



Application Note: AS8510 - AN03 - Copper Mini Shunt

AS8510

AN03 – Copper Mini Shunt

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Revision History

| Revision | Date | Owner | Description |
|----------|------------|-------|-----------------|
| 1.0 | 28.03.2014 | gheh | Initial release |

1 General Description

This document describes the Copper-Shunt based current sensor demo which utilizes the AS8510 for current measurement and thermal-coefficient compensation.

It is intended for a current range of ~40A operation and 60A maximum.

Two measurement paths are provided. The left one uses the AS8510's internal temperature sensor and the right one uses a fine copper meander trace to sense temperature.

1.1 Kit Content

The kit consists of a four layer PCB with all components mounted on the Top Side. Top and bottom are used for routing of digital signals whereas the inner layers transport the current and act as the measurement shunt resistance.



Figure 1: AS8510-Copper-Shunt Board

Communication is done via the mini-HDMI Plug on the top side which connects to the USB Interface board and subsequently to the PC via USB.

2 Getting Started

To get started setup the USB Interface Board for 3.3V operation as is explained in the according App-Note. Connect the mini HDMI Plug on the left of this board to the micro HDMI Plug of the USB Interface Board. Connect the load across connectors A-B with A being the GND connection. Install the supplied Software. Connect the USB Interface Board to the PC via USB and start the GUI.

3 Hardware Description

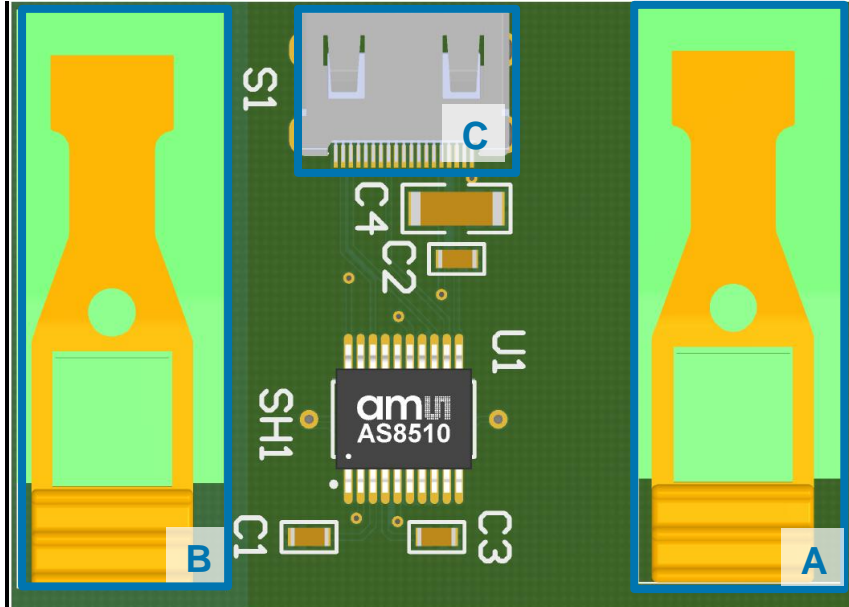


Figure 2: PCB Connection Diagram

| Label | Name | Description | Info |
|-------|------|-------------------------------------|-------------------------------------|
| A | GND | Measurement path GND connection | AS8510 Temp compensated path |
| B | LOAD | Measurement path Load connection | |
| C | HDMI | HDMI SPI Connector | Connects to the USB Interface Board |

