

**AUTOMOTIVE**



# AGENDA

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Always on the move with the right components

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# ALWAYS ON THE MOVE WITH THE RIGHT COMPONENTS



Electronic component solutions for automotive suppliers

One thing is certain – the future will be electronic. This applies in particular to the area of mobility, where vehicles are interacting more and more with their environment. To meet the pressure to innovate in the development and industrial production of vehicle modules.

An intelligent combination of quality, flexibility and availability is required. As one of the leading design-in distributors in Europe, Endrich has specialized in this area, Automotive suppliers optimizing their development and production processes in the best possible way.

Where competence meets service.

For more than 40 years we have been a family-owned company with more than 20 European sales offices within the industry a byword for know-how and value added services.

We see ourselves not only as a supplier of high-quality electronic components from Asia and the USA, but rather as a link between the possibilities of the manufacturers and the

requirements of our customers. The highly specialized Endrich-Automotive team stands by suppliers to the automotive industry as a central contact partner in every phase of a project for site – with comprehensive technical support – from the first consultation about a tailor-made product solution to a successful market launch: customer-oriented, innovative, effective, personal and binding.





Our focus is on maximum efficiency by optimizing all parts of a process chain. Whether Kanban, just-in-time, buffer or consignment stock or a smooth logistics, all processes are individually adapted to the requirements of our customers at Endrich. EDI standard and precise traceability of each batch is a matter of course. But as complex as the tasks may be no matter what, in the end there is a simple result: The satisfied customer.

endrich – components of life.

# SENSORS

## Applications & Features



### CLIMATE CONTROL SYSTEM

SEMITEC, TATEYAMA, TEWA, Sciosense

### ADAPTIVE HEADLIGHT

TDK-Micronas, TATEYAMA

### STEERING MOTOR - BLD MOTOR

TDK-Micronas, Sensitec

### LIDAR 3D SENSOR / TIME OF FLIGHT

Everlight, TDK InvenSense

### E-MOTOR EV/HV

SEMITEC, TATEYAMA, TEWA, TDK-Micronas, Sensitec

### TRUNK FOOT SENSOR

TDK InvenSense

### BATTERY MANAGEMENT SYSTEM

SEMITEC, TATEYAMA, TEWA, TDK-Micronas, Sensitec, Sciosense

### VEHICLE INTERIOR AIR QUALITY (VIAQ)

Sciosense

### STEERING ANGLE

TDK-Micronas, Sensitec

### SEAT-POSITION

TDK-Micronas, TDK InvenSense

### WINDSHIELD-SENSORS

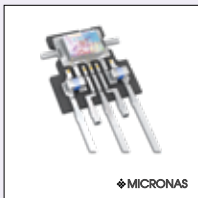
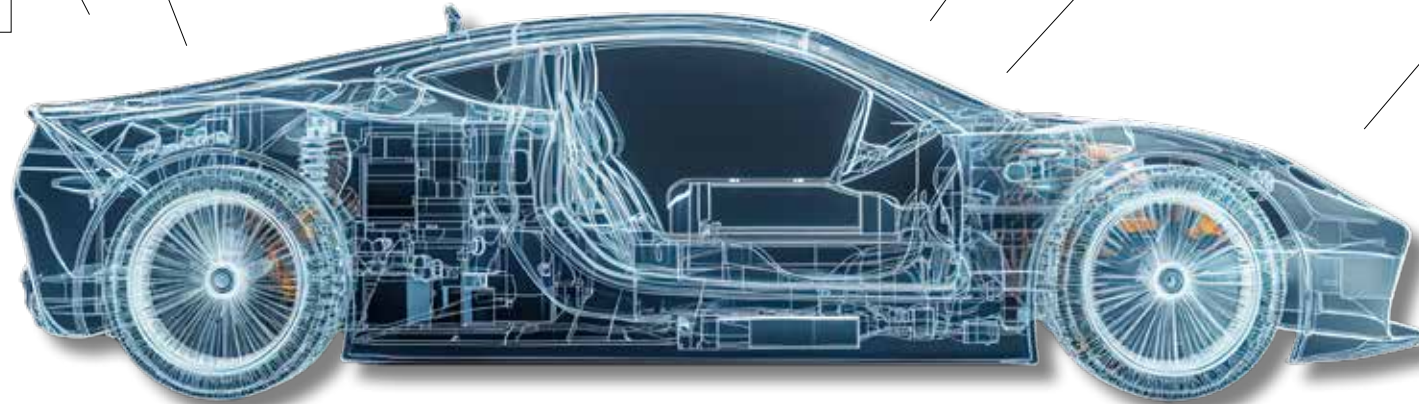
Sciosense, Everlight

