General Description

The MAX9632 is a low-noise, precision, wide-band operational amplifier that can operate in a very wide +4.5V to +36V supply voltage range. The IC operates in dual (±18V) mode. The exceptionally fast settling time and low distortion make the IC an excellent solution for precision acquisition systems. The rail-to-rail output swing maximizes the dynamic range when driving high-resolution 24-bit ΣΔ ADCs even with low supply voltages. The IC achieves 55MHz of gain-bandwidth product and ultra-low 0.94nV/√Hz input voltage noise with only 3.9mA of quiescent current. The IC is offered in 8-pin SO, µMAX®, and TDFN packages and is rated for operation over the -40°C to +125°C temperature range.

Benefits and Features

♦ DC and AC Performance Ideal for High-Resolution ADC Driver Applications
  ♦ 55MHz Gain-Bandwidth
  ♦ 600ns Settling Time to 16-Bit Accuracy
  ♦ THD of -128dB at 10kHz
  ♦ Low Input Offset Voltage 125µV (max)
  ♦ 0.94nV/√Hz Ultra-Low Input Voltage Noise
  ♦ Low Input Offset Temperature Drift 0.5µV/°C (max)
  ♦ Unity-Gain Stable

♦ Wide Supply for High-Voltage Front-Ends
  ♦ +4.5V to +36V Supply Range

♦ Improved Reliability with ESD Protection
  ♦ ±8kV HBM and ±1kV CDM ESD

♦ Low Pin Count Packages Save Board Space
  ♦ 8-Pin SO, µMAX, TDFN Packages

Applications

High-Resolution ADC Drivers
High-Resolution DAC Buffers
Medical Imaging
Low-Noise Signal Processing
Test and Measurement Systems
ATE

Ordering Information

<table>
<thead>
<tr>
<th>PART</th>
<th>TEMP RANGE</th>
<th>PIN-PACKAGE</th>
<th>TOP MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX9632ASA+</td>
<td>-40°C to +125°C</td>
<td>8 SO</td>
<td>—</td>
</tr>
<tr>
<td>MAX9632ATA+</td>
<td>-40°C to +125°C</td>
<td>8 TDFN-EP*</td>
<td>BML</td>
</tr>
<tr>
<td>MAX9632AUA+</td>
<td>-40°C to +125°C</td>
<td>8 µMAX</td>
<td>—</td>
</tr>
</tbody>
</table>

+Denotes a lead(Pb)-free/RoHS-compliant package.
*EP = Exposed pad.

µMAX is a registered trademark at Maxim Integrated Products, Inc.

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim’s website at www.maximintegrated.com.
MAX9632

36V, Precision, Low-Noise, Wide-Band Amplifier

ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCC to VEE</td>
<td></td>
<td>Guaranteed by PSRR</td>
<td>4.5</td>
<td>36</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Supply Current</td>
<td>Icc</td>
<td></td>
<td>3.9</td>
<td>6.5</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Power-Supply Rejection Ratio</td>
<td>PSRR</td>
<td>TA = +25°C</td>
<td>125</td>
<td>140</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40°C ≤ TA ≤ +125°C</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ESD Protection

HBM............................................................................................................... 8kV
CDM.............................................................................................................. 1kV

Operating Temperature Range................................................. -40°C to +125°C
Junction Temperature........................................................... +150°C
Lead Temperature (soldering, 10s)................................. +300°C
Soldering Temperature (reflow)........................................+260°C

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

PACKAGE THERMAL CHARACTERISTICS (Note 1)

8 TDFN

Junction-to-Ambient Thermal Resistance (θja)............42°C/W
Junction-to-Case Thermal Resistance (θjc).................8°C/W

8 SO

Junction-to-Ambient Thermal Resistance (θja)........136°C/W
Junction-to-Case Thermal Resistance (θjc).............38°C/W

8 µMAX

Junction-to-Ambient Thermal Resistance (θja)......206.3°C/W
Junction-to-Case Thermal Resistance (θjc).........42°C/W

Note 1: Package thermal resistances were obtained using the method described in JEDEC specification JESD51-7, using a four-layer board. For detailed information on package thermal considerations, refer to www.maximintegrated.com/thermal-tutorial.

