1st/July/2021

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MLX91218 - MLX91219 Launch

Current sensor ICs for 200-2000+A applications with High SNR & OCD function

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Part 1: Melexis Introduction

Part 2: Current Sensor Application

Part 3: Melexis Current Sensor Solution

Part 4: Summary

Part 1: Melexis Introduction

The Melexis portfolio

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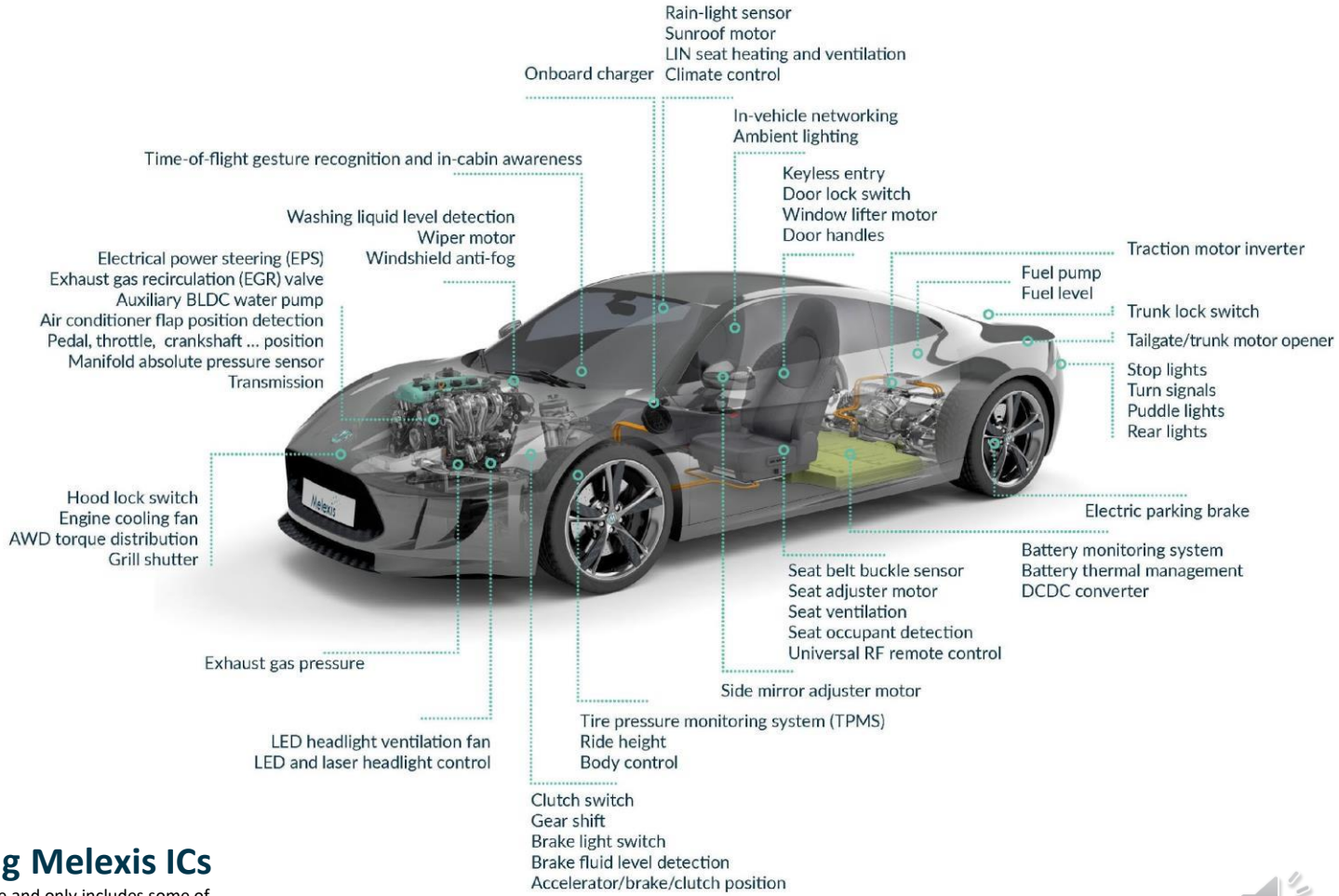
13 chips in every new car



Applications containing Melexis ICs

Disclaimer: Please note this list is not exhaustive and only includes some of the most common applications containing Melexis ICs.

