

Introduction

Melexis' family of innovative Triaxis™ current sensors have proven to be an excellent match for deployment in power distribution units (PDU). This document details the specific benefits of Melexis current sensors for such applications.



Figure 1: Power Distribution Unit (PDU)

Triaxis™ Current Sensors

Triaxis™ current sensors are non-intrusive and can be used to measure the current directly from a PCB trace or a bus bar. Flowing current generates a magnetic field around the conductor, which is sensed by the Hall effect principle. The sensor output voltage is then proportional to the current.

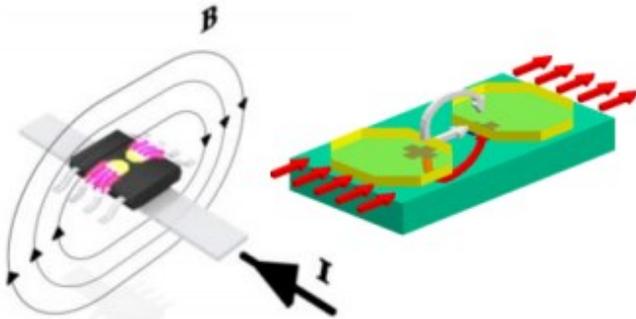


Figure 2: Current sensing principle with Triaxis™ current sensors (right) and patented IMC® technology (left)

Classic Hall effect sensors are sensitive to magnetic fields perpendicular to the chip surface. Thanks to the patented IMC® technology, the lateral magnetic field is made locally vertical and measured differentially with high signal-to-noise ratio.

PDU Applications

Market for Power Distribution Units (PDU) is growing rapidly with the increasing need for computing power, storage and bandwidth. As a significant portion of the overall grid power is provided through PDUs, the reliability and efficiency of these devices is critical. The ability to monitor and analyze power consumption, as well as to spot potential issues before they occur, are thus key selling features for PDU manufacturers.

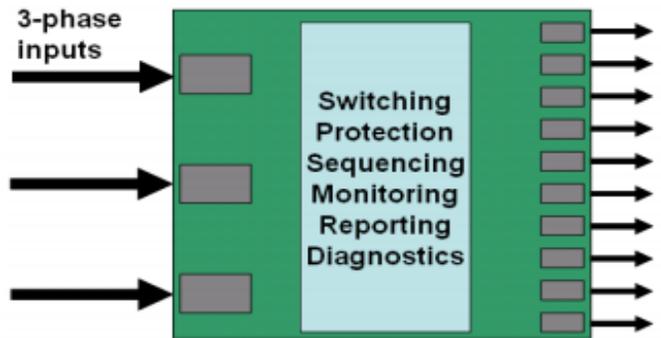


Figure 3: Simplified PDU block diagram

The Triaxis™ current sensor family is an optimal solution for PDU applications, providing accurate and reliable monitoring of the current consumption for each input/output of the system. Many of the challenges faced by PDU designers – including voltage transient survival, current inrush handling, space constraints and modularity – can be addressed with this lowcost, contact-less current sensing solution.



Figure 4: PDU board with MLX91205 sensors.

On the primary side (PDU input), current can be directly measured from a bus bar.

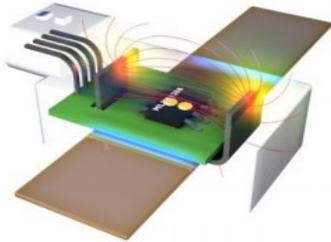


Figure 5: Direct, non-intrusive bus bar current measurement with MLX91206.

Key Benefits of Triaxis™ Sensors

Non-intrusive sensing

Contact-less sensing principle ensures intrinsic isolation and protection against huge transient voltages or inrush currents.

Accuracy

High linearity, with compensation for offset and sensitivity drift over temperature.

Speed

Fast analog output with very short response time (8µs) and wide bandwidth (100kHz).

High modularity

Many different designs are possible depending on application requirements. MLX91206 can be programmed to match a broad range of sensitivities.

Standard assembly with low footprint

Triaxis™ current sensors are packaged in SOIC-8 and can be assembled by standard surface-mount techniques. They feature a much smaller footprint than classic Hall sensors with iron cores.

Quick Selection Guide

Table 1 displays comparative specifications and features for each current sensor in the Triaxis™ family.

	91205	91206
Sensitivity [mV/mT] *programmable	100/280	80-700*
Refresh rate [µs]	2	4
Bandwidth [kHz]	100	80
Fast analog output	Yes	Yes
PWM output	No	Yes
Programmable	No	Yes
Diagnostic functions	No	Yes
Package	SOIC-8	SOIC-8
Temp. range [°C]	-40 to 125	-40 to 150

Table 1: Sensors specifications and features

Design considerations

- Higher sensitivity by means of multilayer PCBs with current loops under the sensor.
- PCB ground layer for proper isolation against high dV/dt pulses.
- Optional ferromagnetic shield to protect the sensor from external fields.

Customer Support

Melexis provides customer support to help with the selection and integration of Triaxis™ current sensors in your application. Magnetic simulations and demonstrator boards are available upon request. Our application engineers will be happy to support you!

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