

Product Line PTS – Focus Portfolio for Mass Market¹

1) Concrete parts listed in respective pitch capsule

Non-Automotive

Consumer, Industrial, Medical, Mobility

1



Magnetic Position Sensor

2



**IVT Sensor
(current / voltage)**

3



Temperature Sensor

4



Capacitive Sensor

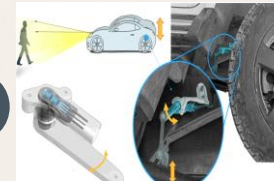
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Inductive Position Sensor

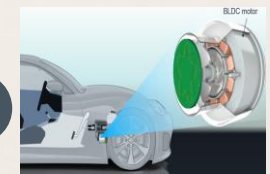
Automotive / Transportation

1



Magnetic Position Sensor

2



Inductive Position Sensor

3



Capacitive Sensor

4



**IVT Sensor
(current / voltage)**

A landscape featuring solar panels, wind turbines, and an energy storage container at sunset. The scene is bathed in the warm, golden light of the setting sun, which is positioned behind a line of wind turbines. In the foreground, there are solar panels and a large, white energy storage container with 'ENERGY STORAGE' written on its side. The ground is covered in tall grass, and the overall atmosphere is serene and futuristic.

ams Osram – IVT (Current, Voltage and Temperature) Sensors

for industrial, consumer & mobility applications

Focus product : AS8512

Content

1. **Focus products** → Which products are we talking about?
2. **Applications** → What can they be used for?
3. **Market size** → What is the revenue potential?
4. **USPs and competitive comparison** → Why should customers use ams Osram?
5. **Success stories** → Proof points for what we claim
6. **Product order information and Design resources** → How can you get the product? How can you easily design-in the product?

AS8512 product family offers compelling IVT sensing solutions

IVT sensing for industrial, medical & consumer applications

AS8512



AS8512 is a current, temperature and voltage (IVT) sensor tailored to accurately measure wide range of current ranging from mA to 1500kA with 16-bit resolution over temperature range of -40°C up to 105°C over SPI serial interface

Offers : High price performance ratio, offset-free measurement , two independent differential input channels, built-in self diagnostics

Suitable for : Grid energy storage systems ,Building Energy Storage Systems, E-mobility and battery driven devices

AS8512 Product Overview

High accuracy industrial IVT sensor

Key Features

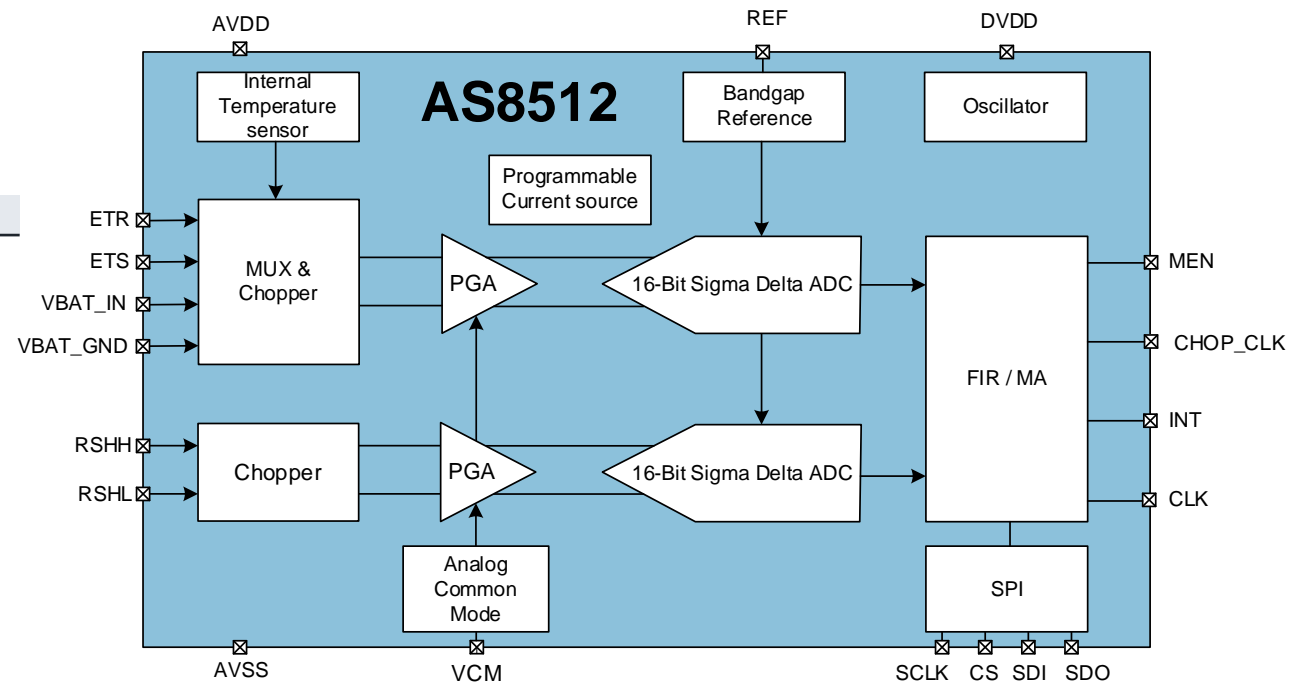
- Low supply voltage
- Redundant measurement possibility
- Flexible configuration
- Unique measurement principle