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Melexis supplied > **1.3 billion** ICs worldwide in 2020

SENSE&DRIVE by Melexis

- Magnetic position sensors
- Inductive position sensors
- Current sensors
- Latch & switch
- Embedded drivers
- Smart drivers

SENSE&LIGHT by Melexis

- Pressure sensors
- Tire monitoring sensors
- Temperature sensors
- Optical sensors
- Sensor interfaces
- Embedded lighting

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Part 2: Current Sensor Application

Current Sensor Application

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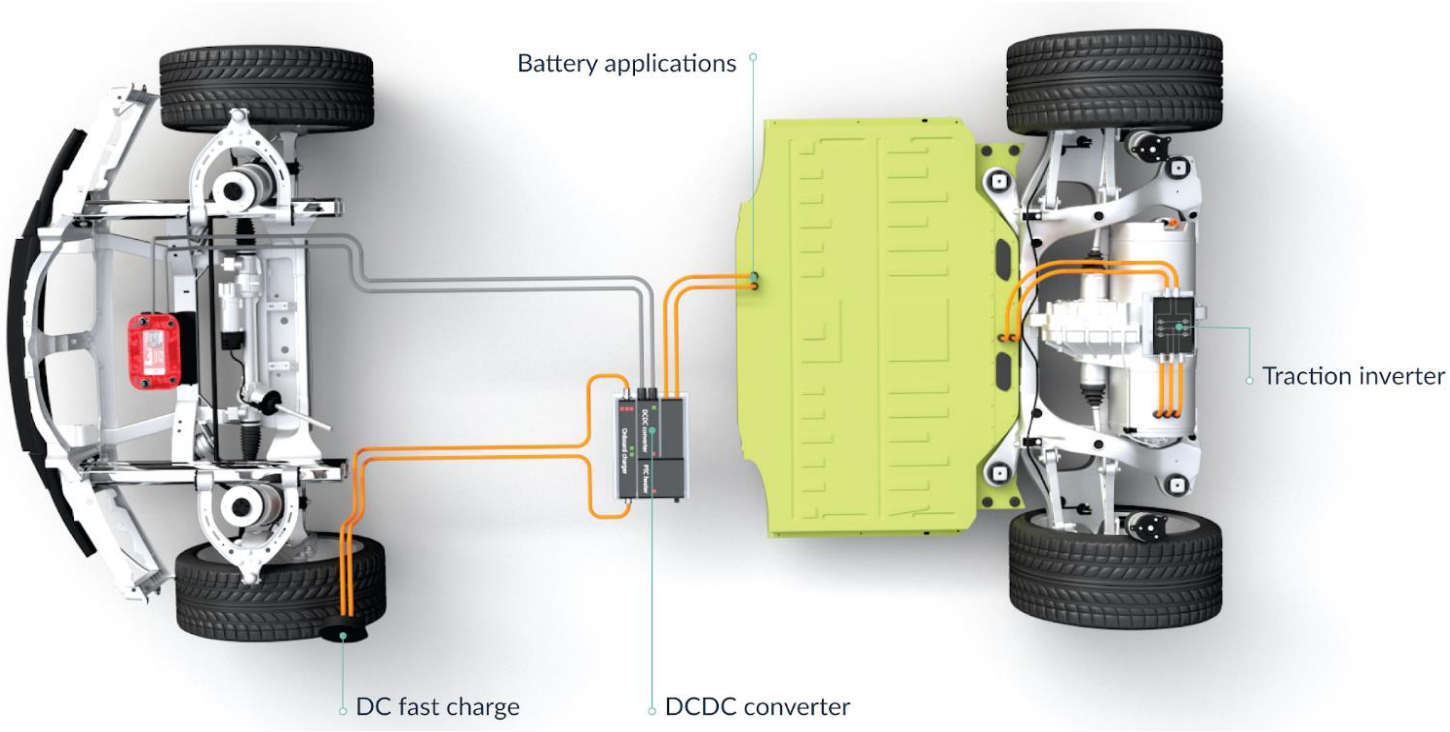
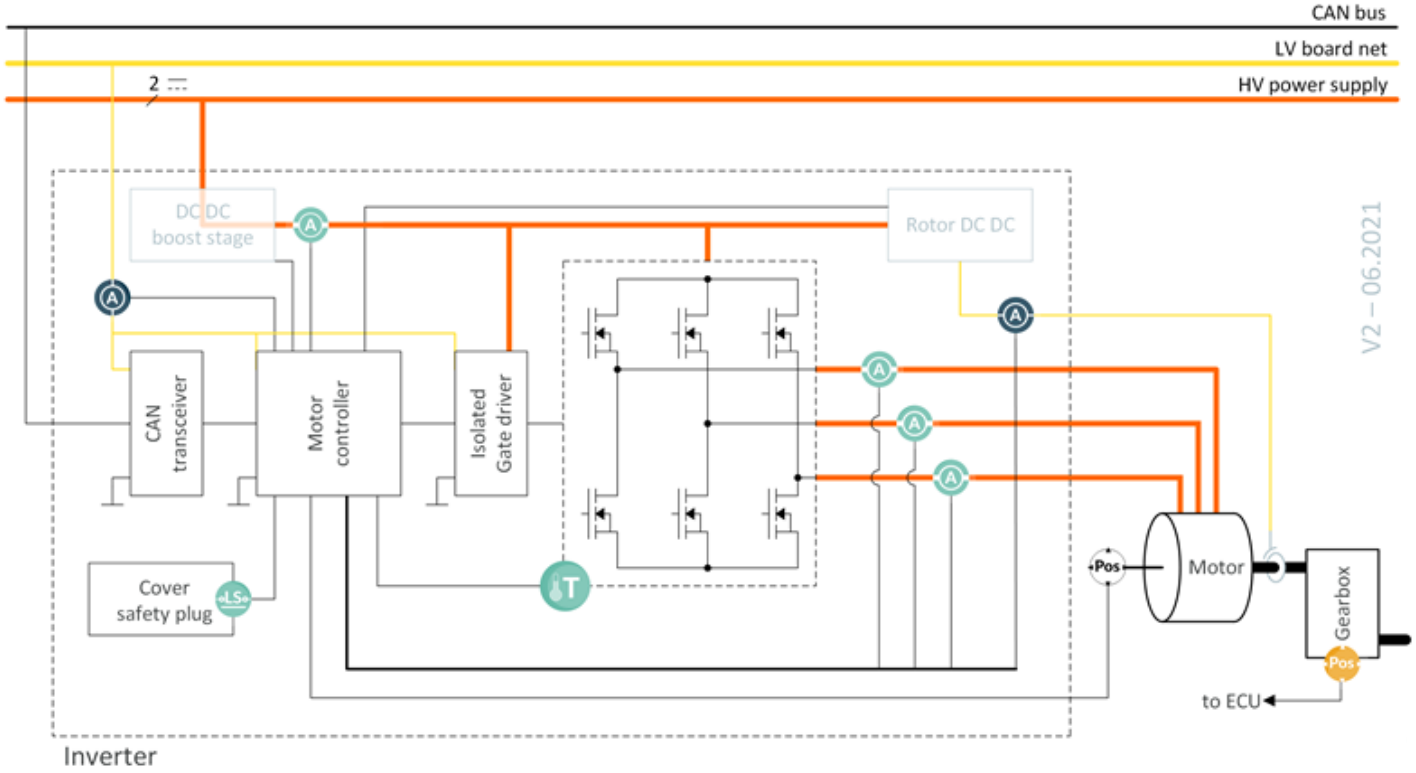
Automotive (H)EV powertrain applications