### EGR / EXHAUST TEMP. MEASUREMENT

SEMITEC, TATEYAMA, TEWA, TDK-Micronas, Sciosense

### MAP LIGHT CONTROL

Everlight, TDK-InVensense



MICRONAS

Hall Direct Angle



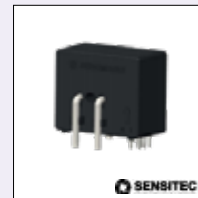
TATEYAMA

NTC SMD



TDK

MEMS Motion Sensors



SENSITEC

Leakage Current Sensor



Sciosense

ir quality, HVAC an+H49+I49



EVERLIGHT

Auto-Grade VCSEL Diode AEC-Q102

**MAGNETIC SENSOR**

Direct Angle Hall Sensors	■	■					
TMR Sensor / Linear Hall Sensors	■	■					
Switches	■	■					
Motor Controllers	■	■					
Current Sensors	■	■					

**TEMPERATURE SENSORS**

NTC SMD / NTC leaded			■	■			
NTC film types			■	■			
NTC thermistor probes			■	■			
Assembled sensors			■	■			

**MOTION SENSORS**

Infrared and ambient light sensor					■		
TOF Sensors					■		

**OPTICAL SENSORS**

Magnetometer / Accelerometer						■	
Gyroscope						■	

**ENVIRONMENTAL SENSOR**

Gas Sensor / Pressure							■
Temperatur / Humidity Sensor							■
Ultrasound sensor interface for water & gas flow metering							■

**KEY FEATURES**

<ul style="list-style-type: none"> <li>■ HAL39xy - True 3D sensor with internal stray field compensation</li> <li>■ HAC - Hall sensor with integrated capacitors</li> <li>■ HAR - Hall sensor as dual-die variant (redundancy) HVC motor controller with integrated drivers</li> </ul>	<ul style="list-style-type: none"> <li>■ Current sensors of varying complexity: Discrete components (chip level), Current sensor modules, Residual current sensors</li> </ul>	<ul style="list-style-type: none"> <li>■ Temperature sensors especially for e-mobility applications (HV/EV)</li> <li>■ <math>\mu</math>-Pressure and temperature sensors for medical applications</li> </ul>	<ul style="list-style-type: none"> <li>■ Temperature sensors with extremely fast thermal response time especially for e-motor applications (coil &amp; hairpin)</li> </ul>	<ul style="list-style-type: none"> <li>■ Optical response similar to human eyes, High resolution, Programmable integration time, Night vision, Rain sensor, Dashboard Lighting control, Touch sensor, Gesture detection, Driving monitoring, Flood illumination In-Cabin Sensor</li> </ul>	<ul style="list-style-type: none"> <li>■ MEMS Motion Sensors for Automotive Applications: Grade 1 6-axis Motion Tracking device for safety and Grade2 3-axis accelerometer with ASIL-B and ASIL-D rating. Programmable interrupts, a 4096-byte FIFO, programmable gyroscope, on-chip 16-bit ADCs</li> </ul>	<ul style="list-style-type: none"> <li>■ HVAC out-cabin air quality (Prevents toxic/ unpleasant gases in traffic) HVAC energy management (dewpoint detection, Windshield Antifogging) Battery condition monitoring (thermal runaway) In-cabin air quality (Detect particles and odors in-and outside cabin)</li> </ul>
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# ACOUSTICS

