



## LMV331

### LINEAR INTEGRATED CIRCUIT

## SINGLE GENERAL PURPOSE, LOW VOLTAGE, SMALL PACK COMPARATORS

### DESCRIPTION

The UTC **LMV331** is the single version, which is available in space saving SOT23-5 packages. The UTC **LMV331** is the most cost-effective solution where space, low voltage, low power and price are the primary specification in circuit design for portable consumer products. The UTC **LMV331** have bipolar input and output stages for improved noise performance.

### FEATURES

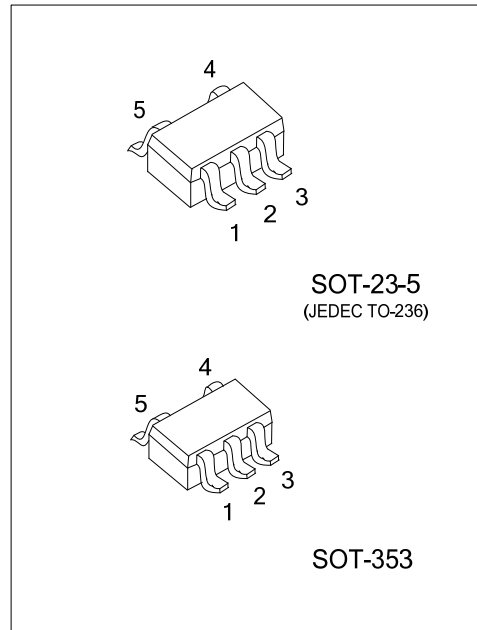
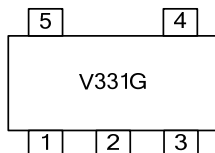
- \* Low operating voltage 2.7-5V.
- \* Industrial temperature range (-40°C~+85°C)
- \* Low supply current 60µA
- \* Input common mode voltage range includes ground
- \* Low output saturation voltage 0.2V

### ORDERING INFORMATION

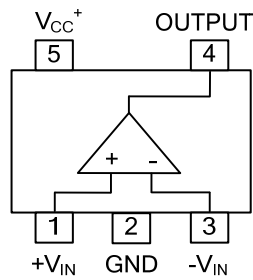
Ordering Number	Package	Packing
LMV331G-AE5-R	SOT-23-5	Tape Reel
LMV331G-AL5-R	SOT-353	Tape Reel

<p>LMV331G-AE5-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE5: SOT-23-5, AL5: SOT-353 (3) G: Halogen Free and Lead Free</p>
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### MARKING



