

# Melexis

INSPIRED ENGINEERING

**Hall Sensors**  
**Wireless**  
**Environment Sensors**  
**Time-of-Flight**

Smart  
**Solutions**  
for **you!**



## About Melexis

Melexis creates, manufactures and delivers advanced Mixed-Signal semiconductors for automotive, industrial and consumer applications.

Melexis offers a wide range of standard products such as Sensor ICs (Hall-Effect, Optical, Infrared and MEMS), Communication ICs (Low Power RF, RFID and Automotive BUS), Actuator-ICs (for electric motors, electro magnets and LEDs), as well as application specific integrated circuits (ASICs).

## Hall Effect Sensor ICs

- Hall Position Sensors
- Hall Latches/Switches
- Gear Tooth Sensors
- Current Sensors
- Programming Tools



## Pressure Sensor ICs

- Integrated Pressure Sensors
- Programmable Sensor Interfaces
- Analog Sensor Interfaces



## Hardware

- Development Kits
- Demo Boards
- Programming Tools



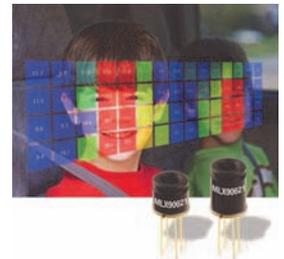
## Wireless ICs

- RFID / NFC (125kHz & 13.56MHz)
- Transmitter (300MHz - 1GHz)
- Receiver (300MHz - 1GHz)



## Infrared and Optical ICs

- Optical Gesture & Proximity Sensing
- Infrared Sensor Array
- Infrared Thermometer
- Optical switch sensor
- Light-to-voltage sensor



## LIN Bus Controller ICs

- LIN RGB Slave Controller
- LIN Slave Controller
- LIN System Basic IC
- LIN Transceiver



## Motor Controller / Fan Driver ICs

- Motor controller for brushless DC
- Single coil PWM fan driver
- 2-coil fan driver



## MLX90393

### Triaxis® Micro Power Magnetometer

The Melexis MLX90393 is the newest addition to the Melexis position sensing portfolio, bringing the highest flexibility in the portfolio's smallest assembly. Complementing this, the magnetic field sensor is designed for micro-power applications, with programmable duty cycles in the range of 0.1% to 100%.

With its 3x3mm footprint, the Melexis MLX90393 can fit in the tiniest of assemblies. It provides a digital output proportional to the sensed magnetic flux density along the 3 perpendicular axes of symmetry of the sensor. But the miniature sensor is mostly characterized by the fact that it can interchange measurement speed for both current consumption and noise on the digital output signal, making it the raw building block for any magnetic sensing application up to 85degC.

An external microcontroller can then combine the measurement data in order to define the position of the magnet with respect to the sensor. All this at a selectable duty cycle of 0.1% to 100%.

### Applications



### Features MLX90393

- Magnetometer Sensor (Absolut Linear & Rotary, 3D-Joystic)
- Micro-power Triaxis® Hall Technology
- In-application runtime programmable functional parameters
- SPI slave and/or I<sup>2</sup>C slave with 2 bits HW addressing and 5 bits SW
- Can be used to measure magnetic XYZ and temperature T or any combination thereof
- Single measurement mode, burst mode and wake-up on change mode
- Power supply of 2.2V to 3.6V, down to 1.8V IO voltage
- Wide temperature range from -40°C to 85°C

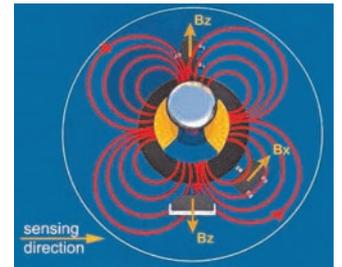
### EVB90393web

- MLX90393 3D-Hall Sensor IC & WIZ922PoE Module



## Melexis announces lateral sensing throughout the full magnetic Latch & Switch portfolio

Melexis announces the rollout of its integrated magnetic concentrator (IMC) technology to multiple devices within its Latch & Switch product range, delivering tangible benefits to designers, especially in demanding automotive applications.



As many traditional Hall-effect sensors are only sensitive to magnetic flux perpendicular to the IC, it can be necessary to develop complex (and therefore large and expensive) custom magnetic structures to achieve the desired measurement. Melexis' Latch & Switch sensors use the innovative magnetic Triaxis® technology that allows the measurement of the lateral magnetic flux component.

As a result of the inclusion of IMC technology, simple wheel speed sensing on motorcycles can now be performed using a single two-wire switch sensor with integrated capacitor (MLX92242 or MLX92241) and a traditional magnet. This approach uses the lateral field rather than the previous method of using the perpendicular field, thus vastly simplifying the designer's task.

As brushless DC (BLDC) motors become an increasingly popular choice for many applications including blowers, cooling fans and pumps, more sophisticated control is required. By integrating an IMC into products, such as the MLX92211, surface mount sensing is available, thereby simplifying the production process and reducing the space required.

In the automotive world, DC motors are proliferating into applications such as windows and seat positioning. The ability to sense direction had required a complex four-pole magnet but by including IMC technology into the MLX92211, the MLX92221 and the newly released MLX92256 four-wire sensors, more accurate solution can be achieved with any magnet. The simplicity extends to setting up as only crude alignment is required to facilitate a pitch-independent sensor.

With devices such as the MLX92231, the MLX92291, the MLX92211, the MLX92232 and the MLX92292, which are commonly used in automotive applications such as transmission selectors (gear shifts) and HMI interfaces, the inclusion of an IMC allows the magnet to be placed beside the sensor, thereby saving space and enabling new applications where previously there was not enough room for a magnetic sensing solution.

