We are part of the future car

Elmos develops, produces and markets semiconductors and sensors. For over 30 years, Elmos innovations have been bringing new functions to life and making mobility safer, more comfortable and more energy efficient. Our components, so-called integrated circuits (ICs), offer the right solutions to meet the challenges of the global megatrends:

- Autonomous driving
- Electromobility/CO2 reduction
- Safety, connectivity and comfort

Our ICs bring innovation to the customer’s system. That is our claim. We are among the world’s most experienced suppliers of customer specific semiconductors for the automotive industry. Our self-defined, application specific ICs are on the cutting edge. More than 350 satisfied customers all over the world are convinced by our innovativeness and quality.

Elmos has expanded its international presence. With locations all over the world, we are represented in all key markets and always close to the customer. Our business model encompasses the entire process of a semiconductor: highly specialized teams create ideas and develop, produce and market the electronic components that make the difference. We provide our customers with innovation for the future car.

- Highly specialised research and development team
- International customer support
- Worldwide production and distribution network

Tailor-made: Perfect fitting ASICs

The ASIC (Application Specific Integrated Circuit) is a chip, which in particular has been manufactured for the customer. The advantage: its know how stays protected and the special chip is tailor-made for the use in the application.

The creative design engineers begin the tasks that are needed to construct a new chip very systematically indeed. To begin with, the customer has his vision of what he wants. In some cases, this actual idea can already take on a very concrete form, it can also be the starting point for comprehensive system consultation. After all, advising the customer is one of the main tasks belonging to the Elmos sales and design engineers. They advise the customer on the optimal technical solution. All those involved fall back on long-standing experience in electronic know-how.

Best possible system integration, which means creating a higher functionality whilst simultaneously reducing the complexity at system level, is the target of the work. System knowledge combined with expertise and the optimal choice of possible integration strategies are prerequisites for success. Elmos has more than 30 years experience in developing and producing ASICs for the automotive and industry sector. Our design teams are experts in following application fields:

- Bus Systems / Network Products
- DC/DC Converter / Power Products
- I/O ICs
- Transponder
- Actuator Driver
- Motor Control
- Sensors
- ... and other applications requiring a smart mixed-signal semiconductor solution.

Regardless of which solution you prefer, may it be an ASIC or an ASSP, Elmos always offers you the perfect fitting semiconductor for your applications and needs.
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### Sensors - Ultrasonic

#### IO pt-to-pt Interface

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V&lt;sub&gt;Supply&lt;/sub&gt;</th>
<th>Transducer frequency</th>
<th>Architecture</th>
<th>Transducer driver type / output</th>
<th>Measurable Distance*</th>
<th>Interface</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E524.02 Digital Ultrasonic Transducer Driver and Signal Processor</td>
<td>7V to 18V</td>
<td>40kHz to 58kHz</td>
<td>pt-to-pt</td>
<td>transformer / 108mA to 310mA</td>
<td>20cm - 400cm</td>
<td>proprietary bidirectional IO (2-wire)</td>
<td>QFN20L4</td>
<td>▪ For new designs E524.08 is recommended</td>
</tr>
<tr>
<td>E524.03 Digital Ultrasonic Transducer Driver and Signal Processor</td>
<td>7V to 18V</td>
<td>40kHz to 58kHz</td>
<td>pt-to-pt</td>
<td>transformer / 108mA to 310mA</td>
<td>20cm - 400cm</td>
<td>proprietary bidirectional IO (2-wire)</td>
<td>QFN20L4</td>
<td>▪ For new designs E524.09 is recommended</td>
</tr>
<tr>
<td>E524.05 Direct Drive Ultrasonic Sensor IC</td>
<td>7V to 18V</td>
<td>38kHz to 72kHz</td>
<td>pt-to-pt</td>
<td>direct drive / 8V to 14.5V</td>
<td>25cm - 250cm</td>
<td>proprietary bidirectional IO (2-wire)</td>
<td>QFN20L4</td>
<td>▪ Significant reduction of system costs and size</td>
</tr>
<tr>
<td>E524.06 Direct Drive Ultrasonic Sensor IC</td>
<td>7V to 18V</td>
<td>38kHz to 72kHz</td>
<td>pt-to-pt</td>
<td>direct drive / 8V to 14.5V</td>
<td>25cm - 250cm</td>
<td>proprietary bidirectional IO (3-wire)</td>
<td>QFN20L4</td>
<td>▪ Significant reduction of system costs and size</td>
</tr>
<tr>
<td>E524.07 Direct Drive Ultrasonic Sensor IC</td>
<td>7V to 18V</td>
<td>38kHz to 72kHz</td>
<td>external µC</td>
<td>direct drive / 8V to 14.5V</td>
<td>25cm - 250cm</td>
<td>EUSART (2-wire)</td>
<td>QFN20L4</td>
<td>▪ Significant reduction of system costs and size</td>
</tr>
<tr>
<td>E524.08 2&lt;sup&gt;nd&lt;/sup&gt; Generation Ultrasonic Transducer Driver and Signal Processor</td>
<td>6V to 18V</td>
<td>30kHz to 83kHz</td>
<td>pt-to-pt</td>
<td>transformer / 168mA to 354mA</td>
<td>10cm - 600cm</td>
<td>proprietary bidirectional IO (2-wire)</td>
<td>QFN20L4</td>
<td>▪ Excellent short and long range performance</td>
</tr>
<tr>
<td>E524.09 2&lt;sup&gt;nd&lt;/sup&gt; Generation Ultrasonic Transducer Driver and Signal Processor</td>
<td>6V to 18V</td>
<td>30kHz to 83kHz</td>
<td>pt-to-pt</td>
<td>transformer / 168mA to 354mA</td>
<td>10cm - 600cm</td>
<td>proprietary bidirectional IO (3-wire)</td>
<td>QFN20L4</td>
<td>▪ Excellent short and long range performance</td>
</tr>
<tr>
<td>E524.32 High Voltage Direct Drive Ultrasonic Sensor IC</td>
<td>6V to 18V</td>
<td>30kHz to 83kHz</td>
<td>pt-to-pt</td>
<td>direct drive</td>
<td>10cm - 400cm</td>
<td>proprietary bidirectional IO (2-wire)</td>
<td>QFN20L4</td>
<td>▪ Best measurement performance without transformer</td>
</tr>
<tr>
<td>E524.33/34/35 High Voltage Direct Drive Ultrasonic Sensor IC</td>
<td>6V to 18V</td>
<td>30kHz to 83kHz</td>
<td>pt-to-pt</td>
<td>direct drive</td>
<td>10cm - 400cm</td>
<td>proprietary bidirectional IO (3-wire)</td>
<td>QFN20L4</td>
<td>▪ Best measurement performance without transformer</td>
</tr>
</tbody>
</table>

*Reachable detection range for a standard pole (75mm diameter, 1m height).
Overall system performance depends on external components (transducer, transformer, PCB layout, …) and environmental conditions (supply voltage, noise, ambient temperature, …)
## LIN Bus (or pt-to-pt) Interface

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>Interface</th>
<th>$V_{\text{SUPPLY}}$</th>
<th>$I_q$ (µA)</th>
<th>VDD</th>
<th>ESD (kV)</th>
<th>Bitrate</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>E521.50 Master IC</td>
<td>IO / LIN</td>
<td>5V to 28V</td>
<td>17</td>
<td>-</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
<td>TSSOP16</td>
</tr>
</tbody>
</table>
Direct Drive Ultrasonic Sensor IC | E524.05/06

**Key Features**
- Supports directly driven ultrasonic transducers
- Optimized short & long range performance due to:
  - Active and passive damping mechanisms
  - Sensitivity time control
- Programmable driver voltage and receiver sensitivity
- One wire I/O interface for programming and communication
- Configurable static and automatic thresholds
  - E524.05: 2-wire Interface
  - E524.06: 3-wire Interface

**Applications**
- Ultrasonic park assist (USPA/PAS/UPA)
- Industrial distance measurement

---

Direct Drive Ultrasonic Sensor IC | E524.07

**Key Features**
- Supports directly driven transducers
- Optimized short & long range performance due to:
  - Active and passive damping mechanisms
  - Sensitivity time control
- Programmable driver voltage and receiver sensitivity
- Control and signal processing via external controller
  - 2 wire EUSART Interface (3.3V)

**Applications**
- Ultrasonic park assist systems (USPA/PAS/UPA)
- Industrial distance measurement
- Robotics

---

**Application Diagram**

- ECU
- Ultrasonic Module
- Ultrasonic Transducer
- External µC Interface

---

**Application Diagram**

- ECU
- Sensor Module
- External µC
- EUSART Interface

---

**Order No. see page 28**
**2nd Gen. Ultrasonic Transducer Driver and Signal Processor | E524.08/09**

**Key Features**
- Drives ultrasonic transducer via center-tapped transformer
- Excellent short & long range performance due to:
  - Wide signal gain range / Sensitivity time control / Static and automatic thresholds / Near-field threshold / Echo peak detection / Fast time constant algorithm
- Advanced IO protocol with configurable measurement profiles
- IC and transducer diagnosis information
- E524.08: 2-wire Interface
- E524.09: 3-wire Interface

**Applications**
- Ultrasonic park assist (USPA/PDS/UPA)
- Automatic parking (SPAS/APA)
- Advanced driver assistance systems (ADAS)
- Industrial distance measurement

**Application Diagram**

**High Voltage Direct Drive Ultrasonic Sensor IC | E524.32/33/34/35**

**Key Features**
- Supports directly driven transducers
- Best measurement performance due to:
  - Smart damping algorithm / Two static and one automatic thresholds / Near field detection / Noise suppression
- High robustness and diagnostics
- Transducer diagnosis information / Temperature sensor
- Advanced IO protocol with configurable measurement profiles
- E524.32: 2-wire Interface | E524.33: 3-wire Interface | E524.34: 3-wire Interface 3.3V | E524.35: 3-wire Interface 5.0V

**Applications**
- Ultrasonic park assist systems (USPA, PAS, ...)
- Advanced driver assistance systems (ADAS)
- Distance and level metering

**Application Diagram**
LIN Smart Ultrasonic Parking Assist (FLASH) | E524.14/24

**Key Features**
- Drives ultrasonic transducer via center-tapped transformer
- Good measurement performance due to flexible software
- IC and transducer diagnosis information
- Embedded 8bit microcontroller with 8KByte FLASH or ROM / 512Byte SRAM / 128Byte EEPROM
- LIN 2.2 Interface with slave node position detection (SNPD) and alternative pin-coding capabilities
- E524.14: User programmable Flash memory
- E524.24: Ready-to-use and flexible standard software (Rom)

**Applications**
- Ultrasonic park assist systems (USPA, PAS, ...)
- Advanced driver assistance systems (ADAS)
- Distance and level metering

**Board**
- Order No. see page 28

**Applications**
- Ultrasonic park assist systems (USPA, PAS, ...)
- Advanced driver assistance systems (ADAS)
- Distance and level metering

**Application Diagram**

---

Direct Drive Smart LIN Ultrasonic Sensor IC | E524.16

**Key Features**
- Supports directly driven transducers
- Best measurement performance due to:
  - Static and automatic thresholds / Near-field detection / Noise suppression
- IC and transducer diagnosis information
- Embedded 8bit microcontroller with 16KByte OTP / 1024Byte SRAM / 256Byte EEPROM
- LIN 2.2 Interface with slave node position detection (SNPD)
- 4 High-voltage GPIOs for ECU less parking systems

**Applications**
- Ultrasonic park assist systems (USPA, PAS, ...)
- Advanced driver assistance systems (ADAS)
- Distance and level metering

**Packages**
- QFN20L5

**Application Diagram**

---
Sensors - Ultrasonic, Product Portfolio

**IO pt-to-pt Interface**
- Proprietary interface
- Optimized state machine
- Most signal conditioning in Park-ECU

**lin BUS (or pt-to-pt) Interface**
- LIN Bus-System, less wiring
- Flexible controller solution
- Signal pre-conditioning in sensor
- Potentially without Park-ECU or ECU-less

**E524.08/09**
Transformer Drive 2nd Gen. with advanced IO Interface (10cm – 600cm)

**E524.02/03**
Transformer Drive 1st Gen. with IO Interface (20cm – 400cm)

**E524.05/06/07**
Direct Drive 1st Gen. with IO Interface (25cm – 250cm)

**E524.32/33/34/35**
Direct Drive 2nd Gen. with advanced IO Interface (10cm – 400cm)

**E524.14/24**
Smart Transformer Drive 1st Gen. with LIN Interface and 8bit Controller (FLASH and ROM versions) (15cm – 500cm)

**E524.16**
Smart Direct Drive 1st Gen. with LIN Interface and 8bit Controller (10cm – 300cm)

**E521.50**
Master IC 4 LIN Transceiver for LIN and IO Systems

E521.50
Master IC
4 LIN Transceiver for LIN and IO Systems
## Sensors - SSP: Sensor Signal Processor for Resistive Bridges

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>$V_{\text{SUPPLY}}$</th>
<th>Output</th>
<th>Range</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.42 Automotive SSP with Analog or Sent Output - Gen. 2</td>
<td>5V ±0.5V</td>
<td>Analog: Ratio metric to $V_{\text{SUPPLY}}$ (10-90%) Digital: SENT interface</td>
<td>Sensor Sensitivity 1mV/V to 50mV/V</td>
<td>QFN20L5 Bare-Die</td>
<td>▪ Automotive protection +40/-28V ▪ Very low noise front-end ▪ Trimmable input low-pass filter ▪ Comprehensive self diagnostics ▪ SENT interface (SAE J2716, Jan 2010)</td>
</tr>
<tr>
<td>E520.45 Sensor Signal Processor with SENT and T-Channel</td>
<td>5V ±0.5V</td>
<td>Digital: SENT interface</td>
<td>Sensor Sensitivity 5 mV/V to 50 mV/V</td>
<td>QFN20L5 Bare-Die</td>
<td>▪ Automotive protection ±18V ▪ Low current consumption: 3mA ▪ Trimmable input low-pass filter ▪ Dedicated NTC linearization programmable ▪ Comprehensive self diagnostics ▪ SENT interface (SAE J2716, Jan 2010)</td>
</tr>
<tr>
<td>E703.11 Sensor Signal Processor for High Precision Applications</td>
<td>2.7 V to 5.5V</td>
<td>SPI or I2C with CRC, Analog voltage, PWM or FM, End of Conversion/Alarm</td>
<td>Sensor Sensitivity 2 mV/V to 88mV/V</td>
<td>DFN14_3x4 Bare-Die</td>
<td>▪ Precision front end with two 16-bit ADC ▪ Configurable sample rate (2...50kS/s) and low pass filter (10Hz...8kHz) ▪ 6th order polynomial sensor correction ▪ Sleep mode available (I&lt;20µA)</td>
</tr>
</tbody>
</table>
Automotive SSP with Analog or SENT Output - Gen. 2 | E520.42

**Key Features**
- Very low noise front-end amplifier and ADC allows SNR > 70dB for inputs down to 1mV/V FS
- PGA configurable to 50mV/V FS and adjustable offset of ±150% FS
- Digital compensation of offset- and gain-drift and non-linearity up to 3rd order
- Analog voltage or digital SENT output (SAE J2716, JAN2010)
- Supply 5.0 ± 0.5V, over-voltage a. reverse polarity protection (28V)
- Single-wire programming interface

**Board**
- Order No. see page 28

**Applications**
- Exhaust systems
- Engine and transmission

**Application Diagram**

---

Sensor Signal Processor with SENT and T-Channel | E520.45

**Key Features**
- Low noise front-end optimized for MEMS resistive sensor bridges
- Sensitivity trimming for 5..50 mV/V full scale input and offset trim
- Media temperature sensing with external NTC and linearization of digital output
- SENT interface for pressure, pressure/secure, or pressure/temperature output data
- 5V-supply with over-voltage and reverse polarity protection (±18V)

