V12/10.2023

Melexis

INNOVATION WITH HEART

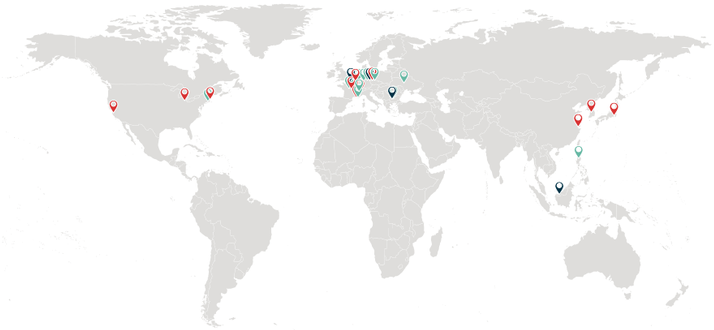
## International Presence

**www.melexis.com/sales-contact**

Europe, Middle East and Africa
sales_europe@melexis.com

Asia and Oceania
sales_asia@melexis.com

Americas
sales_usa@melexis.com



- Research & Development
- Sales & Applications
- Manufacturing

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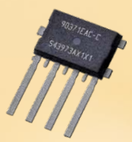
**PCB-less solutions**

SMP-3 (VE)



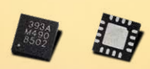
SMP-4 (VD)

DMP-4 (VS)

**SMD solutions**

SOIC-8 (DC)

TSSOP-16 (GO)



QFN-16 (LW)

DFN-6 (LW)

UTDFN-8 (LQ)

*Thanks to its magnetic compass the fascinating honey bee has the ability to perceive the omnipresent magnetic field (MF) of the Earth. This magnetic field sensitivity matches this wonderful creature with our Triaxis® magnetic sensors.*

Melexis

INNOVATION WITH HEART

SELECTION GUIDE

# TRIAXIS® POSITION SENSOR FOR AUTOMOTIVE AND INDUSTRIAL APPLICATIONS

*We are a pioneer in programmable angular and linear Hall sensors for rotary, linear, and joystick motion. Our devices offer improved manufacturability of sensor assemblies and modules. Our technology and innovations support a broad range of applications in automotive markets and beyond.*

## Triaxis® Value Optimied Sensing - for embedded applications using an external microcontroller

| | IC part number | Status | Motion | | | | Magnetic Range | | Data Rate | Supply | Idd | Output | | | | | | Operating Temperature [°C] | | | | | Angular processing | Field Mapping | Package | | | | (A)SIL ready | Strayfield immunity ISO11452-8 | AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | On-axis | Off-axis | Joystick (3D) | Linear | min - max [mT] | min. field [mT/mm][4] | [kHz] | [V] | [mA] | Ratiometric Analog | PWM | SENT | SPI | I²C | Resolution [bit] | S: -20..85 | E: -40..85 | K: -40..125 | L: -40..150 | G: -40..160 | | | SMD SOIC-8 | SMD TSSOP-16[2] | SMD QFN-16 | SMD UTDFN-8 | | | |
| Triaxis® Value Optimized | MLX90395 | prod | ✓ | ✓ | ✓ | ✓ | 5 - 50 / 10 - 120 | | 2 | 2.6 to 3.6 | 0.234 | | | | ✓ | ✓ | 16 | | | ✓ | | | off | $B_X$ / $B_Y$ / $B_Z$ | ✓ | ✓ | ✓ | | | | ✓ |