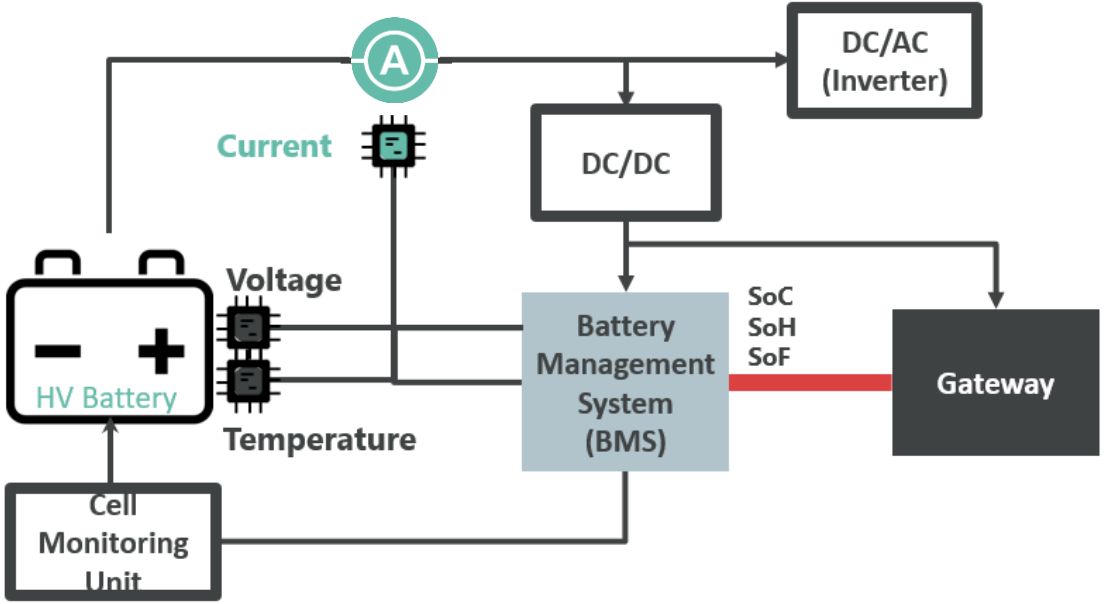


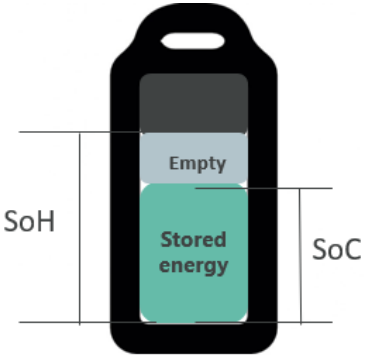
BMS
DC/DC converter
On-Board Charger
PTC Heater
Traction Inverter

Traction Inverter



Battery Management System(BMS)





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Non-Automotive Application

- **DC Fast Charger**
  - Made out of multiple 15 … 30KW chargers
  - 45KW(125A), 240KW(400A), 400KW(400A?)

- **AC Wallbox**
  - 3.3KW … 6.6KW(1-Phase)