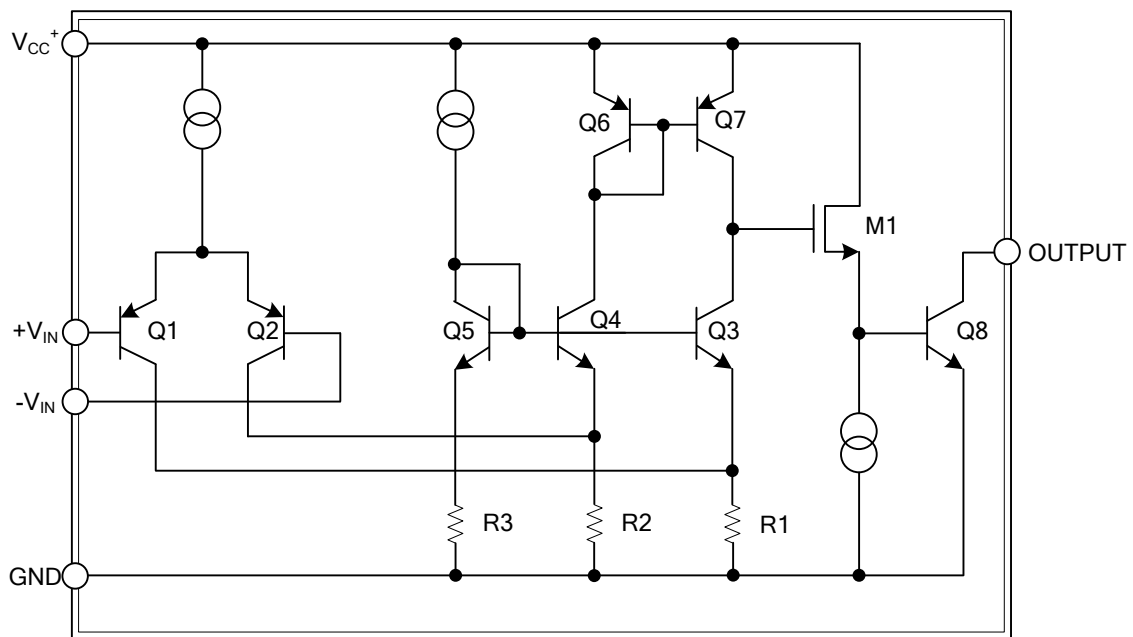
### ■ PIN CONFIGURATION



### ■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	+V <sub>IN</sub>	Non-inverting input
2	GND	Ground
3	+V <sub>IN</sub>	inverting input
4	OUTPUT	Output
5	V <sub>CC</sub> <sup>+</sup>	Power supply

### ■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{CC}$	2.7~5.5	V
Differential Input Voltage	$V_{IN(DIFF)}$	$\pm V_{CC}$	V
Voltage on Any Pin (Referred to GND pin)		5.5	V
Soldering Information	Infrared or Convection (20 sec)	235	°C
Junction Temperature (Note 1)	$T_J$	150	°C
Operating Temperature	$T_{OPR}$	-40~+85	°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 CHARACTERISTICS (Note1)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-23-5	265	°C/W
	SOT-353	350	°C/W

### ■ 2.7V DC ELECTRICAL CHARACTERISTICS

(All limits guaranteed for  $T_J=25^\circ\text{C}$ ,  $V_+=2.7\text{V}$ ,  $V_-=0\text{V}$ , unless otherwise specified. Boldface limits apply at the temperature extremes.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 2)	MAX (Note 3)	UNIT
Input Offset Voltage	$V_{OS}$			1.7	7	mV
Input Offset Voltage Average Drift	$TCV_{OS}$			5		$\mu\text{V}/^\circ\text{C}$
Input Bias Current	$I_B$			10	250	nA
Input Offset Current	$I_{OS}$			5	50	nA
Input Voltage Range	$V_{CM}$			-0.1		V
				2.0		V
Saturation Voltage	$V_{SAT}$	$I_{sink} \leq 1\text{mA}$		200		mV
Output Sink Current	$I_O$	$V_O \leq 1.5\text{V}$	5	23		mA
Supply Current	$I_S$			40	100	$\mu\text{A}$
Output Leakage Current				0.003	1	$\mu\text{A}$

### ■ 2.7V AC ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , $V_+=2.7\text{V}$ , $R_L=5.1\text{k}\Omega$ , $V_-=0\text{V}$ .)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 2)	MAX	UNIT
Propagation Delay (High to Low)	$t_{PHL}$	Input Overdrive=10mV		1000		ns
		Input Overdrive=100mV		350		ns
Propagation Delay (Low to High)	$t_{PLH}$	Input Overdrive=10mV		500		ns
		Input Overdrive=100mV		400		ns