Applications & Features



## TELEMATICS ACOUSTICAL FEEDBACK

Qinlong, Universal

## INFO PANEL ACOUSTICAL AND HAPTICAL TOUCH FEEDBACK

Qinlong, Universal, Baolong

## E-CALL SYSTEM

Vansonic, BSE

## REVERSE DRIVE WARNING

Qinlong, Universal

## REAR FLAP & SLIDE DOOR WARNING

Vansonic, Qinlong, Universal

## PARK DISTANCE CONTROL

Vansonic, Qinlong, Universal

## DRIVER WARNING SIGNAL (FUEL, OIL, LIGHT, SAFETY BELT, ETC.)

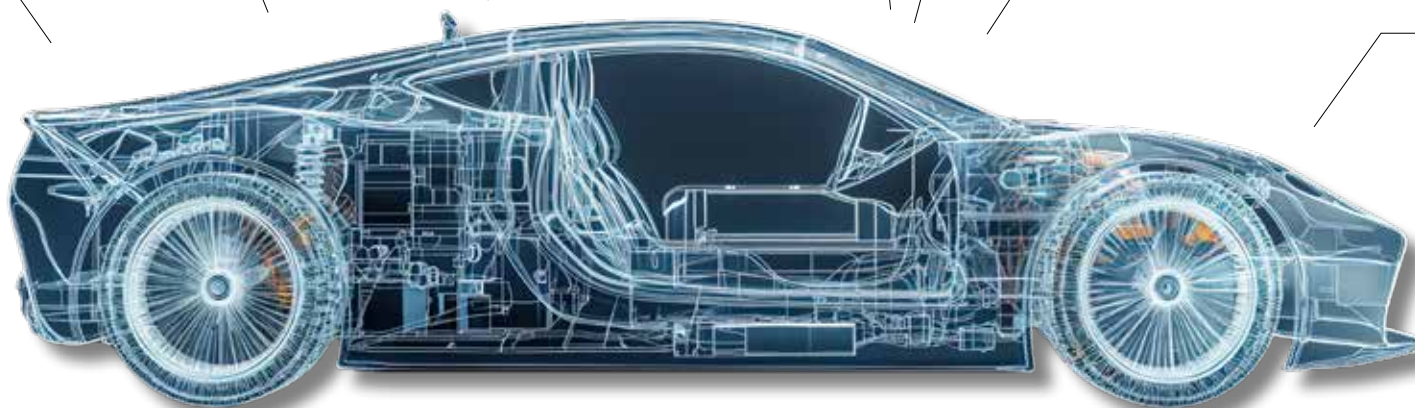
Vansonic, Qinlong, Universal

## RADAR DISTANCE CONTROL ALARM

Vansonic, Qinlong, Universal

## AVAS

Qinlong



Dynamic Speakers



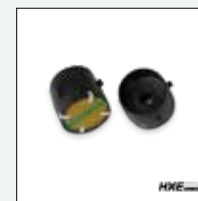
Vibration Motor



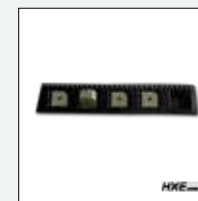
Electret Condenser Microphones



Dynamic Speakers



Piezo Buzzers & Transducers



Electro Buzzers & Transducers

## ACOUSTICS

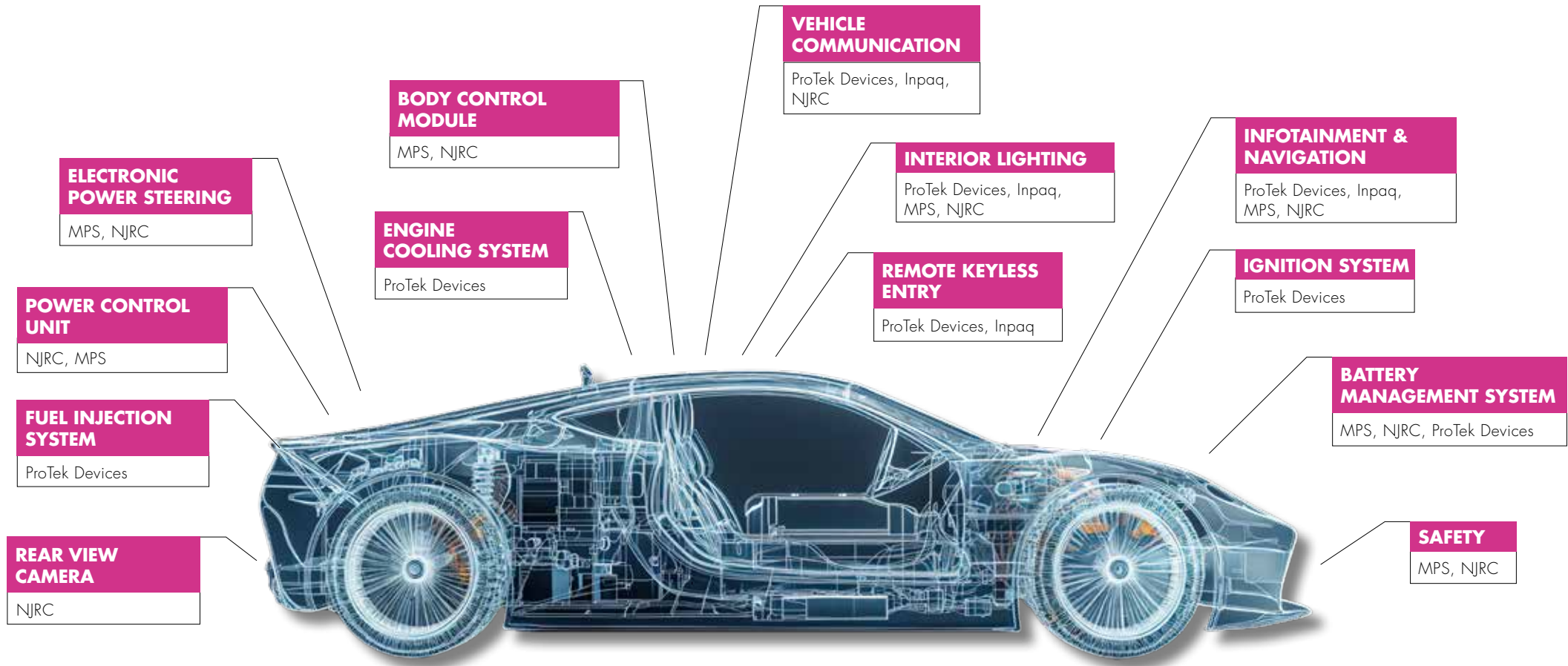
Piezoel. Transducer		■	■		
Piezoel. Buzzer		■	■		
Piezoel. Speaker		■	■		
Piezoel. Element		■	■		
E-magn. Transducer		■	■		
E-magn Buzzer		■	■		
Dyn. Speakers	■	■	■		
AVAS		■			
Exciter		■			
SMD microphones	■		■		■
Standard micro.	■		■		■
MEMS microphones			■		■
Coin vib. Motors				■	
Cylinder vib. Motors				■	
SMD vib. Motors				■	
Linear vib. Motors				■	

