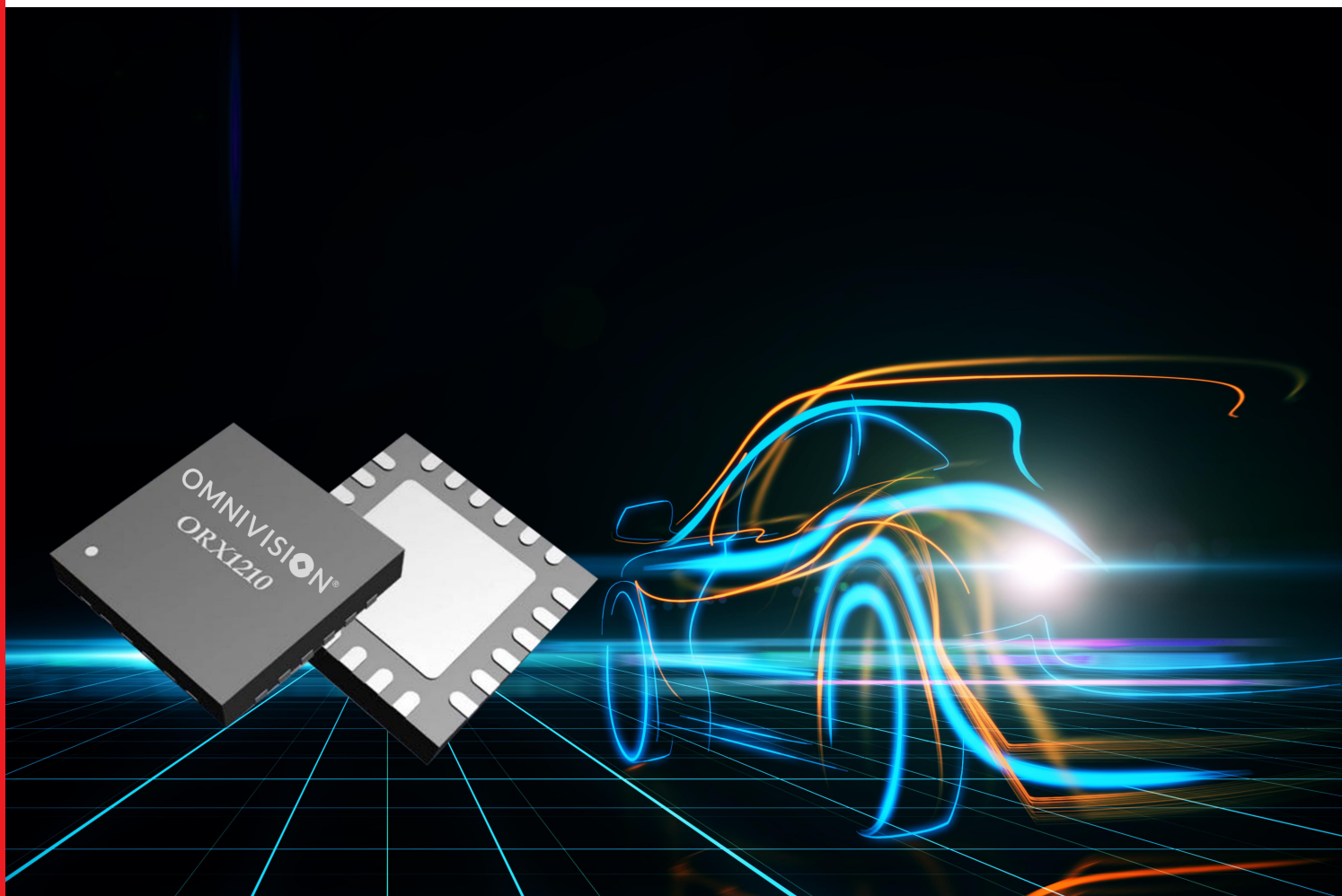


ORX1210 product brief



The First Automotive Camera PMIC Solution with ASIL B Functional Safety in China: High Efficiency, High Intelligence, and Strong Functional Safety

As the world's leading semiconductor solution developer of advanced digital imaging, analog, and touch and display technology, OMNIVISION has been committed to developing products related to automotive cameras. Besides image sensors, OMNIVISION launches the ORX1210, the latest highly integrated PMIC for automotive cameras.