## Triaxis® Mainstream Sensing - for optimum applications with typical features

| | IC part number | Status | Motion | | | | Magnetic Range | | Data Rate | Supply | Idd | Output | | | | | | Operating Temperature [°C] | | | | | Angular processing | Field Mapping | Package | | | | | (A)SIL ready | Strayfield immunity ISO11452-8 | AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | On-axis | Off-axis | Joystick (3D) | Linear | min - max$B_{XY}$ [mT] | min. field [mT/mm] | [kHz] | [V] | [mA] | Ratiometric Analog | PWM | SENT | SPI | I²C | Resolution [bit] | S: -20..85 | E: -40..85 | K: -40..125 | L: -40..150 | G: -40..160 | | | SMD SOIC-8 | SMD TSSOP-16[2] | PCBless[1] DMP-4 | PCBless[1] SMP-3 | PCBless[1] SMP-4 | | | |
| Triaxis® Mainstream Sensing | MLX90316 | prod | ✓ | | | | 20 - 70 | | 2 / 5[3] | 5 | 8.5 / 13.5[3] | ✓ | ✓ | | ✓ | | 12 | ✓ | ✓ | ✓ | ✓ | | on | XY | ✓ | ✓ | | | | | | ✓ |
| | MLX90324 | prod | ✓ | | | | 20 - 70 | | 3.4 | 5 | 7 / 12.5[3] | ✓ | ✓ | ✓ | | | 12 | | | | ✓ | | on | XY | ✓ | ✓ | | | | | | ✓ |
| | MLX90333 | prod | | ✓ | ✓ | ✓ | 20 - 70 | | 1 | 5 | 8.5 / 13.5[3] | ✓ | ✓ | | ✓ | | 12 | | ✓ | ✓ | ✓ | | on | XZ / YZ | ✓ | ✓ | | | | | | ✓ |
| | MLX90340 | prod | ✓ | ✓ | | ✓ | 20 - 70 | | 3.4 | 5 | 13.5 | ✓ | ✓ | | | | 12 | ✓ | ✓ | | ✓ | | on | XY / XZ/ YZ | ✓ | ✓ | | | | | | |
| | MLX90363 | prod | ✓ | ✓ | ✓ | ✓ | 20 - 70 | | 1 | 3.3 / 5 | 12.5 | | | | ✓ | | 12 | | ✓ | ✓ | ✓ | | on/off | XY / XZ/ YZ | ✓ | ✓ | | | | B[7] | | ✓ |
| | MLX90364 | prod | ✓ | ✓ | | ✓ | 20 - 70 | | 3.4 | 5 | 6 | ✓ | ✓ | | | | 12 | | | | ✓ | | on | XY / XZ/ YZ | | | ✓ | | | B[6] | | ✓ |
| | MLX90365 | prod | ✓ | ✓ | | ✓ | 20 - 70 | | 3.4 | 5 | 6 | ✓ | ✓ | | | | 12 | | ✓ | ✓ | ✓ | | on | XY / XZ/ YZ | ✓ | ✓ | | | | B[6] | | ✓ |
| | MLX90366 | prod | ✓ | ✓ | | ✓ | 20 - 70 | | 1.1 | 5 | 6 | | | ✓ | | | 12 | | | | ✓ | | on | XY / XZ/ YZ | | | ✓ | | | B[6] | | ✓ |
| | MLX90367 | prod | ✓ | ✓ | | ✓ | 20 - 70 | | 1.1 | 5 | 6 | | | ✓ | | | 12 | | ✓ | ✓ | ✓ | | on | XY / XZ/ YZ | ✓ | ✓ | | | | B[6] | | ✓ |
| | MLX90421 | prod | ✓ | ✓ | | ✓ | 10 - 70 | | 2.2 | 5 | 8.5 | ✓ | ✓ | | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | ✓ | ✓ | ✓ | B | | ✓ |
| | MLX90422 | prod | ✓ | ✓ | | ✓ | 10 - 70 | | 1.1 | 5 | 8.5 | | | ✓ | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | ✓ | ✓ | ✓ | B | | ✓ |
| | MLX90423 | prod | | | | ✓ | 10 - 70 | 1.5 - 6 | 4.7 | 5 / 12[5] | 9 / 11 | ✓ | ✓ | ✓ | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | | ✓ | | B or C | 5mT | ✓ |
| | MLX90425 | prod | ✓ | | | | | 10 | 1.9 | 5 | 10 | ✓ | ✓ | | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | (✓)[(8)] | | ✓ | (✓)[(8)] | B | 5mT | ✓ |
| | MLX90426 | prod | ✓ | | | | | 10 | 1.1 | 5 | 10 | | | ✓ | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | (✓)[(8)] | | ✓ | (✓)[(8)] | B | 5mT | ✓ |

## Triaxis® Performance Sensing - for demanding applications

| | IC part number | Status | Motion | | | | Magnetic Range | | Data Rate | Supply | Idd | Output | | | | | | | Operating Temperature [°C] | | | | | Angular processing | Field Mapping | Package | | | | | (A)SIL ready | Strayfield immunity ISO11452-8 | AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | On-axis | Off-axis | Joystick (3D) | Linear | min - max$B_{XY}$ [mT] | min. field [mT/mm] | [kHz] | [V] | [mA] | Ratiometric Analog | PWM | SENT | SPC | PSI5 | Resolution [bit] | S: -20..85 | E: -40..85 | K: -40..125 | L: -40..150 | G: -40..160 | | | SMD SOIC-8 | SMD TSSOP-16[2] | PCBless[1] DMP-4 | PCBless[1] SMP-3 | PCBless[1] SMP-4 | | | |
| Triaxis® Performance Sensing | MLX90371 | prod | ✓ | ✓ | | ✓ | 10 - 70 | 3.8 - 10 | 2.3 | 5 | 10 | ✓ | ✓ | | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | ✓ | | ✓ | B | 5mT | ✓ |
| | MLX90372 | prod | ✓ | ✓ | | ✓ | 10 - 70 | 3 - 10 | 1 | 5 / 12[5] | 10 | | ✓ | ✓ | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | ✓ | | | C | 5mT | ✓ |
| | MLX90373 | prod | ✓ | ✓ | | ✓ | 10 - 70 | 4.1 - 10 | 1 | 5 / 12[5] | 11 | | | | | ✓ | 12 | | | ✓ | | | on | XY / XZ/ YZ | | ✓ | ✓ | | | C | 5mT | ✓ |
| | MLX90374 | prod | ✓ | ✓ | | ✓ | 10 - 70 | 3 - 10 | 1 | 5 / 12[5] | 10 | | dual | ✓ | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | | ✓ | | | C | 5mT | ✓ |
| | MLX90376 | prod | ✓ | ✓ | | ✓ | 10 - 70 | 3 - 10 | 0.5 / 2.5 | 5 / 12[5] | 9 / 13.5[3] | ✓ | ✓ | ✓ | ✓ | | 12 - 14 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ (stacked) | | | ✓ (stacked) | C | 5mT | ✓ |
| | MLX90377 | prod | ✓ | ✓ | | ✓ | 10 - 70 | 3 - 10 | 0.5 / 2.5 | 5 / 12[5] | 9 / 13.5[3] | ✓ | ✓ | ✓ | ✓ | | 12 - 14 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | ✓ | ✓ | | C | 5mT | ✓ |
| | MLX90378 | prod | | | ✓ | | 10 - 70 | | 1 | 5 / 12[5] | 9 | | dual | ✓ | | | 12 | | | | | ✓ | on | XY / XZ/ YZ | ✓ | ✓ | | | | C | | ✓ |

