Autodimming RetroVision Mirrors

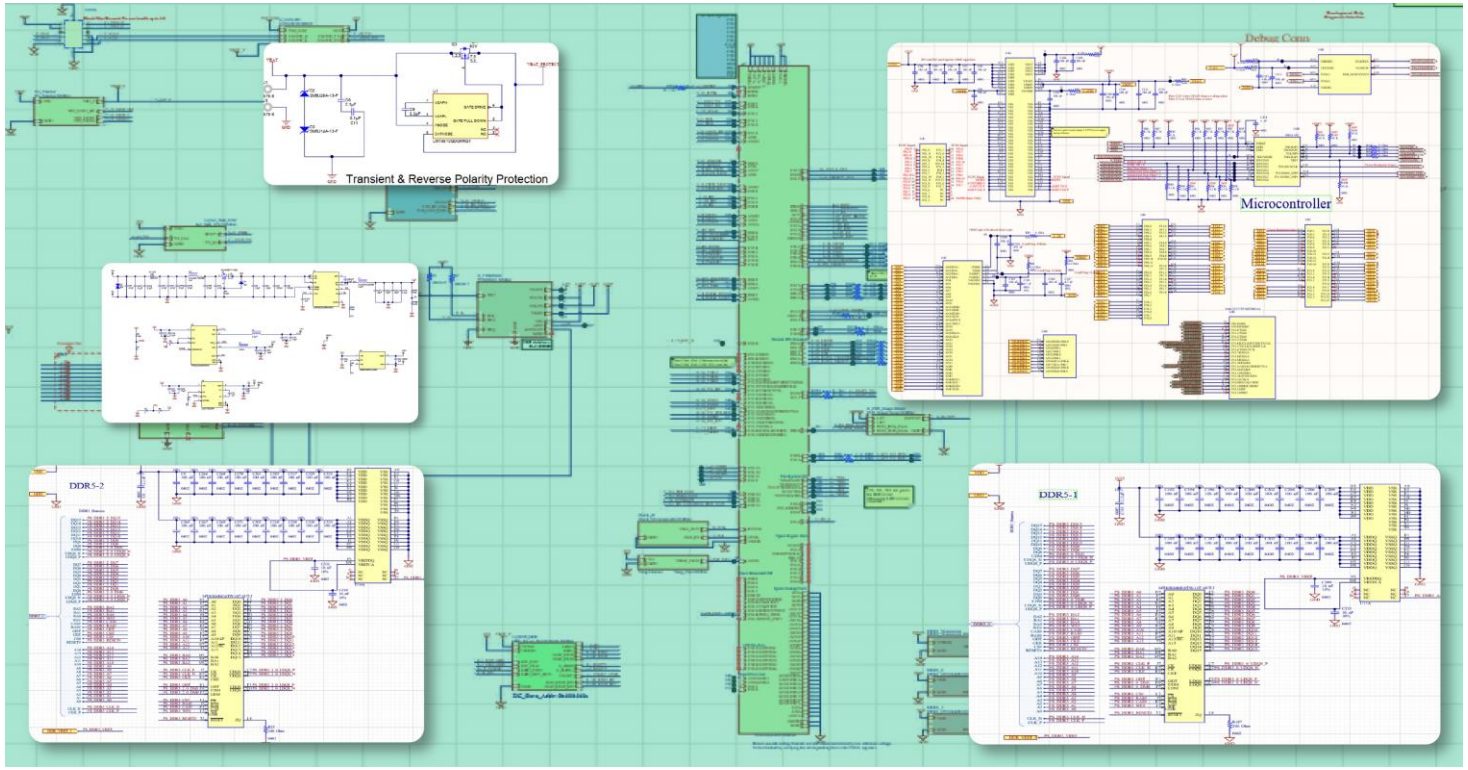
Scope: End-End PCB Design with Analysis

Application: ADAS

The Autodimming RetroVision Mirror is an intelligent automotive rearview mirror that automatically adjusts its brightness in response to glare from headlights. It reduces blinding effects, enhancing safety during nighttime driving. Using electrochromic technology or gel-based systems, sensors detect light intensity and darken the mirror to reduce glare. This feature is seamless and effortless for drivers, reducing eye strain and maintaining focus on the road. A valuable safety feature that enhances driving comfort and safety.