**Board**
- Order No. see page 28

**Applications**
- Digital MAP / T-MAP sensors
- Exhaust systems
- Engine and transmission
- Automotive or industrial products using resistive sensor bridges

**Packages**
- QFN20L5
- Bare-Die

**Application Diagram**
Sensor Signal Processor for High Precision Applications | E703.11

Key Features
- High precision frontend
- PGA configurable to 2.88mV/V FS, offset adjustable to ±300% FS
- Output signal bandwidth widely configurable: (10Hz..8kHz), accuracy (10..15 ENOB) and sample rate (2..50kS/s)
- Ultra low latency: output update rate 2..50kS/s, DSP time<25µs
- 6th order polynomial sensor correction (16 coefficients)
- Temperature sources: chip, bridge and external (diode, NTC)

Applications
- High precision industrial pressure sensors
- Ultra low pressure OEM modules
- Automotive or industrial products using resistive sensor bridges

Board
- Order No. see page 28

Packages
- DFN14_3x4
- Bare-Die

Application Diagram
Precise and Fast Signal Conditioning
## Sensors - Optical IR Sensor (HALIOS®)

### Automotive

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V_{SUPPLY}</th>
<th>I_{q}</th>
<th>Sensitivity</th>
<th>Detection</th>
<th>Bandwidth</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
</table>
| E527.04 Rain and Light Sensor | 3.1V to 3.5V | 4.5mA (typical)* 8μA (sleep) | - | Rain Ambient Light | - | QFN20L4 | ▪ Rain Sensor Signal Processor  
▪ Logarithmic amplifier for ambient light measurements  
▪ SPI interface |
| E527.05 HALIOS® Rain and Light Sensor with LIN | 7.0V to 18V | 4.5mA (typical)* 8μA (sleep) | - | Rain Ambient Light | - | QFN44L7 | ▪ Logarithmic amplifier for ambient light measurements  
▪ SPI interface  
▪ 3.3V Voltage regulator, 100mA output current |
| E909.06 HALIOS® Multi Purpose Sensor for Automotive | 2.25V to 2.75V 3.3V (GPIO) | 2.5mA (typical) <50μA (stop mode) | - | Proximity 1..3 dimensional input devices Touch | - | QFN32L5 | ▪ Optical/capacitive sensor IC for gesture control and object detection  
▪ 5 LED drivers, 8x GPIO  
▪ 16 bit μC with flash  
▪ SPI-compatible, I²C Interface, LIN UART  
▪ Internal temp. compensation |
| E909.07 Transimpedance Amplifier with High Sensitivity | 3V to 3.5V | 3mA (typical) <1μA (sleep) 172dBOhm | 500kHz | QFN20L4 Bare-Die | ▪ Enlarges detection range of HALIOS® ICs E909.06  
▪ Limiting amplifier output  
▪ High resistive output stage |
| E909.21 HALIOS® Controller for Proximity and Gesture Recognition | 3V to 3.6V | 33mA (typical) | - | Proximity 1..3 dimensional input devices | - | QFN32L5 | ▪ 16 Bit μC with flash, SPI and I²C Interface  
▪ Two independent receiving channels  
▪ Real time measurement results for rapid gesture detection  
▪ 100mA LED output current |
| E909.22 HALIOS® Signal Conditioner for Proximity and Gesture Recognition | 2.2V to 3.6V | 18mA (active) 40μA (idle) 1.5μA (sleep) | - | Proximity 1..3 dimensional input devices | - | QFN20L4 | ▪ Companion chip for E909.21  
▪ Two independent receiving channels  
▪ Real time measurement results for rapid gesture detection  
▪ 100mA LED output current |

* Without LED current and photo diode current
<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>$V_{\text{Supply}}$</th>
<th>$I_q$</th>
<th>Sensitivity</th>
<th>Detection</th>
<th>Bandwidth</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E527.16 HALIOS® Gesture Switch</td>
<td>2.25V to 2.75V</td>
<td>3.5mA (typical)</td>
<td>-</td>
<td>Proximity Awareness</td>
<td>-</td>
<td>QFN32L5</td>
<td>▪ Advanced ready-to-use function</td>
</tr>
<tr>
<td></td>
<td>3.3V (periphery)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Implemented gesture recognition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ PWM-Output for innovative motion-controlled lighting application</td>
</tr>
<tr>
<td>E909.11 Ultra Low Power HALIOS®</td>
<td>2.2V to 3.6V</td>
<td>10µA (typical)</td>
<td>-</td>
<td>Proximity</td>
<td>-</td>
<td>QFN20L4 Bare-Die</td>
<td>▪ IC for gesture control solutions, proximity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5µA (idle)</td>
<td></td>
<td>1..3 dimensional</td>
<td></td>
<td></td>
<td>▪ and ambient light measurements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.4µA (sleep)</td>
<td></td>
<td>input devices</td>
<td></td>
<td></td>
<td>▪ Adaptive power saving control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ambient Light Measurement</td>
<td></td>
<td></td>
<td>▪ Self-calibration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ I2C Interface</td>
</tr>
</tbody>
</table>
Rain and Light Sensor | E527.04

**Key Features**
- Front end Optical Rain Sensor signal processor
- Four input channels for ambient light measurements
- High sensitivity, no total reflection needed
- Very high robustness against ambient influences like sun light, aging and dirt
- Two embedded LED drivers, driving up to 40mA
- Provides a rain drop signal via the WS pin • SPI interface
- Temperature sensor
- Extensive diagnosis during operation

**Applications**
- Optical Rain Sensor (wiping systems)
- Industrial camera and window systems
- Ambient Light Sensor (measurement) to control
  - Headlight, Head-up Displays, Air conditioning

**Packages**
- QFN20L4

**Application Diagram**

HALIOS® Rain and Light Sensor with LIN | E527.05

**Key Features**
- Rain Sensor with SBC functionality
- LIN Transceiver
- Configurable µC window watchdog
- High sensitivity, no total reflection needed
- Very high robustness against ambient influences like sun light, aging and dirt
- 2 embedded LED Drivers, no external drivers needed
- Supports functional safety (large number of diagnostic functions)

**Applications**
- Optical Rain Sensor (wiping systems)
  - Windshield, Security Cameras
- Ambient Light Sensor (measurement) to control
  - Headlight, Head-up Displays, Air Conditioning
- Pollution Sensor

**Packages**
- QFN44L7

**Application Diagram**

Elmos Product Catalog | 2018/2019
HALIOS® Multi Purpose Sensor for Automotive | E909.06

Key Features
- Optical/capacitive sensor IC for gesture control and object detection
- Controls up to 4 LED sending channels
- 16Bit µC with up to 60k FLASH
- SPI, I²C and LIN-SCI Interfaces
- Standard Firmware implemented
- Scaleable IR based HMI platforms
- Automotive qualified (AEC-Q100)

Applications
- Proximity & gesture recognition
- HMI for infotainment
- Superior User Experience for touch screen displays

Application Diagram

Transimpedance Amplifier with High Sensitivity | E909.07

Key Features
- Increases proximity range of E909.06 by factor 5
- Limiting amplifier output
- High resistive output stage
- No current consumption in standby mode

Applications
- Optical receivers
- Transimpedance amplifiers
- Multiplex function for channel expander of chip set

Application Diagram
HALIOS® Controller for Proximity and Gesture Recognition | E909.21

Key Features
- 4 LED Sending Channels, 100mA per channel
- 2 Receiving Channels
- 1 Compensator Channel
- Scalable HALIOS® frequency up to 1MHz
- 16 bit Harvard Architecture H430 CPU
- 32k Byte Flash
- 4k Byte SRAM and 8k Byte SysROM
- Automotive qualified (AEC-Q100)

Board
- Order No. see page 29

Applications
- HMI for infotainment (gesture detection, proximity detection)
- Driver and passenger detection
- Touchless control in harsh environments (e.g. explosion protected areas)

Application Diagram

HALIOS® Signal Conditioner f. Proximity a. Gesture Recognition | E909.22

Key Features
- Patented HALIOS® control loop
- 4 LED Sending Channels, 100mA per channel
- 2 Receiving Channels
- 1 Compensator Channel
- Scalable HALIOS® frequency up to 1MHz
- SSI serial sensor interface
- Ambient light immunity up to 200,000 lux
- Temperature Range -40°C to +85°C
- Automotive qualified (AEC-Q100)

Applications
- Proximity a. gesture recognition for automotive touch displays
- Driver and passenger detection
- Wake-up function for displays
- Touchless control in harsh environments (e.g. explosion protected areas)

Application Diagram
HALIOS® Gesture Switch | E527.16

**Key Features**
- Ready-to-use functions
- Implemented gesture recognition
- Detection approx. 25cm
- Direct light control possible
- PWM-Output (125 Hz, 8 Bit)
- Reference schematics and reference layout are available

**Applications**
- Innovative motion controlled light
- Optical push buttons and controls
- Wake-up function for saving energy
- Pre-selection to simplify menu structures

**Application Diagram**

---

Ultra Low Power HALIOS® | E909.11

**Key Features**
- Lowest stand by current of 0.4μA
- Up to 1MHz HALIOS® frequency
- Controls up to 3 LED sending channels
- Ambient Light Measurement
- High Speed 3.4MHz I²C Interface
- New electro-optical basic coupling implemented
- Standard Firmware implemented
- Minimal external components

**Applications**
- High performance proximity detection up to 50cm
- Fast and reliable 3D gesture control solution for mobile and industrial devices

**Application Diagram**
Sensors - Smoke Detector Controller

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>$V_{\text{SUPPLY}}$</th>
<th>Protection</th>
<th>$I_{\text{SUPPLY}}$</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
</table>
| E520.24 Universal Smoke Detector Controller | 8V to 50V            | 60V        | Configurable: Down to 90μA | SOIC16 Bare-Die  | - For network addressable, optical smoke detectors
|                        |                     |            |                     |                  | - 1.5 to 45nA photo current input range                   |
|                        |                     |            |                     |                  | - 8bit μC with 4kByte or 8kByte, 128Byte RAM              |
|                        |                     |            |                     |                  | - Configurable/programmable loop interface                |
Universal Smoke Detector Controller | E520.24

Key Features
- 2-Wire bus operation with 8V to 50V supply, low supply current down to 90µA
- Embedded 8-bit µC with 4kByte or 8kByte Instruction Memory and 128Byte RAM
- 48Byte MTP with 32Byte uncommitted for configuration data + 16 Byte for device ID and calibration
- 2 configurable 420mA LED driver
- Photo current input range (1.5...45)nA
- Thermistor input

Applications
- Simplifies design of addressable smoke detectors required by legislation
- Fully programmable smoke detectors
- Device with GPIOs and LN24 bus interface
- Alarm Switch Controller

Board
- Order No. see page 29

Applications Packages
- SOIC16
- Bare-Die

Application Diagram
## Sensors - Passive Infrared Sensors

### Pyroelectric Sensor Signal Processor (SSP)

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V\text{\textsubscript{SUPPLY}}</th>
<th>I\text{\textsubscript{SUPPLY}}</th>
<th>Output</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
</table>
| E931.06 Pyroelectric SSP | 2.7V to 3.6V | 15µA | PIR Signal and Temperature (DOCI™) | Wafer Bare-Die | - Digital signal processing  
- Single wire interface (DOCI™) |
| E931.62 Dual Channel Pyroelectric SSP | 2.7V to 3.6V | 15µA | PIR Signal and Temperature (DOCI™) | Wafer Bare-Die | - Dual channel  
- Digital signal processing  
- Single wire interface (DOCI™) |
| E931.96 Low Power Pyroelectric SSP | 2.7V to 3.6V | 5µA | Motion DETECT, Supply voltage for PIR Detector | SOIC8 Wafer Bare-Die | - Ultra low power consumption  
- Excellent power supply rejection  
- Programmable detection criteria and operating modes |

### Pyroelectric Sensor Signal Controller (SSC)

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V\text{\textsubscript{SUPPLY}}</th>
<th>I\text{\textsubscript{SUPPLY}}</th>
<th>Output</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
</table>
| E931.95 Pyroelectric SSC with Pulse Trigger Select | 2.7V to 3.6V | 12µA | Motion DETECT, Threshold | SOIC14 TSSOP14 Wafer | - Outputs for relay and LED  
- Insensitive to RF interference  
- Instanteous settling after power up |
| E910.97 Pyroelectric SSC with Relay Output | 2.7V to 3.6V | 15µA | PIR Signal, digital | Wafer Bare-Die | - Outputs for motion detect  
- Insensitive to RF interference  
- Inputs for sensitivity and on time |
| E931.97 Pyroelectric SSC with Relay/LED Output | 2.7V to 3.6V | 12µA | Motion DETECT, Threshold | SOIC14N TSSOP14 Wafer Bare-Die | - Outputs for relay and LED  
- insensitive to RF interference  
- Instanteous settling after power up |
| E931.98 Pyroelectric SSC with Zero Crossing Detection | 2.7V to 3.6V | 70µA | Motion DETECT, Threshold | SOIC14N TSSOP14 | - Insensitive to RF interference  
- Instanteous settling after power up  
- Adaptive mains zero cross switching |
Sensors - Thermopile

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V_{SUPPLY}</th>
<th>I_{SUPPLY}</th>
<th>Output</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E931.78</td>
<td>2.2V to 3.6V</td>
<td>20µA</td>
<td>Thermopile Signal and Temperature and EEPROM Data</td>
<td>Wafer</td>
<td>High precision temperature sensing</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bare-Die</td>
<td>Digital signal processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I²C interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16 Bit ADC for sensor signal</td>
</tr>
</tbody>
</table>
Pyroelectric SSP | E931.06

Key Features
- Direct connection to PIR sensor elements
- Temperature measurement
- Differential PIR sensor input
- Low Current Consumption
- Excellent power supply rejection
- High dynamic range

Applications
- Integration with PIR sensor elements
- High end PIR systems
- Building management

Packages
- Wafer
- Bare-Die

Application Diagram

---

Dual Channel Pyroelectric SSP | E931.62

Key Features
- Direct connection to PIR sensor elements
- Temperature measurement
- Differential PIR inputs
- Digital Signal Processing (DSP)
- Single wire serial interface (DOCI™)
- Operating voltage down to 2.7V
- Low current consumption
- High dynamic range
- High supply rejection

Applications
- Integration with PIR sensor elements (hybrid modules)
- Gas sensors
- High end PIR systems

Packages
- Wafer
- Bare-Die

Application Diagram
Low Power Pyroelectric SSP | E931.96

Key Features
- Programmable detection criteria and operating modes
- Digital signal processing
- On chip supply regulator for conventional PIR detectors
- Ultra low power consumption
- Differential PIR sensor input
- Excellent power supply rejection
- Insensitive to RF interference
- Instantaneous settling after power up

Applications
- Wireless intruder detectors
- Battery powered door chimes
- Emergency lighting
- Motion and presence detection

Application Diagram

Pyroelectric SSC with Pulse Trigger Select | E931.95

Key Features
- Digital Signal Processing
- On chip shunt regulator
- Low Power Consumption
- Differential PIR sensor input
- Outputs for relay and LED
- Selectable pulse count and pulse window evaluation
- Blind period after load switching
- Insensitive to RF interference

Applications
- PIR motion detection
- Intruder detection
- Occupancy detection
- Motion sensor lights
- Automatic TV standby

Application Diagram
Pyroelectric SSC with Relay Output | E910.97

Key Features
- Digital Signal Processing
- On chip shunt regulator
- Low Power Consumption
- Differential PIR sensor input
- Excellent power supply rejection
- Inputs for sensitivity and on time