## KEY FEATURES

<ul style="list-style-type: none"> <li>■ Reliable dynamic loudspeaker technology</li> <li>■ Competitive price</li> <li>■ SMD reflowable</li> <li>■ Flame retardant plastics</li> <li>■ High acoustics performance</li> <li>■ Different connection versions</li> <li>■ Customised solutions</li> <li>■ Optional housing</li> <li>■ ESD packaging</li> </ul>	<ul style="list-style-type: none"> <li>■ Reliable dynamic loudspeaker technology</li> <li>■ Reliable solid state of sounder (piezo and magnetic) technology</li> <li>■ Very Competitive price</li> <li>■ SMD reflowable</li> <li>■ Flame retardant plastics</li> <li>■ High acoustics performance</li> <li>■ Different connection versions</li> <li>■ Customised solutions</li> <li>■ Optional housing</li> <li>■ ESD packaging</li> </ul>	<ul style="list-style-type: none"> <li>■ Reliable dynamic loudspeaker technology</li> <li>■ Reliable solid state of sounder (piezo and magnetic) technology</li> <li>■ Very Competitive price</li> <li>■ SMD reflowable</li> <li>■ Flame retardant plastics</li> <li>■ High acoustics performance</li> <li>■ Different connection versions</li> <li>■ Customised solutions</li> <li>■ Optional housing</li> <li>■ High performance in automatic production lines</li> <li>■ ESD packaging</li> </ul>	<ul style="list-style-type: none"> <li>■ Reliable vibrations motor technology</li> <li>■ Very Competitive price</li> <li>■ SMD reflowable</li> <li>■ High diversity in SMD motors</li> <li>■ High vibration performance</li> <li>■ Different connection versions</li> <li>■ Customised solutions</li> <li>■ Customised packagings</li> </ul>	<ul style="list-style-type: none"> <li>■ Reliable microphone technology</li> <li>■ Very Competitive price</li> <li>■ SMD reflowable</li> <li>■ High performance microphones</li> <li>■ Different connection versions</li> <li>■ Customised solutions</li> </ul>
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# ACTIVE COMPONENTS

Applications & Features



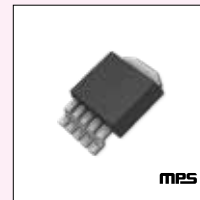
ESD Guard™



Load Dump Protection



Motor Driver IC



LDO



Video IC



TVS Array

**ANALOG ICs**

Analog switches	■	■		
Audio ICs	■	■		
Communication ICs		■		
GaAs MMICs		■		
LED drivers	■	■		
Motor ICs	■	■		
Operational amplifiers		■		
Power supply ICs	■	■		
Video ICs		■		