4 Software Description

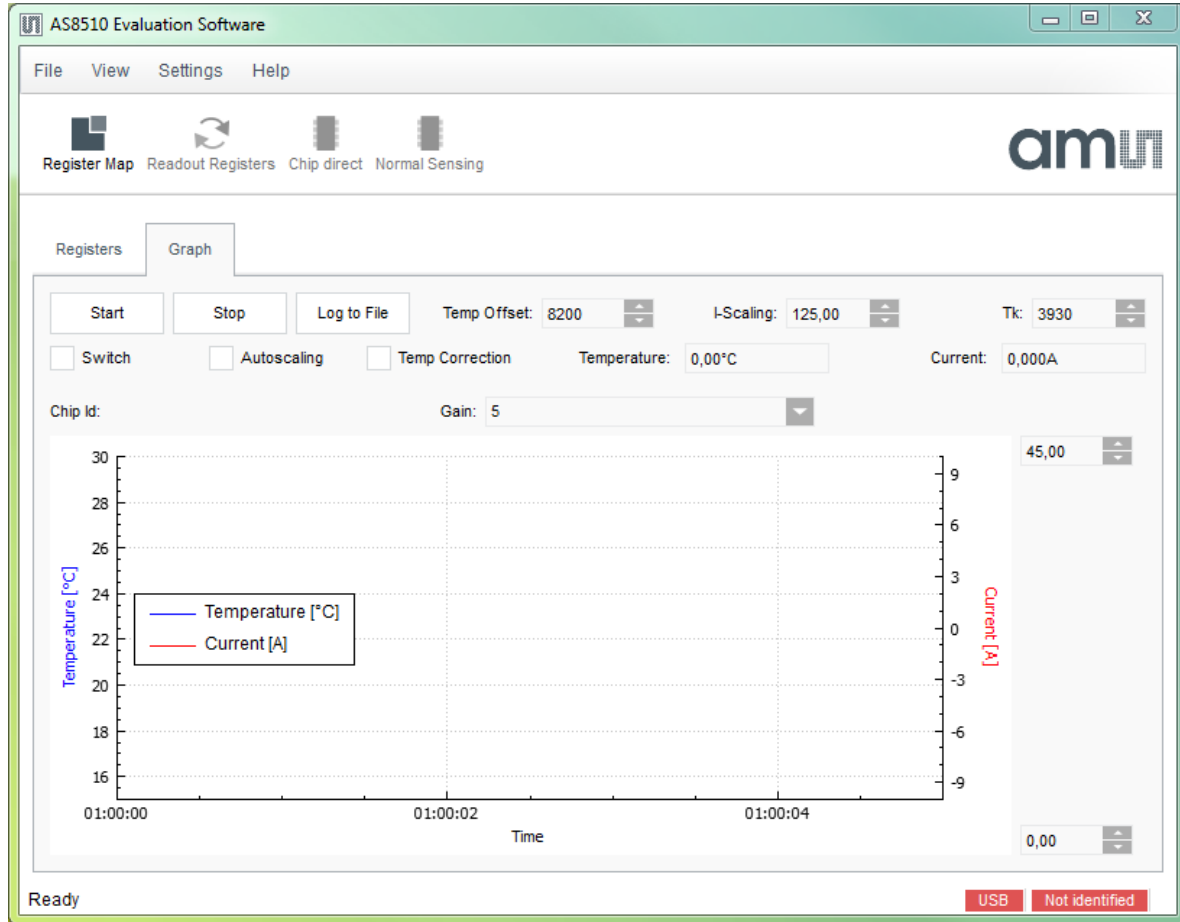


Figure 3: AS8510 GUI

Once started the PC GUI will automatically detect the AS8510 Board connected to the USB Interface and show this in the right-bottom field.

The Start and Stop buttons will commence measurements respectively stop them.

Measured current and temperature is always displayed synchronous with the temperature in blue and current in red.

The *Temp Correction* checkbox enables the temperature correction of the impedance of the copper resistor.

In order to get reliable measurement result the sensor has to be calibrated first.

Ideally the board is exposed to a known temperature without current and the *Temp Offset* is changed until the displayed Temperature is correct.

Then a known low current $\sim 5A$ is run through the sensor and the *I-Scaling* is also changed accordingly.

Last but not least the current is run through at a higher temperature and the *TK* is changed to accommodate for the copper thermal coefficient. All of these values have a rough starting value but will require some tuning for optimal performance.