Applications
- PIR motion detection
- Intruder detection
- Occupancy detection
- Motion sensor lights

Packages
- Wafer
- Bare-Die

Application Diagram

Pyroelectric SSC with Relay/LED Output | E931.97

Key Features
- Digital Signal Processing
- On chip shunt regulator
- Low Power Consumption
- Differential PIR sensor input
- Excellent power supply rejection
- Outputs for relay and LED

Board
- Order No. see page 29

Applications
- PIR motion detection
- Intruder detection
- Occupancy detection
- Motion sensor lights

Packages
- SOIC14N
- TSSOP14
- Wafer
- Bare-Die

Application Diagram
Pyroelectric SSC with Zero Crossing Detection | E931.98

**Key Features**
- One pulse trigger
- Adaptive zero crossing switching
- On chip shunt regulator
- Low power consumption
- Differential PIR sensor input
- Excellent power supply rejection

**Applications**
- PIR motion detection
- Intruder detection
- Occupancy detection
- Motion sensor lights

**Packages**
- SOIC14N
- TSSOP14

**Application Diagram**

---

High Resolution Thermopile SSP | E931.78

**Key Features**
- Direct connection to thermopile elements
- Temperature measurement
- E'PROM for calibration and identification
- I2C Interface
- Operating voltage down to 1.8V
- Low current consumption
- High dynamic range
- High supply rejection

**Applications**
- Presence and Motion Detection
- High precision remote temperature sensing
- Infrared pyrometers

**Packages**
- Wafer
- Bare-Die

**Application Diagram**

---
### Ultrasonic

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E524.0x</td>
<td>&quot;Ultrasonic Park Assist&quot; Demonstrator</td>
<td>Master Board</td>
<td>K5240X-0001</td>
</tr>
<tr>
<td>E524.02</td>
<td>Ultrasonic Sensor Board</td>
<td>Sensor Board</td>
<td>K52402-0002</td>
</tr>
<tr>
<td>E524.03</td>
<td>Ultrasonic Sensor Board</td>
<td>Sensor Board</td>
<td>K52403-0002</td>
</tr>
<tr>
<td>E524.05</td>
<td>Ultrasonic Sensor Board</td>
<td>Sensor Board</td>
<td>K52405-0002</td>
</tr>
<tr>
<td>E524.06</td>
<td>Ultrasonic Sensor Board</td>
<td>Sensor Board</td>
<td>K52406-0002</td>
</tr>
<tr>
<td>E524.08</td>
<td>Ultrasonic Sensor Board</td>
<td>Sensor Board</td>
<td>K52408-0001</td>
</tr>
<tr>
<td>E524.09</td>
<td>Ultrasonic Sensor Board</td>
<td>Sensor Board</td>
<td>K52409-0001</td>
</tr>
<tr>
<td>E524.14</td>
<td>LIN Smart Ultrasonic Parking Assist (FLASH)</td>
<td>Evaluation Kit</td>
<td>K52414-0001</td>
</tr>
<tr>
<td>E524.17</td>
<td>Sensor FPGA Board</td>
<td>Demoboard</td>
<td>K52417-0001</td>
</tr>
<tr>
<td>E524.17</td>
<td>Sensor Socket Board</td>
<td>Demoboard</td>
<td>K52417-0002</td>
</tr>
<tr>
<td>E524.17</td>
<td>Sensor Application Board</td>
<td>Demoboard</td>
<td>K52417-0003</td>
</tr>
<tr>
<td>E524.33</td>
<td>Ultrasonic Sensor Board</td>
<td>Demoboard</td>
<td>K52433-0001</td>
</tr>
<tr>
<td>E521.42</td>
<td>Master FPGA Board</td>
<td>Demoboard</td>
<td>K52142-0001</td>
</tr>
<tr>
<td>E521.42</td>
<td>Master Socket Board</td>
<td>Demoboard</td>
<td>K52142-0002</td>
</tr>
<tr>
<td>E521.42</td>
<td>Master Application Board</td>
<td>Demoboard</td>
<td>K52142-0003</td>
</tr>
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</table>

### Pressure Sensor

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.42/45</td>
<td>SSP2 Board + Adapter</td>
<td>Evaluation Kit</td>
<td>K5204x-0001</td>
</tr>
<tr>
<td>E520.42/45</td>
<td>Adapter for SSP2 Board</td>
<td>Demoboard</td>
<td>K5204x-0002</td>
</tr>
<tr>
<td>E520.42/45</td>
<td>SSP Board</td>
<td>Demoboard</td>
<td>Z00000-0010</td>
</tr>
<tr>
<td>E520.42/45</td>
<td>SSP2 Multiplexer</td>
<td>Multiplexer</td>
<td>Z00000-0011</td>
</tr>
<tr>
<td>E703.11</td>
<td>Sensor Signal Processor for High Precision Applications</td>
<td>Evaluation Kit</td>
<td>K70311-0001</td>
</tr>
</tbody>
</table>
HALIOS®

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E527.04/05</td>
<td>Evaluation Kit</td>
<td>Evaluation Board</td>
<td>KI 1210005</td>
</tr>
<tr>
<td>E527.16</td>
<td>HALIOS® Reference Design Board</td>
<td>Demoboard</td>
<td>RD 1210001</td>
</tr>
<tr>
<td>E909.06</td>
<td>Gesture Reference HALIOS® Board</td>
<td>Demoboard</td>
<td>RD 1210005</td>
</tr>
<tr>
<td>E909.06</td>
<td>HALIOS® 2 inch slider</td>
<td>Demoboard</td>
<td>RD 1210006</td>
</tr>
<tr>
<td>E909.06</td>
<td>HALIOS® COM Board</td>
<td>Com Board</td>
<td>AC 1210001</td>
</tr>
<tr>
<td>E909.06</td>
<td>Evaluation Kit V3</td>
<td>Evaluation Board</td>
<td>KI 1210003</td>
</tr>
<tr>
<td>E909.11</td>
<td>HALIOS® Reference Design Board</td>
<td>Demoboard</td>
<td>RD 1210002</td>
</tr>
<tr>
<td>E909.21</td>
<td>Evaluation Kit</td>
<td>Evaluation Board</td>
<td>KI 1210004</td>
</tr>
<tr>
<td>E909.21</td>
<td>HALIOS® ProxDimm-Light G2</td>
<td>-</td>
<td>RD 1210007</td>
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</table>

Smoke Detector Controller

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.24</td>
<td>Universal Smoke Detector Controller</td>
<td>Demoboard</td>
<td>KS2024-0001</td>
</tr>
</tbody>
</table>

Pyroelectric Sensor Signal Processor (SSP)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E931.96</td>
<td>Motion Sensing, Ultra Low Power PIR controller, Evaluation Module</td>
<td>Demoboard</td>
<td>K93196-0001</td>
</tr>
</tbody>
</table>
## Motor Control - Stepper Motor

<table>
<thead>
<tr>
<th>Part No. / Function</th>
<th>V&lt;sub&gt;supply&lt;/sub&gt;</th>
<th>I&lt;sub&gt;peak&lt;/sub&gt;</th>
<th>P(Motor)peak</th>
<th>RDS&lt;sub&gt;on&lt;/sub&gt;</th>
<th>Interface</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E520.01/02</strong></td>
<td>3V to 25V (42V)</td>
<td>12x 350mA</td>
<td>12x 8.75W</td>
<td>1.5Ω</td>
<td>SPI-compatible (3.3/5V)</td>
<td>QFN32L5 SOIC28</td>
<td>Stall detection for stepper motors (E520.01) suitable for Full Step, Half Step, Wave Drive</td>
</tr>
<tr>
<td><em>Driver IC</em></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>12x Low-Side for 3 Stepper Motors with/without Stall Detection</td>
<td></td>
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</tr>
<tr>
<td><strong>E520.03/08</strong></td>
<td>3V to 25V (42V)</td>
<td>8x 350mA</td>
<td>8x 8.75W</td>
<td>1.5Ω</td>
<td>SPI-compatible (3.3/5V)</td>
<td>SOIC20 QFN20L5 QFN32L5</td>
<td>Stall detection for stepper motors (E520.03) suitable for Full Step, Half Step, Wave Drive</td>
</tr>
<tr>
<td><em>Driver IC</em></td>
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<tr>
<td>8x Low-Side for 2 Stepper Motors with/without Stall Detection</td>
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</tr>
<tr>
<td><strong>E523.30</strong></td>
<td>5.5V to 20V (42V)</td>
<td>2x 800mA H-Bridge</td>
<td>25W</td>
<td>550mΩ (HS) 450mΩ (LS)</td>
<td>LIN 2 x (1.3 comp.) or SAE-J2602 or PWM Interface Optional LIN Auto-Addressing (SNPD) only E523.30 or LIN Flash update JTAG</td>
<td>QFN32L6</td>
<td>Current chopper motor control</td>
</tr>
<tr>
<td><em>SoC</em></td>
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<tr>
<td>Power Stepper Controller with Stall Detection</td>
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<td></td>
</tr>
<tr>
<td>with/without Auto-Addressing (LIN / PWM Interface)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>E523.31/32</strong></td>
<td>5.5V to 20V (42V)</td>
<td>2x 800mA H-Bridge</td>
<td>25W</td>
<td>550mΩ (HS) 450mΩ (LS)</td>
<td>LIN 2 x (1.3 comp.) or SAE-J2602 or LIN Flash update JTAG</td>
<td>QFN32L6</td>
<td>Current chopper motor control</td>
</tr>
<tr>
<td><em>Plug &amp; Play</em></td>
<td></td>
<td></td>
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<tr>
<td>Power Stepper Controller with Stall Detection</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>with standard application software (LIN Interface)</td>
<td></td>
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</tr>
<tr>
<td><strong>E910.01</strong></td>
<td>5.5V to 25.5V</td>
<td>8x 350mA</td>
<td>8x 8.75W</td>
<td>1.5Ω</td>
<td>SPI-compatible (5V)</td>
<td>SOIC20</td>
<td>Short circuit protection</td>
</tr>
<tr>
<td><em>SoC</em></td>
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</tr>
<tr>
<td>Stepper Motor 8x Low Side Driver</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

*Plug & Play* Chip with defined functionality | no controller programming necessary  
*SoC* System-on-a-Chip | with integrated microcontroller  
*SBC* System-Basic-Chip | with Voltage Regulator Reset, Watchdog, physical Interface  
*Driver IC* Driver Chip without SBC or SoC features
12/8x Low-Side Driver with Stall Detection | E520.01/02/03/08

Key Features
- 12 high current outputs (RDS,on typ. 1.5Ω / I_MAX = 350mA)
- Low standby current (typically <1µA)
- Serial interface (SPI) for direct µC interfacing
- Short circuit/ Open load detection, diagnosis
- Stall detection for full-/half-step, wave drive
- Stall detection qualification service
- T_Junc, peak = +150°C

Applications
- Stepper motor driver with/without stall detection
- DC motor driver with PWM
- Relay driver with VBAT- automatically PWM
- LED driver with 3 logarithmic PWM sources

Application Diagram

Power Stepper Controller with Stall Detection | E523.30/31/32

Key Features
- Drives a bipolar stepper motor
- Sensorless "stall detection"
- I · Coil current up to 2 x 800mA (prog. chopper)
- 5.5V - 20V supply voltage (load dump 42V)
- Sleep mode current typically 30µA
- Embedded 8bit µC 256 Byte RAM, 8k FLASH, 8k ROM, 64 Byte EEPROM
- Versions: LIN/PWM Interface, optional LIN Auto-Addressing

Applications
- Stepper or DC motor actuators
- Grill-Shutter
- Head-Light adjust
- Water valve

Application Diagram

Elmos Product Catalog | 2018/2019
Stepper Motor 8 x Low Side Drive | E910.01

Key Features
- Supply voltage range VDD 4.5V to 5.5V
- Low standby current (typ. <1µA)
- SPI compatible interface to µC
- Addressing modes: daisy chain and chip select
- Output status detection
- 8 high current outputs (RON typ. 1.5Ω / Imax = 350mA)
- Wide output operating voltage range (5.5 to 25.5V)
- Output open/short circuit detection

Applications
- Relays
- Actuator Universal
- Liquid Valves
- Cruise Control
- HVAC Flaps

Packages
- SOIC20

Application Diagram

*SoC / *Plug & Play
Visionary Concepts for Motor Driven HVAC Solutions.
## Motor Control - BLDC Motor | Switched Reluctance Motor

### BLDC Motor Controller

<table>
<thead>
<tr>
<th>Part No. / Function</th>
<th>V&lt;sub&gt;supply&lt;/sub&gt;</th>
<th>I&lt;sub&gt;PEAK&lt;/sub&gt;</th>
<th>I&lt;sub&gt;MAX DC&lt;/sub&gt;</th>
<th>P(Motor) peak</th>
<th>RDS&lt;sub&gt;ON&lt;/sub&gt;</th>
<th>Interface</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E523.05 *SoC</td>
<td>7V to 28V</td>
<td>6x ±400mA</td>
<td>6x ±75mA</td>
<td>≈1.5kW</td>
<td>8Ω (HS)</td>
<td>LIN 2.x (1.3 comp.), SAE-J2602 or PWM bidirectional</td>
<td>QFN48L7</td>
<td>For new designs E523.06 is recommended</td>
</tr>
<tr>
<td></td>
<td>(5V to 42V)</td>
<td></td>
<td></td>
<td>≈3W</td>
<td>4Ω (LS)</td>
<td>SPI for user expansion</td>
<td></td>
<td>16bit/48 MHz CPU assisted by 2 powerful co-processors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LIN Flash update</td>
<td></td>
<td>Library ROM for LIN-stack software update via LIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JTAG</td>
<td></td>
<td>Software support on request</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TJ&lt;sub&gt;peak&lt;/sub&gt; = +125°C</td>
</tr>
<tr>
<td>E523.06 *SoC</td>
<td>7V to 28V</td>
<td>6x ±400mA</td>
<td>6x ±75mA</td>
<td>≈1.5kW</td>
<td>8Ω (HS)</td>
<td>LIN 2.x (1.3 comp.), SAE-J2602 or PWM bidirectional</td>
<td>QFN48L7</td>
<td>16bit/48 MHz CPU assisted by 2 powerful co-processors</td>
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<td></td>
<td>(5V to 42V)</td>
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<td></td>
<td>≈3W</td>
<td>4Ω (LS)</td>
<td>SPI for user expansion</td>
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<td>Library ROM for LIN-stack software update via LIN</td>
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<td>LIN Flash update</td>
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<td>Software support on request</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>JTAG</td>
<td></td>
<td>TJ&lt;sub&gt;peak&lt;/sub&gt; = +150°C</td>
</tr>
<tr>
<td>E523.52 *SoC</td>
<td>12V to 72V</td>
<td>6x ±200mA</td>
<td>6x ±50mA</td>
<td>≈1.5kW</td>
<td>10Ω (HS)</td>
<td>LIN Interface with external</td>
<td>QFN36L7</td>
<td>Usable for 24/48V automotive Board Net</td>
</tr>
<tr>
<td></td>
<td>(7V to 76V)</td>
<td></td>
<td></td>
<td></td>
<td>5Ω (LS)</td>
<td>PWM Interface with external components</td>
<td></td>
<td>16bit/48 MHz CPU assisted by 2 powerful co-processors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SPI for user expansion</td>
<td></td>
<td>Library ROM for LIN-stack software update via LIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LIN Transceiver</td>
<td></td>
<td>(software support on request)</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>LIN Flash update</td>
<td></td>
<td>TJ&lt;sub&gt;peak&lt;/sub&gt; = +150°C</td>
</tr>
</tbody>
</table>