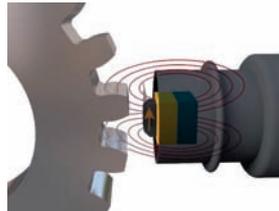
### MLX92242 / MLX92241

#### Lateral Sensing within Latch & Switch Products

As with the standard MLX92242, a Hall sensing element, a voltage regulator (covering 2.7V to 24V), a current sink-configured output driver and a series of sophisticated IC protection mechanisms (over-voltage, reverse voltage, thermal shutdown, etc.) are all included, plus an EEPROM memory via which EOL programming can be executed. The EEPROM allows suitable magnetic thresholds to be set for the particular application scenario, then subsequently locked. Alternatively pre-programming can be carried out by Melexis to customers' specifications. A magnetic switching range, spanning from 1mT to 64mT and a magnetic latching range of -64mT to 64mT is achievable.

#### Applications

- Shifter applications
- Neutral position sensing
- Brake light switch sensor



#### Features MLX92242 / MLX92241

- IMC-Hall® technology
- Highly flexible and robust Position Sensor
- High accuracy achieved by end-of-line programming for [MLX92242](#)
- Wide magnetic latch range:  $\pm 100$  mT to  $\pm 100$ mT
- Wide magnetic switch range:  $\pm 0$ mT to  $\pm 100$ mT
- Programmable hysteresis: 0mT to 88mT
- Programmable field: North or South
- Programmable output polarity: direct or inverted
- Built-in negative TC coefficient: 0 to -2000 ppm/degC
- Wide operating voltage range from 2.7 to 24 V
- Reverse supply voltage protection
- Under-voltage lockout protection
- Thermal protection

This new package option enables PCB-less modules and assemblies while retaining the EMI/ESD performance necessary in harsh duty environments.

The pin ordering for this option is optimized to allow wider clearance and direct connection via welding or soldering to a connector or an insert molded lead frame connector. This avoids any secondary operations typically consisting of bending of the leads.



### MLX92232/-92231/-92292/-92291

#### 3-Wire Hall Effect Latch & Switch Sensor

With devices such as the MLX92232 / MLX92231, and the MLX92292 / MLX92291, which are commonly used in automotive applications such as transmission selectors and HMI interfaces, the inclusion of an IMC allows the magnet to be placed beside the sensor, thereby saving space and enabling new applications where previously there was not enough room for a magnetic sensing solution.

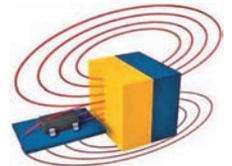
The MLX92232 / MLX92292 is the first end-of-line programmable sensor in a family of high accuracy devices each integrating a Hall sensor element with advanced offset cancellation mechanism, a voltage regulator and an open-drain output driver combined with EEPROM memory.

The flexible programming capabilities enable end of production line calibration for finished sensor modules, allowing compensation of mechanical assembly tolerances, material variations and magnet part to part variations. The programmable hysteresis and the built-in TC compensation parameters are ensuring an excellent temperature performance with usage of cost optimized magnets.

The Melexis [MLX92292/MLX92291](#) latch/switch sensor represents a whole new way of sensing. It's the first chip designed with the Triaxis® technology (lateral sensing) and the very first switch on the market with ASIL-B readiness, combined with [MicroPower](#). This will prove advantageous in circumstances where the engine may not be turned on, as it places no significant drain on the battery resource. As sleep time is a programmable parameter.

#### Applications

- Automotive, Consumer and Industrial
- Robotics



#### Features MLX9223x / MLX9229x

- Lateral sensing with IMC-Hall® technology
- Functions:
  - Latch & Switch for [MLX92232 & MLX92292](#)
  - Switch for [MLX92231 & MLX92291](#)
- Programming:
  - Customer (EoL) for [MLX92232 & MLX92292](#)
  - Factory for [MLX92231 & MLX92291](#)
- $\mu$ -Power Mode for [MLX92292 & MLX92291](#)
  - Less than 10 $\mu$ A average supply current
  - Wide operating voltage range from 3.3 to 18 V
- Wide magnetic latch range:  $\pm 0.4$ mT to  $\pm 80$ mT
- Wide magnetic switch range:  $\pm 1.5$ mT to  $\pm 66$ mT
- Programmable hysteresis: 1mT to 36mT
- Programmable field: north or south
- Programmable output polarity: direct or inverted
- Wide operating voltage range from 2.7 to 24 V
- Reverse supply voltage protection
- Output current limit with auto-shutoff
- Under-voltage lockout protection

## MLX92211/-92221/-92256

### Lateral Hall Effect Latch & Speed Sensor

#### FLEXIBILITY IN THE MAGNETIC DESIGN

Melexis' Latch & Switch sensors use an innovative magnetic technology that allows the measurement of the lateral magnetic flux component.

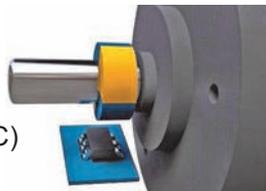
In the automotive world, DC motors are proliferating into applications such as windows and seat positioning. The ability to sense direction had required a complex four-pole magnet but by including IMC technology into the MLX92221, the MLX92211 and newly released MLX92256 four-wire sensors a more accurate solution can be achieved with any magnet. The simplicity extends to setting up as only crude alignment is required to facilitate a pitch-independent sensor.