### ■ 5V DC ELECTRICAL CHARACTERISTICS

(All limits guaranteed for  $T_J=25^\circ\text{C}$ ,  $V_+=5\text{V}$ ,  $V_-=0\text{V}$ , Unless otherwise specified. Boldface limits apply at the temperature extremes.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 2)	MAX (Note 3)	UNIT
Input Offset Voltage	$V_{OS}$			1.7	7	mV
Input Offset Voltage Average Drift	$TCV_{OS}$			5		$\mu\text{V}/^\circ\text{C}$
Input Bias Current	$I_B$			25	250	nA
Input Offset Current	$I_{OS}$			2	50	nA
Input Voltage Range	$V_{CM}$			-0.1		V
				4.2		V
Voltage Gain	$A_V$		20	50		V/mV
Saturation Voltage	$V_{SAT}$	$I_{sink} \leq 4\text{mA}$		200	400	mV
Output Sink Current	$I_O$	$V_O \leq 1.5\text{V}$	10	84		mA
Supply Current	$I_S$			60	120	$\mu\text{A}$
Output Leakage Current				0.003	1	$\mu\text{A}$

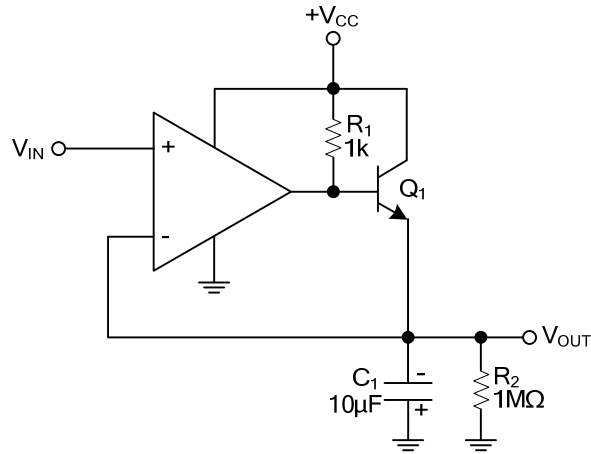
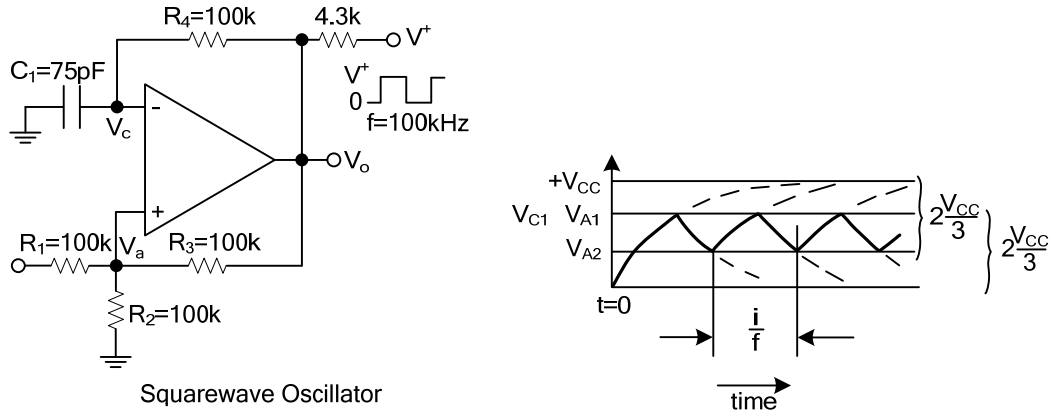
### ■ 5V AC ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , $V_+=5\text{V}$ , $R_L=5.1\text{k}\Omega$ , $V_-=0\text{V}$ .)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP (Note 2)	MAX	UNIT
Propagation Delay (High to Low)	$t_{PHL}$	Input Overdrive=10mV		600		ns
		Input Overdrive=100mV		200		ns
Propagation Delay (Low to High)	$t_{PLH}$	Input Overdrive=10mV		450		ns
		Input Overdrive=100mV		300		ns

Notes: 1. The maximum power dissipation is a function of  $T_{J(max)}$ ,  $\theta_{JA}$ , 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.

2. Typical Values represent the most likely parametric norm.
3. All limits are guaranteed by testing or statistical analysis.

■ TYPICAL APPLICATION CIRCUIT



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