SENSOR SIGNAL CONDITIONING ICS FOR INDUSTRIAL, MEDICAL, AND CONSUMER APPLICATIONS
EASY-TO-USE SENSOR SIGNAL CONDITIONER ICS

Designing sensor interfaces can be quite challenging and time consuming, and producing them in volume is often expensive due to long test cycles on costly production test equipment. Renesas Sensor Signal Conditioner (SSC) ICs facilitate both design and production of sensor interfaces by providing programmable, highly accurate, wide gain and quantization functions combined with powerful, high-order digital correction and linearization algorithms.

SENSOR SIGNAL CONDITIONING BASICS

### SENSOR SIGNAL
- Physical measure
  - Pressure
  - Torque
  - Temperature
  - Force
  - Weight/load

### SIGNAL CONDITIONING
- Signal transducing
- Signal amplification
- Signal conditioning (compensation of offset, non-linearity and temperature dependency)

### CONDITIONED OUTPUT
- Linear analog ratiometric voltage, current loop
- Digital PWM, I²C, SPI and OWI output

**TYPICAL SSC BLOCK DIAGRAM**
Renesas’ Sensor Signal Conditioner ICs typically interface with following main sensor types: resistive bridges, thermopile and differential or absolute capacitors. For each sensor type, further specialization allows selecting the optimal balance between price and performance for the required operating voltage and temperature range, gain, resolution, input/output format, and qualification level.

Our SSC ICs offer digital compensation of sensor offset, sensitivity, temperature drift, and nonlinearity in wide operational temperature ranges: −50°C to +150°C (maximum range).

**RENESAS 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

**RENESAS SENSOR SIGNAL CONDITIONERS**

Renesas’ SSCs provide an advantage to our customers’ sensor modules both in performance as well as in the test and calibration process.
INDUSTRIAL AND CONSUMER SSC PORTFOLIO

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Voltage</th>
<th>Output</th>
<th>ADC</th>
<th>Package</th>
<th>Typical Application/Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSC31010</td>
<td>Resistive</td>
<td>2.7 to 30 V</td>
<td>Analog/Digital</td>
<td>14 bit</td>
<td>SOIC, Wafer</td>
<td>Industrial/Analog Sensors</td>
</tr>
<tr>
<td>ZSC31014</td>
<td>Resistive</td>
<td>2.7 to 5.5 V</td>
<td>Digital</td>
<td>14 bit</td>
<td>SOIC, Wafer</td>
<td>Industrial/FC Sensors</td>
</tr>
<tr>
<td>ZSC31015</td>
<td>Resistive</td>
<td>2.7 to 30 V</td>
<td>Analog/Digital</td>
<td>14 bit</td>
<td>SOIC, Wafer</td>
<td>Industrial/Analog Sensors</td>
</tr>
<tr>
<td>ZSC31050</td>
<td>Resistive</td>
<td>2.7 to 40 V</td>
<td>Analog/Digital</td>
<td>15 bit</td>
<td>SSOP, Wafer</td>
<td>Industrial/Current Loop</td>
</tr>
<tr>
<td>ZSSC3026</td>
<td>Resistive</td>
<td>1.8 to 3.6 V</td>
<td>Digital</td>
<td>16 bit</td>
<td>Wafer</td>
<td>Consumer, White Goods</td>
</tr>
<tr>
<td>ZSSC3036</td>
<td>Resistive</td>
<td>1.8 to 3.6 V</td>
<td>Digital</td>
<td>16 bit</td>
<td>Wafer</td>
<td>Stacked Die Assemblies</td>
</tr>
<tr>
<td>ZSSC3027</td>
<td>Resistive</td>
<td>1.7 to 3.6 V</td>
<td>Digital</td>
<td>16 bit</td>
<td>Wafer</td>
<td>Industrial</td>
</tr>
<tr>
<td>ZSSC3018</td>
<td>Resistive</td>
<td>1.68 to 3.6 V</td>
<td>Digital</td>
<td>18 bit</td>
<td>QFPN, Wafer</td>
<td>Industrial/White Goods</td>
</tr>
<tr>
<td>ZSSC3218</td>
<td>Resistive</td>
<td>1.68 to 3.6 V</td>
<td>Digital</td>
<td>18 bit</td>
<td>QFPN, Wafer</td>
<td>Consumer/White Goods</td>
</tr>
<tr>
<td>ZSSC3224</td>
<td>Resistive</td>
<td>1.68 to 3.6 V</td>
<td>Digital</td>
<td>24 bit</td>
<td>QFPN, Wafer</td>
<td>Industrial/Consumer</td>
</tr>
<tr>
<td>ZSSC3240</td>
<td>Resistive</td>
<td>2.7 to 48 V</td>
<td>Analog/Digital</td>
<td>24 bit</td>
<td>QFPN, Wafer</td>
<td>Industrial/Current Loop</td>
</tr>
<tr>
<td>ZSSC3123</td>
<td>Capacitive</td>
<td>2.3 to 5.5 V</td>
<td>Digital, PDM</td>
<td>14 bit</td>
<td>TSSOP, Wafer</td>
<td>Industrial</td>
</tr>
<tr>
<td>ZSSC3230</td>
<td>Capacitive</td>
<td>1.68 to 3.6 V</td>
<td>Digital, PDM</td>
<td>18 bit</td>
<td>QFPN, Wafer</td>
<td>Industrial/Consumer</td>
</tr>
</tbody>
</table>

SENSOR APPLICATION REFERENCE DESIGNS

- Oil pressure and temperature sensor
- Pressure sensing in consumer electronics
- Industrial pressure sensor
- Sensors for white goods

WHY CHOOSE RENESAS SSCS?

Renesas 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

© 2020 Renesas Electronics America Inc. (REA). All rights reserved. All trademarks are the property of their respective owners. REA believes the information herein was accurate when given but assumes no risk as to its quality or use. All information is provided as-is without warranties of any kind, whether express, implied, statutory, or arising from course of dealing, usage, or trade practice, including without limitation as to merchantability, fitness for a particular purpose, or non-infringement. REA shall not be liable for any direct, indirect, special, consequential, incidental, or other damages whatsoever, arising from use of or reliance on the information herein, if advised of the possibility of such damages. REA reserves the right, without notice, to discontinue products or make changes to the design or specifications of its products or other information herein. All contents are protected by U.S. and international copyright laws. Except as specifically permitted herein, no portion of this material may be reproduced in any form, or by any means, without prior written permission from Renesas Electronics America Inc. Visitors or users are not permitted to modify, distribute, publish, transmit or create derivative works of any of this material for any public or commercial purposes.

Document No.: R70PF0096EU0000

Renesas Electronics America Inc. | renesas.com
1001 Murphy Ranch Road, Milpitas, CA 95035 | Phone: 1-888-468-3774