ELECTRICAL CHARACTERISTICS

(Vcc = 15V, Vee = -15V, Rl = 10kΩ to Vgnd, Vin+ = Vin- = Vgnd = 0V, Vshdn = Vgnd, Ta = -40°C to +125°C. Typical values are at Ta = +25°C, unless otherwise noted.) (Note 2)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>POWER SUPPLY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply Voltage Range</td>
<td>Vcc</td>
<td>Guaranteed by PSRR</td>
<td>4.5</td>
<td>36</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Supply Current</td>
<td>Icc</td>
<td></td>
<td>3.9</td>
<td>6.5</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Power-Supply Rejection Ratio</td>
<td>PSRR</td>
<td>TA = +25°C</td>
<td>125</td>
<td>140</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40°C ≤ TA ≤ +125°C</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHUTDOWN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shutdown Input Voltage</td>
<td>Vshdn</td>
<td>Device disabled</td>
<td>Vcc-0.35</td>
<td>Vcc</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Shutdown Current</td>
<td>Isdh</td>
<td>Vshdn = Vcc</td>
<td>1</td>
<td>15</td>
<td>μA</td>
<td></td>
</tr>
<tr>
<td>DC SPECIFICATIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Offset Voltage</td>
<td>Vos</td>
<td>TA = +25°C</td>
<td>30</td>
<td>125</td>
<td>μV</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-40°C ≤ TA ≤ +125°C</td>
<td>165</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Offset Voltage Drift</td>
<td>Δvos</td>
<td>(Note 3)</td>
<td>0.15</td>
<td>0.5</td>
<td>μV/°C</td>
<td></td>
</tr>
<tr>
<td>Input Bias Current</td>
<td>Ib</td>
<td></td>
<td>30</td>
<td>180</td>
<td>nA</td>
<td></td>
</tr>
<tr>
<td>Input Offset Current</td>
<td>Ios</td>
<td></td>
<td>15</td>
<td>100</td>
<td>nA</td>
<td></td>
</tr>
<tr>
<td>Input Common-Mode Range</td>
<td>Vcm</td>
<td>Guaranteed by CMRR</td>
<td>Vee + 1.8</td>
<td>Vcc - 1.4</td>
<td>V</td>
<td></td>
</tr>
</tbody>
</table>

Maxim Integrated
## ELECTRICAL CHARACTERISTICS (continued)

(V\(_{CC}\) = 15V, V\(_{EE}\) = -15V, R\(_L\) = 10kΩ to V\(_{GND}\), V\(_{IN+}\) = V\(_{IN-}\) = V\(_{GND}\) = 0V, V\(_{SHDN}\) = V\(_{GND}\), T\(_A\) = -40°C to +125°C. Typical values are at T\(_A\) = +25°C, unless otherwise noted.) (Note 2)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common-Mode Rejection Ratio</td>
<td>CMRR</td>
<td>V(<em>{EE}) + 1.8V ≤ VCM ≤ V(</em>{CC}) - 1.4V, T(_A) = +25°C</td>
<td>120</td>
<td>135</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V(<em>{EE}) + 1.8V ≤ VCM ≤ V(</em>{CC}) - 1.4V, -40°C ≤ T(_A) ≤ +125°C</td>
<td></td>
<td></td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Large-Signal Gain</td>
<td>AVOL</td>
<td>V(<em>{EE}) + 0.2V ≤ V(</em>{OUT}) ≤ V(_{CC}) - 0.2V, R(_L) = 10kΩ</td>
<td>125</td>
<td>140</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V(<em>{EE}) + 0.6V ≤ V(</em>{OUT}) ≤ V(_{CC}) - 0.6V, R(_L) = 600Ω</td>
<td>120</td>
<td>135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Voltage Swing</td>
<td>VOH</td>
<td>V(<em>{CC}) - V(</em>{OUT})</td>
<td>50</td>
<td>150</td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R(_L) = 10kΩ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R(_L) = 600Ω</td>
<td>150</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VOL</td>
<td>V(<em>{OUT}) - V(</em>{EE})</td>
<td>50</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R(_L) = 10kΩ</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>R(_L) = 600Ω</td>
<td>150</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-Circuit Current</td>
<td>ISC</td>
<td></td>
<td>56</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T(_A) = +25°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### AC SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain-Bandwidth Product</td>
<td>GBWP</td>
<td></td>
<td>55</td>
<td></td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Slew Rate</td>
<td>SR</td>
<td>0 ≤ V(_{OUT}) ≤ 5V</td>
<td>30</td>
<td></td>
<td></td>
<td>V/μs</td>
</tr>
<tr>
<td>Settling Time</td>
<td>TS</td>
<td>To 0.0015%, V(<em>{OUT}) = 10V(</em>{P-P}), C(_L) = 100pF, AV = 1V/V</td>
<td>600</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Total Harmonic Distortion</td>
<td>THD</td>
<td>f = 1kHz, V(<em>{OUT}) = 3V(</em>{RMS}), R(_L) = 600Ω, AV = 1V/V</td>
<td>-136</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f = 10kHz, V(<em>{OUT}) = 3V(</em>{RMS}), R(_L) = 600Ω, AV = 1V/V</td>
<td>-128</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input-Voltage Noise Density</td>
<td>e(_N)</td>
<td>f = 1kHz</td>
<td>0.94</td>
<td></td>
<td></td>
<td>nV/√Hz</td>
</tr>
<tr>
<td>Input Voltage Noise</td>
<td></td>
<td>0.1Hz ≤ f ≤ 10Hz</td>
<td>65</td>
<td></td>
<td></td>
<td>nVp-p</td>
</tr>
<tr>
<td>Input-Current Noise Density</td>
<td>i(_N)</td>
<td>f = 1kHz</td>
<td>3.75</td>
<td></td>
<td></td>
<td>pA/√Hz</td>
</tr>
<tr>
<td>Capacitive Loading</td>
<td>C(_L)</td>
<td>No sustained oscillation, AV = 1V/V</td>
<td>350</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
</tbody>
</table>