**DIGITAL & OVERVOLTAGE PROTECTION**

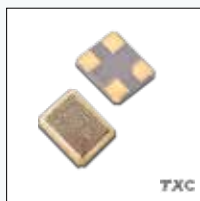
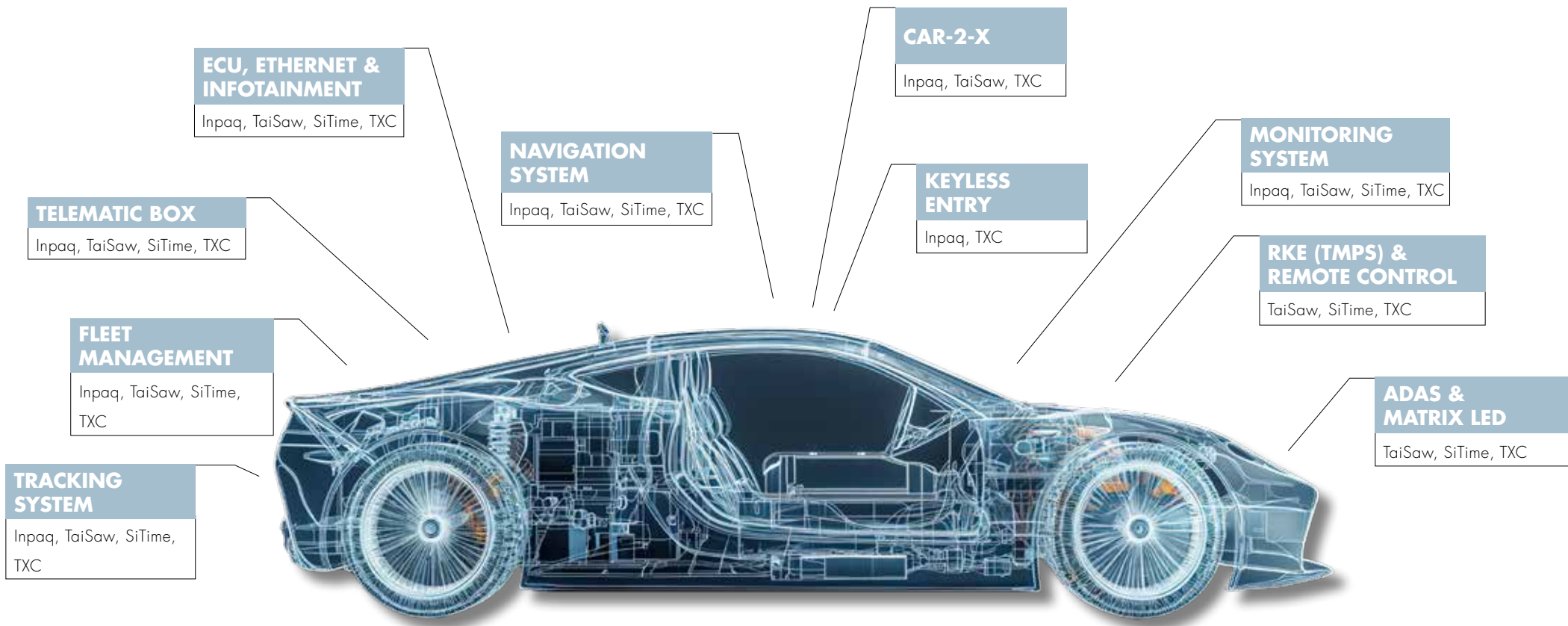
TVS diode / arrays			■	
FLASH Memory				■
MCU				■

**KEY FEATURES**

	<ul style="list-style-type: none"> <li>■ Long availability</li> </ul>	<ul style="list-style-type: none"> <li>■ Long availability</li> <li>■ Customer made product</li> <li>■ Possible customer adaption</li> </ul>	<ul style="list-style-type: none"> <li>■ Customized solutions possible</li> <li>■ Biggest AEC-Q101 qualified TVS solutions product portfolio</li> <li>■ Compact sizes</li> <li>■ Low capacitance devices for data lines</li> <li>■ High powered solutions for power lines</li> </ul>	<ul style="list-style-type: none"> <li>■ Compact sizes</li> <li>■ Long Availability</li> <li>■ Direct technical support</li> </ul>
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# FREQUENCY & RADIO COMPONENTS

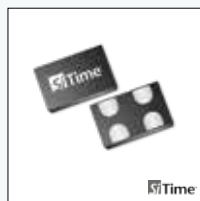
Applications & Features



Quartz Crystal



Patch Antenna



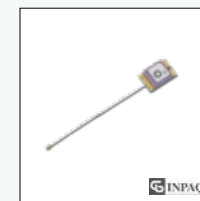
MEMS Oscillator



Chip Antenna



Filter



Active Antenna



### QUARTZ

Quartz crystals (MHz) / (kHz)		■		■
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### OSCILLATORS

Oscillators (MHz) / (kHz)	■	■		■
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### FILTERS

SAW / BAW / MCF filters		■		
Dielectric filters		■		
Diplexer / duplexer / FEM		■		

