

General Description

The LTA27 44-V precision operational amplifier combines the low offset and drift of the LTA77/OP77/OP07 with both high speed and low noise. The LTA27 offers outstanding dc precision and ac performance, including 25 μV ultralow offset, 0.2 $\mu\text{V}/^\circ\text{C}$ maximum drift over temperature, 0.32 $\mu\text{V}_{\text{P-P}}$ input voltage noise, 4.5 MHz gain bandwidth product and 3 V/ μs slew rate. External offset nulling is not required in the majority of circuits.

A CMRR of 114 dB minimum and PSRR of 10 $\mu\text{V}/\text{V}$ (100 dB) maximum virtually eliminate errors caused by common-mode signals and power supply drifts. This combination of outstanding characteristics makes the LTA27 ideally suited for high resolution instrumentation and other tight error budget systems.

The robust design of the LTA27 provides ease-of-use to the circuit designer: integrated RF/EMI rejection filter, no phase reversal in overdrive conditions, and high electro-static discharge (ESD) protection. The LTA27 is optimized for operation at voltages from +8 V (± 4 V) to +44 V (± 22 V) over the extended temperature range of -40 $^\circ\text{C}$ to $+125$ $^\circ\text{C}$.

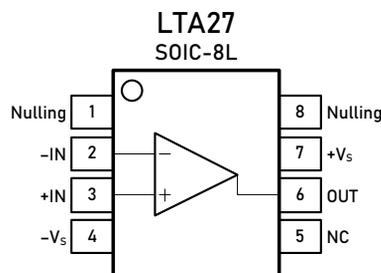
Features and Benefits

- Offset Voltage: 25 μV Maximum (LTA27A)
- Offset Voltage Drift: 0.2 $\mu\text{V}/^\circ\text{C}$ Maximum (LTA27A)
- 0.1 to 10 Hz Noise: 0.32 $\mu\text{V}_{\text{P-P}}$
- High Common-Mode Rejection: 126 dB
- Wide Supply: ± 4 V to ± 22 V, 8 V to 44 V
- Wide Bandwidth: 4.5 MHz
- High Slew Rate: 3 V/ μs
- Low Quiescent Current: 0.7 mA per Amplifier
- EMI/RFI Filtered Inputs

Applications

- Replaces OP27 Series with Improved Performance
- Multiplexed Data-Acquisition Systems
- High-Resolution ADC Driver Amplifiers
- SAR ADC Reference Buffers
- High-Side and Low-Side Current Sensing
- Test and Measurement Equipment
- Programmable Logic Controllers
- High Precision Comparator

Pin Configuration (Top View)



Pin Description

Symbol	Description
-IN	Inverting input of the amplifier. The voltage range is from V_{S-} to V_{S+} .
+IN	Non-inverting input of the amplifier. This pin has the same voltage range as -IN.
OUT	Amplifier output.
Nulling	External input offset voltage adjustment
+ V_S	Positive power supply. The voltage is from 6 V to 44 V. Split supplies are possible as long as the voltage between V_{S+} and V_{S-} is from 6 V to 44 V.
- V_S	Negative power supply. It is normally tied to ground. It can also be tied to a voltage other than ground as long as the voltage between V_{S+} and V_{S-} is from 6 V to 44 V.
NC	No connection.

Ordering Information ⁽¹⁾

Type Number	Package Name	Package Quantity	Eco Class ⁽²⁾	Marking Code
LTA27AXS8/R5	SOIC-8L	Tape and Reel, 2 500	Green (RoHS & no Sb/Br)	ZT-27
LTA27CXS8/R5	SOIC-8L	Tape and Reel, 2 500	Green (RoHS & no Sb/Br)	ZT-27

(1) Please contact to your Linearin representative for the latest availability information and product content details.

(2) Eco Class - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & Halogen Free).

Limiting Value - In accordance with the Absolute Maximum Rating System (IEC 60134).

Parameter	Absolute Maximum Rating
Supply Voltage, V_{S+} to V_{S-}	44 V
Signal Input Terminals: Voltage, Current	V_{S-} to V_{S+} , ± 10 mA
Output Short-Circuit	Continuous
Storage Temperature Range, T_{stg}	-65 °C to +150 °C
Junction Temperature, T_J	150 °C
Lead Temperature Range (Soldering 10 sec)	260 °C

ESD Rating

Parameter	Item	Value	Unit
Electrostatic Discharge Voltage	Human body model (HBM), per MIL-STD-883J / Method 3015.9 ⁽¹⁾	2 000	V
	Charged device model (CDM), per ESDA/JEDEC JS-002-2014 ⁽²⁾	2 000	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process. Manufacturing with less than 500-V HBM is possible if necessary precautions are taken.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process. Manufacturing with less than 250-V CDM is possible if necessary precautions are taken.