**Note 2:** All devices are 100% production tested at T\(_A\) = +25°C. Temperature limits are guaranteed by design.

**Note 3:** Guaranteed by design.
MAX9632
36V, Precision, Low-Noise, Wide-Band Amplifier

Typical Operating Characteristics

(VCC = 15V, VEE = -15V, RL = 10kΩ to VGND, VIN+ = VIN- = VGND = 0V, VSHDN = VGND, TA = -40°C to +125°C. Typical values are at TA = +25°C, unless otherwise noted.)
MAX9632

36V, Precision, Low-Noise, Wide-Band Amplifier

Typical Operating Characteristics (continued)

(VCC = 15V, VEE = -15V, RL = 10kΩ to VGN, VIN+ = VIN- = VGN = 0V, VSHDN = VGN, TA = -40°C to +125°C. Typical values are at TA = +25°C, unless otherwise noted.)

OUTPUT VOLTAGE LOW vs. OUTPUT CURRENT (SINK)

OPEN-LOOP GAIN vs. FREQUENCY

INPUT-VOLTAGE NOISE DENSITY vs. FREQUENCY

OUTPUT VOLTAGE LOW (V)

-15.00
-14.95
-14.90
-14.85
-14.80
-14.75
-14.70
-14.65
-14.60
-14.55
-15.00

OUTPUT SINK CURRENT (mA)

0 10 20 30 40 50 60

FREQUENCY (Hz)

1 10 100 1k 10k 100k 1M 10M 100M

OPEN-LOOP GAIN (dB)

0 20 40 60 80 100 120 140 160

INPUT-VOLTAGE NOISE DENSITY (nV/√Hz)

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8

FREQUENCY (Hz)

10 100 1k 10k 100k

OUTPUT IMPEDANCE vs. FREQUENCY

FREQUENCY (Hz)

10M 1M 100k 10k 1k 100

OUTPUT IMPEDANCE (Ω)

0 10 20 30 40 50 60 70 80 90 100

INPUT CURRENT NOISE DENSITY vs. FREQUENCY

INPUT CURRENT NOISE DENSITY (pA/√Hz)

FREQUENCY (Hz)

10k 1k 100 10 100k

STABILITY vs. CAPACITIVE AND RESISTIVE LOAD PARALLEL

CAPACITIVE LOAD (pF)

0 200 400 600 800 1000 1200

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE

STABLE
MAX9632
36V, Precision, Low-Noise, Wide-Band Amplifier

**Typical Operating Characteristics (continued)**

($V_{CC} = 15V$, $V_{EE} = -15V$, $R_L = 10k\Omega$ to $V_{GND}$, $V_{IN+} = V_{IN-} = V_{GND} = 0V$, $V_{SHDN} = V_{GND}$, $T_A = -40^\circ C$ to $+125^\circ C$. Typical values are at $T_A = +25^\circ C$, unless otherwise noted.)