  - 11KW … 22KW(3-Phase)

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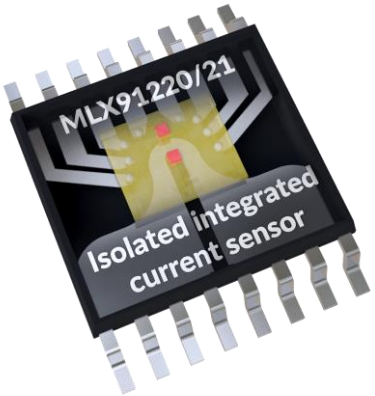
Part 3: Melexis Current Sensor Solution

Product Families

3 Families – New recent addition

Conventional Hall

IMC-Hall®



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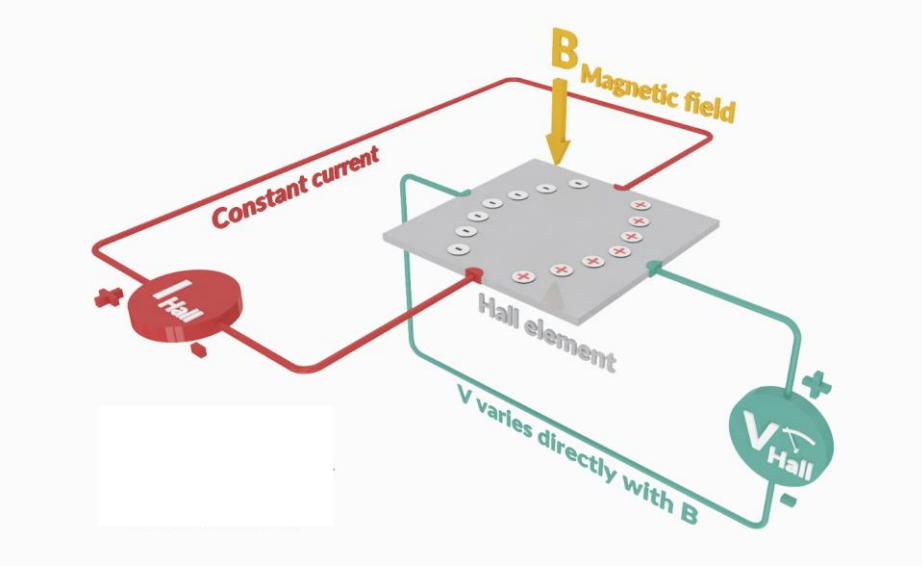
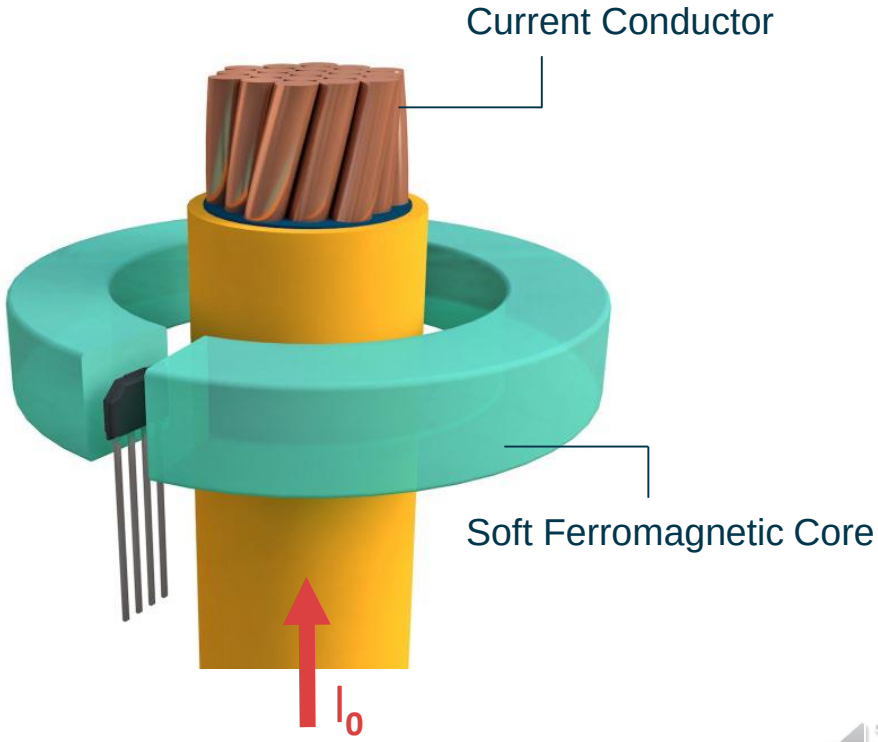
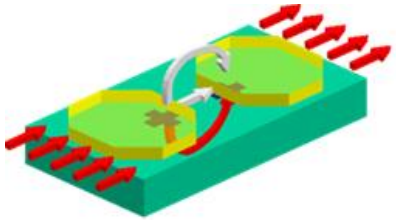
Conventional Current Sensor Solution



