

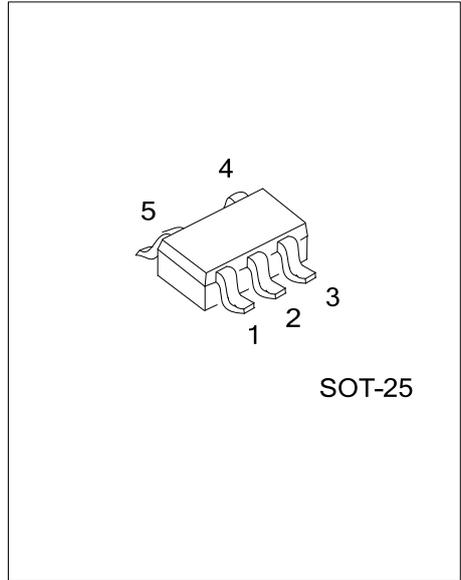


LMV931

Preliminary

CMOS IC

1.8V OPERATIONAL AMPLIFIERS WITH RAIL-TO-RAIL INPUT AND OUTPUT



DESCRIPTION

The UTC **LMV931** is a low-voltage, low-power, operating for operation of 1.8V to 5.5V, it can be used in portable applications that is powered from a single-cell Li-ion or two-cell batteries. It has rail-to-rail input and output capability for maximum signal swings in low-voltage application. The UTC **LMV931** input common-mode voltage extends 200 mV beyond the rails for increased flexibility. The output can swing rail-to-rail unloaded and typically can reach 105mV from the rails, while driving a 600Ω load (at 1.8V operation).

During 1.8V operation, the devices typically consume a quiescent current of 80μA, and yet it is able to achieve excellent electrical specifications. Furthermore, the amplifier offer good output drive characteristic, with the ability to drive a 600Ω load with minimal ringing.

FEATURES

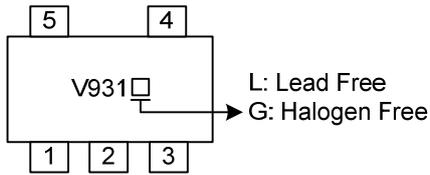
- * Supply Voltage:1.8~5.5V
- * Supply Current/Amplifier:210 μA (Max)
- * Input Offset Voltage:4mV (Max)
- * Rail-to-Rail Input and Output
- * Slew Rate: 0.75V/μs (Typ.)

ORDERING INFORMATION

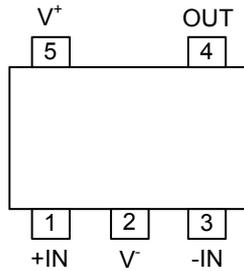
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LMV931L-AF5-R	LMV931G-AF5-R	SOT-25	Tape Reel

<p>LMV931G-AF5-R</p> <ul style="list-style-type: none"> (1)Packing Type (2)Package Type (3)Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) AF5: SOT-25 (3) G: Halogen Free and Lead Free, L: Lead Free
---	--

MARKING



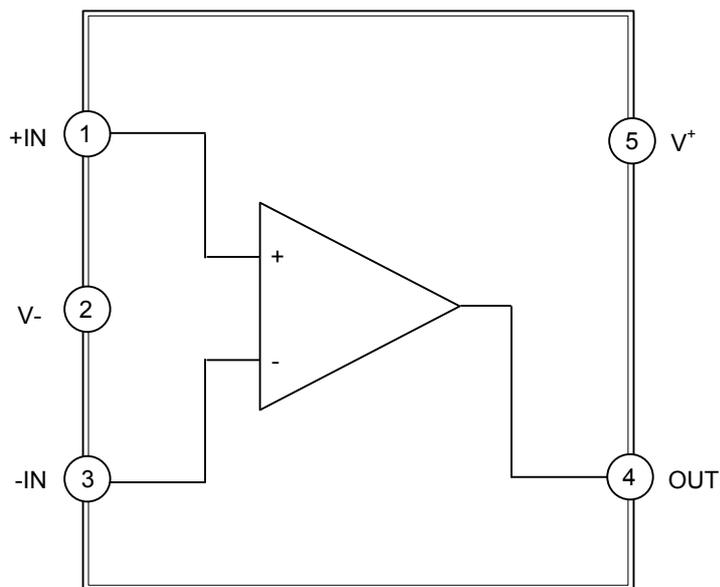
PIN CONFIGURATION



PIN DESCRIPTION

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

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	6	V
Differential Input Voltage	V_{ID}	Supply voltage	V
Input or Output Pin Voltage		$V^- - 0.2 \sim V^+ + 0.2$	V
Junction Temperature	T_J	+150	°C
Storage Temperature	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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	206	°C/W