---

**ISOLATION RESISTANCE vs. CAPACITIVE STABILITY**

**POWER-UP TIME**

$V_{CC} = 5V$, $V_{EE} = -5V$

**RECOVERY FROM SHUTDOWN**

$V_{CC} = 5V$, $V_{EE} = -5V$

**TOTAL HARMONIC DISTORTION vs. FREQUENCY**

**TOTAL HARMONIC DISTORTION vs. OUTPUT VOLTAGE**
MAX9632

36V, Precision, Low-Noise, Wide-Band Amplifier

Pin Configuration

Pin Description

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 5</td>
<td>N.C.</td>
<td>Not Connected</td>
</tr>
<tr>
<td>2</td>
<td>IN-</td>
<td>Negative Input</td>
</tr>
<tr>
<td>3</td>
<td>IN+</td>
<td>Positive Input</td>
</tr>
<tr>
<td>4</td>
<td>VEE</td>
<td>Negative Supply Voltage</td>
</tr>
<tr>
<td>6</td>
<td>OUT</td>
<td>Output</td>
</tr>
<tr>
<td>7</td>
<td>VCC</td>
<td>Positive Supply Voltage</td>
</tr>
<tr>
<td>8</td>
<td>SHDN</td>
<td>Active-High Shutdown</td>
</tr>
<tr>
<td></td>
<td>EP</td>
<td>Exposed Pad (TDFN Only). Connect to a large VEE plane to maximize thermal performance. Not intended as an electrical connection point.</td>
</tr>
</tbody>
</table>
MAX9632
36V, Precision, Low-Noise, Wide-Band Amplifier

Detailed Description
The MAX9632 is designed in a new 36V, high-speed complementary BiCMOS process that is optimized for excellent AC dynamic performance combined with high-voltage operation.

The IC offers precision, high-bandwidth, ultra-low noise and exceptional distortion performance.

The IC is unity-gain stable and operates either with single-supply voltage up to 36V or with dual supplies up to ±18V.

Applications Information

Operating Supply Voltage
The IC can operate with dual supplies from ±2.25V to ±18V or with a single supply from +4.5V to +36V with respect to ground. Even though the IC supports high-voltage operation with excellent performance, the device can also operate in very popular applications at 5V.

Low Noise and Low Distortion
The IC is designed for extremely low-noise applications such as professional audio equipment, very high performance instrumentations, automated test equipment, and medical imaging. The low noise, combined with fast settling time, makes it ideal to drive high-resolution sigma-delta or SARs analog-to-digital converters.

The IC is also designed for ultra-low-distortion performance. THD specifications in the Electrical Characteristics table and Typical Operating Characteristics are calculated up to the fifth harmonic. Even when driving high-voltage swing up to 10VP-P, the IC maintains excellent low distortion operation over and above 100kHz of bandwidth.

Rail-to-Rail Output Stage
The output stage swings to within 50mV (typ) of either power-supply rail with a 10kΩ load and provides a 55MHz GBW with a 30V/s slew rate. The device is unity-gain stable and can drive a 100pF capacitive load without compromising stability. Stability with higher capacitive loads can be improved by adding an isolation resistor in series with the op-amp output. This resistor improves the circuit’s phase margin by isolating the load capacitor from the amplifier’s output. The Typical Operating Characteristics show a profile of the isolation resistor and capacitive load values that maintain the device into the stable region.

Figure 1. Input Protection Circuit

Input Differential Voltage Protection
During normal op-amp operation, the inverting and noninverting inputs of the IC are at essentially the same voltage. However, either due to fast input voltage transients or other fault conditions, these inputs can be forced to be at two different voltages.

Internal back-to-back diodes protect the inputs from an excessive differential voltage (Figure 1). Therefore, IN+ and IN- can be any voltage within the range shown in the Absolute Maximum Ratings section. Note the protection time is still dependent on the package thermal limits.

If the input signal is fast enough to create the internal diodes’ forward bias condition, the input signal current must be limited to 20mA or less. If the input signal current is not inherently limited, an input series resistor can be used to limit the signal input current. Care should be taken in choosing the input series resistor value, since it degrades the low-noise performance of the device.

