



Micropower, High-Precision, RRIO Operational Amplifier for Sensors, Pumps, and Signal Conditioning

The AS333 is a single-channel, high-precision, operational amplifier (op amp). The device has an ultra-low input offset voltage ($8\mu\text{V}$), and near zero-drift over time and temperature for high-accuracy signal conditioning in battery-powered signal conditioning.

This rail-to-rail input and output (RRIO) op amp uses chopper stabilization to minimize input offset voltage, reduce $1/f$ noise, and decrease input crossover-distortion present in most rail-to-rail input op amps.

Its common-mode range is extended 100mV beyond the supply rail and provides near zero-drift over time and temperature. The device is fully specified to operate from 1.8V to 5.5V single power supply.

The AS333 features a good speed/power consumption ratio, offering 350kHz gain bandwidth while consuming only $17\mu\text{A}$ quiescent current. With a low input offset voltage of $8\mu\text{V}$ and near zero-drift of $0.02\mu\text{V}/^\circ\text{C}$, combined with its 50mV from the rails output swing, this device is ideal for applications that require high precision and low-power consumption.

It supports a -40°C to $+125^\circ\text{C}$ ambient temperature range and is available in the industry-standard SOT25 and SOT353 packages.

The wide temperature ranges and high ESD tolerance facilitate its use in harsh applications.



The DIODES Advantage

Micropower, zero-drift op amp for high-precision, current-consumption sensitive applications.

- Low $8\mu\text{V}$ Input Offset Voltage with Zero Drift Without Rail-Rail Input Crossover Disturbance**
 Maintains accuracy across input range, offering high-precision signal conditioning
- High-Input Impedance with Small 70pA Input Bias Currents**
 Enables interface to high resistance sources without degradation of DC precision
- Micropower $17\mu\text{A}$ Quiescent Current**
 Supports battery-powered and handheld signal-conditioning applications
- 350kHz Gain-Bandwidth Product with Low $1.1\mu\text{V}$ Input Noise Voltage**
 Provides accurate signal conditioning from DC up to kHz
- Robust ESD Capability (HBM: 4kV)**
 Improves system reliability

Applications

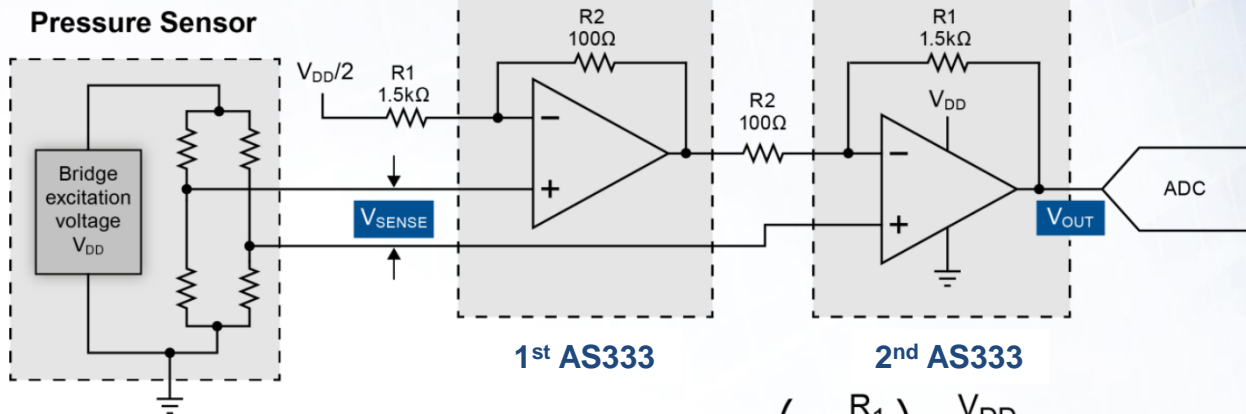
DC-low frequency signal conditioning in:

- Filters
 - Sensor interface
 - Battery-powered systems
- Handheld instruments
 - Portable equipment
 - Medical instrumentation

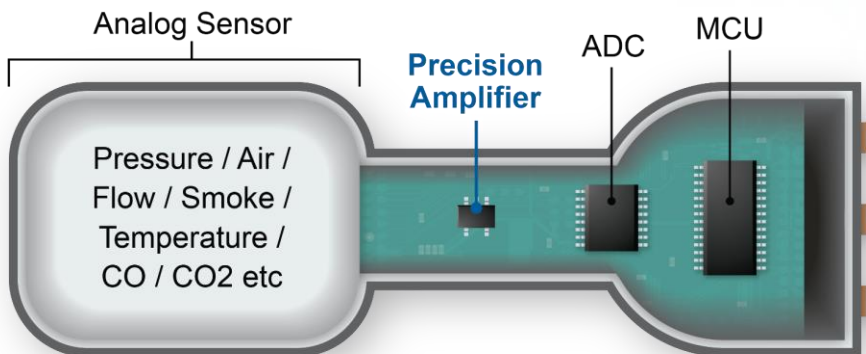
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Typical Application



$$V_{OUT} = V_{SENSE} \times \left(1 + \frac{R_1}{R_2}\right) + \frac{V_{DD}}{2}$$



Precision Micropower Op Amps

Part Number	RRIO	Supply Voltage	V_{CM}	V_{OS}	I_{IB}	Channels	Supply Current	V_{OUT}	GBW	Low-Frequency Input Voltage Noise	Ambient Temperature Range	Package
		V	V	μV	pA		μA	V		μV_{pp}	$^{\circ}C$	
AS333	Yes	1.8 to 5.5	$V_{CC} \pm 0.1$	8	70	1	17	$V_{CC} \mp 0.05$	350	1.1	-40 to +125	SOT25, SOT353
AS2333	Yes	1.8 to 5.5	$V_{CC} \pm 0.1$	8	70	2	24	$V_{CC} \mp 0.05$	350	1.1	-40 to +125	SO-8, MSOP-8, DFN3030

Ordering Information

Orderable Part Number	Compliance (Only Automotive Supports PPAP)	Package	Moisture Sensitivity	Packing	
				Quantity	Carrier
AS333SE-7	Standard	SOT353	MSL-1	3,000	7" Tape & Reel
AS333W5-7	Standard	SOT25	MSL-1	3,000	7" Tape & Reel