Benefits

- 3.3V supply voltage
- Two high resolution 16-bit Sigma-Delta A/D converters
- Programmable sampling to enable data throughput from less than 1Hz to 8kHz
- Zero offset for both channels

Applications

- Grid Storage Systems
- Energy Storage Systems at Home
- E-bikes



Some example applications

IVT Sensors covers a wide field of applications in various market segments

Industrial



Grid Storage Systems

Consumer



Home Energy Storage System



Power Tool Battery monitoring

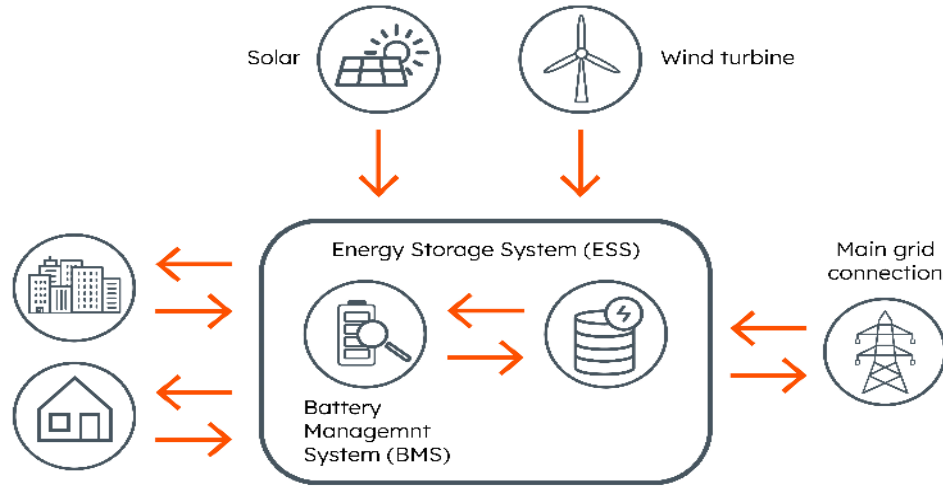
Mobility



E-bikes / Two wheelers

Battery Monitoring in Energy Storage Systems (ESS)

Energy harvesting for long-term power autonomy



Challenges

Battery-pack disfunction

Long-term monitoring

Reliable data acquisition

Easy to implement

Safety measurements

Solutions

Highly accurate current, voltage and temperature measurement

- Synchronous measurement current and voltage/temperature (IVT)
- Compelling cost structure sensor

