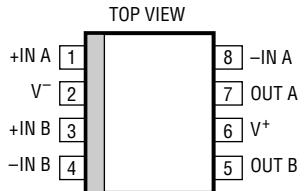


# 20 $\mu$ A Max, Dual SO-8 Package, Single Supply Precision Op Amp

## FEATURES

- 8-Pin SO Package
- 20 $\mu$ A Max Supply Current per Amplifier
- 180 $\mu$ V Max Offset Voltage
- 350pA Max Offset Current
- 0.9 $\mu$ V<sub>P-P</sub>, 0.1Hz to 10Hz Voltage Noise
- 1.5pA<sub>P-P</sub>, 0.1Hz to 10Hz Current Noise
- 0.6 $\mu$ V/°C Offset Voltage Drift
- Single Supply Operation:
  - Input Voltage Range Includes Ground
  - Output Swings to Ground While Sinking Current
  - No Pull-Down Resistors Are Needed
- Output Sources and Sinks 5mA Load Current

## PACKAGE/ORDER INFORMATION

 <p>S8 PACKAGE 8-LEAD PLASTIC SOIC T<sub>JMAX</sub> = 150°C, <math>\theta_{JA}</math> = 200°C/W</p>	ORDER PART NUMBER
	LT1178S8
	PART MARKING
	1178

Please note that the LT1178S8 surface mount pinout differs from that of the LT1178 standard plastic or ceramic dual-in-line packages. Consult factory for Industrial and Military grade parts.

## DESCRIPTION

The LT1178S8 is a micropower dual op amp in the surface mount 8-pin package. It is optimized for single supply operation at 5V. Specifications are also provided at  $\pm 15$ V supplies.

The extremely low supply current is combined with true precision specifications: offset voltage is 60 $\mu$ V, offset current is 50pA. Both offset parameters have low drift with temperature. The 1.5pA<sub>P-P</sub> current noise and picoampere offset current permit the use of megohm level source resistors without introducing serious errors. Voltage noise at 0.9 $\mu$ V<sub>P-P</sub> is remarkably low considering the low supply current.

The LT1178S8 can be operated from a single supply as low as one lithium cell or two Ni-Cad batteries. The input range goes below ground. The all-NPN output stage swings to within a few millivolts of ground while sinking current—no power consuming pull-down resistors are needed.

For applications where three times higher supply current is acceptable, the micropower LT1077 single, LT1078 dual and LT1079 quad are recommended. The LT1077/LT1078/LT1079 have significantly higher bandwidth, slew rate; lower voltage noise and better output drive capability.

## ELECTRICAL CHARACTERISTICS

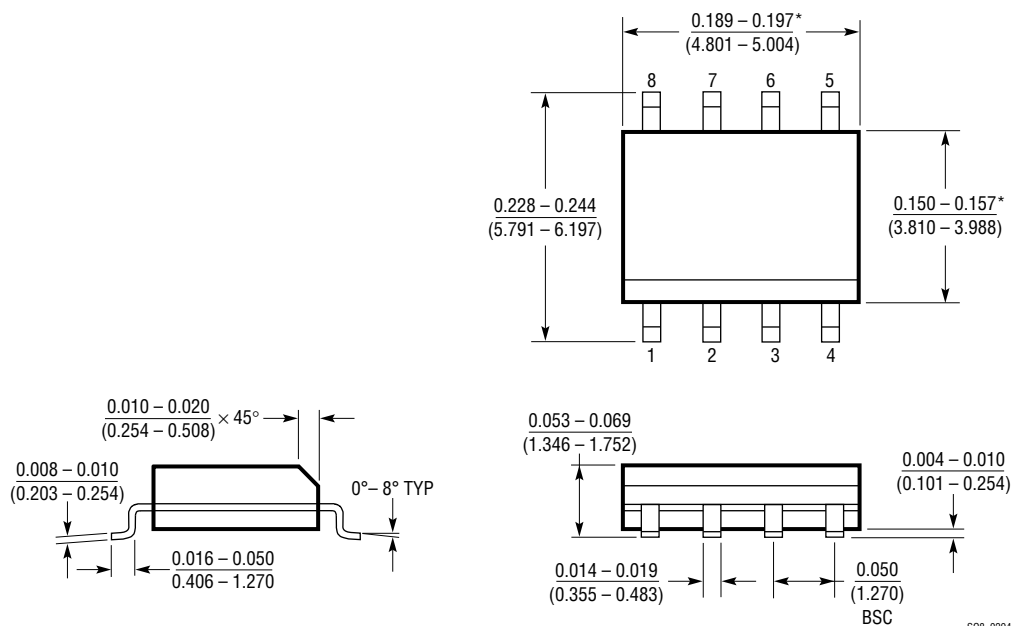
For electrical specifications not listed below, refer to the standard LT1178C data sheet with the changes noted on this page.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V <sub>OS</sub>	Input Offset Voltage	V <sub>S</sub> = 5V, 0V    T <sub>A</sub> = 25°C		60	180	$\mu$ V
		V <sub>S</sub> = 5V, 0V    0°C $\leq$ T <sub>A</sub> $\leq$ 70°C		85	350	$\mu$ V
		V <sub>S</sub> = $\pm 15$ V    T <sub>A</sub> = 25°C		120	350	$\mu$ V
		V <sub>S</sub> = $\pm 15$ V    0°C $\leq$ T <sub>A</sub> $\leq$ 70°C		150	540	$\mu$ V
$\frac{\Delta V_{OS}}{\Delta T}$	Input Offset Voltage Drift (Note 1)	V <sub>S</sub> = 5V, 0V    0°C $\leq$ T <sub>A</sub> $\leq$ 70°C		0.6	3.5	$\mu$ V/°C
		V <sub>S</sub> = $\pm 15$ V    0°C $\leq$ T <sub>A</sub> $\leq$ 70°C		0.7	3.8	$\mu$ V/°C

**Note 1:** Not 100% production tested.

# **PACKAGE DESCRIPTION** Dimension in inches (millimeters) unless otherwise noted.

## **S8 Package 8-Lead Plastic SOIC**



\*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.  
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.006 INCH (0.15mm).

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