* **Plug & Play** Chip with defined functionality | no controller programming necessary
* **SoC** System-on-a-Chip | with integrated microcontroller
* **SBC** System-Basic-Chip | with Voltage Regulator Reset, Watchdog, physical Interface
* **Driver IC** Driver Chip without SBC or SoC features

** Please contact Elmos for selecting the right product for SR Motors
### BLDC Motor Driver

<table>
<thead>
<tr>
<th>Part No. / Function</th>
<th>V_supply</th>
<th>I_peak</th>
<th>I_max DC</th>
<th>P(Motor)peak</th>
<th>RDS_on</th>
<th>Interface</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E523.01/11 *SBC</td>
<td>7V to 28V (5V to 42V)</td>
<td>6x ±400mA</td>
<td>6x ±75mA</td>
<td>≈1.5kW</td>
<td>8Ω (HS) 4Ω (LS)</td>
<td>LIN 2.x (1.3 comp.), SAE-J2602 (only E523.01) or PWM bidirectional</td>
<td>QFN44L7 QSOP44</td>
<td>Voltage Regulator (3.3V/5V) selectable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(external FETs)</td>
<td>3V (direct drive)</td>
<td>LIN Flash update</td>
<td></td>
<td>Precise deadtime generation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≈3W</td>
<td></td>
<td></td>
<td></td>
<td>Watchdog/Diagnostics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≈3W</td>
<td></td>
<td></td>
<td></td>
<td>Demo software on request (sensorless sinus)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>T_{junc.} peak = +170°C</td>
</tr>
</tbody>
</table>

| E523.10 *SBC | 7V to 28V (4.5V to 42V) | 6x +400mA | 6x -600mA | 6x ±75mA | 8Ω (HS) 4Ω (LS) | PWM bidirectional | QFN44L7 | Voltage Regulator (3.3V/5V) selectable |
|              |          |        |          | ≈1.5kW       |             | SPI for configuration |         | Precise deadtime generation |
|              |          |        |          | (external FETs) | 3W (direct drive) |           |         | Watchdog/Diagnostics |
|              |          |        |          | ≈3W          |        |           |         | T_{junc.} peak = +170°C |

| E523.50 *SBC | 12V to 72V (7V to 76V) | 6x ±200mA | 6x ±50mA | ≈1.5kW       | 10Ω (HS) 5Ω (LS) | PWM for motor control | QFN36L7 | Usable for 24/48V automotive Board Net |
|              |          |        |          | (external FETs) | 3W (direct drive) | Diagnostic Pins |         | DC/DC convertor for gate supply |
|              |          |        |          | ≈3W          |        |           |         | 3.3V/20mA supply for external µC |
|              |          |        |          |             |        |           |         | T_{junc.} peak = +150°C |

| E523.81 *Plug & Play | 6V to 28V (5V to 42V) | ±700mA | - | 7kW | 10Ω (HS) 5Ω (LS) | PWM bidirectional analog 0-2.5V | QFN20L5 | State Machine control |
|                      |          |        |    |    |        | JTAG |         | Fully parametrisable via JTAG |
|                      |          |        |    |    |        |      |         | True Sinusoidal SVM (Space Vector Modulation) Drive |
|                      |          |        |    |    |        |      |         | T_{junc.} peak = +170°C |

*Plug & Play Chip with defined functionality | no controller programming necessary
*SoC System-on-a-Chip | with integrated microcontroller
*SBC System-Basic-Chip | with Voltage Regulator Reset, Watchdog, physical Interface
*Driver IC Driver Chip without SBC or SoC features

** Please contact Elmos for selecting the right product for SR Motors
### Field-Oriented BLDC Motor Controller with 16 Bit CPU | E523.06

**Key Features**
- IC supply voltage range 7 to 28V (extended 5V to 42V)
- CPU 16 bit, 24 - 48MHz for application tasks
- 32 kbyte FLASH, ECC protected
- 24 kbyte Masked ROM
- 4 kByte SRAM, parity protected
- Typical deep-sleep mode current 20µA
- 2nd window watchdog and two independent clocks
- LIN 2.x (1.3, SAE-J2602 comp.) or PWM bidirectional
- Fast OpAmp for foot current measurement

**Applications**
- BLDC(EC) motor control, multiple DC motor control
- Cooling fans, HVAC fans, positioning systems
- Fuel, hydraulic, oil and water pumps
- Position system

**Application Diagram**

---

### 72V Brushless Motor Gate Driver with 16bit CPU | E523.52

**Key Features**
- Voltage range 12V to 72V (7V to 76V peak)
- CPU 16 bit, 24 - 48MHz for application tasks
- 32kByte FLASH, 16kByte MaskROM, 4kByte SRAM
- 10 bit 1 Msample SAR ADC
- 4x 16 bit PWM generation (edge/center aligned)
- Adjustable window watchdog (independent clock)
- 6x 200mA gate drivers with programmable dead time and protection features
- Fast OpAmp for foot current measurement

**Applications**
- BLDC(EC) motors in industrial 24V to 60V applications
- Commercial vehicles
- Fuel, hydraulic, oil, water and urea pumps
- Cooling fans, HVAC fans, positioning systems

**Application Diagram**

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**Order No.** see page 43

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**Order No.** see page 43

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**Order No.** see page 43
BLDC Motor Driver (LIN/PWM Interface) | E523.01/11

Key Features
- Gate drive circuit for B6-NMOS bridge
- Voltage range 7V to 28V (5V to 42V peak)
- LIN 2.x (1.3, SAE-J2602 comp.) or PWM bidirectional
- Software update via LIN high speed mode
- Precise, dynamical dead-time generation
- Voltage regulator for µC 3.3V or 5V, up to 70mA direct load + dynamically adjustable
- Configurable over-current protection

Applications
- BLDC(EC) motor control, multiple DC motor control
- Fuel, Hydraulic, Oil and Water pump
- Cooling fan, HVAC fan, positioning systems
- Turbo charger adjustment
- BLDC actuators and servo systems

Application Diagram

BLDC-Motor Driver with Cold-Crank Capability | E523.10

Key Features
- Gate drive circuit for B6-NMOS bridge
- Voltage range 4.5V to 28V (42V peak) for start-stop systems
- Sleep mode current 20µA typically
- Microcontroller supply 3.3V or 5V
- Adjustable watchdog and reset generation
- Motor current measurement amplifier
- Over current switch-off (dynamical change)
- FET short circuit protections (dynamical change)
- Configurable voltage monitoring

Applications
- BLDC(EC) motor control, multiple DC motor control
- Fuel, hydraulic, oil and water pumps
- Cooling fans, HVAC fans, positioning systems
- Turbo charger adjustment

Application Diagram

Order No. see page 43

Packages
- QFN44L7
- QSOP44
### 72V Brushless Motor Gate Driver | E523.50

**Key Features**
- Gate drive circuit for B6-NMOS bridge
- Voltage range 12V to 72V (7V to 76V peak)
- DC/DC converter for 11V/100mA
- µC supply 3.3V up to 20mA direct load, higher loads with external boost transistor possible
- 200mA gate drivers including protection features
- Integrated back EMF detection
- $T_{j,\text{peak}} = +150^\circ C$

**Applications**
- BLDC(EC) motors in industrial 24V to 60V applications
- Commercial vehicles
- Fuel, hydraulic, oil, water and urea pumps
- Cooling fans, HVAC fans, positioning systems

**Board**
- Order No. see page 43

**Application Diagram**

---

### 500mA BLDC Motor Controller | E523.81

**Key Features**
- IC for standalone PMSM applications
- Internal power bridge up to 500mA (rms)
- Selectable PWM speed and error interface or analog speed interface
- Tacho output
- Current controlled start up
- Integrated configurable error handling
- Stall detection
- Automatic restart and rotor delocking

**Applications**
- Small PMSM / BLDC FANs
- Small PMSM / BLDC Pumps

**Applications**
- Small PMSM / BLDC Pumps

**Packages**
- QFN36L7

**Application Diagram**

---

*SBC*
## Motor Control - DC Motor

<table>
<thead>
<tr>
<th>Part No. / Function</th>
<th>V_{SUPPLY}</th>
<th>I_{PEAK}</th>
<th>I_{MAX DC}</th>
<th>P(Motor)max</th>
<th>RDS_{on}</th>
<th>Interface</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E523.03/04/13/14 *SBC</td>
<td>7V to 28V (5V to 42V)</td>
<td>±400mA</td>
<td>±75mA</td>
<td>≈1.5kW (external FETs)</td>
<td>8Ω (HS) 4Ω (LS)</td>
<td>LIN 2 x (1.3) or SAE-J2602 (only E523.03/13) or PWM bidirectional</td>
<td>QFN20L4 QFN32L5 (with high voltage spacer)</td>
<td>Voltage Regulator E523.03/13: 5V</td>
</tr>
<tr>
<td>E523.05 *SoC</td>
<td>7V to 28V (5V to 42V)</td>
<td>6x ±400mA</td>
<td>6x ±75mA</td>
<td>≈1.5kW (external FETs)</td>
<td>8Ω (HS) 4Ω (LS)</td>
<td>LIN 2 x (1.3) or SAE-J2602 or PWM bidirectional</td>
<td>QFN48L7</td>
<td>For new designs E523.06 is recommended 16bit/48 MHz CPU assisted by 2 powerful co-processors Library ROM for LIN-stack software update via LIN Charge Pump Driver included T_{junc peak} = +125°C (Contact supplier for higher temperature)</td>
</tr>
<tr>
<td>E523.06 *SoC</td>
<td>7V to 28V (5V to 42V)</td>
<td>6x ±400mA</td>
<td>6x ±75mA</td>
<td>≈1.5kW (external FETs)</td>
<td>8Ω (HS) 4Ω (LS)</td>
<td>LIN 2 x (1.3) or SAE-J2602 or PWM bidirectional</td>
<td>QFN48L7</td>
<td>16bit/48 MHz CPU assisted by 2 powerful co-processors Library ROM for LIN-stack software update via LIN Charge Pump Driver included T_{junc peak} = +125°C (Contact supplier for higher temperature)</td>
</tr>
<tr>
<td>E523.30 *SoC</td>
<td>7V to 20V (5.5V to 42V)</td>
<td>2x ±75mA</td>
<td>±25W (per Motor)</td>
<td>225mΩ (HS) 275mΩ (LS)</td>
<td>LIN 2 x (1.3) or SAE-J2602 or PWM bidirectional</td>
<td>QFN32L6</td>
<td>Drives 1 or 2 DC motors 8bit CPU, 8k FLASH, 64kByte E²PROM Current chopper motor control Supply and read-out of up to 3, potentiometers or sensors GPIO-pins T_{junc peak} = +150°C (Contact supplier for higher temperatures)</td>
<td></td>
</tr>
<tr>
<td>E910.72 *Driver IC</td>
<td>6V to 19V (40V)</td>
<td>±540mA</td>
<td>7W (1 Motor Mode)</td>
<td>1.25Ω</td>
<td>SPI for configuration</td>
<td>QFN32L5</td>
<td>Sensorless motor positioning 3 independent pulse detectors Excellent positioning performance Drives 3 or 5 DC actuators T_{junc peak} = +170°C (Contact supplier for higher temperatures)</td>
<td></td>
</tr>
</tbody>
</table>

*Plug & Play* Chip with defined functionality | no controller programming necessary

*SoC System-on-a-Chip | with integrated microcontroller

*SBC System-Basic-Chip | with Voltage Regulator Reset, Watchdog, physical Interface

*Driver IC Driver Chip without SBC or SoC features
DC Motor LS FET Driver (LIN / PWM Interface) | E523.03/04/13/14

**Key Features**
- Voltage range 7 to 28V (5V to 42V peak)
- LIN 2 x (1.3, SAE-J2602 comp.) or PWM bidirectional
- Deep sleep mode current I ≤ 30μA
- Voltage Regulator for ext.μC: 3.3V/5V, I MAX =30mA
- Amplifier for low side motor current measurement
- Over-current switch-off, dynamical change via SPI
- Monitoring battery voltage, gate supply, temperature

**Applications**
- DC Wiper
- DC HVAC fan, engine cooling fan
- DC fuel pump, hydraulic pump, oil pump
- Multiple DC motor control
- Without external FETs: direct driving of small loads

**Package**
- QFN20L4
- QFN32L5 (with high voltage spacer)

**Application Diagram**

Field-Oriented DC Motor Controller with 16 Bit CPU | E523.06

**Key Features**
- Gate drive circuit for B6-NMOS bridge
- IC supply voltage range 7 to 28V (extended 5V to 42V)
- CPU 16 bit, 24 - 48MHz for application tasks
- 32 kByte FLASH, ECC protected
- 24 kByte Masked ROM
- 4 kByte SRAM, parity protected
- Typical deep-sleep mode current 20μA
- 2nd window watchdog and two independent clocks
- LIN2.x, LIN1.3 or bidirectional PWM interface

**Applications**
- EC, BLDC, PMSM motors 50W to ~1500W
- Cooling fans, HVAC fans, positioning systems
- Fuel, hydraulic, oil and water pumps

**Package**
- QFN48L7
- LQFP48L7EP

**Application Diagram**

Elmos Product Catalog | 2018/2019
2x 75mA DC Motor 2x Full Bridge Controller (LIN / PWM Interface) | E523.30

Key Features
- Voltage range 7V to 20V (5.5V to 42V)
- LIN 2x (1.3, SAE-J2602 comp.) or PWM bidirectional
- Drives 1 or 2 DC Motors
- 75mA (2 Motor Mode)
- Programmable chopper current
- Slave node position detection / auto-addressing
- 8bit CPU, 8k FLASH, 64Byte E²PROM
- 3 GPIO pins and sensor supply

Board
- Order No. see page 43

Applications
- Headlight adjust
- Grille shutter
- Water valves
- Multi purpose LIN slave

Applications Packages
- Headlight adjust
- Grille shutter
- Water valves
- Multi purpose LIN slave

Packages
- QFN32L6

Application Diagram

6x Half-Bridge DC Motor with Sensorless Positioning | E910.72

Key Features
- Operating supply voltage range 6V to 19V
- 6 half bridges to drive 3, 4, or 5 DC motors
- R_DS(ON) of one half bridge typ. 1.25Ω
- Independent pulse detectors for three motors
- 2 different pulse detectors covering the complete speed range
- Adjustable parameters to drive a high number of different motor types
- Diagnostic data via SPI

Board
- Order No. see page 43

Applications
- Automotive HVAC flap
- DC motor servo systems

Applications Packages
- Automotive HVAC flap
- DC motor servo systems

Packages
- QFN32L5

Application Diagram
## Motor Control - Boards

### Stepper Motor

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Demo also relative for</th>
<th>Function</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.01</td>
<td>E520.02, E520.03, E520.08</td>
<td>12x Low-Side for 3 Stepper Motors with/without Stall Detection</td>
<td>Demo- / Evaluation Board</td>
<td>K52001-0001</td>
</tr>
<tr>
<td>E523.30*</td>
<td>E523.31, E523.34, E523.37</td>
<td>LIN Stepper Evakit (Standard)</td>
<td>Demo- / Evaluation Board</td>
<td>K52330-0001</td>
</tr>
<tr>
<td>E523.30*</td>
<td>E523.31, E523.34, E523.37</td>
<td>LIN Stepper Evakit (Generic)</td>
<td>Demo- / Evaluation Board</td>
<td>K52330-0002</td>
</tr>
<tr>
<td>E523.30*</td>
<td>E523.31, E523.34, E523.37</td>
<td>LIN Stepper SW Evakit (Standard)</td>
<td>Demo- / Evaluation Board</td>
<td>K52330-0003</td>
</tr>
<tr>
<td>E523.30*</td>
<td>E523.31, E523.34, E523.37</td>
<td>LIN Stepper SW Evakit (Generic)</td>
<td>Demo- / Evaluation Board</td>
<td>K52330-0004</td>
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</tbody>
</table>