Low Noise and offset-free measurement

Simple to implement and program due to standard SPI interface

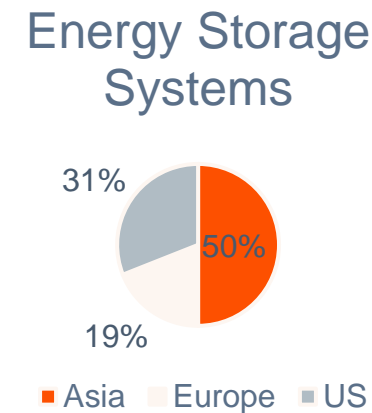
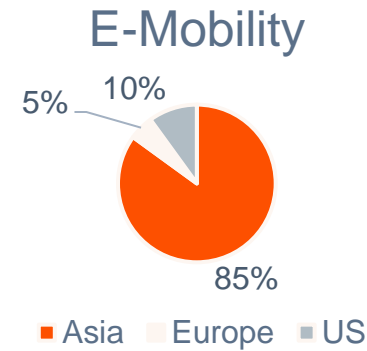
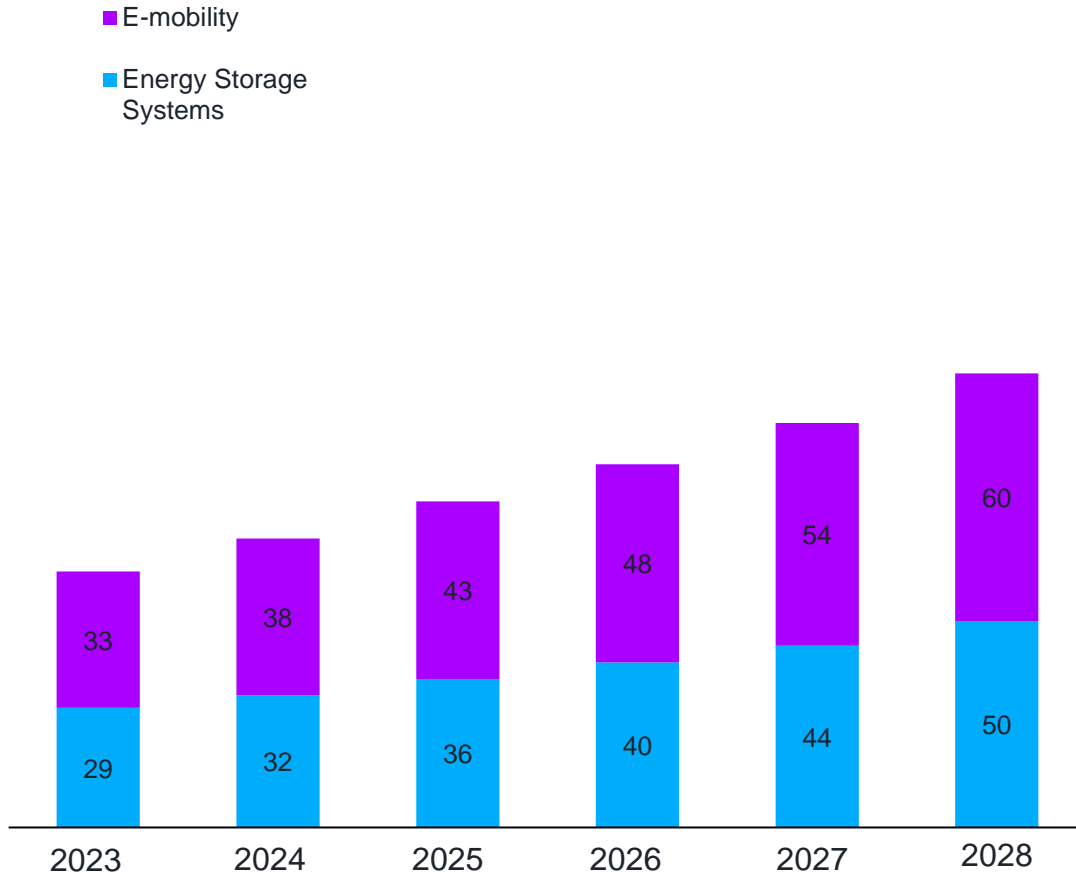
High safety level due to internal diagnostic and redundant measurement channels (2 ADC channels)

Market growth and potential

IVT Sensors market expects to grow with 12.15% CAGR [23-28]

IVT sensors market development (global)

*Market size (SAM) in M€ [2023 to 2028]



Market dynamic

Main reasons of growth

- **Energy storage systems** market shown here comprises of both grid storage systems and home energy storage systems
 - Trend towards renewable energy and towards higher efficiency drives enormous growth potential for IVT sensors
- **E-mobility market** as well shows a trend towards higher efficiency which drives the growth for IVT sensors

*Data derived from ams Osram intelligence

Features: Why to choose ams OSRAM for IVT Sensors

ams OSRAM is shaped to lead IVT Sensors market and generate fast revenue growth

Price Performance Ratio

- High accuracy over full temperature and measurement range

Unique measurement principle

- Special measurement principle (Chop/dechop) allowing offset-free measurement

Guaranteed Supply chain

- Flexible in-house Supply chain, 0.45ppm in past years
- 0 line downs in the last 4 years