### ANTENNAS

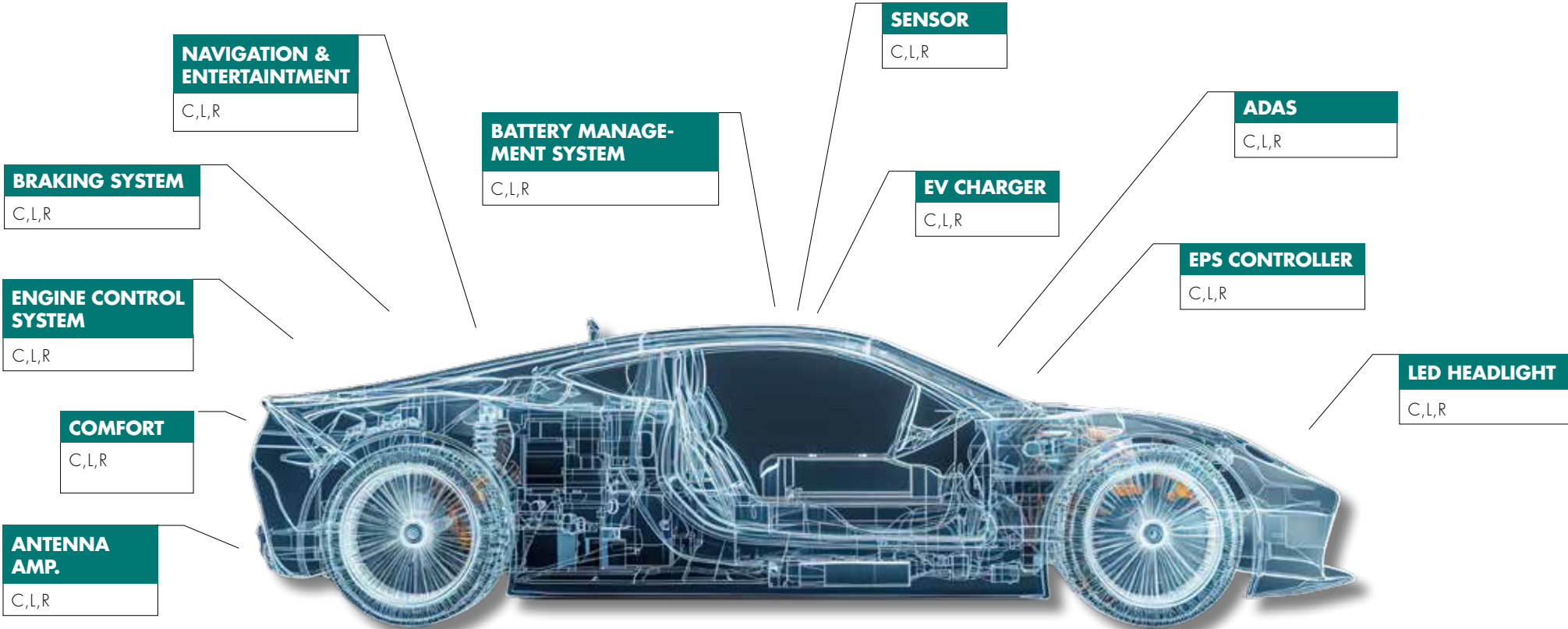
Antennas f. ISM Band, WiFi™, Bluetooth®			■	
Antennas f. GPS/GNSS, LTE/5G			■	
Antennas for UWB, NFC			■	

### KEY FEATURES

	<ul style="list-style-type: none"> <li>MEMS Oscillators, any frequency between 1 to 900MHz</li> <li>±20 ppm frequency stability from -55 °C to 125 °C</li> <li>Programmable spread spectrum</li> <li>Best shock (10,000g) &amp; vibration (70g) resistance</li> <li>Highest reliability at over 1 billion hours MTBF (&lt; 1 FIT)</li> </ul>	<ul style="list-style-type: none"> <li>Complete product portfolio on Crystal, Crystal-Oscillator and RF-Filter</li> <li>Enhanced reliability in the range of -40 °C to +125 °C</li> <li>Simulation, matching, analysis support</li> <li>IC matching information / recommendation for chip set</li> <li>10% global share on CSP SAW Filter</li> </ul>	<ul style="list-style-type: none"> <li>High performance and excellent quality</li> <li>Customized designs and solutions</li> <li>High product variety (patch antennas, chip antennas, active antennas, dipole antennas, LDS/LAP)</li> <li>Small sizes (to 6x6mm) and low profiles (to 2mm)</li> <li>Fine tuned antennas</li> <li>High gain patch antennas for GNSS</li> </ul>	<ul style="list-style-type: none"> <li>Global Ranking No.3 in Automotive Timing Market</li> <li>Enhanced reliability in automotive grade 0 (-40 °C to +150 °C)</li> <li>Timing Industry Leader in Product Minaturization</li> <li>Simulation, matching, analysis support</li> <li>IC matching information / extensive reference designs with major IC manufacturers</li> </ul>
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# PASSIVE COMPONENTS

Applications & Features



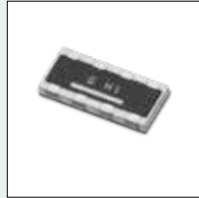
SMD Power Inductor



High Current Inductor



Hybrid Capacitor



Precision Resistor Network



Shunt Resistor



SMD Capacitor

**CAPACITORS (C)**

Electrolytic				■	
Hybrid				■	
MLCC					■

**INDUCTIVE COMPONENTS (L)**

Ferrite beads				■	
RF chokes		■		■	
Power chokes		■		■	
EMI / EMC chokes		■			
LTCC					■