* also valid for DC Motor boards

### DC Motor

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Demo also relative for</th>
<th>Function</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E523.06</td>
<td>-</td>
<td>Field-Oriented DC Motor Controller with 16 Bit CPUv (Standard)</td>
<td>Demo / Evaluation Board</td>
<td>K52306-0001</td>
</tr>
<tr>
<td>E523.06</td>
<td>-</td>
<td>Field-Oriented DC Motor Controller with 16 Bit CPU (50W)</td>
<td>50W DemoBoard</td>
<td>K52306-0002</td>
</tr>
<tr>
<td>E523.06</td>
<td>-</td>
<td>Field-Oriented DC Motor Controller with 16 Bit CPU (300W Climate Blower)</td>
<td>Demo / Evaluation Board</td>
<td>K52306-0003</td>
</tr>
<tr>
<td>E910.72</td>
<td>-</td>
<td>6x Half-Bridge DC Motor with Sensorless Positioning</td>
<td>Demo- / Evaluation Board</td>
<td>K91072-0001</td>
</tr>
</tbody>
</table>

### BLDC Motor

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E523.01/11</td>
<td>B6 Bridge FET Driver (LIN / PWM Interface)</td>
<td>Demo- / Evaluation Board</td>
<td>K52301-0001</td>
</tr>
<tr>
<td>E523.01/11 V1 Fan</td>
<td>B6 Bridge FET Driver (LIN / PWM Interface)</td>
<td>Demo- / Evaluation Board</td>
<td>K52301-0002</td>
</tr>
<tr>
<td>E523.01/11 V2 Pump</td>
<td>B6 Bridge FET Driver (LIN / PWM Interface)</td>
<td>Demo- / Evaluation Board</td>
<td>K52301-0003</td>
</tr>
<tr>
<td>E523.01/11 V4 Water Pump</td>
<td>B6 Bridge FET Driver (LIN / PWM Interface)</td>
<td>Demo- / Evaluation Board</td>
<td>K52301-0005</td>
</tr>
<tr>
<td>E523.05</td>
<td>BLDC Motor Controller with 16bit CPU (LIN / PWM Interface)</td>
<td>Demo- / Evaluation Board</td>
<td>K52305-0001</td>
</tr>
<tr>
<td>E523.50</td>
<td>72V Brushless Motor Gate Driver</td>
<td>Demo- / Evaluation Board</td>
<td>K52350-0001</td>
</tr>
<tr>
<td>E523.52</td>
<td>72V Brushless Motor Gate Driver with 16bit</td>
<td>Demo- / Evaluation Board</td>
<td>K52352-0001</td>
</tr>
<tr>
<td>E523.81</td>
<td>500mA BLDC Motor Controller</td>
<td>DemoBoard</td>
<td>K52381-0001</td>
</tr>
</tbody>
</table>

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## Power Management - LED Driver

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>Efficiency</th>
<th>V$_{\text{SUPPLY}}$</th>
<th>V$_{\text{OUT}}$</th>
<th>Package</th>
<th>Comment / Converter Topology</th>
</tr>
</thead>
<tbody>
<tr>
<td>E522.31/33 1 Channel Switched-Mode Constant Current LED Controller (Oscillator Spectrum Spread/Narrow)</td>
<td>&gt;90%</td>
<td>5V to 55V</td>
<td>up to 80V</td>
<td>QFN32L5</td>
<td>Boost, SEPIC, Buck-Boost or Buck</td>
</tr>
<tr>
<td>E522.32/34 2 Channel Switched-Mode Constant Current LED Controller (Oscillator Spectrum Spread/Narrow)</td>
<td>&gt;90%</td>
<td>5V to 55V</td>
<td>up to 80V</td>
<td>QFN32L5</td>
<td>Boost, SEPIC, Buck-Boost or Buck</td>
</tr>
<tr>
<td>E522.46 8 Channel LED Driver with I²C Interface</td>
<td></td>
<td>3.3V to 32V</td>
<td>-</td>
<td>DFN18L5040</td>
<td>8-channel I²C programmable linear LED driver</td>
</tr>
<tr>
<td>E522.80-83 Linear LED Controller (High Current Version 48 to 151mA)</td>
<td></td>
<td>5V to 25V</td>
<td>-</td>
<td>SOIC16N-EP</td>
<td>3-channel Low Dropout Linear Regulator (LDO) with Power Management and Diagnosis</td>
</tr>
<tr>
<td>E522.84-87 Linear LED Controller (Low Current Version 20 to 60mA)</td>
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<td>5V to 25V</td>
<td>-</td>
<td>SOIC8-EP</td>
<td>3-channel Low Dropout Linear Regulator (LDO) with Diagnosis</td>
</tr>
<tr>
<td>E522.90-93 Triple 55mA Linear LED Controller (14 to 55mA)</td>
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<td>5V to 25V</td>
<td>-</td>
<td>SOIC16N-EP</td>
<td>3-channel Low Dropout Linear Regulator (LDO) with Power Management and Diagnosis</td>
</tr>
</tbody>
</table>
1 Channel Switched-Mode Constant Current LED Controller | E522.31/33

Key Features
- 5.0V to 55V input, up to 80V boosted output voltage
- Boost-to-GND, Boost-to-Battery and SEPIC topologies supported
- Constant current regulation
- Analog dimming and digital dimming 3000:1 at 100Hz PWM
- Advanced In-System diagnostics (e.g. GND loss, output-overload and highside-feedback diagnostics)
- Very low sleep mode currents of typ. 8µA
- Automotive qualified (AEC-Q100)

Applications
- Automotive LED lighting applications
- Exterior LED lighting
- TFT backlighting
- General current driven applications

Application Diagram

2 Channel Switched-Mode Constant Current LED Controller | E522.32/34

Key Features
- 5.0V to 55V input, up to 80V boosted output voltage
- Boost-to-GND, Boost-to-Battery and SEPIC topologies supported
- Constant current regulation
- Analog dimming and digital dimming 3000:1 at 100Hz PWM
- Advanced In-System diagnostics (e.g. GND loss, output-overload and highside-feedback diagnostics)
- Very low sleep mode currents of typ. 8µA
- PIN compatible to E522.31/33
- Automotive qualified (AEC-Q100)

Applications
- Automotive LED lighting applications
- Exterior LED lighting
- TFT backlighting
- General current driven applications

Application Diagram
8 Channel LED Driver with I²C Interface | E522.46

**Key Features**
- Input voltage range 3.3V to 32V (max. 42V)
- 8-channel I²C programmable linear high side driver
- Global PWM and configurable analog dimming
- Automotive qualified (AEC-Q100)

**Board**
- Order No. see page 58

**Applications**
- Automotive LED lighting
- Multi-channel panel applications
- Low current interior lighting
- Dynamic rear light functions

**Packages**
- DFN18L5040

**Board**
- Order No. see page 58

**Applications**
- Automotive LED lighting
- Rear lighting
- Turn indicator driver
- Low current interior lighting
- Industrial LED applications or simple RGB drivers

**Application Diagram**

---

Linear LED Controller (High Current Version 48 to 151mA) | E522.80-83

**Key Features**
- Three independent linear current drivers (3*150mA)
- Operating input voltage range 5V to 25V, max. 40V
- Advanced diagnostic features
  - Open / short detection
  - Diagnostic “RUN” bus to link multiple ICs
- Different start-up voltages for open diagnostics can be chosen: VS=7.5V, 9V, 10V and 15V
- “Single Lamp” mode disables all LEDs in case of a failure
- Automotive qualified (AEC-Q100)

**Applications**
- Automotive LED lighting
- Rear lighting
- Turn indicator driver
- Low current interior lighting
- Industrial LED applications or simple RGB drivers

**Package**
- SOIC16N-EP

**Application Diagram**
Linear LED Controller (Low Current Version 20 to 60mA) | E522.84-87

Key Features
- Three integrated Linear Current Drivers (3*60mA)
- Operating input voltage range 5V to 25V, max. 40V
- Advanced diagnostic features
  - Open / short detection
  - Diagnostic “RUN” bus to link multiple ICs
- Different start-up voltages for open diagnostics can be chosen: VS=7.5V, 9V, 10V and 15V
- “Single Lamp” mode disables all LEDs in case of a failure
- Automotive qualified (AEC-Q100)

Applications
- Automotive LED Lighting, Rear Lighting
- Turn Indicator Driver
- Low Current Interior Lighting
- Industrial LED Applications or simple RGB Drivers

Board
- Order No. see page 58

Packages
- SOIC8EP

Application Diagram

---

Triple Linear LED Controller (14 to 55mA) | E522.90-93

Key Features
- Operating Input Voltage Range 5V to 25V, max. 40V
- Three independent high-side Current Sources (3*55mA)
- Parallel Operation for up to 165mA
- Low Power Standby / Sleep Mode
- Thermal Management Option per Channel
- External Reference Voltage / Derating Supported
- Automotive qualified (AEC-Q100)

Applications
- Automotive LED lighting application
  - Rear Lamp (e.g. Brake Lamp, Reverse Light, Back Up Light, Rear Fog Light, Rear Light Module)
  - Driving of OLEDs in cathode to GND topology

Board
- Order No. see page 58

Packages
- SOIC16N-EP

Application Diagram
## Power Management - DC/DC Converter

### Automotive

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>\text{I}_{\text{MAX}}</th>
<th>Efficiency</th>
<th>\text{V}_{\text{SUPPLY}}</th>
<th>\text{V}_{\text{DUT}}</th>
<th>Package</th>
<th>Comment / Converter Topology</th>
</tr>
</thead>
<tbody>
<tr>
<td>E522.01 Low Quiescent Current PFM Step Down Converter (5V/500mA)</td>
<td>500mA</td>
<td>&gt;92%</td>
<td>4.3V to 40V</td>
<td>5V</td>
<td>QFN20L4 / TSSOP16</td>
<td>Idle current of 12µA typ. Sleep current of 8µA typ. Input voltage up to 40V Up to 100% duty cycle Undervoltage lockout</td>
</tr>
<tr>
<td>E522.02 Low Quiescent Current PFM Step Down Converter (3.3V/500mA)</td>
<td>500mA</td>
<td>&gt;92%</td>
<td>4.3V to 40V</td>
<td>3.3V</td>
<td>QFN20L4 / TSSOP16</td>
<td>Idle current of 12µA typ. Sleep current of 8µA typ. Input voltage up to 40V Up to 100% duty cycle Undervoltage lockout</td>
</tr>
<tr>
<td>E522.03 Low Quiescent Current PFM Step Down Converter (5V/350mA)</td>
<td>350mA</td>
<td>&gt;92%</td>
<td>4.3V to 40V</td>
<td>5V</td>
<td>QFN20L4 / TSSOP16</td>
<td>Idle current of 12µA typ. Sleep current of 8µA typ. Input voltage up to 40V Up to 100% duty cycle Undervoltage lockout</td>
</tr>
<tr>
<td>E522.04 Low Quiescent Current PFM Step Down Converter (3.3V/350mA)</td>
<td>350mA</td>
<td>&gt;92%</td>
<td>4.3V to 40V</td>
<td>3.3V</td>
<td>QFN20L4 / TSSOP16</td>
<td>Idle current of 12µA typ. Sleep current of 8µA typ. Input voltage up to 40V Up to 100% duty cycle Undervoltage lockout</td>
</tr>
<tr>
<td>E522.05 Low Quiescent Current PFM Step Down Converter (Adjustable Voltage/500mA)</td>
<td>500mA</td>
<td>&gt;92%</td>
<td>4.3V to 40V</td>
<td>1.5V to 40V</td>
<td>QFN20L4 / TSSOP16</td>
<td>Idle current of 12µA typ. Sleep current of 8µA typ. Input voltage up to 40V Up to 100% duty cycle Undervoltage lockout</td>
</tr>
<tr>
<td>E522.06 Low Quiescent Current PFM Step Down Converter (Adjustable Voltage/350mA)</td>
<td>350mA</td>
<td>&gt;92%</td>
<td>4.3V to 40V</td>
<td>1.5V to 40V</td>
<td>QFN20L4 / TSSOP16</td>
<td>Idle current of 12µA typ. Sleep current of 8µA typ. Input voltage up to 40V Up to 100% duty cycle Undervoltage lockout</td>
</tr>
<tr>
<td>Part No. / Description</td>
<td>I_{\text{MAX}}</td>
<td>Efficiency</td>
<td>V_{\text{Supply}}</td>
<td>V_{\text{OUT}}</td>
<td>Package</td>
<td>Comment / Converter Topology</td>
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<td>-----------------------------</td>
</tr>
</tbody>
</table>
| E522.07 Low Quiescent Current PFM Step Down Converter (5V/1A) | 1000mA | >92% | 4.3V to 40V | 5V | QFN20L4 | - Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.08 Low Quiescent Current PFM Step Down Converter (3.3V/1A) | 1000mA | >92% | 4.3V to 40V | 3.3V | QFN20L4 | - Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.09 Low Quiescent Current PFM Step Down Converter (Adjustable Voltage/1A) | 1000mA | >92% | 4.3V to 40V | 1.5V to 40V | QFN20L4 | - Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.10 Low Quiescent Current PFM Step Down Converter (2A Buck Converter) | 2000mA | >90% | 3.6V to 40V | 0.8V to 40V | QFN20L4 SOIC8-EP | - Idle current of 15µA typ.  
- Sleep current of 10µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.41/43 Automotive USB 2.0 Supply with Data Line Protection and I²C Interface | 2500mA | >90% | 6.0V to 32V (tran. 42V) | 5V | QFN20L5 | - Fixed frequency 250kHz .. 2MHz ± 25% synchronizable  
- Fixed 5V ± 3% USB Bus voltage with seven programmable negative resistance adjustments  
- SDP, BC 1.2, CDP, DCP and individual USB charging modes |
## Power Management - DC/DC Converter

