Output Swing	V_O	V^+=2.5V, R_L=600Ω to 1.25V	2.30	2.37		V
				0.13	0.20	V
		V^+=2.5V, R_L=2kΩ to 1.25V	2.40	2.46		V
				0.08	0.12	V

■ 2.7V ELECTRICAL CHARACTERISTICS

(T_J=25°C. V^+=2.7V, V^-=0V, V_{CM}=1.0V, V_O=1.35V and R_L > 1MΩ.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}			1	3.5	mV
Input Bias Current	I_B			30	90	nA
Input Offset Current	I_{OS}			0.5	30	nA
Common Mode Rejection Ratio	CMRR	0V≤V_{CM}≤1.7V	70	85		dB
Positive Power Supply Rejection Ratio	+PSRR	1.7V ≤V^+ ≤ 4V, V^-=1V, V_O=0V, V_{CM}=0V	75	85		dB
Negative Power Supply Rejection Ratio	-PSRR	-1.0V≤V^-≤-3.3V, V^+=1.7V, V_O=0V, V_{CM}=0V	73	85		dB
Input Common-Mode Voltage Range	V_{CM}	For CMRR Range ≥ 50dB		-0.3	-0.2	V
			1.9	2.0		V
Large Signal Voltage Gain	A_V	Sourcing, R_L=600Ω~ 1.35V, V_O=1.35V~2.2V	90	100		dB
		Sinking, R_L=600Ω~1.35V, V_O=1.35V~0.5V	85	90		dB
		Sourcing, R_L=2kΩ~1.35V, V_O=1.35V~2.2V	95	100		dB
		Sinking, R_L=2kΩ~1.35, V_O=1.35~0.5V	90	95		dB
Output Swing	V_O	V^+=2.7V, R_L=600Ω~ 1.35V	2.50	2.58		V
				0.13	0.20	V
		V^+=2.7V, R_L=2kΩ~1.35V	2.60	2.66		V
				0.08	0.120	V
Output Current	I_O	Sourcing, V_O=0V	12	16		mA
		Sinking, V_O=2.7V	12	26		mA
Supply Current	I_Q			0.22	0.3	mA
Slew Rate	SR			1.5		V/μs
Gain-Bandwidth Product	GBW			5		MHz
Phase Margin	Φ_m			61		Deg.
Gain Margin	G_m			10		dB
Amp-to-Amp Isolation				135		dB
Input-Referred Voltage Noise	e_n	f =1kHz, V_{CM}=1V		28		nV/$\sqrt{Hz}$
Input-Referred Current Noise	i_n	f =1kHz		0.1		pA/$\sqrt{Hz}$
Total Harmonic Distortion	THD	f=1kHz, A_V=-2, R_L=10kΩ, V_O=4.1V_{PP}		0.01		%

■ 5V ELECTRICAL CHARACTERISTICS

(T_J=25°C. V^+=5V, V^-=0V, V_{CM}=2.0V, V_O=2.5V and R_L > 1MΩ.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}			1	3.5	mV
Input Bias Current	I_B			40	100	nA
Input Offset Current	I_{OS}			0.5	30	nA
Common Mode Rejection Ratio	CMRR	0V≤V_{CM}≤4.0V	72	90		dB
Positive Power Supply Rejection Ratio	+PSRR	1.7V ≤V^+ ≤ 4V, V^-=1V, V_O=0V, V_{CM}=0V	75	85		dB
Negative Power Supply Rejection Ratio	-PSRR	-1.0V≤V^-≤-3.3V, V^+=1.7V, V_O=0V, V_{CM}=0V	73	85		dB
Input Common-Mode Voltage Range	V_{CM}	For CMRR Range ≥ 50dB		-0.3	-0.2	V
			4.2	4.3		V
Large Signal Voltage Gain	A_V	Sourcing, R_L=600Ω~ 2.5V, V_O=2.5V~4.5V	95	105		dB
		Sinking, R_L=600Ω~2.5V, V_O=2.5V~0.5V	95	105		dB
		Sourcing, R_L=2kΩ~2.5V, V_O=2.5V~4.5V	95	105		dB
		Sinking, R_L=2kΩ~2.5V, V_O=2.5V~0.5V	95	105		dB
Output Swing	V_O	V^+=5V, R_L=600Ω~ 2.5V	4.75	4.84		V
				0.17	0.250	V
		V^+=5V, R_L=2kΩ~2.5V	4.85	4.90		V
				0.10	0.15	V
Output Current	I_O	Sourcing, V_O=0V	20	45		mA
		Sinking, V_O=5V	20	40		mA
Supply Current	I_Q			0.30	0.4	mA
Slew Rate	SR		1.4	2.0		V/μs
Gain-Bandwidth Product	GBW			5.6		MHz
Phase Margin	Φ_m			67		Deg.
Gain Margin	G_m			15		dB
Amp-to-Amp Isolation				135		dB
Input-Referred Voltage Noise	e_n	f =1kHz, V_{CM}=1V		24		nV/$\sqrt{Hz}$
Input-Referred Current Noise	i_n	f =1kHz		0.25		pA/$\sqrt{Hz}$
Total Harmonic Distortion	THD	f=1kHz, A_V=-2, R_L=10kΩ, V_O=4.1V_{PP}		0.01		%