

Ultrasonic Ranging ICs

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EXPERTS FOR AUTOMOTIVE ICs

We have a broad expertise in analog mixed-signal integrated circuit design.

We deeply understand our customers application needs to create real system innovation.

We are a global player for automotive ASSPs and ASICs. We offer worldwide sales and application support.



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CORPORATE KEY FACTS



7 Elmos ICs

on average in every new car

6 product segments

Motor Control, Lighting, Safety/Power/Custom ICs,
Ranging, Optical, Sensor ICs

16 locations worldwide

incl. 7 R&D centers, HQ located in Dortmund, Germany

35+ years of experience

in analog mixed signal IC solutions

~1,150 employees

thereof 350+ product developers & engineers

WE ARE LOCATED ALL OVER THE WORLD

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Berlin

Detroit

Dortmund

Shanghai

Dresden

Düsseldorf

Singapore

Seoul

St. Petersburg

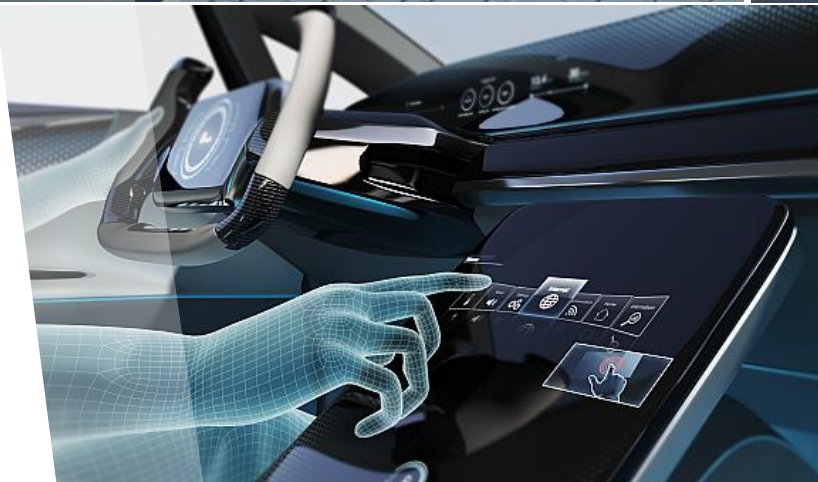
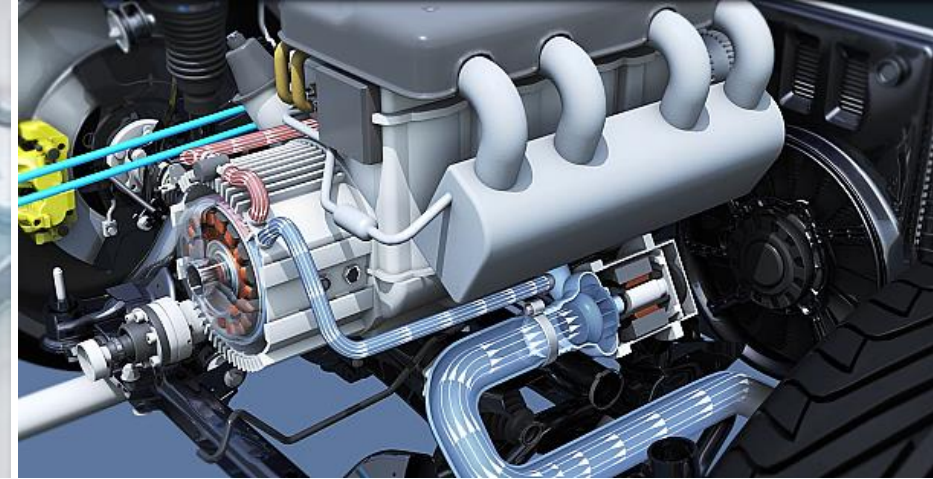
Tokyo