### Industry

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>( I_{\text{MAX}} )</th>
<th>Efficiency</th>
<th>( V_{\text{SUPPLY}} )</th>
<th>( V_{\text{OUT}} )</th>
<th>Package</th>
<th>Comment / Converter Topology</th>
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<tbody>
<tr>
<td>E522.71 Low Power</td>
<td>500mA</td>
<td>&gt;90%</td>
<td>4.3V to 40V</td>
<td>5V</td>
<td>SOIC8-EP</td>
<td>- Industry version</td>
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<tr>
<td>(5V/500mA)</td>
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<td>- Sleep current of 8µA typ.</td>
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<td>- Input voltage up to 40V</td>
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<td>- Up to 100% duty cycle</td>
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<td></td>
<td>- Undervoltage lockout</td>
</tr>
<tr>
<td>E522.72 Low Power</td>
<td>500mA</td>
<td>&gt;90%</td>
<td>4.3V to 40V</td>
<td>3.3V</td>
<td>SOIC8-EP</td>
<td>- Industry version</td>
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<td>- Input voltage up to 40V</td>
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<td>- Up to 100% duty cycle</td>
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<td>- Undervoltage lockout</td>
</tr>
<tr>
<td>E522.73 Low Power</td>
<td>350mA</td>
<td>&gt;90%</td>
<td>4.3V to 40V</td>
<td>5V</td>
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<td>- Industry version</td>
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<td>- Idle current of 12µA typ.</td>
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<td>- Up to 100% duty cycle</td>
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<td>- Undervoltage lockout</td>
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<tr>
<td>E522.74 Low Power</td>
<td>350mA</td>
<td>&gt;90%</td>
<td>4.3V to 40V</td>
<td>3.3V</td>
<td>SOIC8-EP</td>
<td>- Industry version</td>
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<td>- Idle current of 12µA typ.</td>
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<td>- Input voltage up to 40V</td>
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<td>- Up to 100% duty cycle</td>
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<td>- Undervoltage lockout</td>
</tr>
<tr>
<td>E522.75 Low Power</td>
<td>500mA</td>
<td>&gt;90%</td>
<td>4.3V to 40V</td>
<td>1.5V to 40V</td>
<td>SOIC8-EP</td>
<td>- Industry version</td>
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<tr>
<td>Step Down Converter</td>
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<td>- Idle current of 12µA typ.</td>
</tr>
<tr>
<td>(Adjustable Voltage/500mA)</td>
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<td>- Sleep current of 8µA typ.</td>
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<td>- Input voltage up to 40V</td>
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<td>- Up to 100% duty cycle</td>
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<td>- Undervoltage lockout</td>
</tr>
<tr>
<td>Part No. / Description</td>
<td>( I_{\text{MAX}} )</td>
<td>Efficiency</td>
<td>( V_{\text{SUPPLY}} )</td>
<td>( V_{\text{OUT}} )</td>
<td>Package</td>
<td>Comment / Converter Topology</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| E522.76  
Low Power  
Step Down Converter (Adjustable Voltage/350mA)                             | 350mA               | >90%       | 4.3V to 40V       | 1.5V to 40V     | SOIC8-EP | - Industry version  
- Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.77  
Low Power  
Step Down Converter (5V/1A)                                                          | 1000mA              | >90%       | 4.3V to 40V       | 5V              | SOIC8-EP | - Industry version  
- Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.78  
Low Power  
Step Down Converter (3.3V/1A)                                                         | 1000mA              | >90%       | 4.3V to 40V       | 3.3V            | SOIC8-EP | - Industry version  
- Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
| E522.79  
Low Power  
Step Down Converter (Adjustable Voltage/1A)                                           | 1000mA              | >90%       | 4.3V to 40V       | 1.5V to 40V     | SOIC8-EP | - Industry version  
- Idle current of 12µA typ.  
- Sleep current of 8µA typ.  
- Input voltage up to 40V  
- Up to 100% duty cycle  
- Undervoltage lockout |
Low Quiescent Current PFM Step Down Converters | E522.01-09

**Key Features**
- Voltage range 4.3V to 40V
- PFM operation up to 1.33MHz
- Up to >92% efficiency
- Very low 8µA sleep mode current
- Ultra low 12µA standby current
- 100% duty cycle capability
- Junction temperature range -40°C to +150°C
- Automotive qualified (AEC-Q100)

**Applications**
- Supply of
  - Microcontroller systems
  - Automotive telematics, dashboards
  - Partial networking systems
  - Peripheral control systems

**Packages**
- QFN20L4
- TSSOP16

**Board**
- Order No. see page 58

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Low Quiescent Current PFM Step Down Converters | E522.10

**Key Features**
- Voltage range 3.6V to 40V
- PFM operation up to 1.33MHz
- Up to >92% efficiency
- Very low 10µA sleep mode current
- Idle current 15µA
- 100% duty cycle capability
- Junction temperature range -40°C to +150°C
- Automotive qualified (AEC-Q100)

**Applications**
- Supply of
  - Microcontroller systems
  - Automotive telematics, dashboards
  - Partial networking systems
  - Peripheral control systems

**Packages**
- QFN20L4
- SOIC8-EP

**Board**
- Order No. see page 59

---

**Application Diagram**

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**Application Diagram**
Automotive USB 2.0 Supply w. Data Line Protection a. I²C Interface | E522.41/43

Key Features
- Wide input voltage range from 6V to 32V (tran. 42V)
- PWM Step-Down converter 250kHz, 500kHz, 1MHz or 2MHz
- Advanced PWM voltage regulation with 100% duty cycle
- Fixed 5V±3% USB BUS voltage, w. negative resistance adjustm.
- Output currents of 0.5/1A/1.5A/2.5A w. fixed limits or regulation
- ±25% synchronizable to center frequencies
- Wake-on USB functionality
- Automotive qualified (AEC-Q100)

Board
- Order No. see page 58

Applications
- Automotive infotainment and navigation
- USB-Chargers

Application Diagram

Low Power Step Down Converters | E522.71-79

Key Features
- Voltage range 4.3V to 40V
- PFM operation up to 1.33MHz
- Up to >92% efficiency
- Very low sleep mode current, 8µA
- Ultra low 12µA standby current
- 100% duty cycle capability
- Junction temperature range -40°C to +150°C

Board
- Order No. see page 58

Applications
- High efficient, low power industrial supplies
- Supplies for consumer products
- High efficient, low cost, shuntless led drivers

Application Diagram
## Power Management - LDO

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>Recommended $I_{\text{MAX}}$</th>
<th>$V_{\text{SUPPLY}}$</th>
<th>$V_{\text{OUT}}$</th>
<th>Package</th>
<th>Comment / Converter Topology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E522.40</strong> Dual LDO with Diagnosis</td>
<td>2x 200mA</td>
<td>4.5V to 25V</td>
<td>3.3V to $V_{\text{BAT}}$</td>
<td>QFN20L5</td>
<td>• ADC capturing of relevant voltages and currents&lt;br&gt;• I²C interface for programming and monitoring&lt;br&gt;• Multiple protection features</td>
</tr>
<tr>
<td><strong>E522.44</strong> Triple Antenna Supply</td>
<td>1x 350mA, 1x 200mA, 1x 80mA</td>
<td>4.5V to 40V</td>
<td>3V to 40V</td>
<td>DFN18L5040</td>
<td>• Parallel regulator operation&lt;br&gt;• ADC capturing of relevant voltages and currents&lt;br&gt;• I²C interface for programming and monitoring&lt;br&gt;• Multiple protection features</td>
</tr>
<tr>
<td><strong>E522.51</strong> Dual Buck - Quad LDO</td>
<td>1x 800mA, 1x 320mA, 3x 350mA</td>
<td>5.2V to 40V</td>
<td>0.5V to 6V</td>
<td>QFN48L7</td>
<td>• 2 fixed frequency step-down converters&lt;br&gt;• Multifunctional watchdog&lt;br&gt;• Power sequencer&lt;br&gt;• Supply monitoring&lt;br&gt;• SPI Interface</td>
</tr>
<tr>
<td><strong>E522.52</strong> Dual Buck - Quad LDO</td>
<td>2x 350mA, 1x 700mA, 1x 1000mA, 1x 1500mA</td>
<td>5.2V to 40V</td>
<td>0.5V to 6V</td>
<td>QFN48L7</td>
<td>• 2 fixed frequency step-down converters&lt;br&gt;• Multifunctional watchdog&lt;br&gt;• Power sequencer&lt;br&gt;• Supply monitoring&lt;br&gt;• SPI Interface</td>
</tr>
</tbody>
</table>
**Dual LDO with Diagnosis | E522.40**

**Key Features**
- Input voltage range from 4.5V to 25V
- Two accurate output voltages from 3.3V to \( V_{\text{BAT}} \)
- Up to 200mA load current with integrated current limit
- Programmable overcurrent and open load detection levels
- Over voltage, overtemperature a. output voltage error protection
- Open-drain error flag for interrupt generation
- 8bit ADC samples system voltages and current ranges
- Optional external NPN pre-regulator
- Programmable comparator for additional control functions

**Applications**
- Automotive antenna modules
- Navigation and radio units
- General voltage regulator applications

**Application Diagram**

---

**Triple Antenna Supply | E522.44**

**Key Features**
- Input voltage range from 4.5V to 40V
- Resistor programmable output voltage
- Output voltage range 3 to 40V
- Three channels with up to 350mA output current capability
- Parallel regulator operation
- Switch mode operation Output current and voltage sensing
- Thermal protection and temperature monitoring
- Over current/open load protection

**Applications**
- Automotive Antenna Modules
- Navigation and Radio Units
- General Voltage Regulator Applications
- Sensors

**Application Diagram**
Dual Buck - Quad LDO | E522.51/52

**Key Features**

- **Fixed frequency primary buck converter**
  \(V_{\text{IN}}\) max. 40V | \(V_{\text{OUT}}\) from 4V to 6V | \(I_{\text{OUT}}\) max. 800mA/1550mA
- **Fixed frequency secondary buck converter**
  \(V_{\text{IN}}\) max. 6V | \(V_{\text{OUT}}\) from 0.8V to 5.1V
- **LDO 1 (Master)** Input voltage max. to 40V supporting always-on mode, Outp. voltage progr. in 0.05V steps
- **LDO 2 - 4 (with tracking option)** Input voltage max. 6V Output voltage programmable in 0.05V steps

**Applications**

- Microcontroller supply

**Board**

- Order No. see page 59

**Application Diagram**

**Packages**

- QFN48L7
#1 in LED ambient light
For an atmosphere of wellbeing.
## Power Management - Boards

### Lighting

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E522.31</td>
<td>EMV Boost to Battery Converter (650mA)</td>
<td>Demoboard</td>
<td>K52231-0002</td>
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<tr>
<td>E522.31</td>
<td>EMV Boost to GND Converter (500mA)</td>
<td>Demoboard</td>
<td>K52231-0003</td>
</tr>
<tr>
<td>E522.31</td>
<td>Sepic Converter (750mA)</td>
<td>Demoboard</td>
<td>K52231-0004</td>
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<tr>
<td>E522.31</td>
<td>Buck to Battery Converter (3A)</td>
<td>Demoboard</td>
<td>K52231-0005</td>
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<td>E522.32</td>
<td>Headlight LED Demo (2x Boost to Battery Topology) for High Beam, Low Beam (1A) and Daytime Running Light (750mA)</td>
<td>Demoboard</td>
<td>K52232-0003</td>
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<tr>
<td>E522.32</td>
<td>Buck to Battery dual phase Converter (6A)</td>
<td>Demoboard</td>
<td>K52232-0004</td>
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<tr>
<td>E522.46</td>
<td>8 Channel LED Driver with I2C Interface</td>
<td>Evaluation Kit</td>
<td>K52246-0002</td>
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<tr>
<td>E522.8x</td>
<td>Master Controllerboard</td>
<td>Demoboard</td>
<td>K5228x-0001</td>
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<tr>
<td>E522.81</td>
<td>LED Slaveboard Red (3x3 red)</td>
<td>Demoboard</td>
<td>K52281-0001</td>
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<tr>
<td>E522.83</td>
<td>LED Slaveboard RGB (3x red, 3x green, 3x blue)</td>
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<td>E522.9x</td>
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### DC/DC Converter

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<td>E522.02</td>
<td>Low Quiescent Current PFM Step Down Converter (3.3V/500mA)</td>
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<td>E522.03</td>
<td>Low Quiescent Current PFM Step Down Converter (5V/350mA)</td>
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<td>E522.04</td>
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<td>E522.05</td>
<td>Low Quiescent Current PFM Step Down Converter (Adjustable Voltage/500mA)</td>
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<td>E522.07</td>
<td>Low Quiescent Current PFM Step Down Converter (5V/1A)</td>
<td>Demoboard</td>
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<td>E522.07</td>
<td>Low Quiescent Current PFM Step Down Converter (Constant Current)</td>
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<td>E522.08</td>
<td>Low Quiescent Current PFM Step Down Converter (3.3V/1A)</td>
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<td>E522.09</td>
<td>Low Quiescent Current PFM Step Down Converter (Adjustable Voltage/1A)</td>
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Elmos Product Catalog | 2018/2019
## DC/DC Converter

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<tr>
<td>E522.10</td>
<td>Low Quiescent Current PFM Step Down Converter (2A Buck Converter)</td>
<td>Demoboard Adjustable High Frequency Low Power 2A Step Down Converter (V-Demo)</td>
<td>KS2210-0001</td>
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<tr>
<td>E522.10</td>
<td>Low Quiescent Current PFM Step Down Converter (2A Buck Converter)</td>
<td>Demoboard Adjustable High Frequency Low Power 2A Step Down Converter for Constant Current Application (CC-Demo)</td>
<td>KS2210-0002</td>
</tr>
<tr>
<td>E522.10</td>
<td>Low Quiescent Current PFM Step Down Converter (2A Buck Converter)</td>
<td>Demoboard High Frequency Low Power Adjustable Voltage 2A Step Down / Step up Converter (ZETA-Topologie)</td>
<td>KS2210-0003</td>
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<tr>
<td>E522.10</td>
<td>Low Quiescent Current PFM Step Down Converter (2A Buck Converter)</td>
<td>Demoboard High Frequency Constant Current (350mA) Step down / Step up Converter (ZETA-Topologie)</td>
<td>KS2210-0004</td>
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<tr>
<td>E522.41</td>
<td>Automotive USB Supply with Data-Line Protection and ( \text{I}^2\text{C} ) Interface</td>
<td>Evaluation Kit</td>
<td>KS2241-0001</td>
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</table>

## LDO

<table>
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<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
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<tr>
<td>E522.40</td>
<td>Dual LDO with Diagnosis</td>
<td>Evaluation Board</td>
<td>KS2240-0001</td>
</tr>
<tr>
<td>E522.44</td>
<td>Tripple Antenna Supply</td>
<td>Evaluation Board</td>
<td>KS2244-0001</td>
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</table>
## Interface - PSI5 Transceiver

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V&lt;sub&gt;supply&lt;/sub&gt;</th>
<th>I&lt;sub&gt;q&lt;/sub&gt; (mA)</th>
<th>ESD (kV)</th>
<th>Bitrate</th>
<th>Package</th>
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<tbody>
<tr>
<td>E521.40 2-Channel Multi-Mode PSI5 Transceiver</td>
<td>5.3V to 19V</td>
<td>1</td>
<td>4</td>
<td>up to 189 Kbit/s</td>
<td>QFN20L5 SOIC20</td>
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<tr>
<td>E521.41 4-Channel Multi-Mode PSI5 Transceiver</td>
<td>5.3V to 19V</td>
<td>2</td>
<td>4</td>
<td>up to 189 Kbit/s</td>
<td>QFN20L5 SOIC20</td>
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<tr>
<td>E981.07 2-Channel Sensor Interface PSI5</td>
<td>8.5V to 25V</td>
<td>1</td>
<td>4</td>
<td>125 Kbit/s</td>
<td>QFN20L5</td>
</tr>
<tr>
<td>E981.08 4-Channel Sensor Interface PSI5</td>
<td>8.5V to 25V</td>
<td>1</td>
<td>4</td>
<td>125 Kbit/s</td>
<td>QFN32L7</td>
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</tbody>
</table>
2-/4-Channel Multi-Mode PSI5 Transceiver | E521.40/41

Key Features
- Provides two respective, four master channels compliant with PSI5 standard v1.3 and v2.1
- Support 125 Kbit/s, 189 Kbit/s, synchronous and asynchronous modes
- Internal sync-voltage generation
- Programmable bus-voltage 4.6V to 11V
- Automatic threshold adaption to sensor quiescent current
- Reverse polarity protected bus outputs up to 40V

Applications
- Safety (airbag) control systems
- Powertrain control systems
- Vehicle dynamics control system

Application Diagram

Board
- Order No. see page 74

2-/4-Channel Sensor Interface PSI5 | E981.07/08

Key Features
- Two respective, four independent operating channels
- Device parameters comply with PSI5-P10P-500/3L (PSI5 spec 1.3)
- Applicable for parallel and universal mode (standard) as well as daisy chain mode (increased)
- Channel output short circuit protected against 40V and GND

Applications
- Passenger restraint systems

Application Diagram

Board
- Order No. see page 74

Packages
- QFN20LS
- SOIC20

Applications Packages
- Passengers restraint systems
- QFN32L7
- QFN20LS respective
## Interface - CAN Transceiver and System Basis Chip