5 Board Schematics, Layout and BOM

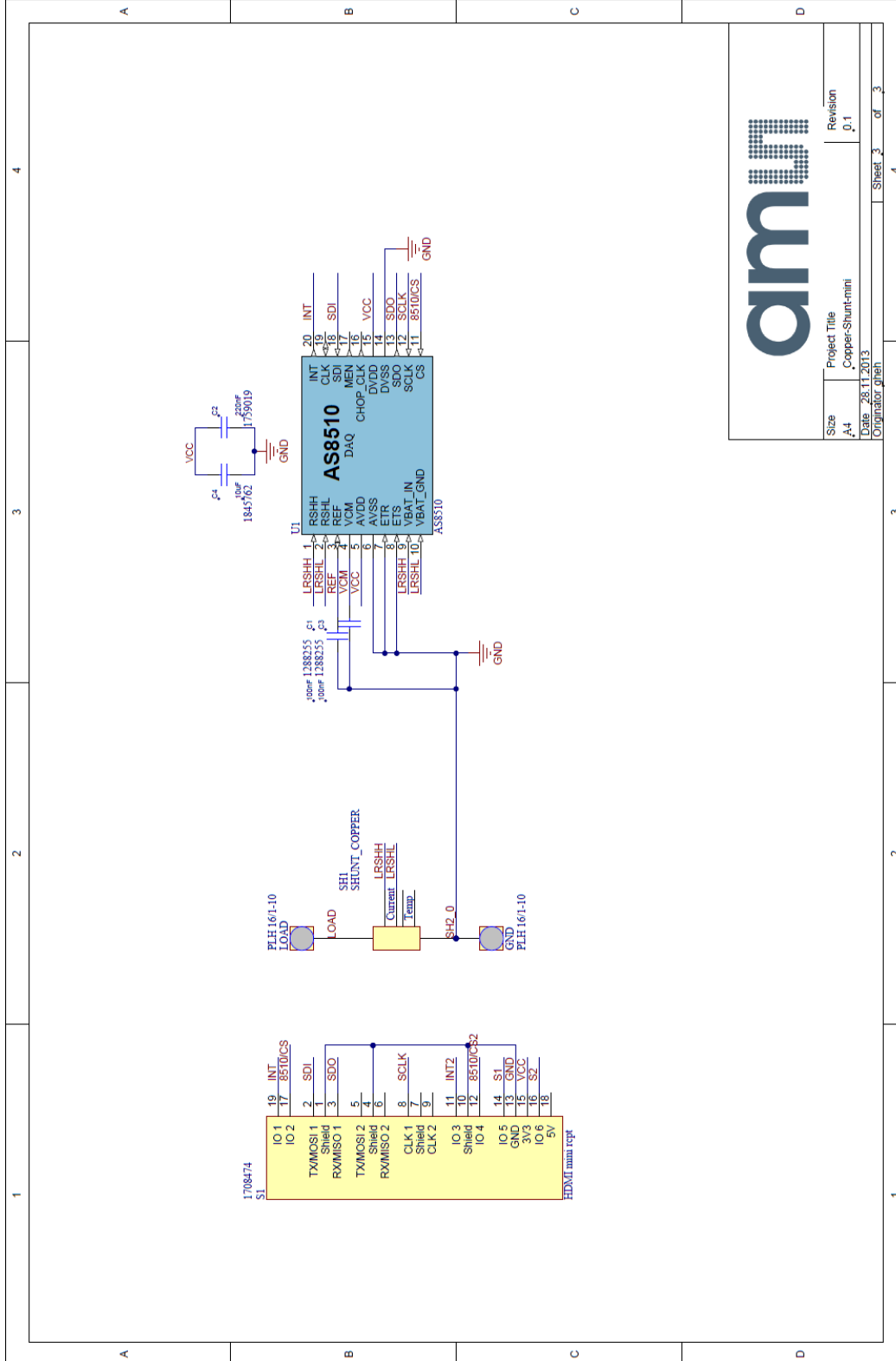


Figure 4: Schematic

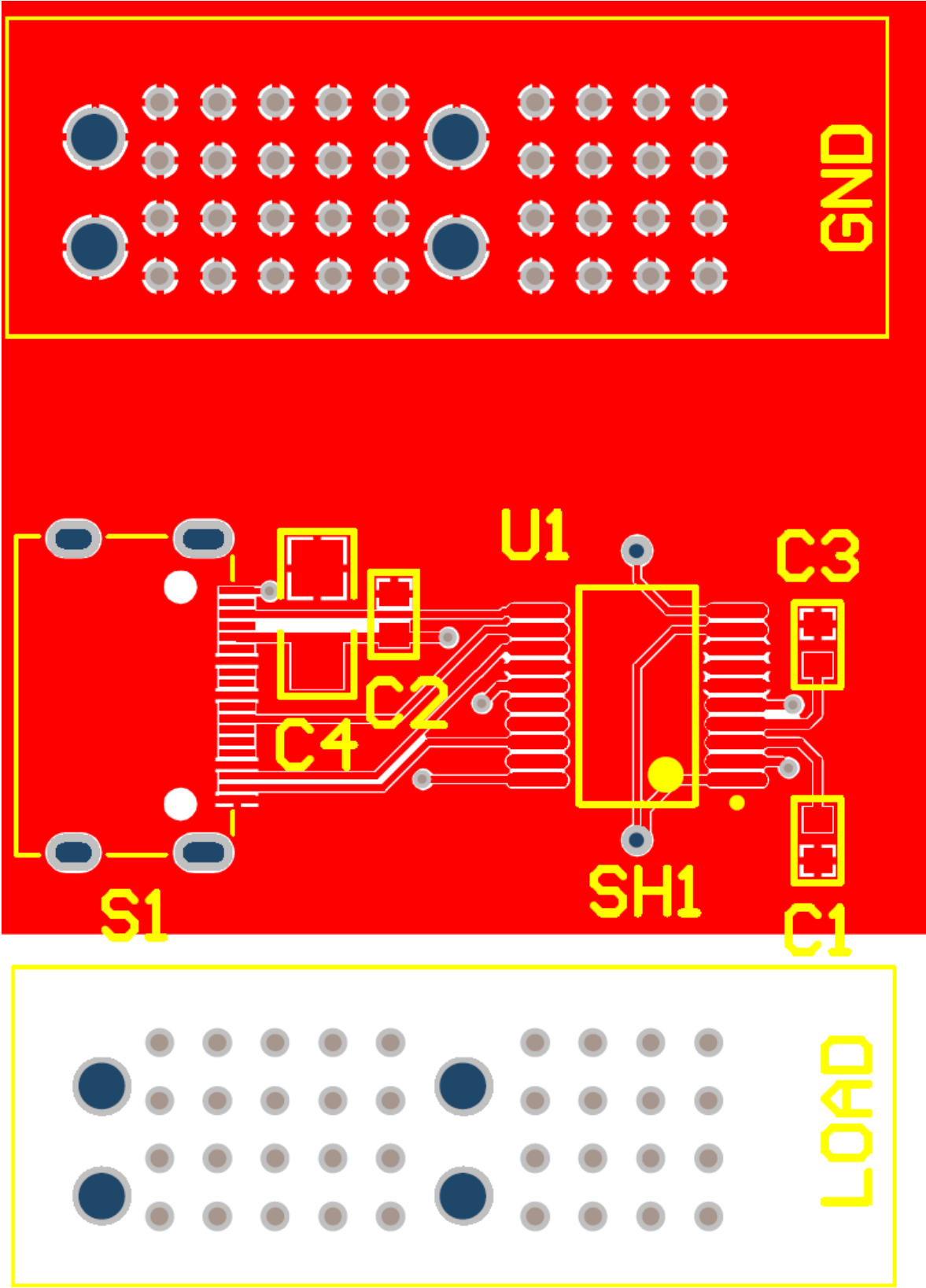


Figure 5: Top Layer

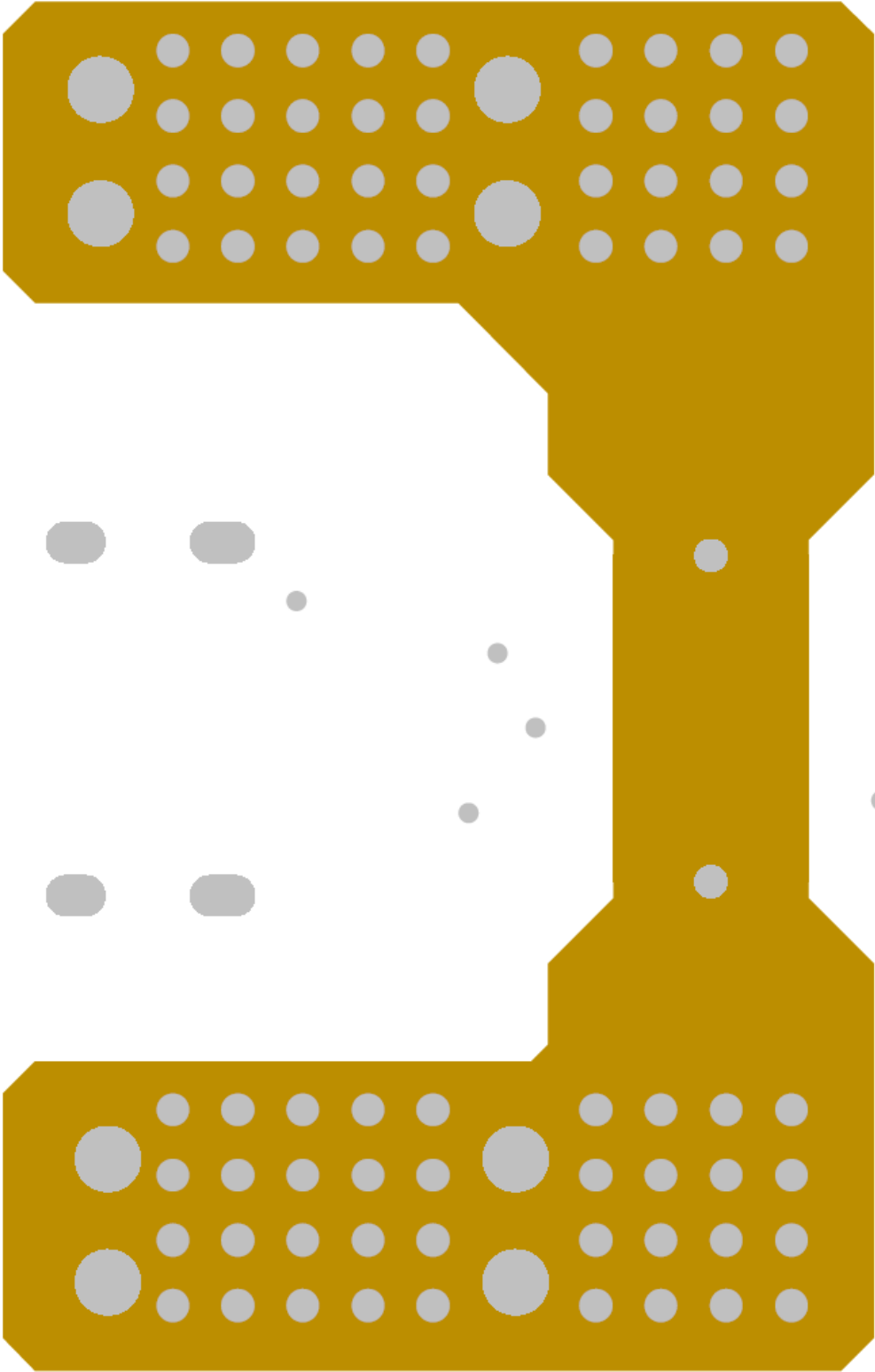


Figure 6: Middle Layer

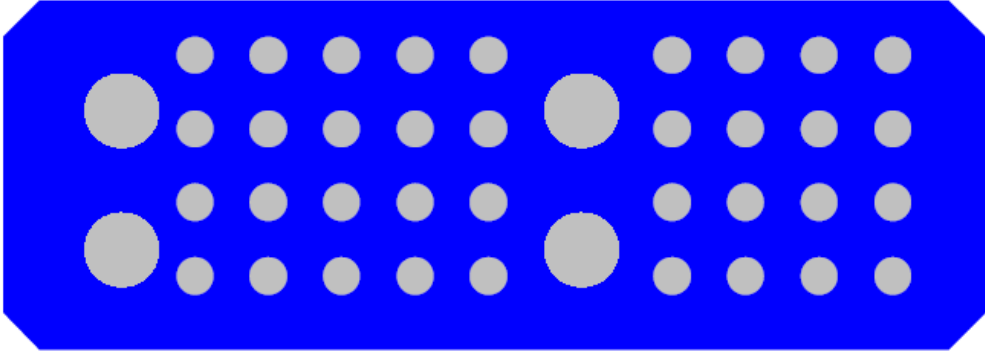
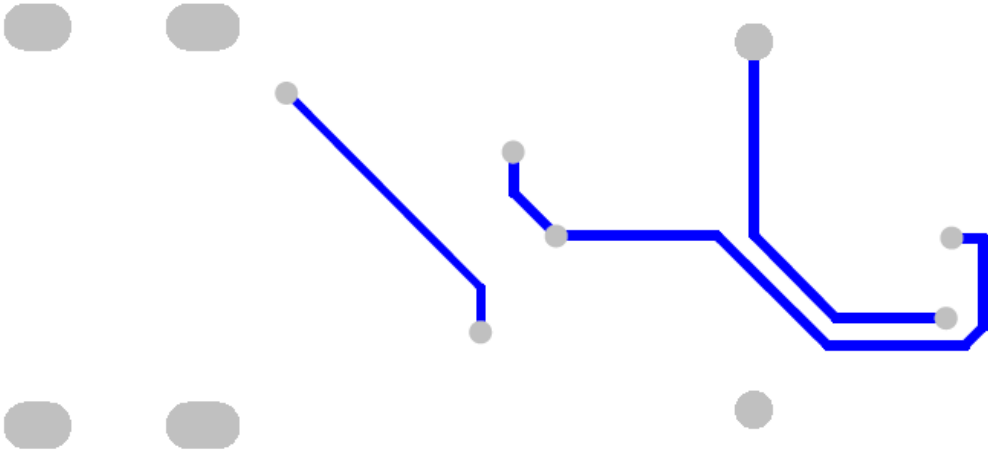
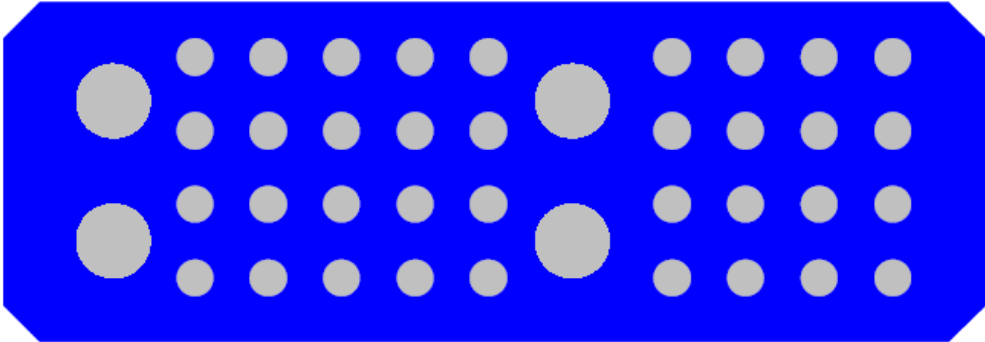


Figure 7: Bottom Layer

| Bill of Materials | | Copper-Shunt-mini | | | | | | | |