## Triaxis® Motor position sensing - for motor commutation solution with magnetic resolver

| | IC part number | Status | Motion | | | | Magnetic Range | | Max. e-rpm[9] | Supply | Idd | Output | | Operating Temperature [°C] | | | | | Angular processing | Field Mapping | Package | | | | | (A)SIL ready | Strayfield immunity ISO11452-8 | AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | On-axis | Off-axis | Joystick (3D) | Linear | min - max$B_{XY}$ [mT] | min. field [mT/mm] | | [V] | [mA] | Sine / Cosine | Resolution [bit] | S: -20..85 | E: -40..85 | K: -40..125 | L: -40..150 | G: -40..160 | | | SMD SOIC-8 | SMD TSSOP-16[2] | SMD DFN-6 | PCBless[1] SMP-3 | PCBless[1] SMP-4 | | | |
| Triaxis® Resolver | MLX90380 | prod | ✓ | ✓ | | | 10 - 70 | | 25'000 | 3.3 / 5 | 7 / 8 | ✓ | sin/cos | | | | ✓ | | off | XY / XZ/ YZ | ✓ | ✓ | | | | B[6] | | ✓ |
| | MLX90381 | prod | ✓ | ✓ | | | 10 - 70 / 40 - 160 | | 50'000 | 3.3 | 4.2 | ✓ | sin/cos | | | | | ✓ | off | XY / XZ/ YZ | | | ✓ | | | B | | ✓ |

## Linear Hall position sensing - for short range linear motion

| | IC part number | Status | Motion | | | | Magnetic Range | | Data Rate | Supply | Idd | Output | | | | | | Operating Temperature [°C] | | | | | Linear processing | Field Mapping | Package | | | | | (A)SIL ready | Strayfield immunity ISO11452-8 | AEC-Q100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | On-axis | Off-axis | Joystick (3D) | Linear | min - max$B_Z$ [mT] | min. field [mT/mm] | [kHz] | [V] | [mA] | Ratiometric Analog | PWM | SENT | SPC | PSI5 | Resolution [bit] | S: -20..85 | E: -40..85 | K: -40..125 | L: -40..150 | G: -40..160 | | | SMD TSOT-23 | SMD SOIC-8 | SMD TSSOP-16[2] | SIP UA-3 | SIP VA-4 | | | |
| Linear Hall | MLX90290 | prod | | | | ✓ | ±20 to ±125 | | 900 | 3.3 / 5 | 5 | ✓ | | | | | - | | | | ✓ | | on | $B_Z$ | ✓ | | | ✓ | | | | ✓ |
| | MLX91377 | prod | | | | ✓ | ±10 to ±100 | | 0.2 / 50 | 5 | 11 | ✓ | ✓ | ✓ | ✓ | | 12 | | | | | ✓ | on | $B_Z$ | | | ✓ | | | B or C | | ✓ |

*(1) Dual Mold Package (DMP) & Single Mold Package (SMP). PCBless packages are intended to be used without a PCB and with electrical connections made directly to a leadframe.*
*(2) TSSOP-16 package include two dies with individual electrical connections, where full redundancy is needed.*
*(3) Slow mode / Fast mode*
*(4) Stray field robust mode utilizes a gradient field (mT/mm) while the traditional mode uses a homogenous field (mT).*
*(5) Extended mode (6-18V) selectable via EEPROM programming.*
*(6) Safety applications supported by safety analysis report and safety manual via HW Evaluation under Clause 13 of ISO26262*
*(7) Safety applications supported by safety analysis report and safety manual via Proven In Use process under Clause 14 of ISO26262*
*(8) Sample stage*
*(9) Electrical at Hall plates*

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