



## OP27

## LINEAR INTEGRATED CIRCUIT

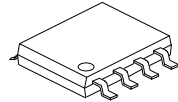
### LOW-NOISE, PRECISION OPERATIONAL AMPLIFIER

#### DESCRIPTION

The UTC **OP27** precision operational amplifier combines the low offset and drift of the OP07 with both high speed and low noise. A gain-bandwidth product of 8MHz and a 1.9V/μsec slew rate provides excellent dynamic accuracy in high-speed, data-acquisition systems.

A low input bias current of ±80nA is achieved by use of a bias-current-cancellation circuit. Over the military temperature range, this circuit typically holds I<sub>B</sub> and I<sub>OS</sub> to ±25nA and 20nA, respectively.

The output stage has good load driving capability. A guaranteed swing of ±10V into 600Ω and low output distortion make the UTC **OP27** an excellent choice for professional audio applications.



SOP-8

#### FEATURES

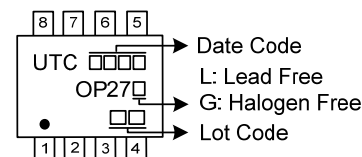
- \* Supply Voltage: ±4.0 ~ ±22.0V
- \* Supply Current/Amplifier: 6.2 mA (Max.)
- \* Input Offset Voltage: 110μV (Max.)
- \* Slew Rate: 1.9V/μs (Typ.)
- \* Excellent CMRR: 120dB at V<sub>CM</sub> of ±11V

#### ORDERING INFORMATION

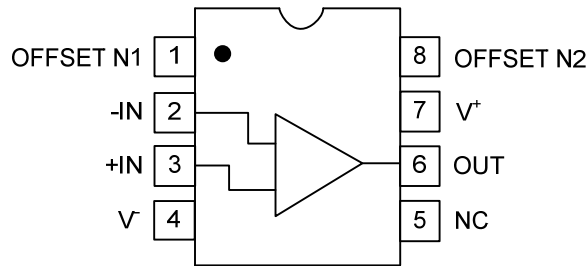
Ordering Number		Package	Packing
Lead Free	Halogen Free		
OP27L-S08-R	OP27G-S08-R	SOP-8	Tape Reel

<p>OP27G-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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#### MARKING



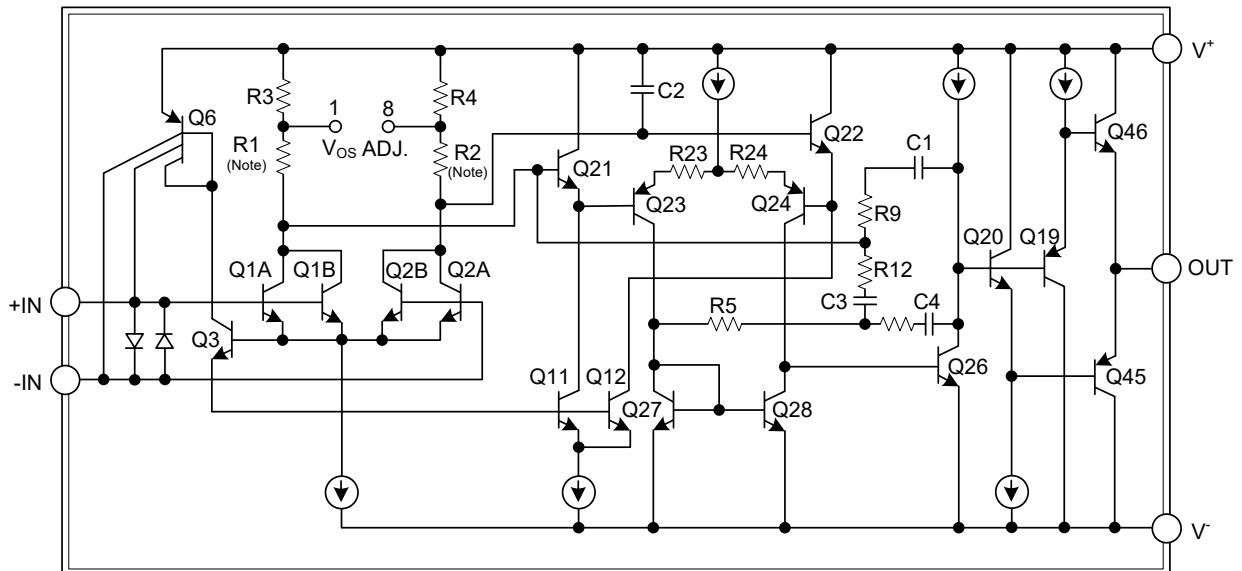
## PIN CONFIGURATION



## PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OFFSET N1	External input offset voltage adjustment
2	-IN	Inverting input
3	+IN	Non-Inverting input
4	V <sup>-</sup>	Negative Power supply
5	NC	No connect
6	OUT	Output
7	V <sup>+</sup>	Positive power supply
8	OFFSET N2	External input offset voltage adjustment

## BLOCK DIAGRAM



Note: R1 and R2 are permanently adjusted at wafer test for minimum offset voltage.