#### Special Features

	Type	Output
MLX92221	Latch	2-wire
MLX92211	Latch	3-wire
MLX92256	Pulse & Direction Speed & Speed	4-wire

#### Applications

- Automotive
- Consumer & Industrial
- Brushless DC Motors (BLDC)



#### General Features

- IMC-Hall® Technology
- Wide operating voltage range:
  - 2.7 to 24V for MLX92221 & MLX92211
  - 3.8 to 24V for MLX92256
- Two Hall plates are integrated in the MLX92256
- Sensitivity for MLX92256
  - Vertical:  $\pm 2.0\text{mT}$  (typ.),  $\pm 4.0\text{mT}$  (max.)
  - Horizontal:  $(\pm 2.0\text{mT}$  (typ.),  $\pm 4.0\text{mT}$  (max.)
- Integrated capacitor (PCB less designs MLX92221)
- Factory calibrated
- Wide temperature range from  $-40^{\circ}\text{C}$  to  $150^{\circ}\text{C}$
- Automotive qualified
- Automotive diagnostics features

## MLX90365

### Triaxis® Position Sensor

Thanks to an IMC on its surface, the monolithic device MLX90365 senses, in a contactless fashion, the 3 spatial components (i.e. Bx, By and Bz) of the applied magnetic flux density.

The rotation of this horizontal component is sensed over a wide range (up to  $360^{\circ}$  - complete revolution) and processed by the on-chip DSP (Digital Signal Processing) to ultimately report the absolute angular position of the end-of-shaft magnet.

Alternatively, through measuring individually the horizontal and vertical components, the MLX90365 is able to address linear stroke (displacement) position sensor and also absolute rotary position sensor with a through-shaft magnet. The output transfer characteristic is fully programmable (e.g. offset, gain, clamping levels, linearity, thermal drift, filtering, range...) to match any specific requirement through end-of-line calibration.

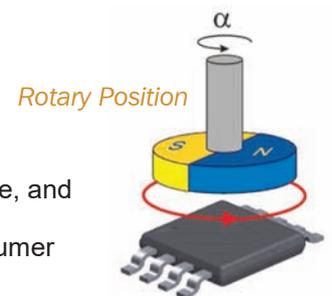
The device is available in single and dual redundant implementations.

The MLX90365 is pin-to-pin compatible with the previous generations of Triaxis® position sensor:

Gen. I / MLX90316, MLX90324, MLX90333 and Gen. II / MLX90360.

#### Applications

- Automotive
- Industrial and robotics
- Building, security, home, and office automation
- White goods and consumer appliances



#### Features MLX90365

- TIMC-Hall® Technology
- Absolute 2D Rotary & Linear Position Sensor IC
- 12 bit Angular Resolution, analog & PWM
- 14 bit resolution SPI
- 10 bit Angular Thermal Accuracy
- Programmable Linear Transfer Characteristics
- Selectable analog (ratiometric) or PWM Output
- Power supply voltage: 5V
  - Over-Voltage Protection
  - Under-Voltage Detection
- Operating temperature range:  $-40^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$
- Single Die - S08 Package
- Dual Die - TSSOP16 Package (full Redundant)



### MLX90371 / MLX90372

#### Triaxis® Rotary & Linear Position Sensor

Both new devices consist of a Triaxis® Hall magnetic front-end, an analog to digital signal conditioner, a DSP for advanced signal processing and an output stage driver. Due to the Integrated Magneto Concentrator (IMC) they are sensitive to magnetic flux in three planes (X, Y & Z). This facilitates the decoding of the absolute rotary or linear position of any moving magnet, enabling the design of non-contact position sensors. The MLX90371 offers analog or PWM output while the MLX90372 offers SENT (SAE J2716 rev April 2016) or PWM output.

The new stray field immune mode drastically reduces or eliminates the effect of stray fields from other magnets or current carrying conductors found in electrified vehicles and supports both on-axis rotary or linear motion with a four-pole or two-pole magnet, respectively. For customers not requiring stray field compatibility, or those requiring off-axis sensing, the MLX90371 is also backwards compatible in both pinout and magnetic design to the MLX90364 and MLX90365 that utilize a two-pole magnet.

#### Applications

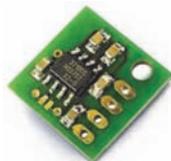


#### Features MLX90371 / MLX90372

- IMC-Hall® Technology
- Absolute linear and rotary position sensor
- Highly flexible and robust Position Sensor
- On chip signal processing
- Stray field immunity capability
- Programmable Measurement Range
- Enhanced self-diagnostics features
- Programmable Linear Transfer Characteristic (Multi-points 4 or 8 points or Piece-Wise-Linear 16 or 32 segments).
- 12 bit Resolution - 10 bit Thermal Accuracy
- Selectable Analog (Ratiometric) or PWM Output
- Selectable SENT or PWM Output (MLX90372)
- 14 bit Angular Resolution & 10 bit Angular Accuracy
- 4.5V to 5.5V application compatible
- Wide temperature range: from -40°C to 160°C

#### EVB90371 universally usable

- MLX90371
- MLX90372
- MLX90365



### MLX90374

#### Triaxis® Rotary & Linear Position Sensor with Dual Output

The MLX90374 is a third generation Triaxis® position sensor. Thanks to an **integrated magnetic concentrator (IMC)** on its surface, the monolithic device senses, in a contactless fashion, the three spatial components (i.e. Bx, By and Bz) of the applied magnetic field allowing for the determination of rotary or linear movement.

For rotary motion a range of 180 degrees is obtained with a four-pole magnet while linear motion up to 25mm or more can be obtained with a two-pole magnet.

The output transfer characteristic is fully programmable with up to 32 calibration points. The monolithic MLX90374 provides two independently configurable output stages, the primary output can encode position data in either SENT or PWM, the second output provides position data encoded as a 12-bit PWM signal. The second output of the MLX90374 ABB can optionally operate as a switch signal with programmable thresholds, while the MLX90374 ABC variant features an additional third output that is also configured as a switch.

The MLX90374 also brings the ability to read an external input. This could be a signal from a temperature sensor, pressure sensor, or another position sensor.

The MLX90374 is available in a single die surface mount SOIC-8 package or single die **PCB-less DMP-4 package**, available for applications without a PCB.

