Automotive Sensor Signal Conditioners Overview
Sensing Solutions Overview

IDT is a trusted partner in the sensing market with more than twenty years of experience developing leading-edge core technologies for sensor signal conditioning (SSC) devices. IDT’s sensor signal conditioning ICs are all-in-one, energy efficient products that are easy-to-use and are supported by advanced software and expert technical support. Our single-pass operation calibration lowers costs by reducing test time without sacrificing precision. Our portfolio offers a broad range of resistive and capacitive SSC ICs. IDT’s highly accurate; single-pass calibration operation enables design of cost-effective, accurate sensing systems.

IDT SSC ICs Enable Easy Sensor Platform Development

- Analog and One-Wire interface
- Digital I2C & SPI output
- Resistive and capacitive sensor interface
- High analog gain for sophisticated sensors
- Industrial and consumer applications
- Low-power and battery-powered applications
- Single-pass calibration
- High ADC resolution up to 24 bit
- Wafer and packaged delivery forms
Why Choose IDT SSCs?

IDT SSC ICs are all-in-one, energy-efficient products that are easy-to-use and are supported by advanced software and expert technical support staff.

Decades of sensor design experience  Excellent evaluation and support tools  Unmatched technical support  Continued investment  Reduced time to market

Innovation-driven and customer-focused, we enable IC solutions that reduce fuel consumption and CO2 emissions to help protect the environment. Our products range from very low-power SSCs for mobile applications to rugged AEC-Q100-qualified ICs that expedite automotive product design by providing advanced sensor-signal conditioning and configurability while minimizing power consumption. Our sophisticated calibration and configuration techniques significantly reduce external component count and time-to-market for products that meet new emission-reduction standards.

Lowest Total System Cost with IDT SSCs
Automotive Solutions

Body
- HVAC
- Power seat
- Mirror control

Infotainment
- Timing solutions
- Wireless power
- Power management

Safety
- Seat occupant detection
- Hands-off detection

Chassis
- Electric power steering
  - ABS/ESP

Powertrain
- Oil level/pressure/temperature/quality
- In-cylinder pressure
- UREA pressure
- Mass air flow sensor
- Seat pressure sensor transmission
- Throttle control
- High temperature sensing (HTS)
- Flex fuel
- E-gas
- Diesel handling

BASIC SELECTION GUIDE FOR IDT SSC FAMILY

Capacitive
- ZSSC312x

Further selection by:
- Temp. Comp.
- Temp. Range
- Gain & Resolution
- Sample Rate
- Supply Voltage
- Operating Current
- Output Type
- Analog
- SPI/I²C
- PWM
- ZACwire™
- Alarm

Resistive
- Yes
  - Automotive
  - ZSSC3101x
  - ZSSC31050
  - ZSSC3018
  - ZSSC3224

- No
  - ZSC31150
  - ZSSC3170
  - ZSSC4151
  - ZSSC4169
  - ZSC3026
  - ZSC3018
  - ZSSC3224
Featured SSC Products

ZSC31150

Automotive Sensor Signal Conditioner

- Digital compensation of sensor offset, sensitivity, temperature drift and non-linearity
- Accommodates nearly all bridge sensors by PGA and programmable ADC
- Capable of conditioning bridge sensor signals ranging from 1 to 275mV/V
- Set of diagnostics functions needed for safety applications
- Temperature compensation via internal diode, external diode or bridge sensor element
- Output options: voltage (0 to 5V), I2C, ZACwire™ (one-wire interface)
Automotive Sensor Signal Conditioner with Analog Output

- Safety and diagnostic functions that can enable support for automotive (ASIL B) and industrial (SIL 2) safety critical applications related to the ISO 26262:2011 and IEC 61508 standards
- Digital compensation of sensor offset, sensitivity, temperature drift, and non-linearity
- Adjustable to nearly all full or half bridge sensors
- Analog gain of 200, supporting sensors with spans down to 1mV/V using the digital zooming option
- Output options: ratiometric 12-bit analog voltage output (e.g., 5-95% or 10-90%) with freely adjustable clamping or ZACwire™ digital one-wire-interface (OWI)
Automotive Grade Resistive Sensor Signal Conditioner with SENT Output