## ■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	$\pm 22$	V
Differential Input Voltage (Note 1)		$\pm 0.7$	V
Voltage at Input or Output Pin (Note 2)		$\pm 22$	V
Junction Temperature	$T_J$	+150	$^{\circ}\text{C}$
Storage Temperature Range	$T_{\text{STG}}$	-65 ~ +150	$^{\circ}\text{C}$

- 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 UTC **OP27**'s inputs are protected by back-to-back diodes. Current limiting resistors are not used in order to achieve low noise. If differential input voltage exceeds  $\pm 0.7\text{V}$ , the input current should be limited to 25mA.
3. For supply voltages less than  $\pm 22\text{V}$ , the absolute maximum input voltage is equal to the supply voltage.

## ■ ELERECOMMENDED OPWRAING CONDITIONS

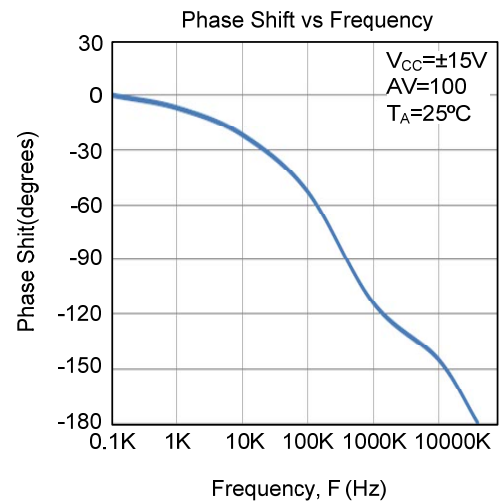
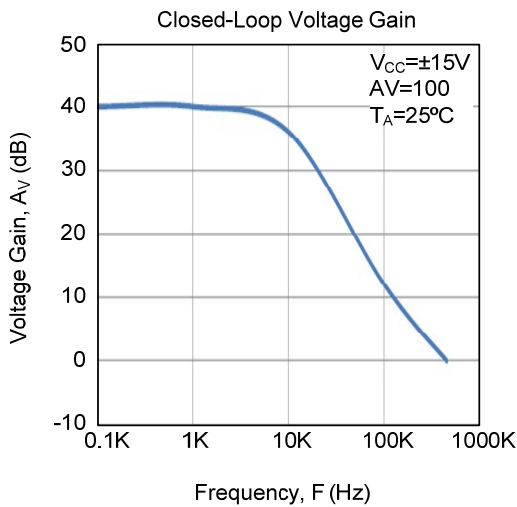
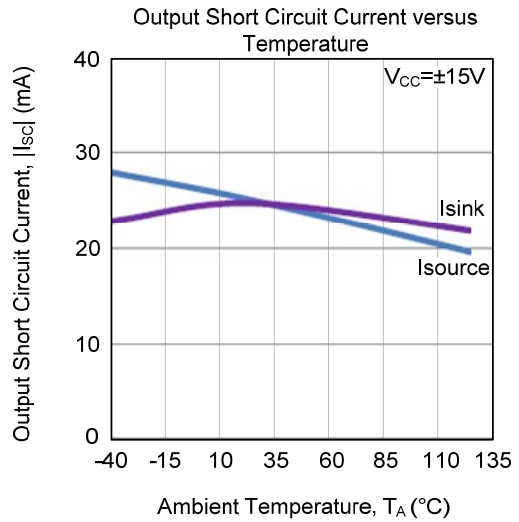
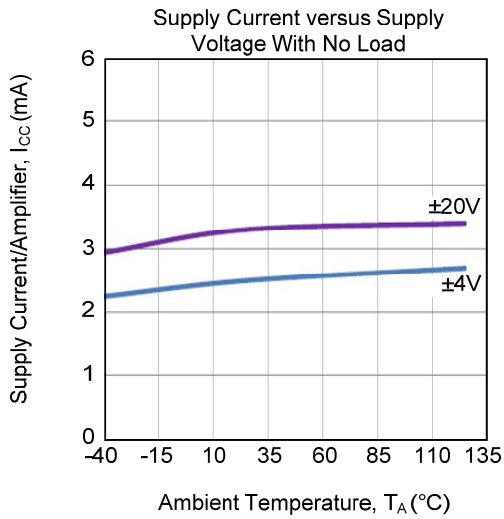
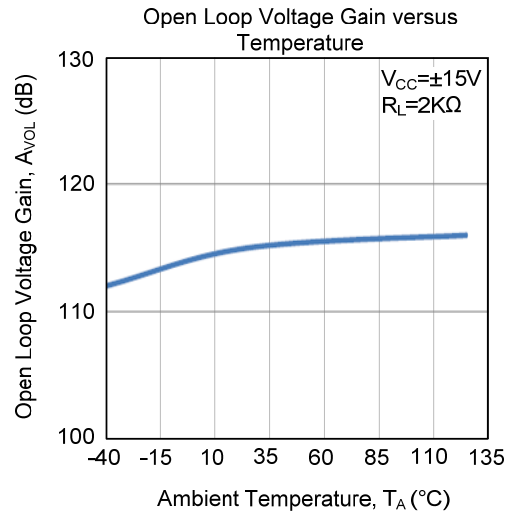
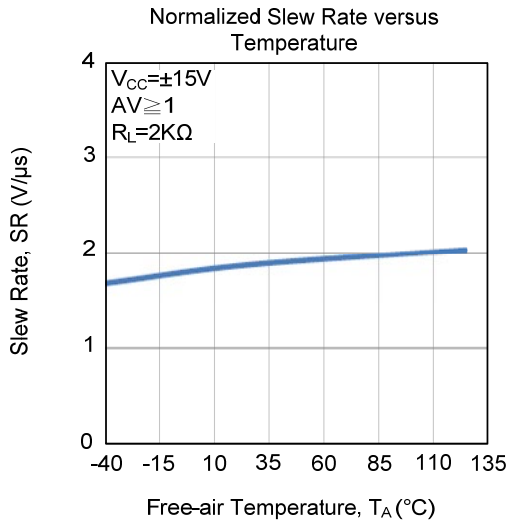
PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V^+ - V^-$	$\pm 4 \sim \pm 22$	V
Operating Junction Temperature Range	$T_{\text{OPR}}$	-40 ~ +125	$^{\circ}\text{C}$