|-------------------|------------|-------------------|----------------------|--------------|--------------------------|------------|------------------------|----------|--|
| Company: | | ams AG | | | | | | | |
| Originator: | | gheh | | | | | | | |
| PCB Name: | | Copper-Shunt-mini | | | | | | | |
| PCB Version: | | 0.1 | | | | | | | |
| Report Date: | | 28.11.2013 | | | | | | | |
| # | Designator | Comment | Name Error-Component | Manufacturer | Manufacturer Part Number | Supplier 1 | Supplier Part Number 1 | Quantity | |
| 1 | C1 | 100nF | | REMET | C0603C104K5RAC1U | Farnell | 1288255 | 1 | |
| 2 | C2 | 220nF | | MULTICOMP | MCCA000162 | Farnell | 1759019 | 1 | |
| 3 | C3 | 100nF | | REMET | C0603C104K5RAC1U | Farnell | 1288255 | 1 | |
| 4 | C4 | 10uF | | MURATA | GRMB1CF61H106KA12L | Farnell | 1845762 | 1 | |
| 5 | GND | PLH 16/1-10 | | | | | | 1 | |
| 6 | LOAD | PLH 16/1-10 | | | | | | 1 | |
| 7 | ST | HDM mini rcpt | | MULTICOMP | 60U019S-340N-81-FEC | Farnell | 1708474 | 1 | |
| 8 | SH1 | SHUNT_COPPER | | | | | | 1 | |
| 9 | UT | AS8510 | | | | AMS | AS8510-ASSM | 1 | |
| Approved | | | Notes | | | | | 9 | |

Table 1: BOM

6 Ordering Information

The AS8510 Copper Shunt demo can be ordered via:

Table 2: Ordering Information

| Ordering Code | Productname | Materialnumber |
|---------------------|--------------------------------|-------------------|
| AS8510-COPPER-SHUNT | AS8510-Copper-Shunt Mini Board | 00000000990600783 |

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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.