



LV651

Advance

CMOS IC

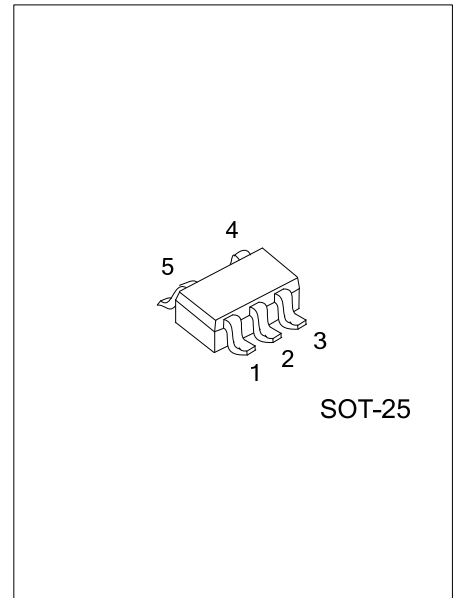
12 MHz, LOW VOLTAGE, LOW POWER AMPLIFIERS

DESCRIPTION

UTC **LV651** is a high-performance, low-power operational amplifier. It has unity-gain stable and provide an excellent solution for general-purpose amplification in low-voltage, low-power applications.

This device of low-voltage, low-power amplifiers provides superior performance and economy in terms of power and space usage. It has a maximum input offset voltage of 1.5mV, a rail-to-rail output stage, and an input common-mode voltage range that includes ground.

The operating supply voltage range is from 2.7V and 5.5V. It can operate over a wide temperature range (-40°C ~ +125°C), making it ideal for automotive applications, sensor applications, and portable equipment applications.



FEATURES

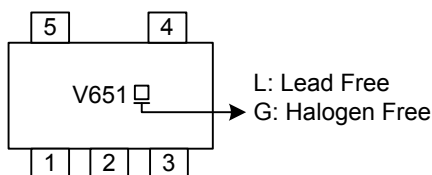
- * Typical 5V Supply, Unless Otherwise Noted
- * Specified 3V and 5V Performance
- * Low Power Supply Current: 116µA
- * Maximum Input Offset Voltage: 1.5mV
- * Output Swing With 2kΩ Load, 120mV from Rail

ORDERING INFORMATION

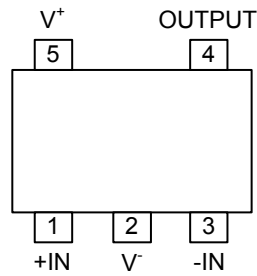
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LV651L-AF5-R	LV651G-AF5-R	SOT-25	Tape Reel

<p>LV651G-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
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MARKING



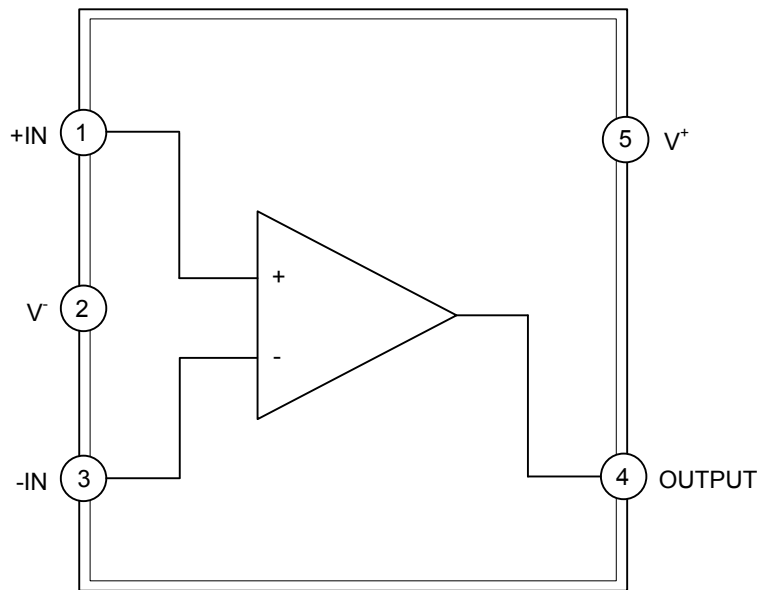
■ PIN CONFIGURATION



■ 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 ($V_S=V^+ - V^-$)		6	V
Differential Input	V_{ID}	± 0.3	V
Input or Output Pin Voltage		$V^- - 0.3 \sim V^+ + 0.3$	V
Junction Temperature (Note 2)	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. 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 OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	2.7 ~ 5.5	V
Temperature Range	T_{OPR}	-40 ~ +125	°C