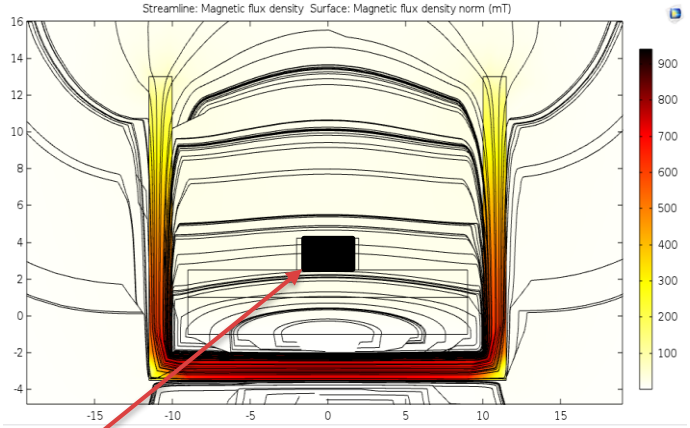


Conventional Hall Current sensors IC, with Hall plate

IMC-HALL® Current Sensor Solution

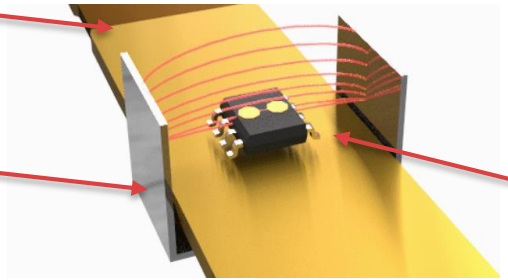


IMC-Hall®



Bus Bar

U-shield



Melexis Current Sensor Location

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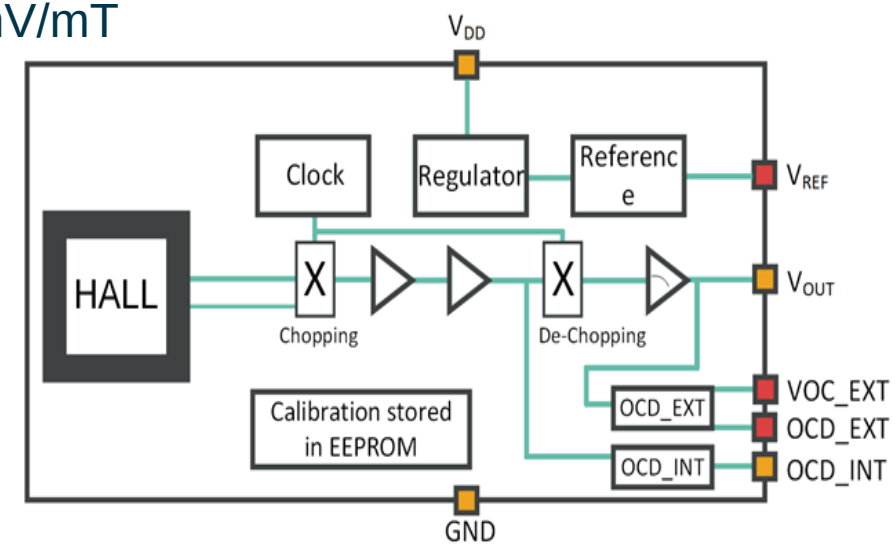
MLX91219 Features