- Differential bridge sensor input and on-chip or external temperature sensors
- Digital compensation for offset, gain, and higher order nonlinearity as well as temperature
- Accuracy: ±0.50% FS at -40°C to 150°C
- SENT output based on SAE J2716 Revision 3.0 standard using Fast and Serial Data Message Channels
- Support for the user's ASIL C safety applications
# Automotive Qualified Sensor Signal Conditioners

## Single-bridge Sensor Signal Conditioners

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Supply Voltage (V)</th>
<th>Interface</th>
<th>Adjustable Analog Gain</th>
<th>Resolution (Bits)</th>
<th>Sample Rate Max (kHz)</th>
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<tbody>
<tr>
<td>ZSSC3015</td>
<td>Resistive Sensor Signal Conditioner with Diagnostics - AEC-Q100 qualified</td>
<td>2.7 - 5.5</td>
<td>Ratiometric Voltage, Absolute Voltage, ZACwire</td>
<td>6, 24, 48, 96</td>
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<td>ZSC31150</td>
<td>Automotive Sensor Signal Conditioner</td>
<td>4.5 - 5.5</td>
<td>Ratiometric Voltage, ZACwire, I2C</td>
<td>3, 7, 9, 14, 26, 35, 52, 70, 105, 140, 210, 280, 420</td>
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<td>7.8</td>
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<tr>
<td>ZSSC3131</td>
<td>Capacitive Sensor Signal Conditioner with Digital Output</td>
<td>4.5 - 5.5</td>
<td>Ratiometric Voltage, ZACwire, I2C</td>
<td>3, 7, 9, 14, 26, 35, 52, 70, 105</td>
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<td>ZSSC3135</td>
<td>Sensor Signal Conditioner for Piezoresistive Bridge Sensors</td>
<td>4.5 - 5.5</td>
<td>Ratiometric Voltage, ZACwire, I2C</td>
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<td>ZSSC3136</td>
<td>Automotive Sensor Signal Conditioner for Safety Switch Applications</td>
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<td>Ratiometric Voltage, ZACwire, I2C</td>
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<td>ZSSC3138</td>
<td>Automotive Sensor Signal Conditioner for Ceramic Sensor Applications</td>
<td>4.5 - 5.5</td>
<td>Ratiometric Voltage, ZACwire, I2C</td>
<td>3, 7, 9, 14, 26, 35, 52, 70, 105, 140, 210, 280, 420</td>
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<td>ZSSC3154</td>
<td>Automotive Sensor Signal Conditioner with Dual Analog Output</td>
<td>4.5 - 5.5</td>
<td>Ratiometric Voltage, ZACwire, I2C, Dual Analog Output</td>
<td>3, 7, 9, 14, 26, 35, 52, 70, 105, 210, 280, 420</td>
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<td>ZSSC3170</td>
<td>Automotive Sensor Signal Conditioner with LIN and PWM Interface</td>
<td>7 - 18</td>
<td>PWM, LIN</td>
<td>3, 7, 9, 14, 26, 35, 52, 70, 105, 140, 210, 280, 420</td>
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<td>ZSSC4151</td>
<td>Automotive Sensor Signal Conditioner with Analog Output</td>
<td>4.5 - 5.5</td>
<td>Ratiometric Voltage, ZACwire, I2C</td>
<td>1 - 200</td>
<td>18</td>
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<td>ZSSC4162</td>
<td>Automotive Sensor Signal Conditioner Dual Bridge SENT Output</td>
<td>4.75 - 5.25</td>
<td>SENT 3.0, I2C</td>
<td>1 - 200</td>
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<td>ZSSC4169</td>
<td>Automotive Grade Resistive Sensor Signal Conditioner with SENT Output &amp; ASIL-C</td>
<td>4.5 - 5.5</td>
<td>SENT, I2C</td>
<td>1 - 200</td>
<td>18</td>
<td>1.56</td>
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The products in this guide represent a portion of IDT’s automotive sensing solutions.

To request samples, download documentation, or learn more, visit: [IDT.com/ssc](http://IDT.com/ssc)

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## Global Strength, Local Focus

IDT is headquartered in Silicon Valley – the heart and soul of technical innovation. Our global locations place design and sales support wherever our customers happen to be, whether in the Americas, Europe or Asia.