**CHIP RESISTORS (R)**

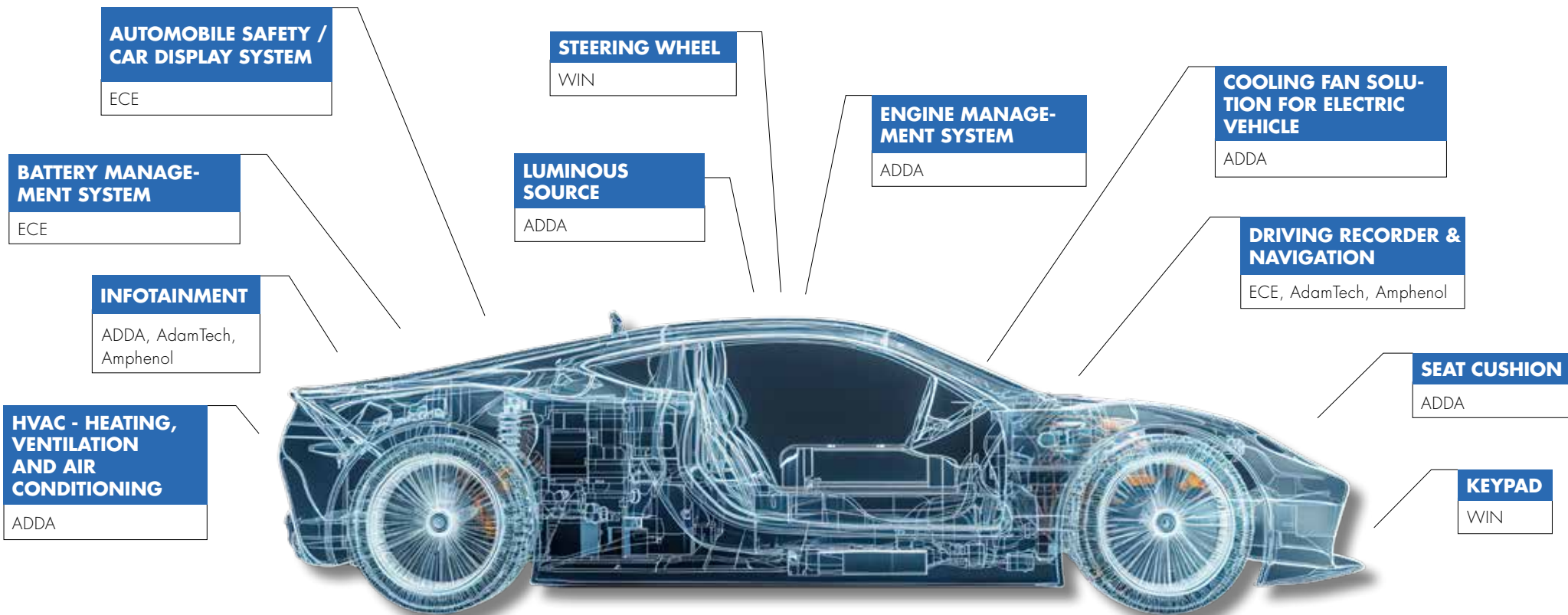
Thin Film	■				■
Thick Film					■
Shunt	■				■
Specialty / others	■				■

**KEY FEATURES**

<ul style="list-style-type: none"> <li>■ Precision resistors: best accuracy and long term stability for demanding applications</li> <li>■ Network resistors: widest ratio with best accuracy and stability. Full customization possible</li> <li>■ Shunt resistors: highest power rating with long side terminals, best compatibility with short side terminals, low TCR, tight tolerance, great reliability</li> </ul>	<ul style="list-style-type: none"> <li>■ Ferrite core: non-shielded semi shielded &amp; shielded types</li> <li>■ Iron/Metal alloy core: low profile, high current power inductors</li> <li>■ Common mode chokes for power line as well as signal line Can Bus, Can-FD, Ethernet, 100Base-T1, PoC and other interfaces</li> <li>■ Ceramic core: wire wound chip inductor for RF-circuits</li> </ul>	<ul style="list-style-type: none"> <li>■ Chip Ferrite Beads for standard/high power/high speed application</li> <li>■ Chip type power inductor with metal alloy core and wire wound spring coil</li> <li>■ Iron/Metal alloy core: low profile, high current power inductors</li> <li>■ Ceramic RF inductors (Multilayer)</li> </ul>	<ul style="list-style-type: none"> <li>■ Aluminum electrolytic Capacitors with various features for low ESR, high ripple, long lifetime, high temperature range up to +150deg.C., anti-vibration</li> <li>■ Hybrid Polymer Capacitors with various features for very low ESR, very high ripple, long lifetime, high temperature range up to +150deg.C., anti-vibration, reverse voltage proof</li> <li>■ All made in Japan</li> </ul>	<ul style="list-style-type: none"> <li>■ Offering a comprehensive range of resistors, capacitors, and inductors, Walsin provides reliable solutions for automotive electronics. With state-of-the-art manufacturing technology and rigorous quality control, Walsin sets the standard in the electronics industry.</li> </ul>
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# ELECTROMECHANICS

