Temperature sensing for infotainment and cluster

Automotive manufacturers place a strategic focus on infotainment systems as they seek to improve both the driver and passenger experience. Today’s infotainment systems consist of the head unit, cluster, premium audio and media interfaces. Prevalent features include voice activated navigation, large touch screens, wireless connectivity and advanced audio/video capabilities.

Head units are located in the center console between the driver and front passenger seat, while clusters are located behind the steering wheel. These small enclosures limit airflow and increase the risk of damage to the application processors and LCD displays due to high temperatures. The TMP235 has a wide operating temperature range and can monitor the system temperature with ±2.0°C accuracy. The TMP235 is currently in production, and there is an automotive qualification to follow.

The audio system consists of multiple speakers that are driven by high power audio amplifiers. The LMT87-Q1 is a precision low-power analog output device that can help mitigate the risk of overheating the audio system by monitoring the amplifier temperature with a 2.7°C (max) accuracy.

The USB charging port is located in the media interface, which is positioned in front of the center console.

The DC/DC converters and charge port controllers may overheat due to excessive heat dissipation during charging. The alert signal of the TMP302-Q1 temperature switch can be connected to the charge port controller, which will disable charging when a temperature threshold is exceeded.

The TI automotive temperature sensor portfolio features both low cost and high accuracy temperature sensor products that simplify temperature measurement. Additionally, TI’s integrated circuit solutions have the following advantages over thermistors:

- No device-level calibration required
- Highly linear temperature response
- Fewer external support components required

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### Table: Temperature Sensors

<table>
<thead>
<tr>
<th>Part number</th>
<th>Interface</th>
<th>Accuracy</th>
<th>Supply range</th>
<th>Package type</th>
<th>Package footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>TMP235-Q1</em></td>
<td>Analog</td>
<td>2.0°C, -40°C to +150°C</td>
<td>2.3 V to 5.5 V</td>
<td>SC70</td>
<td>2.00 x 1.25 mm</td>
</tr>
<tr>
<td>LMT87-Q1</td>
<td>Analog</td>
<td>2.7°C, -50°C to +150°C</td>
<td>2.7 V to 5.5 V</td>
<td>SC70</td>
<td>2.00 x 1.25 mm</td>
</tr>
<tr>
<td>TMP302-Q1</td>
<td>Switch</td>
<td>2.0°C, 40°C to +125°C</td>
<td>1.4 V to 3.6 V</td>
<td>SOT-563</td>
<td>1.60 x 1.20 mm</td>
</tr>
</tbody>
</table>

*pending automotive qualification
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