#### Applications



#### Features MLX90374

- Absolute linear and rotary position sensor
- On-Chip signal processing for robust absolute position sensing
- Stray field immunity capability
- Programmable measurement range
- Programmable Linear Transfer Characteristic (4 or 8 Multi-points or 16 or 32 PWL) Dual output
- In-application programmable
- Stray field immune capability
- PWM Redundant Dual Output
- SENT and Programmable Switch Dual Output
- Extra input pin for reading additional signals
- Enhanced serial data communication
- 12-bit angular resolution & 10-bit thermal accuracy
- Programmable SENT tick time from 1.5µs to 6µs
- Gateway (input) mode for external measurements
- Wide temperature range: from -40°C to 160°C
- PCB-less DMP-4 Package

## MLX90378

### Triaxis® 3D & Joystick Position Sensor

The MLX90378 is a monolithic magnetic position processor IC designed for 3D motion applications (e.g. joysticks).

The magnetic field sensors consist of a TRIAXIS® GEN III Hall magnetic front end, an analog to digital signal conditioner, a DSP for advanced signal processing, and a dual output stage driver capable of providing two Pulse Width Modulated (PWM) outputs or a single SENT output with two channels. The SENT frames can be encoded in a variety of formats. Additionally, the SENT protocol allows for external measurements, error codes, and user-defined values. The two PWM signals correspond to the joystick angle.

The MLX90378 is sensitive to the three components of the magnetic flux density applied to the IC (i.e. Bx, By, and Bz). This sensitivity allows the MLX90378 components, with the correct magnetic circuit, to decode the absolute position of any moving magnet enabling the design of non-contacting 3D position sensors that are frequently required for both automotive and industrial applications.

The MLX90378 device includes an additional input pin that makes it possible to fully integrate other sensors (such as temperature, pressure, or switch inputs), allowing for the additional signal to be transmitted over the SENT output.

The MLX90378 is available in both a single die (SOIC-8) and dual die (TSSOP-16) package for 3D or joystick applications, complements the SPI-output MLX90363 and improves upon the previously released MLX90333.

### Applications

- Automotive Shift Levers
- Industrial Joysticks
- Transmission Position Sensors



*Gimbal Joystick*



*Ball and Socket Joystick*

### Features MLX90378

- Absolute 3D and joystick position sensor
- On-Chip signal processing for robust absolute position sensing
- Input/Gateway pin for external measurement
- Programmable measurement range
- Programmable linear transfer characteristic (4 multi-points per axis)
- In-application programmable
- Dual output
- Selectable PWM (fast) or SENT output
- Enhanced serial data communication
- Magnet push/pull detection
- XYZ output optional via SENT output
- Extra input pin for reading additional signals



## MLX90340

### Triaxis® Absolute Position Processor

The MLX90340 is an absolute position sensor based on the Melexis Triaxis® Hall technology targeted for various applications in consumer and industrial markets. With a key set of core parameters, the MLX90340 addresses the essence: simple and robust position sensing. It offers the best flexibility to measure a 360 degrees rotational (end-of-shaft or through-shaft) and up to a +/- 20 mm linear magnet movement.

The MLX90340 device consists of a Triaxis® Hall magnetic front-end, an analog to digital signal conditioner, a DSP for advanced signal processing and one output stage driver. Due to the Integrated Magneto Concentrator (IMC), it is sensitive to magnetic flux in three planes (X, Y & Z) enabling the design of non-contact position sensors with an Analog or PWM output.

It will complement the successful automotive grade MLX90365 by adding three different temperature ranges for cost-effective applications.

Additionally, the MLX90340 offers four pre-programmed versions customized for various rotation ranges. These provide an analog voltage from 10% to 90% of the supply voltage over an angle span of 90, 180, 270, or 360 degrees, avoiding the need for additional programming at the customers' side and enabling embedded designs where the power ground and output pins are not accessible.

### Applications

- Absolute Rotary Position Sensor
- Absolute Linear Position Sensor
- Non-Contacting Potentiometer

*Rotary Position*



*Linear Position*



### Features MLX90340

- IMC-Hall® Technology
- Absolute linear and rotary position sensor
- On-Chip signal processing for robust absolute position sensing
- Programmable measurement range
- Programmable linear transfer characteristic
  - Arbitrary points (4 points) or
  - Piece-wise-linear (17 points)
- Selectable Analog (Ratiometric) or PWM Output
- 12 bit Resolution - 10 bit Thermal Accuracy
- Single Die - SO8 Package
- Dual Die - TSSOP16 Package (full Redundant)

### Melexis' state-of-the-art Hall-effect current sensors offer enhanced performance and diagnostics

Melexis has announced two new current sense ICs based upon their 20+ years of experience in Hall-effect technology. Both of the new sensors share the same high-performance CMOS core and the MLX91217 implements conventional Hall technology, while the **MLX91216** uses proprietary **Integrated Magneto Concentrator (IMC)**.

Both devices are aimed at automotive applications, in particular inverter phase current monitoring and DC-link monitoring applications where Hall-effect has been the preferred solution for more than a decade. As well as traction motor control, the devices are also suited to other embedded applications such as DCDC converters and battery junction boxes or any application that requires high speed, fast response or highly accurate (over) current measurement.

The new CMOS core and factory trim ensure an improvement in thermal sensitivity drift (33%) and thermal offset drift (50%) over the previous generation. It also introduces more on-chip filtering and the ability to detect broken wires, indicating a fault within the electrical distribution.

Improved signal-to-noise performance can be achieved by trading resolution against response time and sensor bandwidth through the on-chip filtering.

The **MLX91216** is housed in a conventional SOIC8 package for SMD placement. Its IMC technology simplifies the current measurement requiring no external ferromagnetic concentrator ring, making assembly easier as well as reducing size, weight and cost.

The **MLX91216** and MLX91217 offer significant performance enhancements and a rugged design, making them ideal for the challenging applications found in the fast growing market for the electrification of modern automobiles.

