16 V Auto-Zero, Rail-to-Rail Output Operational Amplifiers

AD8638/AD8639

FEATURES

- Low offset voltage: 9 µV maximum
- Offset drift: 0.04 µV/°C maximum
- Rail-to-rail output swing
- 5 V to 16 V single-supply or ±2.5 V to ±8 V dual-supply operation
- High gain: 136 dB typical
- High CMRR: 133 dB typical
- High PSRR: 143 dB typical
- Very low input bias current: 40 pA maximum
- Low supply current: 1.3 mA maximum
- AD8639: qualified for automotive applications

APPLICATIONS

- Pressure and position sensors
- Strain gage amplifiers
- Medical instrumentation
- Thermocouple amplifiers
- Automotive sensors
- Precision references
- Precision current sensing

GENERAL DESCRIPTION

The AD8638/AD8639 are single and dual wide bandwidth, auto-zero amplifiers featuring rail-to-rail output swing and low noise. These amplifiers have very low offset, drift, and bias current. Operation is fully specified from 5 V to 16 V single supply (±2.5 V to ±8 V dual supply).

The AD8638/AD8639 provide benefits previously found only in expensive zero-drift or chopper-stabilized amplifiers. Using the Analog Devices, Inc., topology, these auto-zero amplifiers combine low cost with high accuracy and low noise. No external capacitors are required. In addition, the AD8638/AD8639 greatly reduce the digital switching noise found in most chopper-stabilized amplifiers.

With a typical offset voltage of only 3 µV, drift of 0.01 µV/°C, and noise of 1.2 µV p-p (0.1 Hz to 10 Hz), the AD8638/AD8639 are suited for applications in which error sources cannot be tolerated. Position and pressure sensors, medical equipment, and strain gage amplifiers benefit greatly from nearly zero drift over their operating temperature ranges. Many systems can take advantage of the rail-to-rail output swing provided by the AD8638/AD8639 to maximize signal-to-noise ratio (SNR).

PIN CONFIGURATIONS

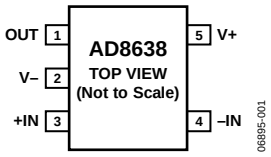

Figure 1. 5-Lead SOT-23 (RJ-5)

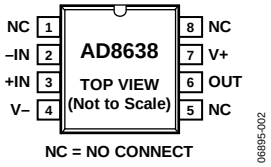

Figure 2. 8-Lead SOIC_N (R-8)

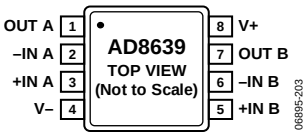

Figure 3. 8-Lead MSOP (RM-8)
8-Lead SOIC_N (R-8)

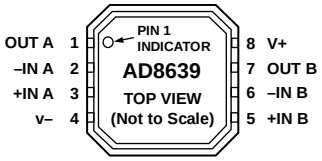

Figure 4. 8-Lead LFCSP_WD (CP-8-5)

The AD8638/AD8639 are specified for the extended industrial temperature range (−40°C to +125°C). The single AD8638 is available in tiny 5-lead SOT-23 and 8-lead SOIC packages. The dual AD8639 is available in 8-lead MSOP, 8-lead SOIC, and 8-lead LFCSP packages. See the Ordering Guide for automotive grades.

The AD8638/AD8639 are members of a growing series of auto-zero op amps offered by Analog Devices (see Table 1).

Table 1. Auto-Zero Op Amps

Supply	2.7 V to 5 V	2.7 V to 5 V Low Power	5 V to 16 V
Single	AD8628	AD8538	AD8638
Dual	AD8629	AD8539	AD8639
Quad	AD8630		

Rev. F

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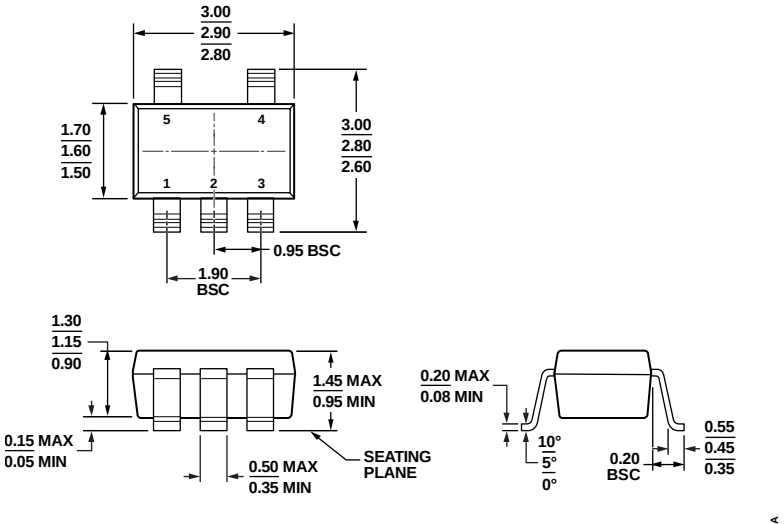
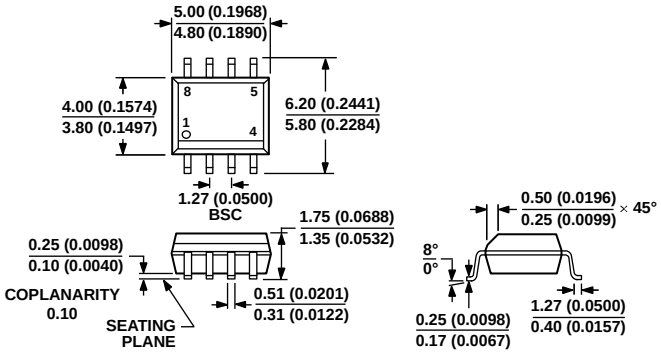
OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MO-178-AA

Figure 55. 5-Lead Small Outline Transistor Package [SOT-23]
(RJ-5)
Dimensions shown in millimeters



COMPLIANT TO JEDEC STANDARDS MS-012-AA
CONTROLLING DIMENSIONS ARE IN MILLIMETERS; INCH DIMENSIONS (IN PARENTHESES) ARE ROUNDED-OFF MILLIMETER EQUIVALENTS FOR REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

Figure 56. 8-Lead Standard Small Outline Package [SOIC_N]
Narrow Body
(R-8)
Dimensions shown in millimeters and (inches)