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>Interface</th>
<th>VSUPPLY</th>
<th>Iq (µA)</th>
<th>VDD</th>
<th>ESD (kV)</th>
<th>Bitrate</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td><strong>E520.14</strong> Quad-CAN Transceiver</td>
<td></td>
<td>11898-2/-5</td>
<td>5.5V to 30V</td>
<td>30</td>
<td>5V</td>
<td>6</td>
<td>up to 1 Mbit/s</td>
</tr>
<tr>
<td><strong>E521.21</strong> CAN-FD SBC with DC/DC and Highside Switch</td>
<td></td>
<td>11898-2/-5</td>
<td>5.5V to 40V</td>
<td>30</td>
<td>3.3V</td>
<td>8</td>
<td>up to 2 Mbit/s</td>
</tr>
<tr>
<td><strong>E521.22</strong> CAN-FD SBC with LDO and Highside Switch</td>
<td></td>
<td>11898-2/-5</td>
<td>5.5V to 40V</td>
<td>30</td>
<td>3.3V</td>
<td>8</td>
<td>up to 2 Mbit/s</td>
</tr>
<tr>
<td><strong>E521.23</strong> CAN-FD SBC with DC/DC and Highside Switch</td>
<td></td>
<td>11898-2/-5</td>
<td>5.5V to 40V</td>
<td>30</td>
<td>5V</td>
<td>8</td>
<td>up to 2 Mbit/s</td>
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<tr>
<td><strong>E521.24</strong> CAN-FD SBC with LDO and Highside Switch</td>
<td></td>
<td>11898-2/-5</td>
<td>5.5V to 40V</td>
<td>30</td>
<td>5V</td>
<td>8</td>
<td>up to 2 Mbit/s</td>
</tr>
</tbody>
</table>
Quad-CAN Transceiver | E520.14

Key Features
- Operating voltage range 5.5V to 30V
- Compliant with ISO 11898-2 and ISO 11898-5
- Supports local and remote wake-up
- Supports low-power modes like sleep and stand-by
- Sleep current consumption typ. 30µA with all wake-up sources enabled
- SPI-compatible interface for configuration and diagnosis
- Three independent voltage monitors
- Fault monitor configurable for each branch

Board
- Order No. see page 74

Applications
- Body Domain Controller
- Gateways

Packages
- QFN32L5

Application Diagram
CAN-FD SBC with DC/DC and Highside Switch | E521.21/23

Key Features
- Voltage regulator 3.3V/5V
- DC/DC buck converter up to 200mA
- HS-CAN-FD transceiver (ISO 11898-2:2016) up to 2 Mbit
- Charge pump for external active reverse polarity protection
- Sensor supply voltage regulator 5V/50mA
- Integrated high-side switch typ. 0.15Ω with current sense
- Gate control for external high-side driver (NMOS power FET)

Applications
- ECU connected to the CAN bus
- Front light modules
- Body computer

Packages
- QFN32L5

Application Diagram

---

CAN-FD SBC with LDO and Highside Switch | E521.22/24

Key Features
- Voltage regulator 3.3V/5V
- Linear Regulator up to 200mA
- HS-CAN-FD transceiver (ISO 11898-2:2016) up to 2 Mbit
- Charge pump for external active reverse polarity protection
- Sensor supply voltage regulator 5V/50mA
- Integrated high-side switch typ. 0.15Ω with current sense
- Gate control for external high-side driver (NMOS power FET)

Applications
- ECU connected to the CAN bus
- Front light modules
- Body computer

Packages
- QFN32L5

Application Diagram
Leading solutions for nearly every network
# Interface - LIN Transceiver and System Basis Chip

## LIN Transceiver and System Basis Chip

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>Interface</th>
<th>V\textsubscript{SUPPLY}</th>
<th>Iq (µA)</th>
<th>V\textsubscript{DD}</th>
<th>ESD (kV)</th>
<th>Bitrate</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elmos Part No. E520.34 LIN SBC with Voltage Regulator and Watchdog (3.3V)</td>
<td>LIN 2.1, LIN 2.2, SAE-J2602</td>
<td>5V to 28V</td>
<td>10</td>
<td>3.3V</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
<td>QFN20L5</td>
</tr>
<tr>
<td>E520.35 LIN SBC with Voltage Regulator and Watchdog (5V)</td>
<td>LIN 2.1, LIN 2.2, SAE-J2602</td>
<td>5V to 28V</td>
<td>10</td>
<td>5V</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
<td>QFN20L5</td>
</tr>
<tr>
<td>E521.25 LIN SBC with Voltage Regulator</td>
<td>LIN 2.1, LIN 2.2, SAE-J2602</td>
<td>5V to 28V</td>
<td>10</td>
<td>3.3V</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
<td>QFN20L5</td>
</tr>
<tr>
<td>E521.50 Quad LIN Transceiver</td>
<td>LIN 2.1, LIN 2.2, SAE-J2602</td>
<td>5V to 28V</td>
<td>17</td>
<td>-</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
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*SoC  System-on-a-Chip | with integrated microcontroller

## LIN RGB Controller

<table>
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<th>Part No. / Description</th>
<th>Interface</th>
<th>V\textsubscript{SUPPLY}</th>
<th>Iq (µA)</th>
<th>V\textsubscript{DD}</th>
<th>ESD (kV)</th>
<th>Bitrate</th>
<th>Package</th>
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</thead>
<tbody>
<tr>
<td>Elmos Part No. E521.31 LIN Controller with Position Detection</td>
<td>LIN 2.1, LIN 2.2, SAE-J2602</td>
<td>5V to 28V</td>
<td>10</td>
<td>5V</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
<td>QFN32L5</td>
</tr>
<tr>
<td>E521.36 RGB LIN Controller with Current Source</td>
<td>LIN 2.1, LIN 2.2, SAE-J2602</td>
<td>5V to 28V</td>
<td>15</td>
<td>-</td>
<td>8</td>
<td>up to 20 Kbit/s</td>
<td>SOIC8-EP</td>
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</tbody>
</table>
LIN SBC with Voltage Regulator and Watchdog (3.3V/5V) | E520.34/35

**Key Features**
- Transceiver compliant with LIN 2.1, LIN 2.2 and SAE-J2602
- Linear voltage regulator with 3.3V (E520.34) or 5V (E520.35), 100mA
- Voltage regulator accuracy ±2% in active mode
- µC window watchdog
- BUS pin ESD-protected ±8 kV according to IEC-61000-4-2
- Fast flash mode, configurable watchdog, \( V_{\text{BAT}} \) divider
- Typical current: standby mode 70µA and sleep mode 10µA

**Applications**
- Smart applications connected to the LIN bus

**Board**
- Order No. see page 75

**Packages**
- QFN20L5

---

**LIN SBC with Voltage Regulator | E521.25**

**Key Features**
- LIN transceiver, V 2.1, V2.2 SAE-J2602, ISO9141
- Operating range V5 5V up to 28V
- Limited functional range 3.8V up to 40V
- Typ. 10µA sleep current consumption
- Very low BUS leakage current
- Reset generation
- µC window watchdog
- Internal 1:6 Voltage Divider for \( V_{\text{BAT}} \) Sensing
- 3.3V (2%) in active mode, (5%) in standby mode

**Applications**
- Smart applications connected to the LIN bus

**Packages**
- QFN20L5

---

**Application Diagram**

![Application Diagram LIN SBC with Voltage Regulator and Watchdog](image)

![Application Diagram LIN SBC with Voltage Regulator](image)
Quad LIN Transceiver | E521.50

**Key Features**
- Input voltage range 5V to 28V
- 4 LIN transceiver V2.1, V2.2, SAE-J2602, ISO9141
- Bus over-current limitation
- Low standby mode current
- LIN remote wake-up detection
- LIN flash mode up to 115 kBit/s

**Applications**
- Body control units

**Packages**
- TSSOP16

**Application Diagram**

LIN Controller with Position Detection | E521.31

**Key Features**
- Transceiver compliant with LIN 2.1, LIN 2.2 and SAE-J2602
- Linear voltage regulator with 5V, 100mA
- State of the art 16bit µC
- Integrated 32kbyte Flash (Flexible EEPROM emulation by SW)
- 4x PWM driven High Side drivers with 5V and up to 30mA each
- µC window watchdog
- ADC 12bit accuracy

**Board**
- Order No. see page 74

**Applications**
- Interior light modules

**Packages**
- QFN32L5

**Application Diagram**
RGB LIN Controller with Current Source | E521.36

Key Features
- Input voltage range 5V to 28V
- Integrated 16 bit microcontroller
- 32kByte OTP
- 128Byte customer usable non-volatile memory
- 1.25kByte RAM 16kByte SysROM containing standard LIN routines and boot loader
- 4 PWM generators with 48MHz and 16bit resolution
- 2 Timer with 16bit resolution

Board
- Order No. see page 74

Applications
- Interior light modules
- Ambient lighting

Packages
- SOIC8-EP

Application Diagram
## Interface - KNX/EIB Transceiver

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V$_{\text{Ssupply}}$</th>
<th>Iq (mA)</th>
<th>V$_{\text{DD}}$</th>
<th>ESD (kV)</th>
<th>Bitrate</th>
<th>Package</th>
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<tbody>
<tr>
<td>E981.03 KNX/EIB Transceiver</td>
<td>19V to 33V</td>
<td>1.9 ¹)</td>
<td>3.3V/5V</td>
<td>2</td>
<td>9.6 Kbit/s</td>
<td>QFN32L7</td>
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<td></td>
<td></td>
<td></td>
<td>19.2 Kbit/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>115.2 Kbit/s</td>
<td></td>
</tr>
<tr>
<td>E981.23 KNX-Transceiver with Hardware Current</td>
<td>19V to 33V</td>
<td>1.9 ¹)</td>
<td>3.3V/5V</td>
<td>2</td>
<td>9.6 Kbit/s</td>
<td>QFN32L7</td>
</tr>
<tr>
<td>Programming</td>
<td></td>
<td></td>
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<td>19.2 Kbit/s</td>
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<tr>
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<td>115.2 Kbit/s</td>
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<td>E981.33 KNX-Bit Transceiver with Hardware Current</td>
<td>19V to 33V</td>
<td>1.9 ¹)</td>
<td>3.3V/5V</td>
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<td>9.6 Kbit/s</td>
<td>QFN32L7</td>
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<tr>
<td>Programming</td>
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<td>19.2 Kbit/s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>115.2 Kbit/s</td>
<td></td>
</tr>
</tbody>
</table>

¹) Typical value for V$_{\text{DD}}$ = 3.3V
**KNX/EIB Transceiver | E981.03**

**Key Features**
- KNX/EIB transceiver, certified according to KNX TP1-256
- Analog mode supported
- Configurable bus current (maximum current and slew rate)
- Voltage regulators
  - 20V: current capability up to 20mA
  - 3.3V or 5V DC/DC converter: current capability up to 70mA
- UART host interface (data rate up to 115.2 Kbit/s)
- SPI for configuration (optional)

**Board**
- Order No. see page 75

**Applications**
- Sensors, actuators, routers, gateways,
  Bus-powered or externally supplied
- Security applications

**Application Diagram**

**KNX-Transceiver with Hardware Current Programming | E981.23**

**Key Features**
- KNX/EIB transceiver, certified according to KNX TP1-256
- Analog mode supported
- Configuration pins for bus current & slope
- Configuration pins for external clock frequency 8 or 7.3728 MHz
- Further configuration and diagnosis via UART
- Voltage regulators
  - 20V: current capability up to 25mA
  - 3.3V or 5V DC/DC converter: current capability up to 100mA

**Board**
- Order No. see page 75

**Applications**
- Sensors, actuators, routers, gateways,
  Bus-powered or externally supplied
- Security applications

**Application Diagram**
**KNX-Bit Transceiver with Hardware Current Programming | E981.33**

### Key Features
- KNX/EIB transceiver, certified according to KNX TP1-256
- Analog mode supported
- Configuration pins for bus current & slope
- Configuration pins for external clock frequency 8 or 7.3728 MHz
- Further configuration and diagnosis via bit transceiver
- Voltage regulators
  - 20V: current capability up to 25mA
  - 3.3V or 5V DC/DC converter: current capability up to 100mA

### Applications
- Sensors, actuators, routers, gateways, Bus-powered or externally supplied
- Security applications

### Board
- KNX EIB transceiver analog mode
- KNX EIB transceiver with medium access control
- Compatible to KNX TP1-256 supporting extended frames up to 254 Bytes payload
- Configuration pins for bus current & slope
- Configuration pins for external clock frequency 8 or 7.3728 MHz
- Further configuration and diagnosis via SPI UART
- UART host interface up to 115kBaud with optional CRC
- Power management functionality with host wake up on received KNX telegram content
- Buck voltage regulator for 3.3 or 5V for up to 70mA 100mA 100mA
- Linear voltage regulator for 20V up to 25mA
- Over temperature monitoring/protection
- Operating temperature range –25°C to +85°C
- QFN32L7 package (all pin compatible)

### Packages
- QFN32L7

### Application Diagram
Make your home smart with KNX network solutions
# Interface - Boards

## PSIS Transceiver

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E521.41</td>
<td>4-Channel Multi-Mode PSIS Transceiver</td>
<td>Demoboard</td>
<td>K52141-0001</td>
</tr>
<tr>
<td>E981.07</td>
<td>2-Channel Sensor Interface PSIS</td>
<td>Evaluation Board</td>
<td>K98107-0001</td>
</tr>
<tr>
<td>E981.07</td>
<td>2-Channel Sensor Interface PSIS</td>
<td>Adapter Board</td>
<td>K98107-0002</td>
</tr>
</tbody>
</table>

## CAN Transceiver and System Basis Chip

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.14</td>
<td>Quad-CAN Transceiver</td>
<td>Evaluation Board</td>
<td>K52014-0001</td>
</tr>
</tbody>
</table>

## Interior Lighting & LIN Controller

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E521.31</td>
<td>LIN RGB Controller with Position Detection</td>
<td>Evaluation Board</td>
<td>K52131-0001</td>
</tr>
<tr>
<td>E521.31</td>
<td>LIN RGB Controller with Position Detection (CPU Board for K52131-0001)</td>
<td>CPU Board</td>
<td>K52131-0002</td>
</tr>
<tr>
<td>E521.31</td>
<td>LIN RGB Controller with Position Detection (Full Application in Small Size)</td>
<td>Mini-Demo</td>
<td>K52131-0003</td>
</tr>
<tr>
<td>E521.31</td>
<td>LIN RGB Controller with Position Detection (Auto-Addressing Test Board)</td>
<td>Evaluation Board</td>
<td>K52131-0004</td>
</tr>
<tr>
<td>E521.31</td>
<td>MiniMux (Mini-Demo Multiplexer)</td>
<td>Mini-Demo</td>
<td>K52131-0005</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source (CPU Board with removable socket)</td>
<td>Evaluation Board</td>
<td>K52136-0001</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source (CPU Board with removable socket ENPLAS)</td>
<td>CPU Board ENPLAS</td>
<td>K52136-0002</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source (CPU Board without removable socket)</td>
<td>CPU Board</td>
<td>K52136-0003</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source</td>
<td>Mini-Demo</td>
<td>K52136-0004</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source (CPU Board RAM Device)</td>
<td>CPU Board</td>
<td>K52136-0005</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source</td>
<td>Mini-Demo ENPLAS</td>
<td>K52136-0006</td>
</tr>
<tr>
<td>E521.36</td>
<td>RGB LIN Controller with Current Source</td>
<td>Mini-Demo RAM</td>
<td>K52136-0007</td>
</tr>
</tbody>
</table>
### LIN Transceiver and System Basis Chip