Frankfurt Oder

Bruchsal

PRODUCT SEGMENTS

- RANGING
- OPTICAL
- SENSOR ICs
- MOTOR CONTROL
- LIGHTING
- SAFETY, POWER & CUSTOM ICs

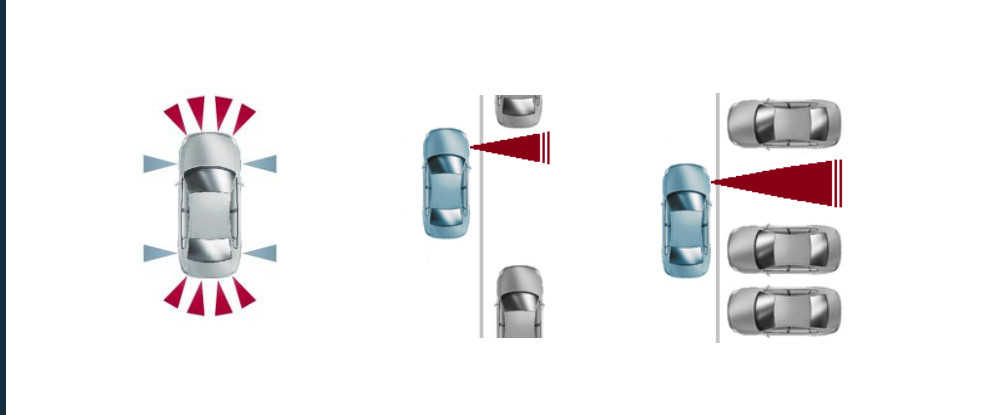


IC SOLUTIONS FOR ASSISTED AND AUTONOMOUS DRIVING

- Global market leader in ultrasonic ICs
- More than 1.3 billion ranging ICs in the field
- Broad ASSP product portfolio
- From most affordable (Direct Drive) to highest performance (ADAS applications)
- Enabling object localization, level- and flow-metering
- Several ultrasonic master ICs support future system architectures

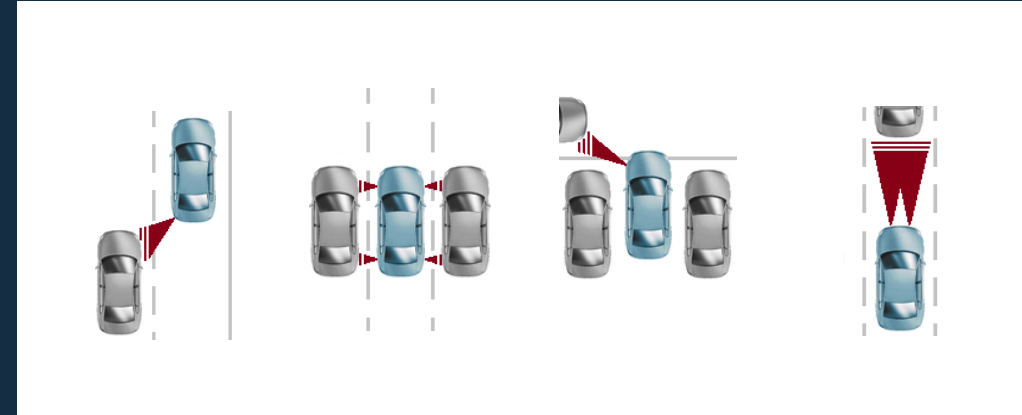
ULTRASONIC RANGING SENSOR APPLICATIONS

Elmos ultrasonic ranging ICs for low, mid and high end applications



PARK ASSIST

- **„Standard“ Parking**
with acoustic signal for front and rear
- **Automatic Parking**
including the detection of available side and parallel parking slots while driving



SAFETY WARNING

- **Blind Spot Detection** for close range
- **Side Distance Warning**
- **Cross Traffic Emergency Brake** when backing out
- **Pre-Crash Warning / Low Speed Emergency Breaking** when driving inner city

ULTRASONIC SENSOR IC

Best ultrasonic measurement performance

Long range and ultra short distances
from 0.1 to 6 meters

- Advanced analog & digital signal processing
- Robust ultrasound coding
- Adaptive thresholds
- Precise Echo Peak Detection (EPD)
- Noise suppression features for higher robustness
- Near field data evaluation for close proximity detection (NFD)

ULTRASONIC SENSOR IC

Variety of integrated diagnosis functions

Extensive diagnostic functions for
IC, external components, transducer and communication

- Ringing time and frequency
- Transducer impedance
- IC temperature and different IC voltages

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ULTRASONIC SENSOR IC

Standardized fast communication interface

Flexible high speed DSI3

- High bandwidth and low latency with up to 444 kbit/s data rate enables high payload data transfer
- Data collection mode reduces latency to a minimum for fast system reaction times
- Supports bus and pt-to-pt topology

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ULTRASONIC SENSOR IC

Maximum flexibility and efficiency

Shorter development times and easy software adoptions
for customer applications benefitting from

- Embedded 32-bit Arm® microcontrollers
- Up to 64 kB re-programmable flash memory
- SysROM with predefined functions:
Boot loader, DSI3 driver, signal path check,...

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ULTRASONIC SENSOR IC

Product options for cost reduction

Significantly reduce system cost and size

- **Direct Drive (LIN based)** with integrated driver stage directly excites a connected ultrasonic transducer eliminating the need for a transformer and other external components
- **ECU-less:** Simple Parking System without external ECU by using one sensor IC as a master. The last sensor in the chain can drive a speaker and/or display for acoustical and visual feedback
- **Auto Addressing:** No need for external circuits as sensors can automatically find their position in the chain

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Innovation Matters

DISCLAIMER

This presentation contains forward-looking statements based on beliefs of Elmos' management. Such statements reflect the company's current views with respect to future events and are subject to risks and uncertainties. Many factors could cause the actual results to be materially different, including, among others, changes in general economic and business conditions, changes in currency exchange rates and interest rates, introduction of competing products, lack of acceptance of new products or services and changes in business strategy. Actual results may vary materially from those projected here. Elmos does not intend or assume any obligation to update these forward-looking statements.

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