### Planar IMC-Hall® Sensors



Thanks to the patented integrated magnetic concentrator (IMC) technology, IMC-Hall® sensors are sensitive to magnetic fields **parallel** to the chip surface. Thus, the sensors can directly measure the current flowing in a bus bar or a PCB trace below the package, without the need for a core.

### Conventional Hall



## MLX91216

### ICM-Hall® High-Speed Current Sensor

The MLX91216 is a monolithic Hall-effect sensor utilizing the ICM-Hall® technology. The sensor provides an analog output voltage proportional to the applied magnetic flux density parallel to the IC surface.

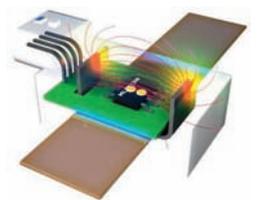
The transfer characteristic of the MLX91216 is factory trimmed over temperature, and is programmable (offset, sensitivity, clamping, filtering) during end-of-line customer calibration. The output clamping levels and on-chip filtering are also programmable as a function of application needs. With the 250kHz bandwidth and fast response time, it is particularly adapted for high speed applications such as inverters and converters where fast response time due to fast switching is required.

In a typical current sensing application, the sensor is used in combination with a U-shaped shield which facilitates the mechanical assembly of the current sensor over traditional ferromagnetic cores. This shield is recommended to be laminated for high bandwidth applications.

The MLX91216 can then be mounted over the bus bar and separated from it by the PCB. As the shield does not serve the primary purpose of concentration, it can be made smaller and lighter than ferromagnetic cores without losing signal thanks to the integrated magnetic concentrator (IMC) depicted also in Figure. As a result, dense power electronics can be achieved enabling system savings and surface mount assembly.

## Applications

- Battery Management Systems
- DC-DC Converter
- Power Distribution Unit
- Industrial and Robotics



## Features MLX91216

- IMC-Hall® Technology
- High Field and Very High Field variants
- End-of-line programmable sensor
- Selectable analog ratiometric output
- Measurement range from  $\pm 5$  to  $\pm 450$ mT
- Wideband sensing: DC to 250kHz
- Very short response time (2 $\mu$ s)
- High linearity down to  $\pm 0.2\%$  full scale
- Very low thermal drift
  - Offset drift (<5mV)
  - Sensitivity drift (<1%)
- Programmable output clamping levels
- Broken wire detection and diagnostics
- AEC-Q100 – Grade 0 Automotive Qualified
- SOIC-8 package

## MLX90132

### 13.56MHz Multi-Protocol RFID Transceiver

The MLX90132 is a 13.56MHz, fully integrated, multi-protocol RFID/NFC transceiver IC. It has been designed to handle sub-carrier frequencies from 106 to 848 kHz and baud rates up to 848kbit/s. The dual driver architecture of the MLX90132 requires minimal external support components.

The MLX90132 embeds tag emulation functionality for NFC support. Enhanced tag and field detection capabilities provide significant power consumption reduction in RFID reader configuration and in NFC mode.

### Applications

- NFC enabled car for access and start
- Combo NFC and Wireless Power Charging solutions
- NFC applications in Industrial area
  - White goods
  - Security Systems



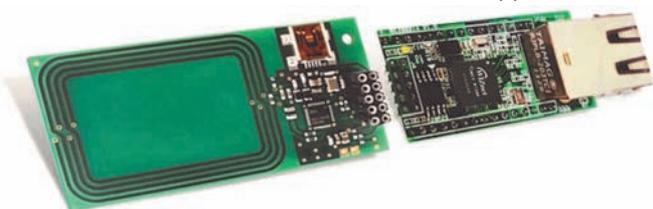
### Features MLX90132

- Conformity to:
  - ISO/IEC 18092 (NFC)
  - ISO/IEC 14443 A1 and B2
  - ISO/IEC 15693
  - ISO/IEC 18000-3 mode 1
- SPI/UART Interface with 528 Bytes Buffer
- High speed communication (848kbit/s)
- Embedded RF field and TAG detectors
- Transmit power up to 317mW
- Power Down Mode = 1µA typ.
- Power supply of 2.7V or 5V
- Wide temperature range from -40°C to 150°C
- 32-pin Quad Flat No-Lead Package (QFN)
- Low external component count

### EVB90132web

#### RFID/NFC Reader board

The EVB90132 allows an operation with the integrated PCB antenna and can be controlled by any Microcontroller via the standard SPI or UART interface. The EVB90132web consists in addition to the EVB90132 of a WIZnet WIZ922PoE module with an MCU and preprogrammed Web frontend for an easy plug-and-play start to help implement a RFID- or a fully functional NFC-reader. Free ANSI-C code is available for software support.



## MLX90129

### Sensor TAG Data-Logger

The Melexis MLX90129 combines a precise acquisition chain for external resistive sensors with a wide range of interface possibilities. It can be accessed and controlled through its ISO15693 RFID front-end or via its SPI port. Without any other component than a 13.56MHz tuned antenna, it becomes a RFID thermometer.

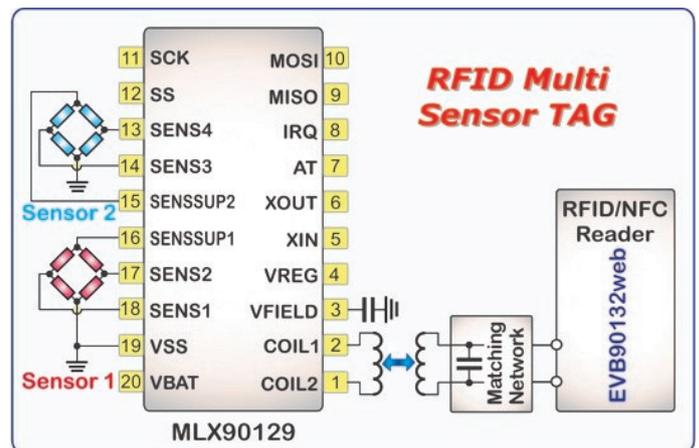
For measuring other physical quantities, one or two resistive sensors can be connected to make battery less sensing points. In this tag mode, the chip can supply a regulated voltage to the other components of the application.