- Factory selected 5V or 3.3V supply
- Measurement range from ±12 to 500mT
- Programmable sensitivity from 4 to 105mV/mT
- High speed AC and DC current sensing
  - 400KHz bandwidth
  - 2us response time
- Very low thermal drift for wide range
  - Offset drift (<5mV)
  - Sensitivity drift (<1%)
- High linearity down to ±0.5% full scale
- Fast dual overcurrent detection
  - Internal threshold
  - External threshold(Only SOIC8)
- AEC-Q100 – Grade 0 Automotive Qualification



SOIC8 only SOIC8 & SIP4-VA

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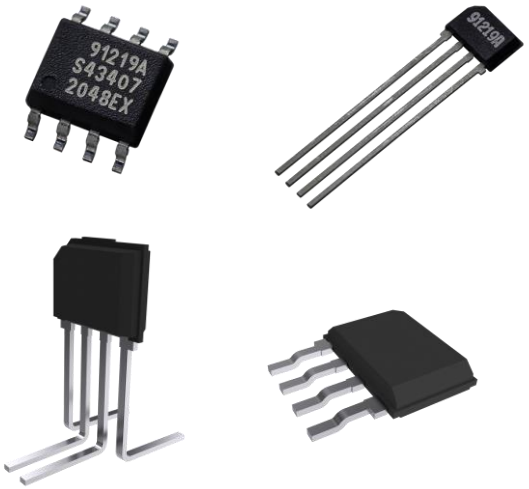
MLX91219 Package Information

- Package Code
  - VA for SIP-4 package
  - DC for SOIC-8 package – coming soon

- Option code for MLX91219 Trim and Form
  - xxA-xxx for straight leads
  - xxR-xxx for 2x 90deg lead bending, 5.34mm height PCB to dambar
  - xxS-xxx for 2x 90deg lead bending, 3.7mm height to dambar
  - xxZ-xxx for Z-shape



MLX91219 Package Family

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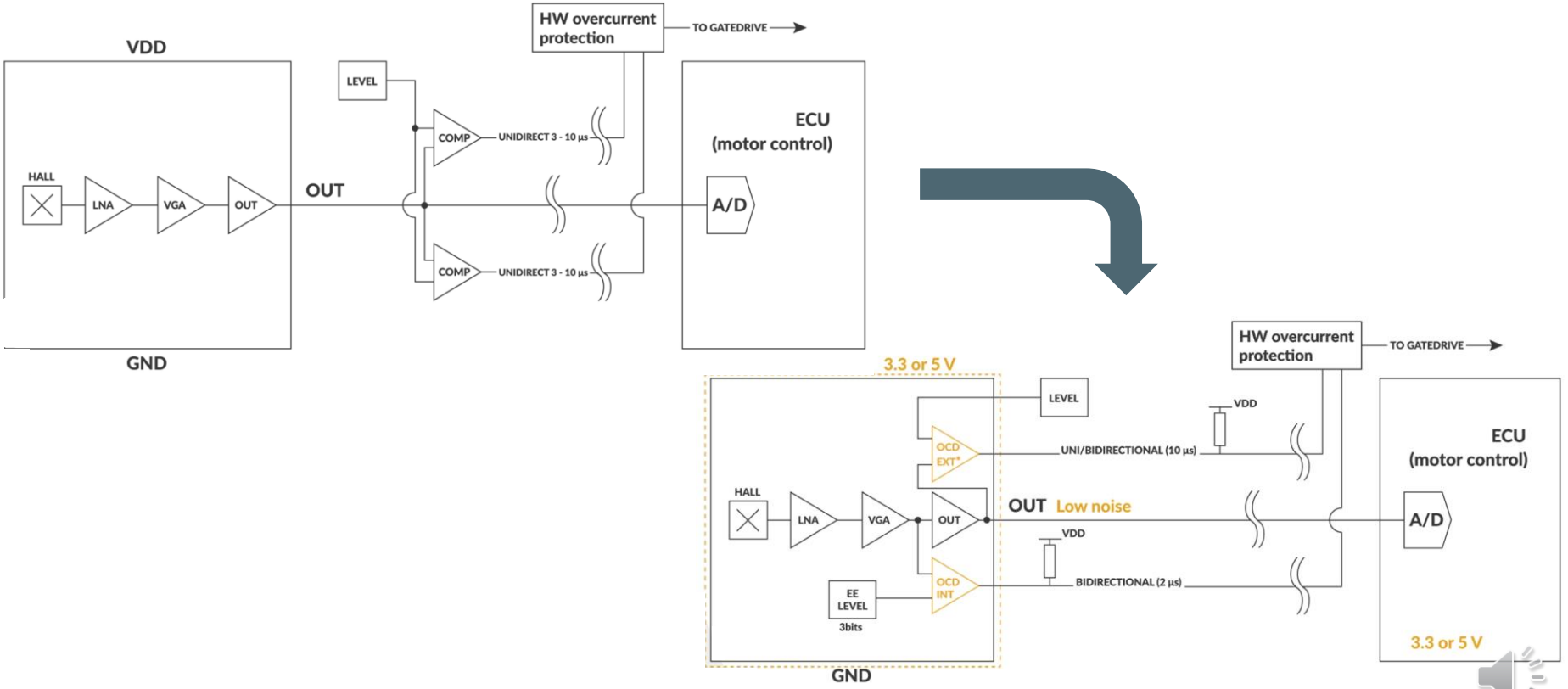
MLX91219 OCD Function