■ RECOMMENDED OPERATING CONDITIONS

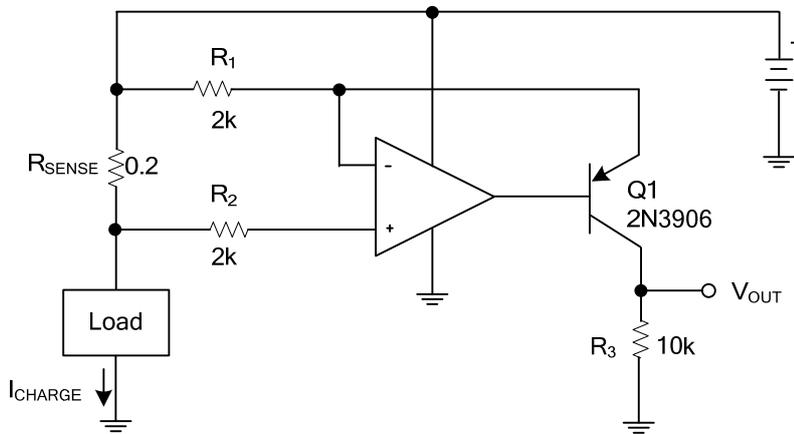
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	1.8 ~ 5.5	V
Operating Free-Air Temperature	T_{OPR}	-40 ~ +125	°C

■ ELECTRICAL CHARACTERISTICS

($T_A = 25^\circ\text{C}$, $V^+ = 1.8 \sim 5\text{V}$, $V^- = 0\text{V}$, $V_{IC} = V^+/2$, $V_O = V^+/2$, and $R_L > 1\text{M}\Omega$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Supply Current/Amplifier	I_Q			120	210	μA	
Power Supply Rejection Ratio	PSRR	$1.8\text{V} \leq V^+ \leq 5\text{V}$, $V_{IC} = 0.5\text{V}$	75	100		dB	
Input Offset Voltage	V_{OS}			1	4	mV	
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$			10		$\mu\text{V}/^\circ\text{C}$	
Input Bias Current	I_B			20		nA	
Input Offset Current	I_{OS}			10		nA	
Common-Mode Voltage Range	V_{CM}		$V^- - 0.2$		$V^+ - 0.2$	V	
Common-Mode Rejection Ratio	CMRR	$0\text{V} \leq V_{IC} \leq 1.5\text{V}$, $2.3\text{V} \leq V_{IC} \leq 2.7\text{V}$	60	85		dB	
		$-0.2\text{V} \leq V_{IC} \leq 0\text{V}$, $2.7\text{V} \leq V_{IC} \leq 2.9\text{V}$	50	78		dB	
Large Signal Voltage Gain	A_V	$R_L = 600\Omega$, $V_O = 0.2\text{V}$ to $V^+ - 0.2\text{V}$	82	96		dB	
		$R_L = 2\text{k}\Omega$, $V_O = 0.2\text{V}$ to $V^+ - 0.2\text{V}$	88	105		dB	
Output Voltage	V_O	$R_L = 600\Omega$, $V_{ID} = \pm 100\text{mV}$	V_{OH}	$V^+ - 0.14$ 5V	$V^+ - 0.09$ V		V
			V_{OL}		0.12	0.16	V
		$R_L = 2\text{k}\Omega$, $V_{ID} = \pm 100\text{mV}$	V_{OH}	$V^+ - 0.05$ 5V	$V^+ - 0.03$ V		V
			V_{OL}		0.037	0.065	V
Slew Rate	SR			0.75		$\text{V}/\mu\text{S}$	
Gain Bandwidth Product	GBW			2.2		MHz	
Phase Margin	ϕ_M			70		°	
Gain Margin				7.5		dB	
Equivalent Input Noise Voltage	V_n	$f = 1\text{kHz}$		50		$\text{nV}/\sqrt{\text{Hz}}$	
Equivalent Input Noise Current	I_n	$f = 1\text{kHz}$		0.07		$\text{pA}/\sqrt{\text{Hz}}$	
Total Harmonic Distortion	THD	$f = 1\text{kHz}$, $A_V = 1$, $R_L = 600\Omega$, $V_{ID} = 1V_{p-p}$		0.05		%	

■ TYPICAL APPLICATION CIRCUIT



$$V_{OUT} = \frac{R_{SENSE} * R_3}{R_1} * I_{CHARGE} = 1\Omega * I_{CHARGE}$$

High-Side Current Sense Amplifier

UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.