Adding a battery will enable the use of the standalone data logging mode. The sensor output data is stored in the internal 3.5 kbit user memory. One can extend the storage capacity by connecting an external E2PROM to the SPI port.

The SPI port can also connect the MLX90129 to a microcontroller which allows more specific applications, like adding actuating capability or RF transmission.

The MLX90129 has been optimized for low power, low voltage battery and battery less applications.

### Application Examples



### Features MLX90129

- Versatile A/D interface for resistive sensors
- ISO 15693 13.56MHz transponder
- Slave/Master SPI interface
- 4kbit EEPROM with access protection
- Standalone data-logging mode
- Ultra-low-power system
- Battery or battery-less applications
- Wide power supply range from 2.7V to 5.5V
- Power management and battery low-level detector

## MLX90809

### Relative Pressure Sensor

Melexis' pressure sensors consist of a piezo resistive Wheatstone bridge that sits on the edge of a silicon membrane and transforms the stress induced by pressure on the membrane into an electrical signal. They can be used in conjunction with amplifier circuits to provide pressure indication. They may also be incorporated into a system in package (SIP), which integrates all the necessary circuitry, as in our Tire Pressure Monitoring sensor. The tire pressure monitor actually combines three sensor technologies in a single package: a pressure sensor; temperature sensor and a motion sensor.

The MLX90809 is a packaged, factory calibrated, integrated relative pressure sensor delivering a ratio-metric analog or digital (using the SENT protocol) signal.

Use of an optimized architecture and a high density CMOS technology imparts the 90809 with best in class automotive EMC performance. A DSP based architecture using a 16bit microcontroller provides outstanding performance in terms of initial accuracy.

A smart package and die assembly concept suits applications with stringent automotive temperature and stress conditions needing small drift over life.

### Applications

- Automotive applications
- Industrial applications
  - Process monitoring
  - Vacuum sensor
  - Fluid pressure
- Consumer applications
  - Filter monitoring
  - White goods



### Features MLX90809

- High accuracy relative pressure sensor (+/-1.5%FSO)
- Ratio-metric analog output or digital SENT output
- Fully integrated MEMS with analog front end circuit, 16 bit microcontroller, analog back end circuitry and voltage regulators
- Factory calibrated and/or fully programmable through the connector for customized calibration curves
- Wide temperature range from -40°C to 150°C
- Automotive qualified
- Automotive diagnostics features
- Programmable through the connector

## PTC-04

### Programmer for Melexis PTC devices

The PTC-04 programmer was designed for efficient and precise calibration of the Melexis families of programmable ICs. The programmer is designed to be easily adapted to a standard PC and to an application module to allow calibration of programmable sensor ICs within the operating environment.

The PTC-04 programmer contains its own programmable power supply and measurement circuitry. And it is similar to a standard EEPROM programmer, but adds many special features such as 16-bit voltage and current measurement capability, and configuration options that will accommodate users from the prototyping phase directly into production.

An IBM compatible PC is required (not included) to load software to the programmer and control the functions of the programmer. Communication is done through a standard RS-232 null modem cable to a COM port of the PC or via USB. The PC requires no custom configuration, allowing the programmer to be used with any PC with a COM port speed of 115.2kbs or a standard USB 1.1 or USB 2.0.

### Contents of a PTC04 Set

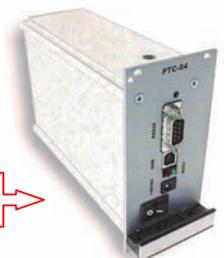
- PTC-04 with a default Daughterboard
- Power supply and Power cables
- RS232 serial cable and USB cable
- Installation CD
- Calibration certificate

### Applications

- Experimental tool for Lab and Prototyping
- Production Equipment for Serial
- Programming
- Programming tool for characterization

### Features

- Universal programming utility
- Fast development
- Fast plug-in for software applications
- Atmega128 Core
- Firmware updatable via RS232 and USB
- FPGA updatable via RS232 and USB
- 3 High current programmable supplies
- 1 High speed fast
- 16-bit level settings
- 16-bit differential measurements
- 4 analog comparators
- Vector generator
- I<sup>2</sup>C to daughter board
- Mountable in 19" rack



## MLX90640

### Infrared Sensor Array 32x24 Pixel

Melexis MLX90640 Far Infrared Thermal Sensor is a fully calibrated 32 x 24 pixel thermal IR array in a compact, industry-standard, 4-lead TO39 package, featuring a digital interface.

The MLX90640 contains 768 FIR (Far Infrared) pixels. An ambient sensor is integrated to measure the ambient temperature of the chip and supply sensor to measure the VDD. The outputs of all sensors IR, Ta and VDD are stored in internal RAM and are accessible through I<sup>2</sup>C.

The MLX90640 has a -40°C to 85°C operational temperature range and can measure object temperatures between -40°C and 300°C. Maintaining high levels of precision across its full measurement scale, this Far Infrared sensor delivers a typical target object temperature accuracy of ±1°C.