■ 3V DC ELECTRICAL CHARACTERISTICS

($T_A=25^\circ\text{C}$, $V^+=3\text{V}$, $V^-=0\text{V}$, $V_O=V_{CM}=V^+/2$, and $R_L > 1\text{M}\Omega$.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}			0.1	± 1.5	mV
Input Bias Current	I_B			80	120	nA
Input Offset Current	I_{OS}			2.2	15	nA
Common-Mode Rejection Ratio	CMRR	$0\text{V} \leq V_{CM} \leq 2\text{V}$	87	100		dB
Power Supply Rejection Ratio	PSRR	$3 \leq V^+ \leq 5\text{V}$, $V_{CM}=0.5$	87	95		dB
		$2.7 \leq V^+ \leq 5.5\text{V}$, $V_{CM}=0.5$	87	95		dB
Input Common-Mode Voltage Range	CMVR	CMRR $\geq 75\text{dB}$	0		2.1	V
Large Signal Voltage Gain	A_{VOL}	$0.3 \leq V_O \leq 2.7$, $R_L=2\text{k}\Omega$ to $V^+/2$	80	85		dB
		$0.3 \leq V_O \leq 2.7$, $R_L=10\text{k}\Omega$ to $V^+/2$	86	93		dB
Output Swing High	V_O	$R_L=2\text{k}\Omega$ to $V^+/2$		80	95	mV from rail
Output Swing Low		$R_L=10\text{k}\Omega$ to $V^+/2$		45	50	
		$R_L=2\text{k}\Omega$ to $V^+/2$		95	110	
		$R_L=10\text{k}\Omega$ to $V^+/2$		60	65	
Maximum Continuous Output Current	I_{SC}	Sourcing		17		mA
		Sinking		25		mA
Supply Current	I_Q			115	140	μA
Slew Rate	SR	$A_V=+1$, 10% to 90%		3.0		V/ μs
Gain-Bandwidth Product	GBW			12		MHz
Input-Referred Voltage Noise	e_n	$f=100\text{kHz}$		17		$\text{nV}/\sqrt{\text{Hz}}$
		$f=1\text{kHz}$		17		$\text{nV}/\sqrt{\text{Hz}}$
Input-Referred Current Noise	i_n	$f=100\text{kHz}$		0.1		$\text{pA}/\sqrt{\text{Hz}}$
		$f=1\text{kHz}$		0.15		$\text{pA}/\sqrt{\text{Hz}}$
Total Harmonic Distortion	THD	$f=1\text{kHz}$, $A_V=2$, $R_L=2\text{k}\Omega$		0.003		%

■ 5V DC ELECTRICAL CHARACTERISTICS

($T_J=25^\circ\text{C}$, $V^+=5\text{V}$, $V^-=0\text{V}$, $V_O=V_{CM}=V^+/2$, and $R_L > 1\text{M}\Omega$.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Offset Voltage	V_{OS}			0.1	± 1.5	mV
Input Bias Current	I_B			80	120	nA
Input Offset Current	I_{OS}			2.2	15	nA
Common-Mode Rejection Ratio	CMRR	$0V \leq V_{CM} \leq 4V$	90	100		dB
Power Supply Rejection Ratio	PSRR	$3V \leq V^+ \leq 5V, V_{CM}=0.5V$	87	95		dB
		$2.7V \leq V^+ \leq 5.5V, V_{CM}=0.5V$	87	95		dB
Input Common-Mode Voltage Range	CMVR	CMRR $\geq 80\text{dB}$	0		4.1	V
Large Signal Voltage Gain	A_{VOL}	$0.3 \leq V_O \leq 4.7V, R_L=2\text{k}\Omega$ to $V^+/2$	79	84		dB
		$0.3 \leq V_O \leq 4.7V, R_L=10\text{k}\Omega$ to $V^+/2$	87	94		dB
Output Swing High	V_O	$R_L=2\text{k}\Omega$ to $V^+/2$		120	140	mV from rail
Output Swing Low		$R_L=10\text{k}\Omega$ to $V^+/2$		75	90	
		$R_L=2\text{k}\Omega$ to $V^+/2$		110	130	
		$R_L=10\text{k}\Omega$ to $V^+/2$		70	80	
Maximum Continuous Output Current	I_{SC}	Sourcing		18.5		mA
		Sinking		25		mA
Supply Current	I_Q			116	140	μA
Slew Rate	SR	$A_V=+1, V_O=1V_{PP}, 10\%$ to 90%		3.0		$\text{V}/\mu\text{s}$
Gain-Bandwidth Product	GBW			12		MHz
Input-Referred Voltage Noise	e_n	$f=100\text{kHz}$		17		$\text{nV}/\sqrt{\text{Hz}}$
		$f=1\text{kHz}$		17		$\text{nV}/\sqrt{\text{Hz}}$
Input-Referred Current Noise	i_n	$f=100\text{kHz}$		0.1		$\text{pA}/\sqrt{\text{Hz}}$
		$f=1\text{kHz}$		0.15		$\text{pA}/\sqrt{\text{Hz}}$
Total Harmonic Distortion	THD	$f=1\text{kHz}, A_V=2, R_L=2\text{k}\Omega$		0.003		%

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