Shutdown
The shutdown is referenced to the positive supply. See the Electrical Characteristics table for the proper levels of functionality. A high level (above VCC - 0.35V) disables the op amp and puts the output into a high-impedance state. A low level (below VCC - 3V) enables the device. As an example, if the op amp is powered with dual supplies of ±15V, the device is enabled when shutdown is at or below 12V. The device is disabled when shutdown is at or above 14.65V. If the op amp is powered with a single supply of 36V, the device is enabled when shutdown is at or below 33V. The device is disabled when shutdown is at or above 35.65V. This input must be connected to a valid high or low voltage and should not be left disconnected.

Power Supplies and Layout
The MAX9632 can operate with dual supplies from ±2.25V to ±18V or with a single supply from +4.5V to +36V with respect to ground. When used with dual supplies, bypass both VCC and VEE with their own 0.1µF capacitor to ground. When used with a single supply, bypass VCC with a 0.1µF capacitor to ground.
Careful layout technique helps optimize performance by decreasing the amount of stray capacitance at the op amp's inputs and outputs. To decrease stray capacitance, minimize trace lengths by placing external components close to the op amp's pins.

For high-frequency designs, ground vias are critical to provide a ground return path for high-frequency signals and should be placed near the decoupling capacitors. Signal routing should be short and direct to avoid parasitic effects. Avoid using right angle connectors since they may introduce a capacitive discontinuity and ultimately limit the frequency response.

**Electrostatic Discharge (ESD)**

The IC has built-in circuits to protect it from ESD events. An ESD event produces a short, high-voltage pulse that is transformed into a short current pulse once it discharges through the device. The built-in protection circuit provides a current path around the op amp that prevents it from being damaged. The energy absorbed by the protection circuit is dissipated as heat.

ESD protection is guaranteed up to ±8kV with the Human Body Model (HBM). The Human Body Model simulates the ESD phenomenon wherein a charged body directly transfers its accumulated electrostatic charge to the ESD-sensitive device. A common example of this phenomenon is when a person accumulates static charge by walking across a carpet and then transfers all of the charge to an ESD-sensitive device by touching it.

Not all ESD events involve the transfer of charge into the device. ESD from a charged device to another body is also a common form of ESD.

If a charged device comes into contact with another conductive body that is at a lower potential, it discharges into that body. Such an ESD event is known as Charged Device Model (CDM) ESD, which can be even more destructive than HBM ESD (despite its shorter pulse duration) because of its high current. The IC guarantees CDM ESD protection up to ±1kV.

**Driving High-Resolution Sigma-Delta ADCs**

The MAX9632’s excellent AC specifications and 55MHz bandwidth are a good fit for driving high-speed, high-precision SAR ADCs. These ADCs require an ultra-low noise op amp to achieve high signal-to-noise ratio (SNR). The MAX11905 is a 20-bit, 1.6Msps fully differential ADC with 98.3dB SNR at fIN = 10kHz. The MAX11905 measures analog inputs up to ±VREF. Sampling up to 1.6Msps, the MAX11905 achieves better than -123dB THD and 125 SFDR at fIN = 10kHz.

The Typical Application Circuit shows an example of the MAX9632 driving the MAX11905.

**Chip Information**

PROCESS: BiCMOS
MAX9632
36V, Precision, Low-Noise, Wide-Band Amplifier

Typical Application Circuit

![Typical Application Circuit Diagram]

Package Information

For the latest package outline information and land patterns (footprints), go to [www.maximintegrated.com/packages](http://www.maximintegrated.com/packages). Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

<table>
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<tr>
<th>PACKAGE TYPE</th>
<th>PACKAGE CODE</th>
<th>OUTLINE NO.</th>
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<td>8 SO</td>
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<td>90-0096</td>
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<td>8 TDFN-EP</td>
<td>T833+3</td>
<td>21-0137</td>
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<td>8 μMAX</td>
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### Revision History

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<tr>
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<th>DESCRIPTION</th>
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<tr>
<td>0</td>
<td>10/10</td>
<td>Initial release</td>
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<tr>
<td>1</td>
<td>4/11</td>
<td>Updated short-circuit current spec</td>
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<td>Added µMAX package</td>
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<td>4</td>
<td>6/14</td>
<td>Revised the Features and Driving High-Resolution Sigma-Delta ADCs sections and updated Typical Application Circuit and Package Information section</td>
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<td>5</td>
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<td>Revised Benefits and Features section</td>
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