### Applications

- Temperature sensing in residential, Industrial and commercial conditioning
- Home appliances with temperature control
- Passenger detection and classification
- Presence detection/person localization



### Features MLX90640

- Small size, low cost 32x24 pixels IR array
- Easy to integrate
- Factory calibrated
- A typical target object temperature accuracy of 1°
  - precision across its full measurement scale
- Noise Equivalent Temperature Difference
  - (NETD) 0.1K RMS @1Hz refresh rate
- Two different field of view (FoV) options:
  - standard 55°x35°
  - wide angle 110°x75°
- Programmable refresh rate 0.5Hz...64Hz
- Can measure object temperature between -40 to 300°C
- I<sup>2</sup>C compatible digital interface
- 3.3V supply voltage
- Current consumption less than 23mA
- Operating temperature -40°C ÷ 85°C
- 4-pin TO39 package incorporating the requisite optics



## MLX90641

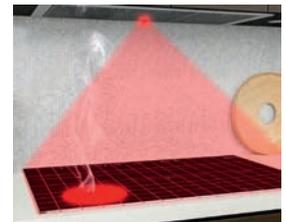
### Infrared Sensor Array 16x12 Pixel

The new **MLX90641** device has lower thermal noise compared to the current MLX90640, an increased refresh rate of 64 Hz and an elevated operating temperature up to 125 °C. The MLX90641 is a fully calibrated 16x12 pixels thermal IR array in an industry standard 4-lead TO39 package with digital interface. The MLX90641 contains 192 FIR pixels. An ambient sensor is integrated to measure the ambient temperature of the chip and supply sensor to measure the VDD. The outputs of all sensors IR, Ta and VDD are stored in internal RAM and are accessible through I<sup>2</sup>C .

The MLX90641 offers 192 FIR pixels, allowing for less powerful processors to be used, contributing to lower system overhead. Additionally, no re-calibration is required thereby reducing further operational expenses.

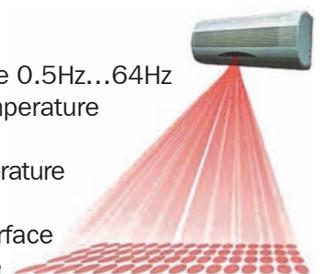
### Applications

- Home appliances with temperature control
- Thermal Comfort sensor in automotive Air Conditioning control system
- Intrusion / Movement detection
- Passenger classification
- Visual IR thermometers



### Features MLX90641

- Small size, low cost 16x12 pixels IR array
- Easy to integrate
- Factory calibrated
- Noise Equivalent Temperature Difference
  - (NETD) 0.1K @4Hz refresh rate
- Two different field of view (FoV) options:
  - Standard 55°x35°
  - Wide angle 110°x75°
- Programmable refresh rate 0.5Hz...64Hz
- A typical target object temperature accuracy of 1 °C
- Can measure object temperature between -40 to 300°C
- I<sup>2</sup>C compatible digital interface
- Evaluation board available



### MLX75024 and MLX75123

#### QVGA Time-of-Flight Chipset

MLX75024 TOF sensor chip together with MLX75123 companion chip provides a complete Time-of-Flight solution. The MLX75024 TOF sensor supports up to QVGA resolution with unpaired sunlight rejection. MLX75024 is the successor of MLX75023, with enhanced sensitivity and reduced power consumption. The MLX75123 controls the TOF sensor, the illumination unit and streams data to the host processor. The chipset offers performance, flexibility, simplifies the design and allows a very compact 3D camera.

The MLX75024 is an optical Time-of-Flight (TOF) sensor array. The sensor features 320 x 240 (QVGA) Time-of-Flight pixels based on DepthSense® technology. Thanks to its high speed output, which enables a frame rate up to 600 frames per second, the sensor can be used to track for fast moving objects. The TOF sensor is available in a small glass BGA wafer level package form factor while the TOF companion chip is available in a compact 7x7mm<sup>2</sup> ELP package.

The sensor is available for ambient operating temperature ranges of -20 +85°C and -40 to +105°C.

#### Applications

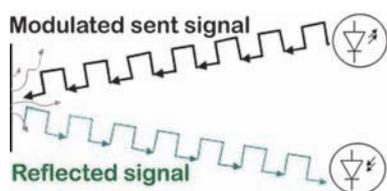
- Automotive applications
- Building & Security
- Industrial & Robotics



#### Features MLX75024 / MLX75123

- 1/3" optical Time-of-Flight sensor
  - Optical area = 4.8 x 3.6 mm<sup>2</sup>
- QVGA Resolution: 320 x 240 pixels
- Support both 850 and 940 nm wavelength
- 15 x 15 µm DepthSense® pixels
- Demodulation frequency up to 40 MHz
- Two dual channel analog outputs
- Pixel rate up to 80 MSPS
- Integrated temperature sensor
- Configurable over I<sup>2</sup>C up to 400kHz
- -20 +85 °C and -40 +105 °C temperature ranges

#### EVK75124 (TOF Evaluation Kit)



### MLX75027

#### VGA Time-of-Flight Sensor

The MLX75027 is a system-on-chip solution, providing VGA (640 x 480) pixel resolution image sensing and processing in a single BGA package (141 Pins).

As the industry continues towards semi-autonomous vehicles, advances in ADAS (Advanced Driver Assistance Systems) are bringing many benefits.

The MLX75027 uses a modulated light source and optical time-of-flight sensing to create a three-dimensional image of the cabin, allowing it to monitor people and objects, as well detect gestures. It can also be used to detect free space and obstacles outside of the vehicle, such as pedestrians, for collision warning and navigation applications.

The MLX75027 is able to operate in an ambient temperature of -40 to +105°C. Thanks to a simple supply system, with only three positive voltage domains, the sensor simplifies the design of the supply unit and together with a low power dissipation allows a very compact 3D camera.

The MLX75027 supports up to 100 MHz illumination modulation frequency, which makes it well suited for VCSELs illumination and has a built-in temperature sensor.

The MLX75027 uses Sony Semiconductor Solutions Corporation's Back Illumination technology and includes advanced features, such as programmable region of interest, continuous or triggered operation modes and horizontal/vertical flip image modes. System level interfaces include CSI-2 serial data output, MIPI D-PHY.