Electrical Characteristics

$V_S = \pm 15\text{ V}$, $T_A = +25\text{ }^\circ\text{C}$, $V_{CM} = V_S/2$, $V_O = V_S/2$, and $R_L = 10\text{ k}\Omega$ connected to $V_S/2$, unless otherwise noted. Boldface limits apply over the specified temperature range, $T_A = -40\text{ }^\circ\text{C}$ to $+125\text{ }^\circ\text{C}$.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFFSET VOLTAGE						
Input offset voltage	V_{OS}	LTA27A		± 10	± 25	μV
		LTA27C		± 30	± 100	
Offset voltage drift	$V_{OS\text{ TC}}$	LTA27A, $T_A = -40$ to $+125\text{ }^\circ\text{C}$			± 0.2	$\mu\text{V}/^\circ\text{C}$
		LTA27C, $T_A = -40$ to $+125\text{ }^\circ\text{C}$			± 0.6	
Long-term stability ⁽¹⁾	$V_{OS\text{ TC}}$	LTA27A		± 0.2		$\mu\text{V}/\text{Mo}$
		LTA27C		± 0.4		
Power supply rejection ratio	PSRR	LTA27A, $V_S = \pm 4$ to $\pm 18\text{ V}$		1	10	$\mu\text{V}/\text{V}$
		LTA27C, $V_S = \pm 4$ to $\pm 18\text{ V}$		2	20	
INPUT BIAS CURRENT						
Input bias current	I_B	LTA27A			10	nA
		LTA27C			15	
Input offset current	I_{OS}			0.5		nA
NOISE						
Input voltage noise	V_n	$f = 0.1$ to 10 Hz		0.32		$\mu\text{V}_{\text{p-p}}$
Input voltage noise	e_n	$f = 10\text{ Hz}$		14		$\text{nV}/\sqrt{\text{Hz}}$
Input current noise	I_n	$f = 10\text{ Hz}$		5		$\text{pA}/\sqrt{\text{Hz}}$
INPUT VOLTAGE						
Common-mode voltage range	V_{CM}		± 11	± 12.3		V
Common-mode rejection ratio	CMRR	LTA27A, $V_{CM} = \pm 11\text{ V}$		114	126	dB
		LTA27C, $V_{CM} = \pm 11\text{ V}$		100	120	
INPUT IMPEDANCE						
Input capacitance	C_{IN}	Differential		2.0		pF
		Common mode		3.5		
OPEN-LOOP GAIN						
Open-loop voltage gain	A_{VOL}	LTA27A, $R_L \geq 2\text{ k}\Omega$, $V_O = \pm 10\text{ V}$	1,000	1,800		V/mV
		LTA27C, $R_L \geq 2\text{ k}\Omega$, $V_O = \pm 10\text{ V}$	700	1,500		
FREQUENCY RESPONSE						
Gain bandwidth product	GBW			4.5		MHz
Slew rate	SR	$G = +1$, $C_L = 100\text{ pF}$, $V_O = 1.5$ to 3.5 V		3		$\text{V}/\mu\text{s}$
OUTPUT						
Output voltage swing	V_D	$R_L = 10\text{ k}\Omega$		± 14	± 14.8	V
		$R_L = 1\text{ k}\Omega$		± 13.5	± 14.5	
Short-circuit current	I_{SC}			± 22		mA
Offset adjustment range				± 1.5		mV

(1) Long-term input offset voltage stability refers to the averaged trend line of V_{OS} vs. time over extended periods after the first 30 days of operation.

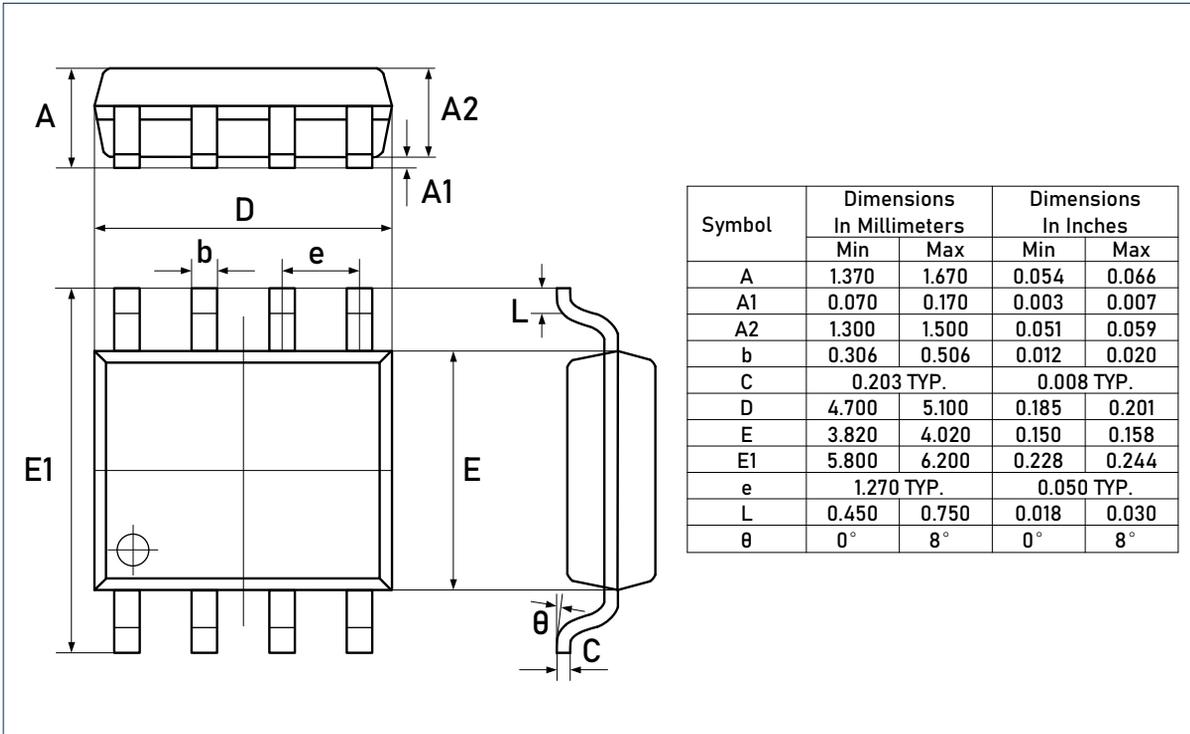
Electrical Characteristics (continued)