MLX91219 OCD Function Features

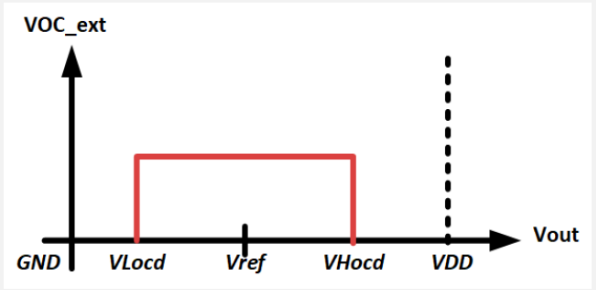
Parameter	OCD_{INT}		OCD_{EXT}
Overcurrent effect	OCD_{INT} pin active low (falling edge)		OCD_{EXT} pin active low (falling edge)
Polarity	Bidirectional OCD		Unidirectional or bidirectional
Availability	SIP4 VA, SOIC8 package		SOIC8 package only
Threshold definition	EEPROM (internal)		Resistive divider on VOC_{EXT}
Threshold range (4bits)	20 .. 200%FS		10 .. 100%FS
Accuracy	~±10%		~±7%
Response time	1.4µs	2.1µs	~10µs
Setup time	~1µs		>10µs
Hold time	7µs	14µs	~10µs

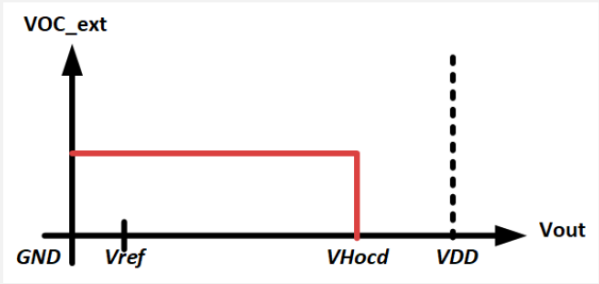
MLX91219 Internal Overcurrent Detection Principle

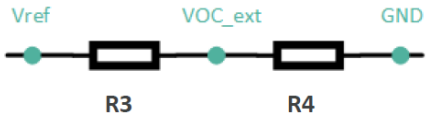
Ordering Code	Sensitivity [mV/mT]	OCD_{INT} Factory trimmed Threshold Level [%FS]	OCD_{INT} Factory trimmed Threshold Level [mT]
MLX91219LVA-AAA-500	7	128 %FS	366 mT
MLX91219LVA-AAA-501	10	128 %FS	256 mT
MLX91219LVA-AAA-502	15	128 %FS	170 mT

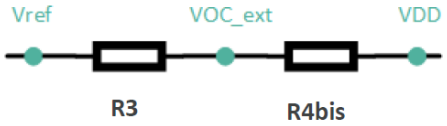
MLX91219 External Overcurrent Detection Principle