#### Applications

- Automotive - Body, HVAC, Comfort & Lighting
- Automotive - Chassis & Safety
- Building, Security, Home & Office Automation
- Industrial & Robotics
- Medical & Healthcare

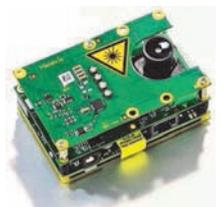


#### Features MLX75027

- Support both 850 and 940 nm wavelength
- Full VGA resolution image acquisition up to 135 distance frames per second
- Integrated light source control with up to 100 MHz modulation frequency
- MIPI CSI-2 serial camera interface
- Integrated temperature sensor

#### EVK75027 (TOF Evaluation Kit)

The evaluation kit is a complete ToF camera and can be directly connected to a PC for visualization and recording of depth map data while allowing direct access to many configuration settings.



## MLX81106/7 /8 /9

### LIN RGB LED driver for ambient lighting

The MLX8110x offers all potential for typical LIN switch application. Additionally, MLX8110x LIN RGB slave provides a single chip solution for driving up to four LEDs (RGB+1) via constant current sources in automotive ambient lighting applications. Every output can be programmed to a maximum current of 48mA (@ VS > 6V) through the built-in Flash memory.

All necessary components like physical layer LIN transceiver, LIN controller, voltage regulator and 16-bit RISC-based microcontroller, as well as supporting functions like ADC, 16-bit current modulation, constant current high voltage capable outputs and LED color and aging compensation are integrated into the chip. The high voltage inputs/outputs are capable to drive loads directly supplied through the battery voltage. It also includes the possibility for LIN auto-configuration and can thus be used for other applications requiring a low pin count fully integrated LIN slave.

### Applications

- Local Interconnect Network (LIN)
- Automotive Interior & Exterior Lighting
- Other applications are possible if software is used to allow the IC to function as LED driver



### MLX8110x Features

- 16-bit RISC MCU with:
  - Internal RC-Oscillator (12 to 24MHz programmable)
  - 24kB to 32kB USER Flash memory
  - 1 kByte RAM,
  - 384 Byte EEPROM with ECC
- LIN Protocol Controller according:
  - LIN 2.x and SAE J2602
  - Baudrate up to 19.2kBaud
  - Frame processing
  - Low interrupt load to the application
- IO Configuration:
  - Up to 12 IOs for **MLX81107/ 9**
  - Up to 4 IOs for **MLX81106/ 8**
  - 4 programmable constant current (max 30mA)/ high voltage capable IOs Diagnostic capability for connected LED
- Voltage output for supply external 5V loads via npn transistor for **MLX81107**
- 4 times 16-bit PWM outputs
- Serial Interface (SPI)
- LED color compensation and aging compensation
- Internal battery and reference voltage monitor

## MLX80050/51 /30 /31

### Enhanced LIN System Basis IC

MLX8005x/3x consist of a low-drop voltage regulator, 5 V / 3.3 V / 70 mA, combined with a reset/watchdog unit and a LIN bus transceiver. The LIN transceiver is suitable for LIN bus systems as it conforms to LIN specification revision 2.x and SAE J2602. The watchdog times of the integrated window watchdog can be adapted on application needs via external resistors. With the help of an external bipolar transistor, it is possible to extend the output current of the integrated voltage regulator. The combination of voltage regulator and bus transceiver, as well as watchdog unit, makes it possible to develop simple, but powerful and cheap slave nodes in LIN bus systems.

This IC transceiver combines a physical layer LIN transceiver, according to LIN 2.x, as well as SAEJ2602 with a 3.3 V or 5 V voltage regulator, with RESET output, for the connected microcontroller and a window watchdog.

This enhanced IC transceiver is optimized in accordance with the increased EMC requirements for single-wire bus systems, as well as the “hardware requirements for LIN, controller area network (CAN), and Flexray interfaces in automotive applications” defined from German OEMs.

### Applications

- Automotive Applications
  - Body & HVAC
  - Comfort & Lighting



### Features MLX80050 /51 /30 /31

- LIN 2.x / SAE J2602 compliant
- Operating voltage VSUP = 5 V to 27 V
- Three modes: normal, silent, and sleep
- MLX80030/31
  - Normal mode 3.3 V / 70 mA ±2%
  - Silent mode 3.3 V / 20 mA ±2%
- **MLX80050/51**
  - **Normal mode 5 V / 70 mA ±2%**
  - **Silent mode 5 V / 20 mA ±2%**
- Low current consumption (typ.)
  - Normal mode 3.3 V / 70 mA ±2%
  - Silent mode 3.3 V / 20 mA ±2%
- LIN-bus transceiver
  - Baud rate up to 20 kBaund
  - Slew rate control for best EME behavior
  - Low slew mode (SAE J2602 transmission)
  - High-impedance LIN pin, in case of loss of ground
  - Bus input voltages -24 V to 30 V independent from VBAT
  - Programmable window watchdog

## About DACOM West

In 1986 DACOM West GmbH was established as a distributor for high-quality active and passive electronical components. Since then we have been an independent, privately owned company, supporting our customers with the implementation of electronical components of the newest generation for telecom, industrial, consumer and automotive applications.

Our head office is based in Haan (near Düsseldorf), with additional offices located in Erfurt and Rosenau (Austria). Our Partners are selected based on our core competence and are meant not to compete, but complete each others portfolio. By concentrating on selected manufacturers, an in-depth technical competence, detailed product knowledge and first class product support is achieved. With most of our suppliers we have long lasting business relationships of up to 10 years

We are ISO 9001:2008 certified, documenting and acknowledging a complete quality chain from manufacturer to customer.



## Contact

### Headquarter

Dacom West GmbH  
Schallbruch 19-21  
D-42781 Haan

Phone: +49 (0) 2129 376-200  
Fax: +49 (0) 2129 376-209  
Email: [sales@dacomwest.de](mailto:sales@dacomwest.de)

### Office Erfurt

Phone: +49 (0) 2129 376-205

### Office Bruckbach

Phone: +43 (0) 7448 21643-11