$V_S = \pm 15\text{ V}$, $T_A = +25\text{ }^\circ\text{C}$, $V_{CM} = V_S/2$, $V_O = V_S/2$, and $R_L = 10\text{ k}\Omega$ connected to $V_S/2$, unless otherwise noted. Boldface limits apply over the specified temperature range, $T_A = -40\text{ }^\circ\text{C}$ to $+125\text{ }^\circ\text{C}$.

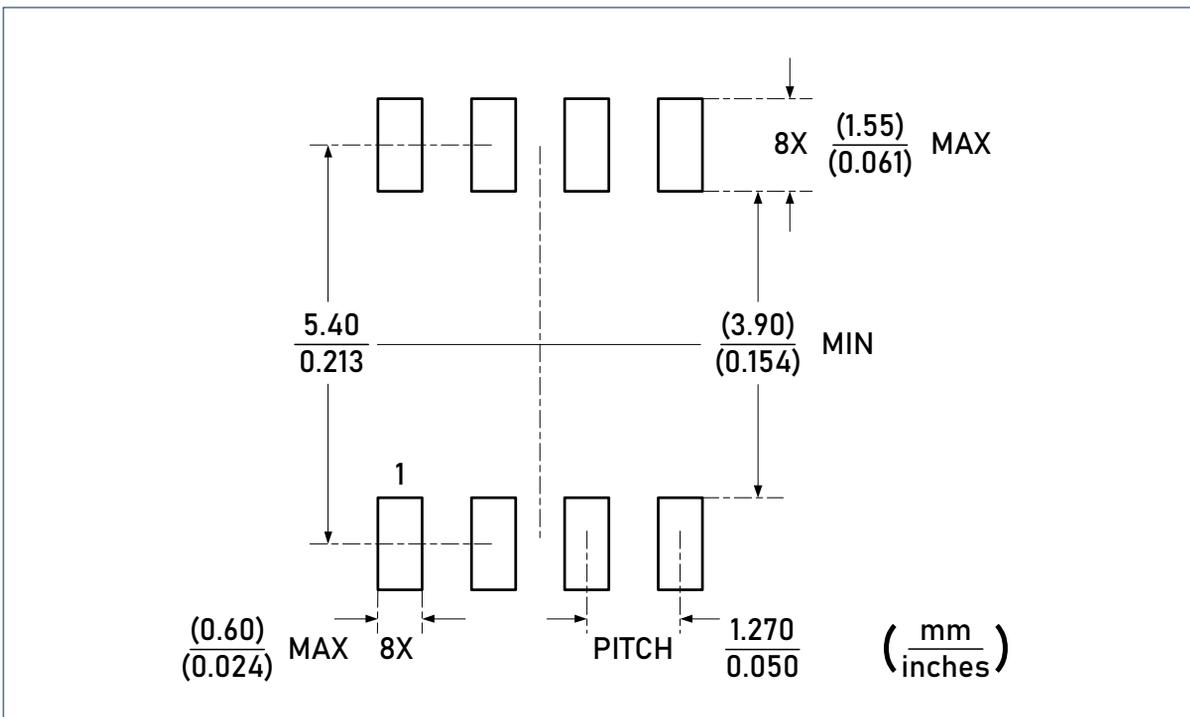
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<i>POWER SUPPLY</i>						
Operating supply voltage	V_S	$T_A = -40\text{ to }+125\text{ }^\circ\text{C}$	± 4		± 22	V
Quiescent current (per amplifier)	I_Q	$V_S = \pm 15\text{ V}$, no load		0.7	1.5	mA
		$V_S = \pm 4\text{ V}$, no load		0.63	1	
<i>THERMAL CHARACTERISTICS</i>						
Operating temperature range	T_A		-40		+125	$^\circ\text{C}$
Package Thermal Resistance	θ_{JA}	SOIC-8L		125		$^\circ\text{C/W}$

Package Outlines (continued)

DIMENSIONS, SOIC-8L



RECOMMENDED SOLDERING FOOTPRINT, SOIC-8L



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For additional product information, or full datasheet, please contact with the Linearin's Sales Department or Representatives.