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.34</td>
<td>LIN SBC with Voltage Regulator and Watchdog (3.3V)</td>
<td>Evaluation Board</td>
<td>K52034-0001</td>
</tr>
<tr>
<td>E520.35</td>
<td>LIN SBC with Voltage Regulator and Watchdog (5V)</td>
<td>Evaluation Board</td>
<td>K52035-0001</td>
</tr>
</tbody>
</table>

### KNX/EIB Transceiver

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E981.03</td>
<td>KNX/EIB Transceiver</td>
<td>KNX TP Demoboard</td>
<td>K98103-0001</td>
</tr>
<tr>
<td>E981.03</td>
<td>KNX/EIB Transceiver</td>
<td>KNX TP 815 Evaluation Board V2</td>
<td>K98103-0002</td>
</tr>
<tr>
<td>E981.23</td>
<td>KNX/EIB Transceiver</td>
<td>KNX TP 815 Evaluation Board V2</td>
<td>K98123-0001</td>
</tr>
<tr>
<td>E981.33</td>
<td>KNX/EIB Transceiver</td>
<td>KNX TP 815 Evaluation Board V2</td>
<td>K98133-0001</td>
</tr>
</tbody>
</table>
## Special Projects - Safety

<table>
<thead>
<tr>
<th>Part No. / Description</th>
<th>V\textsubscript{SUPPLY}</th>
<th>V\textsubscript{ER}</th>
<th>Output</th>
<th>Range</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>E521.40 2-Channel Multi-Mode PSI5 Transceiver</td>
<td>5.3V to 19V</td>
<td>-</td>
<td>PSI5</td>
<td>-</td>
<td>QFN20L5 SOIC20</td>
</tr>
<tr>
<td>E521.41 4-Channel Multi-Mode PSI5 Transceiver</td>
<td>5.3V to 19V</td>
<td>-</td>
<td>PSI5</td>
<td>-</td>
<td>QFN20L5 SOIC20</td>
</tr>
<tr>
<td>E524.40 Safety Pressure Sensor with PSI5 Interface</td>
<td>5V to 18V</td>
<td>-</td>
<td>PSI5</td>
<td>400..1500hPa / 400..1900hPa</td>
<td>SOIC20 (cavity)</td>
</tr>
<tr>
<td>E981.07 2-Channel Sensor Interface PSI5</td>
<td>8.5V to 25V</td>
<td>-</td>
<td>PSI5</td>
<td>-</td>
<td>QFN20L5</td>
</tr>
<tr>
<td>E981.08 4-Channel Sensor Interface PSI5</td>
<td>8.5V to 25V</td>
<td>-</td>
<td>PSI5</td>
<td>-</td>
<td>QFN32L7</td>
</tr>
<tr>
<td>E981.17 4-Channel Airbag Squib Driver</td>
<td>4.5V to 5.5V</td>
<td>8V to 35V</td>
<td>-</td>
<td>-</td>
<td>QFN44L7</td>
</tr>
<tr>
<td>E981.18 8-Channel Airbag Squib Driver</td>
<td>4.5V to 5.5V</td>
<td>8V to 35V</td>
<td>-</td>
<td>-</td>
<td>QFN44L7</td>
</tr>
<tr>
<td>E981.20 4-Channel Squib Driver with Current Counter</td>
<td>4.5V to 5.5V</td>
<td>8V to 35V</td>
<td>-</td>
<td>-</td>
<td>QFN44L7</td>
</tr>
<tr>
<td>E981.21 8-Channel Squib Driver with Current Counter</td>
<td>4.5V to 5.5V</td>
<td>8V to 35V</td>
<td>-</td>
<td>-</td>
<td>QFN44L7</td>
</tr>
</tbody>
</table>
2-/4-Channel Multi-Mode PSIS Transceiver | E521.40/41

**Key Features**
- Provides two respective, four master channels compliant with PSIS standard v1.3 and v2.1
- Support 125 Kbit/s, 189 Kbit/s, synchronous and asynchronous modes
- Internal sync-voltage generation
- Programmable bus-voltage 4.6V to 11V
- Automatic threshold adaption to sensor quiescent current
- Reverse polarity protected bus outputs up to 40V

**Board**
- Order No. see page 86

**Applications**
- Safety (airbag) control systems
- Powertrain control systems
- Vehicle dynamics control system

**Packages**
- QFN20LS
- SOIC20

**Application Diagram**

---

Safety Pressure Sensor with PSIS Interface | E524.40

**Key Features**
- Standard pressure sensor for crash detection (side impact, pedestrian protection) according to specification AK-LV29 (VDA)
- PSIS data interface using synchronous or asynchronous transmission modes
- Pressure sensor cell integrated with the signal processing IC
- Input precision amplifier and signal chain:
  - Range 1: 400…1500 hPa, for “side impact detection”
  - Range 2: 400…1900 hPa, for “pedestrian protection”

**Board**
- Order No. see page 86

**Applications**
- Crash pressure sensor for passive safety
- Active pedestrian protection safety systems

**Packages**
- SOIC20

**Application Diagram**
### 2-/4-Channel Sensor Interface PSI5 | E981.07/08

**Key Features**
- Two respective, four independent operating channels
- Device parameters comply with PSI5-P10P-500/3L (PSI5 spec 1.3)
- Applicable for parallel and universal mode (standard) as well as daisy chain mode (increased)
- Channel output short circuit protected against 40V and GND

**Board**
- Order No. see page 86

**Applications**
- Passenger restraint systems

**Packages**
- QFN32L7
- QFN20LS respective

---

### 4-/8-Channel Airbag Squib Driver | E981.17/18

**Key Features**
- Two squib current modes (LCM and HCM) selectable via SPI commands
- Simultaneously firing of 4 loops possible
- Squib channel diagnostics and monitoring
- Autarky voltage & squib supply voltage diagnostics
- Separate low side and high side driver control
- Serial interface (SPI synchronous communication) to µC (3.3V and 5V tolerant inputs)

**Applications**
- Squib driver in a restraint diagnostic and control module (RDM)

**Packages**
- QFN44L7
4-/8-Channel Squib Driver with Current Counter | E981.20/21

Key Features

- Two squib current modes (LCM and HCM) selectable via SPI commands
- Simultaneously firing of 4 loops possible
- Squib channel diagnostics, monitoring and current counter
- Autarky voltage & squib supply voltage diagnostics
- Separate low side and high side driver control
- Serial interface (SPI synchronous communication) to µC (3.3V and 5V tolerant inputs)

Applications

- Squib driver in a restraint diagnostic and control module (RDM)

Packages

- QFN44L7

Application Diagram
## Special Projects - Engine Management

<table>
<thead>
<tr>
<th>Part No. / Function</th>
<th>$V_{\text{supply}}$</th>
<th>$R_{\text{DS(on)}}$</th>
<th>Interface</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E525.07 Glow Plug Control IC</td>
<td>5.5 V to 16 V (45 V)</td>
<td>4x Gate driver</td>
<td>PWM, SPI</td>
<td>QFN32L6</td>
<td>Slew rate controlled gate driver, Gate sequencing, Advanced diagnosis, Ground shift compensating</td>
</tr>
</tbody>
</table>
Glow Plug Control IC | E525.07

Key Features

- 4 gate drivers for external hi-side power-NMOS
- PWM controlled gate output with integrated charge pump
- Adjustable gate charge / discharge currents
- Gate sequencing for minimum current ripple
- MOS protection by gate-source voltage limitation
- Glow plug current sense with over-current shut-off
- Battery measurement, over-voltage and undervoltage, shut-down, charge pump monitoring

Applications

- Quick start Diesel engine controls for Euro 6
- Ceramic glow plugs
- Steel glow plugs
- For direct and indirect injection

Packages

- QFN32L6

Application Diagram
# Special Projects - Relay Driver

<table>
<thead>
<tr>
<th>Part No. / Function</th>
<th>High-Side Driven</th>
<th>Low-Side Driven</th>
<th>Bi-Stabil</th>
<th>Included µC</th>
<th>Interface</th>
<th>Feed-Back Inputs</th>
<th>Package</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>E520.02/08 *Driver IC</td>
<td>-</td>
<td>12/08</td>
<td>-</td>
<td>External</td>
<td>SPI</td>
<td>0 ( to ext.µC)</td>
<td>QFN32L5 QFN20L5 SOIC20 SOIC28</td>
<td>Automatical VBAT dependent PWM generation for constant holding current</td>
</tr>
<tr>
<td>E523.03/04 *SBC</td>
<td>1 or 1</td>
<td>6 or 3</td>
<td>External 3.3V/5V</td>
<td>LIN1.3/2.x/PWM</td>
<td>0 ( to ext.µC)</td>
<td>QFN44L7 QSOOP44 QFN48L7</td>
<td>Regulator</td>
<td>Watchdog</td>
</tr>
<tr>
<td>E523.01/11 *SBC</td>
<td>6 or 6</td>
<td>16 or 5</td>
<td>External 3.3V/5V</td>
<td>LIN1.3/2.x/PWM</td>
<td>0 ( to ext.µC)</td>
<td>QFN48L7 QSOOP44</td>
<td>Regulator</td>
<td>Watchdog</td>
</tr>
<tr>
<td>E523.02/12 *SBC</td>
<td>4 or 4</td>
<td>8 bit</td>
<td>External 3.3V/5V</td>
<td>LIN1.3/2.x/PWM</td>
<td>0 ( to ext.µC)</td>
<td>QFN48L7 QSOOP44</td>
<td>Regulator</td>
<td>Watchdog</td>
</tr>
<tr>
<td>E522.06 *SoC</td>
<td>6 or 6</td>
<td>16 or 5</td>
<td>16 bit 4-48Mhz</td>
<td>LIN1.3/2.x/PWM</td>
<td>Flashable via LIN</td>
<td>QFN48L7</td>
<td>32k FLASH (free programmble) 16k SysROM (hardware LIN library) 4k RAM</td>
<td></td>
</tr>
<tr>
<td>E523.30/34 *SoC</td>
<td>2 or 2</td>
<td>8 bit</td>
<td>16 bit 4-48Mhz</td>
<td>LIN1.3/2.x/PWM</td>
<td>LIN auto-addressing</td>
<td>QFN32L6</td>
<td>8k FLASH and ROM + 4k SysROM library switchable 5V supply for external needs 3.3V ADC reference for ratiometric measurements ROM version available</td>
<td></td>
</tr>
<tr>
<td>E523.31/37 Free Programmable LIN2 x Relay Node for 2-4 Relays</td>
<td>2 or 2</td>
<td>3</td>
<td>3</td>
<td>LIN1.3/2.x/PWM</td>
<td>LIN auto-addressing</td>
<td>QFN32L6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Plug & Play* Chip with defined functionality | no controller programming necessary

*SoC* System-on-a-Chip | with integrated microcontroller

*SBC* System-Basic-Chip | with Voltage Regulator Reset, Watchdog, physical Interface

*Driver IC* Driver Chip without SBC or SoC features
12/8x Low-Side Relay Driver with Constant Holding Current | E520.02/08

Key Features
- 12 high current outputs (RDS_{ON} typ. 1.5Ω / I_{MAX} = 350mA)
- Low standby current (typically <1µA)
- Serial interface (SPI) for direct µC interfacing
- Short circuit / Open load detection, diagnosis
- T_{Junc, peak} = +150°C

Applications
- Relay Driver with automatically \( V_{BAT} \)-dependent WM duty cycle generation
- Low power dissipating relay boards

Applications Diagram

LIN2.x Relay Node SBC for 1 Relay | E523.03/04/13/14

Key Features
- Voltage range 7V to 28V (5V to 42V peak)
- Controlling 1 low side driven relay or 1 high side driven relay
- Relay pull-in and holding current can be controlled via PWM input
- Power supply 3.3V or 5V for external controller
- LIN2.x(1.3), SAE-J2602 interface or bidirectional PWM
- Several Diagnostic and protection functions
- Adjustable window watchdog
- T_{Junc, peak} = +170°C

Applications
- LIN2.x or LIN1.3 relay nodes

Applications Diagram
LIN2.x Relay Node SBC for 6/5 relays | E523.01/11

Key Features
- Voltage range 7V to 28V (5V to 42V peak)
- Controls 6 relays, low- or high-side driven or 5 bistable relays
- Relay pull-in and holding current can be controlled via PWM input
- Power supply 3.3V or 5V for external controller
- LIN 2.x interface (1.3), SAE-J2602 or PWM bidirectional
- Several diagnostic and protection functions
- Adjustable window watchdog
- $T_{jmax} = +170°C$

Applications
- LIN2.x or LIN1.3 relay nodes

Packages
- QFN44L7
- QSOP44
- QFN48L7

Application Diagram

LIN2.x Relay Node SBC for 4/3 Relays | E523.02/12

Key Features
- Voltage range 7V to 28V (5V to 42V peak)
- Controls 4 relays, low- or high-side driven or 3 bistable relays
- Relay pull-in and holding current can be controlled via PWM input
- Power supply 3.3V or 5V for external controller
- LIN 2.x interface (1.3), SAE-J2602 or PWM bidirectional
- Several diagnostic and protection functions
- Adjustable window watchdog
- $T_{jmax} = +170°C$

Applications
- LIN2.x or LIN1.3 relay nodes

Packages
- QFN44L7
- QSOP44

Application Diagram
Free Programmable LIN2.x Relay Node for 6/5 relays | E523.06

**Key Features**
- Voltage range 7V to 28V (5V to 42V peak)
- Controls 6 relays high- or low-side driven or 5 bistable relays
- Relay pull-in and holding current can be controlled via PWM input
- LIN2.x(1.3)(SAE-J2602) interface or bidirectional PWM interface
- 16 bit RISC CPU 32k FLASH 16k SysROM 4k SRAM
- 10 bit 1 Msample SAR ADC
- 4x 16 bit PWM generation (edge/center aligned)
- $T_{J_{max}}$ peak = +150°C

**Applications**
- LIN2.x or LIN1.3 relay nodes

**Packages**
- QFN48L7

**Application Diagram**

Free Programmable LIN2.x Relay Node for 2-4 relays | E523.30/31/34/37

**Key Features**
- Controls 4 high side driven relays or 2 low side driven relays or 3 bistable relays
- Programmable holding current for low-side up to 800mA
- 5.5V to 20V supply voltage (load dump 42V)
- Embedded 8bit µC 256 Byte RAM, 8k FLASH + 4k SysROM, 64 Byte E²
- LIN2.x(1.3), SAE-J2602 or PWM Interface, LIN Auto-Addressing
- $T_{J_{max}}$ peak = +170°C

**Applications**
- LIN2.x or LIN1.3 relay nodes

**Packages**
- QFN32L6

**Application Diagram**
# Special Projects - Boards

## Safety

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Function</th>
<th>Board type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E521.41</td>
<td>4-Channel Multi-Mode PSI5 Transceiver</td>
<td>Demoboard</td>
<td>K5214-0001</td>
</tr>
<tr>
<td>E524.40</td>
<td>Safety Pressure Sensor with PSI5 Interface</td>
<td>Demoboard</td>
<td>K5244-0001</td>
</tr>
<tr>
<td>E981.07</td>
<td>2-Channel Sensor Interface PSI5</td>
<td>Evaluation Board</td>
<td>K98107-0001</td>
</tr>
<tr>
<td>E981.07</td>
<td>2-Channel Sensor Interface PSI5</td>
<td>Adapter Board</td>
<td>K98107-0002</td>
</tr>
</tbody>
</table>
We deploy the airbag
For more safety at the right moment.
Set up globally, regional strong

Elmos has consistently expanded its presence. We are represented in all important markets and always close to our customers. Elmos business model covers the complete development process of a semiconductor: from the idea, the development, the production as well as the sales. Our experts supports our customers with extented application know-how. We know every detail of a semiconductor and deliver innovations to our customers in series!

- International customer support
- Meeting the highest global quality standards
- Worldwide production and distribution network
Distribution Service

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