Bidirectional configuration	Unidirectional configuration









$$VOC_{EXT} = V_{REF} * \frac{R_3}{R_3 + R_4}$$

$$VLocd = VOC_{EXT}$$

$$VHocd = 2.V_{REF} - VLocd$$

$$VOC_{EXT} = V_{REF} + (V_{DD} - V_{REF}) * \frac{R_3}{R_3 + R_{4bis}}$$

$$VHocd = VOC_{EXT}$$

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MLX91218 Features

- Factory selected 5V or 3.3V supply
- Measurement range from ±200 to >2000A
- High speed AC and DC current sensing
  - 400KHz bandwidth
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- Very low thermal drift for wide range
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  - Sensitivity drift (<1%)
- High linearity down to ±0.3% full scale
- Fast dual overcurrent detection
  - Internal threshold
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- AEC-Q100 – Grade 0 Automotive Qualification
- SOIC-8

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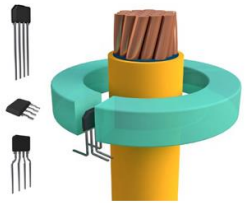
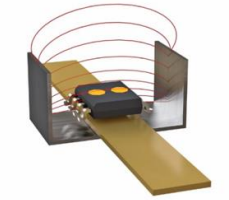
Part 4: Summary

Summary

The MLX91218 (IMC-HALL®) and the MLX91219 (Conventional Hall) are high-speed high-accuracy current sensor simplifying automotive inverter/converter module designs with an integrated dual overcurrent detection (OCD) functionality, a flexible supply 3.3V/5V and an improved SNR.



Conventional Hall



IMC-Hall®

Integrated

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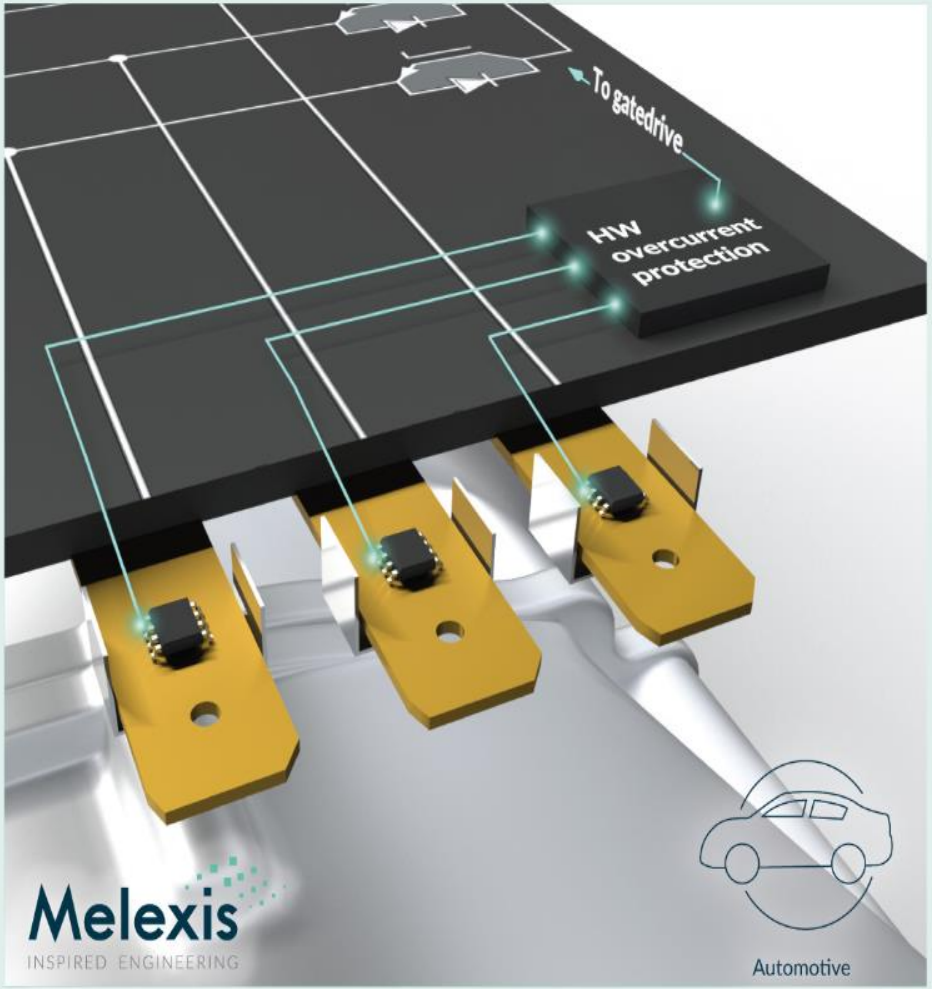

- Dual overcurrent detection
- Flexible supply voltage
- High speed
- Low noise

400 kHz CURRENT SENSOR IC WITH DUAL OVERCURRENT DETECTION

MLX91218
IMC-HALL®

MLX91219
CONVENTIONAL HALL