Competitive advantage (USP)

Wide measurement range

- Offers a wide current measurement range from 1 mA to 1.5 kA

Easy integration

- SPI interface is used as interface between the AS8512 and an external micro-controller to configure the device and access the status information
- SPI protocol is simple

Low linearity error

- Offers a very linearity error of $\pm 0.25\%$ over full measurement range


Key features

AS8512 versus competitors

Fighting guide


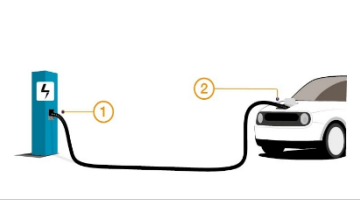


ams Osram key strength

Feature	AS8512	Comp 1	Comp 2	Comp 3
Supply voltage	3.0 – 3.6 V	2.7V – 5.5V	2.0V – 5.5V	2.3V-5.5V
Max. no.of channels	5 (1: Differential, 4 : Auxiliary)	2 (1:Differential, 1:Auxiliary)	4(Auxiliary)	3 (1:Differential, 2:Auxiliary)
Interface	SPI	SPI	I2C	I2C
Sampling Frequency	8kHz	20kHz	3.3kHz	2kHz
Current Measurement accuracy error	0.5% 	1.0%	1.89%	2.0%
PGA steps	4	0	8	8
Internal Temperature sensor	YES	YES	NO	YES
Reference voltage pin	YES	NO	NO	YES
Diagnostics	YES	YES	NO	NO
Resolution	16 Bit	20 Bit	16 Bit	16 Bit

Success stories

Few Design-Win examples

Part number	AS8512	AS8512
Market segment	Industrial	Mobility
Application details	Grid Storage systems	EV Charging stations
		
Win Factors	Price performance ratio , High accuracy, Low offset, Wide measurement range	Price performance ratio , High accuracy, Low offset, Wide measurement range

Product order information

Overview of the available products

Product Name	Part Number (Order Code)	Package Type	Temperature Range	Supply	Focus Market Segment	Design Resources
AS8512	AS8512-ZSSM (Q65113A7218) AS8512-ZSSP (Q65113A7217)	SSOP	-40°C to +105°C	3.0 to 3.6V	<ul style="list-style-type: none">• Industrial• Consumer• Mobility	Upcoming (Q3'24)
AS8510	AS8510-ASSP (Q65114A0684) AS8510-ASSM (Q65114A0683)	SSOP	-40°C to +125°C	3.0 to 3.6V	<ul style="list-style-type: none">• Mobility	USB Interface Board (Q65114A1391) , Copper Shunt Demo Board , Software

Design Resources

Support Tools (AS8510)

Board



The AS8510 Demo Kit for AS8510 data acquisition front-end IC allows easy evaluation of the AS8510 features. Key Features: - User friendly graphical PC interface ; Easy implementation in your own software (for example to do lab measurements in Labview) possible

Recommended

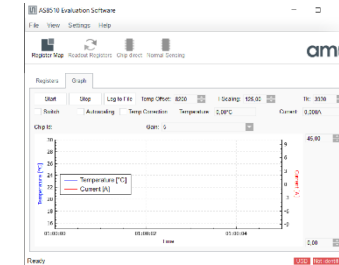
Programmer



The USB Interface Board enables communication between the Copper-Shunt Demo and PC. The kit consists of the dual layer PCB USB Interface Board and a HDMI Type-D to Type-C Cable which is used to connect demo board.