## ■ CTRICAL CHARACTERISTICS ( $V^+ - V^- = \pm 15\text{V}$ , $T_A = 25^{\circ}\text{C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current/Amplifier	$I_Q$			3.2	6.2	mA
Power Supply Rejection Ratio	PSRR	$V_S = \pm 4\text{V} \sim \pm 18\text{V}$		125	150	dB
Input Offset Voltage (Note 1)	$V_{\text{OS}}$			50	110	$\mu\text{V}$
Offset Adjustment Range		$R_P = 10\text{k}\Omega$		$\pm 4.0$		mV
Input Bias Current	$I_B$			$\pm 70$	$\pm 110$	nA
Input Offset Current	$I_{\text{OS}}$			12	80	nA
Common-Mode Voltage Range	$V_{\text{CM}}$		$\pm 11$	$\pm 12.3$		V
Common Mode Rejection Ratio	CMRR	$V_{\text{CM}} = \pm 11\text{V}$	100	120		dB
Large Signal Voltage Gain	$A_V$	$R_L \geq 600\Omega, V_O = \pm 10\text{V}$	95	115		dB
		$R_L \geq 2\text{k}\Omega, V_O = \pm 10\text{V}$	95	115		dB
Output Voltage	$V_O$	$R_L \geq 600\Omega$	$V_{\text{OH}}$	10	11.5	V
			$V_{\text{OL}}$		-11.5	-10
		$R_L \geq 2\text{k}\Omega$	$V_{\text{OH}}$	11.2	13.5	V
			$V_{\text{OL}}$		-13.5	-11.5
Slew Rate (Note 2)	SR	$R_L \geq 2\text{k}\Omega$		1.9		V/ $\mu\text{s}$
Gain Bandwidth Product (Note 2)	GBW			8.0		MHz
Input Noise Voltage Density (Note 3)	$e_n$	$f_o = 10\text{Hz}$		3.8		nV/ $\sqrt{\text{Hz}}$
		$f_o = 30\text{Hz}$		3.3		nV/ $\sqrt{\text{Hz}}$
		$f_o = 1000\text{Hz}$		3.2		nV/ $\sqrt{\text{Hz}}$
Input Noise Current Density (Note 3, 4)	$i_n$	$f_o = 10\text{Hz}$		1.7		pA/ $\sqrt{\text{Hz}}$
		$f_o = 30\text{Hz}$		1.0		pA/ $\sqrt{\text{Hz}}$
		$f_o = 1000\text{Hz}$		0.7		pA/ $\sqrt{\text{Hz}}$
Input Noise Voltage (Note 3, 5)	$e_{n\text{ p-p}}$	0.1Hz to 10Hz		0.1		$\mu\text{V p-p}$

- Notes: 1. Input offset voltage measurements are performed  $\sim 0.5$  seconds after application of power.
2. Guaranteed by design.
3. Sample tested.
4. See test circuit for current noise measurement.
5. See test circuit and frequency response curve for 0.1Hz to 10Hz tester.

■ TYPICAL CHARACTERISTICS



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