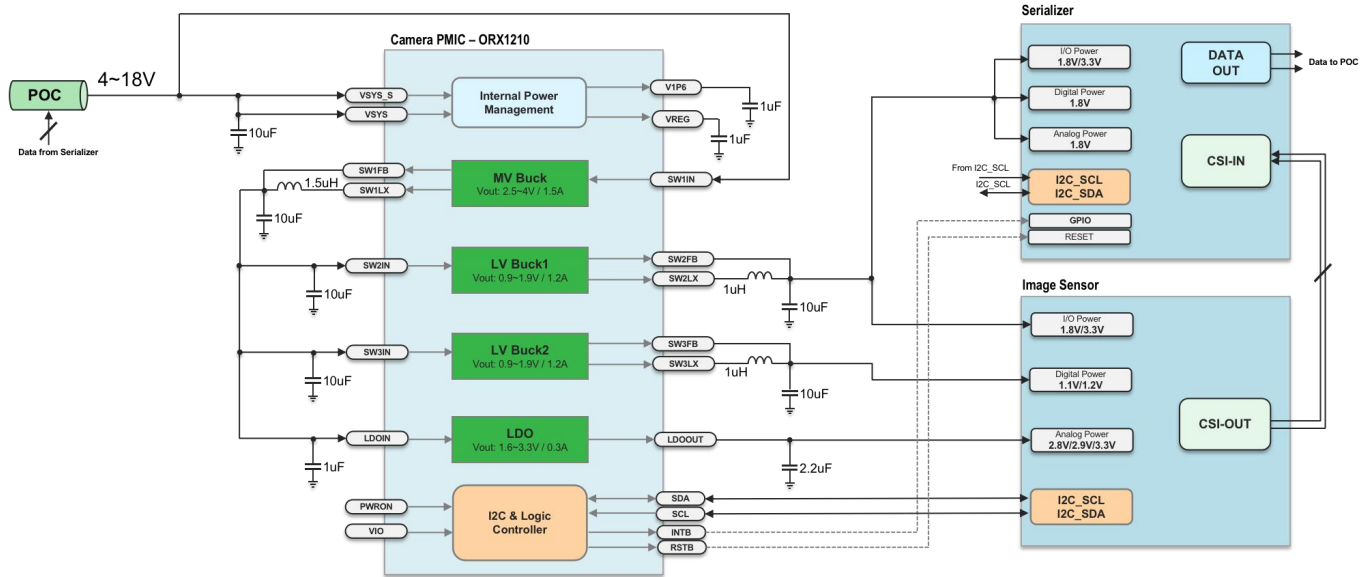
Available in a QFN4x4mm² package, the ORX1210 features a wide input voltage range from 4.0 V to 18 V. The ORX1210 consists of a medium-voltage DC-DC buck converter, two low-voltage DC-DC buck converters, and an LDO with high PSRR and low noise. The LDO is optimized for the camera-sensitive frequency range from 100 K to 1 MHz to better suppress the influence of power noise on image quality.

Flexible power-on sequence control ensures stable operation of the system. The spread spectrum function improves the EMI performance of the system. High power efficiency and good thermal dissipation allow normal operation of the system under high ambient temperature. The ORX1210 provides multiple safety mechanisms, and the functional safety level meets ASIL-B requirements.

Find out more at www.ovt.com.



- ◆ AEC-Q100 certification
- ◆ ISO 26262 ASIL-B functional safety compliance
- ◆ 2.3 MHz fixed switching frequency
- ◆ MTP (Multi-Time Programming), three-time programming available
- ◆ Spread spectrum and phase shift output for better EMI performance
- ◆ Built-in soft start to limit inrush current
- ◆ Wide voltage range and high current output compliant with power requirements of mainstream image sensors
- ◆ Primary synchronous buck converter 1
 - Configurable output voltage: 2.5 V~4.0 V
 - Maximum continuous output current: 1.5 A
- ◆ Secondary synchronous buck converter 2
 - Configurable output voltage: 0.9 V~1.9 V
 - Maximum continuous output current: 1.2 A
- ◆ Secondary synchronous buck converter 3
 - Configurable output voltage: 0.9 V~1.9 V
 - Maximum continuous output current: 1.2 A
- ◆ Secondary LDO
 - Configurable output voltage: 1.6 V~3.3 V
 - Maximum continuous output current: 0.3 A
- ◆ RoHS compliant and halogen free
- ◆ Wettable flank package: QFN 4x4~24, pitch: 0.5mm



Power-up Self-tests to Ensure System Reliability

The ORX1210 supports self-tests during power-on. When the power voltage of the system VSYS exceeds the UVDET 3.7 V, the ORX1210 (ASIL-B) performs self-tests immediately after importing the MTP configurations. The PMIC performs self-tests three times in total and enters the safe mode if the tests fail, ensuring that the system is in a safe state.

Timing Control to Ensure System Stability

The power-on sequence of the ORX1210 is controlled by the PWRON pin or the PWRON bit in registers. The ORX1210 supports the control of the power-on sequence for all the three buck converters and the LDO respectively. In case of the PWRON pin control, when the input voltage of the PWRON pin is high, this will be regarded by the ORX1210 as a power-on event, the output of power sequence is turned on. In case of the PWRON bit control, after the register configuration is imported, soft start is turned on for the corresponding power output channels according to the setting sequence and the output voltage reaches the setting value. When the power voltage VSYS is less than UVDET, all power output channels are powered off at the same time, and the PMIC enters the POR mode until the voltage on the VSYS pin resumes.

Spread Spectrum to Improve EMI Performance

To optimize EMI performance, the ORX1210 uses the spread spectrum to extend the original 2.3 MHz fixed switching frequency by $\pm 10\%$, which mitigates EMI noise at 2.3 MHz. In the meantime, the buck converter 2 and buck converter 3 support phase shift to reduce the influence of switching noise from the buck converter 1 and switching ripples, improving the overall EMI performance of the ORX1210.

High Conversion Efficiency and High PSRR

The ORX1210 integrates efficient primary and secondary synchronous buck converters with a maximum conversion max efficiency of over 90%. Additionally, to reduce the impact of noise on camera sensors, the LDO is optimized for input power noise suppression, with a PSRR of up to 65 dB in the frequency range below 100 KHz and 45 dB in the frequency range from 100 KHz to 1 MHz.

Intelligent Communication Interface

With an integrated I2C communication interface the ORX1210 supports real-time query of the operation status and reading of fault information in the fault state from the host.

Highly-Integrated Safety Mechanism and ASIL B Functional Safety

To meet the functional safety requirements from the ADAS, the ORX1210(ASIL-B) highly integrates safety mechanisms to diagnose the functional failures which can greatly expand the coverage of single point failures and potential failures diagnosis, and improve the functional safety level of the system.