Recommended

Software

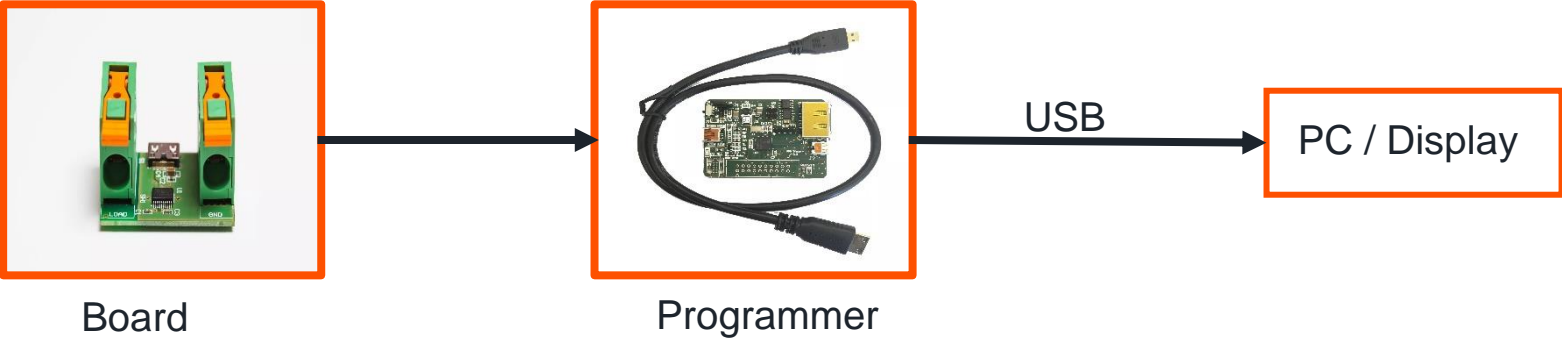


AS8510 has 2 types of evaluation software. One is a software to evaluate the copper shunt board and another is to evaluate the demo board

Optional

Design Resources

Example User Guide (AS8510)