Applications & Features



Relay



Micro Switch



Radial Fan



Silicone Keypad



Micro Switch



Axial Fan



### AIR MOVERS

Axial and radial fans	■				
DC	■				

### SWITCHES / KEYPADS

Tactile switches		■			
Push-button switches		■			
Silicone keypads & membrane keyboards			■		
Relays		■			
Micro switches		■			

### CONNECTORS

Data		■			
Power		■			
Fakra				■	■

### KEY FEATURES

<ul style="list-style-type: none"> <li>■ Technical skill of window person and regularly personal support / visits</li> <li>■ Quick response</li> <li>■ Large product range</li> <li>■ Modular construction system</li> <li>■ MOQ = 500 pcs</li> <li>■ Thermal simulation</li> <li>■ Fan &amp; Heatsink</li> <li>■ Tailor-made solution &gt; 50,000 pcs</li> </ul>	<ul style="list-style-type: none"> <li>■ Wide variety of products</li> <li>■ Vertical integration</li> <li>■ Production capability</li> <li>■ Engineering soul</li> <li>■ Quality assurance</li> </ul>	<ul style="list-style-type: none"> <li>■ Mold making: Design, Production</li> <li>■ Rubber: Screen printing, Laser etching, Epoxy coating</li> <li>■ Switches / Membranes / Touch panels: Cutting, Assembly, Printing / Etching</li> <li>■ Plastic injection: Screen printing, Electroplating, Spraying</li> <li>■ Customized application solution possible (plastic housing + switches etc.)</li> </ul>	<ul style="list-style-type: none"> <li>■ Ruggedized housing with audible locking mechanism</li> <li>■ 14 different mechanical and visual key codes</li> <li>■ Minimum of 25 mating cycles</li> <li>■ Reliable electrical performance up to 6 GHz</li> <li>■ Available in a variety of PCB and cable-mount configuration</li> <li>■ Stamped &amp; formed construction for fully automated cable termination</li> <li>■ FAKRA 2 compatible with enhanced TPA functionality</li> <li>■ Mechanical pull to 90N min.</li> <li>■ Chamber compatible per FAKRA 2 specification</li> <li>■ Connector housings are removable for field replacement</li> </ul>
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# AUTOMOTIVE GRADE PRODUCTS

## SENSORS

- Switches Hall
- Linear Hall
- Direct angle Hall
- NTC SMD
- NTC leaded
- PTC leaded
- NTC film types
- NTC thermistor probes
- PTC thermistor probes
- Assembled sensors

## PASSIVE COMPONENTS

- Electrolytic capacitors
- Hybrid capacitors
- Power capacitors
- Ferrite beads
- RF chokes
- Power chokes
- EMI / EMC chokes
- Precision chipresitors
- Low ohm chipresitors
- Special / others chipresitors

## ACTIVE COMPONENTS

- Analog switches
- Audio ICs
- Communication ICs
- GaAs MMICs
- LED drivers
- Motor ICs
- Operational amplifiers
- Power supply ICs
- Video ICs
- TVS diode- / arrays
- Multilayer varistors
- ESD suppressors

## ELECTROMECHANICS

- Axial and radial fans air movers
- DC air movers
- Tactile switches
- Push-button switches
- Silicone keypads & membrane keyboards
- Relays
- Micro switches
- Data connectors
- Power connectors
- Fakra

## FREQUENCY & RADIO COMPONENTS

- Quartz crystals
- Oscillators
- SAW / BAW / MCF filters
- Dielectric filters
- Diplexer / duplexer / FEM
- GPS / GNSS modules
- Antennas f. ISM Band, WiFi™, Bluetooth®
- Antennas f. GPS/ GNSS, GSM/UMTS/LTE
- Antennas f. car2car communication
- NFC

## ACOUSTICS






- Piezo buzzers & transducers
- Electro buzzers & transducers
- Dynamic speakers
- Electret condenser microphones
- Vibration motors

# MANUFACTURER OVERVIEW

## SENSORS

						
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## ACOUSTICS

				
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## ACTIVE COMPONENTS

			
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## FREQUENCY & RADIO COMPONENTS

			
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## PASSIVE COMPONENTS

				
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## ELECTROMECHANICS

				
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## OFFICES IN EUROPE

Germany  
Nagold (Headquaters)  
Austria & Slovenia  
Switzerland  
France

Spain  
Italy  
Hungary  
Romania  
Bulgaria



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