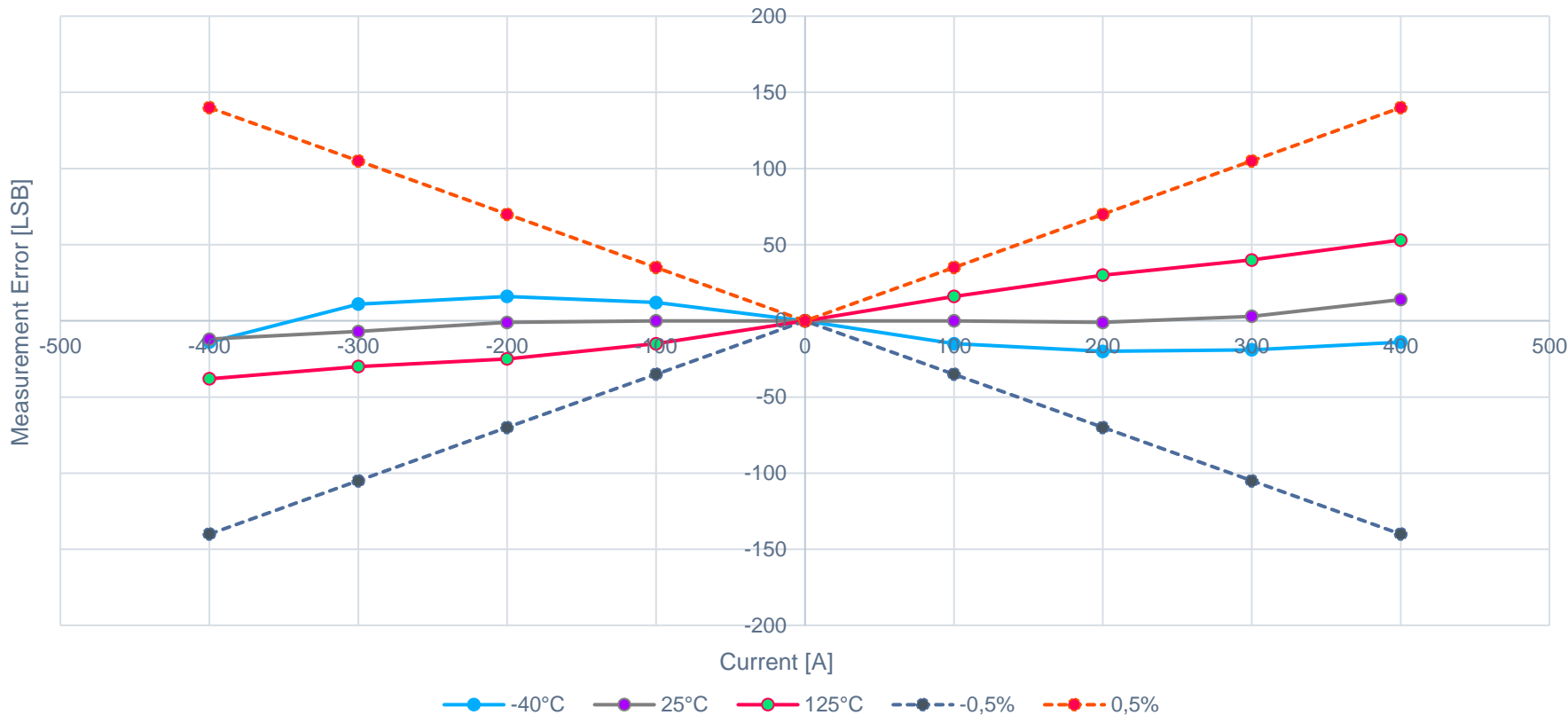
BACKUP



Key features: accuracy over temperature

Linear behavior and low measurement error over large temperature range

Typical current sense accuracy for a single point room temperature End Of Line calibrated system



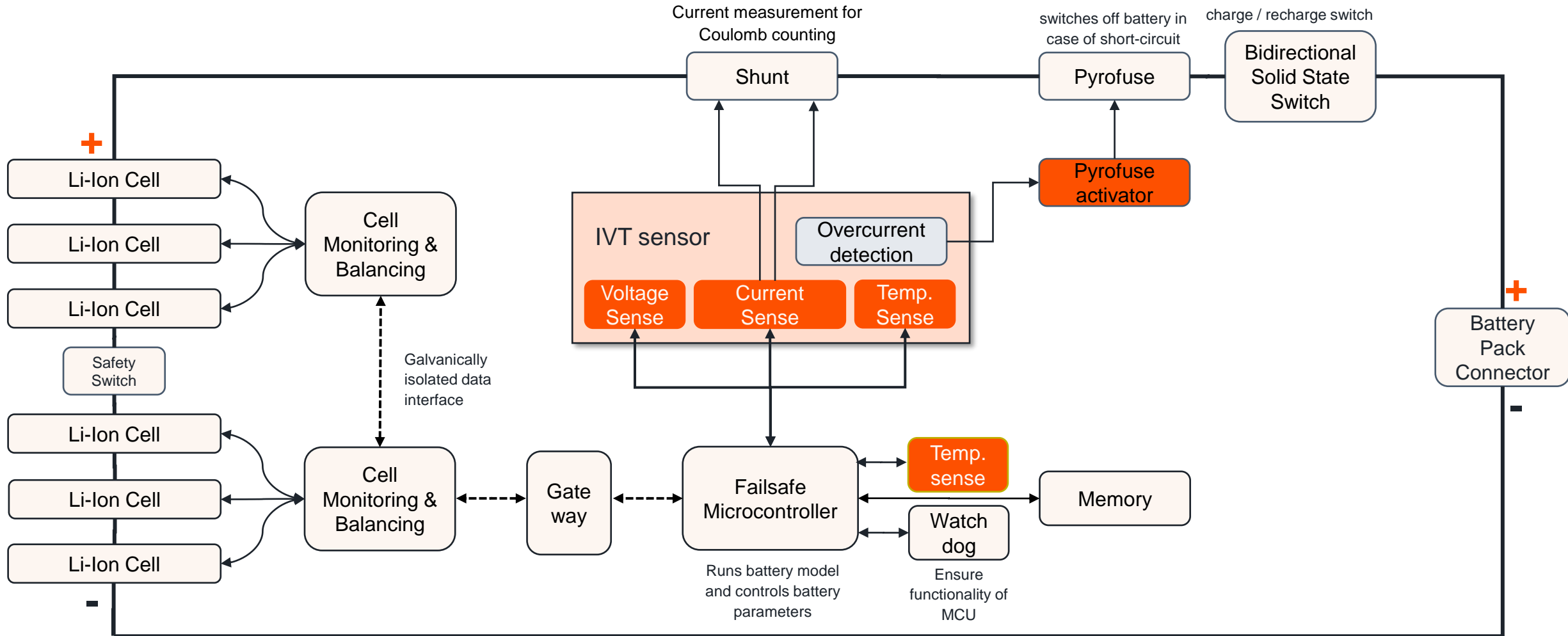
Error_max = +/- 0,25%

*Maximum Error over full temperature range at this measurement

Error_max < 0,1% achievable with 3 point temperature calibration and temperature compensation

Battery Management System Block Diagram

High level overview



Sensing is life

ami OSRAM