ECAD

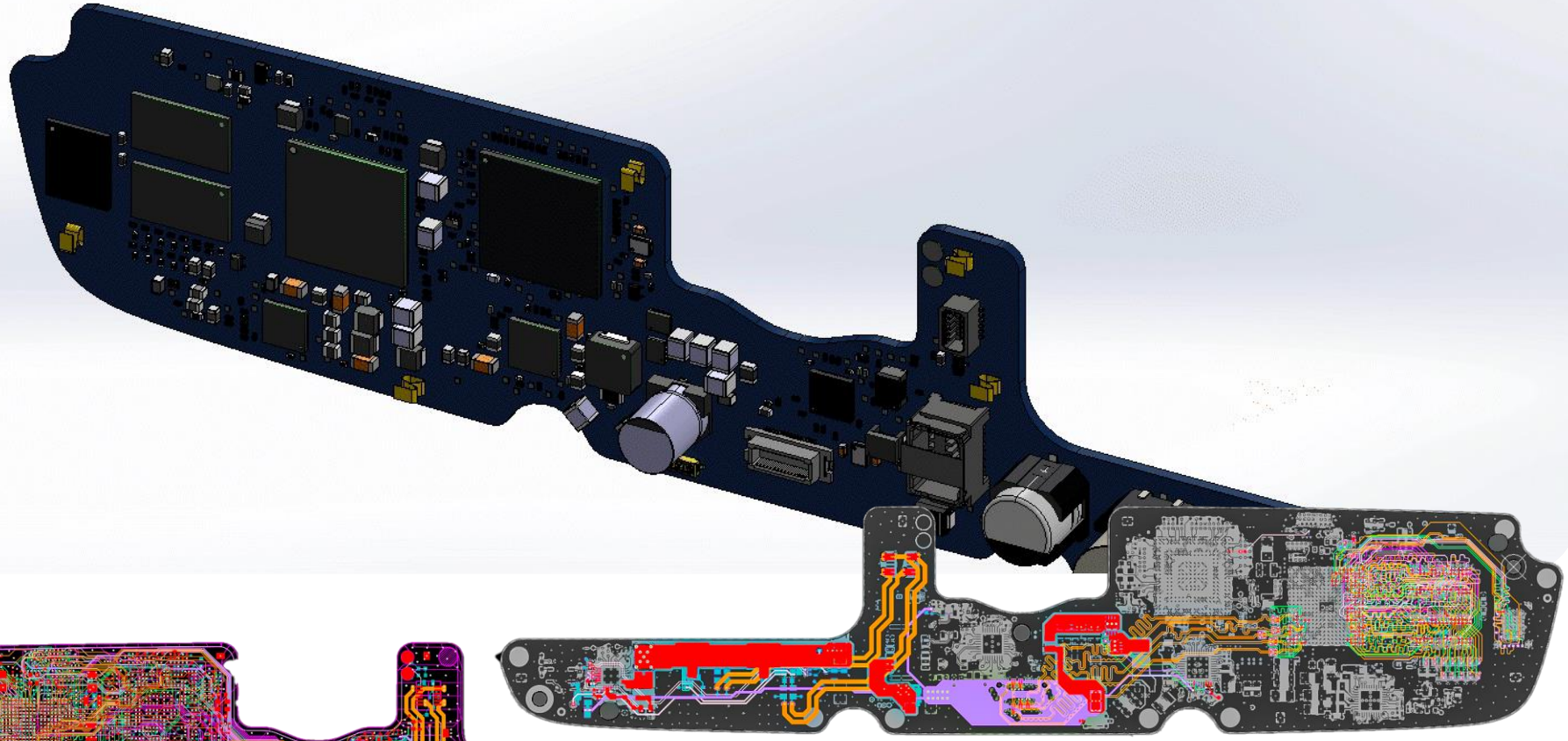
- Schematics



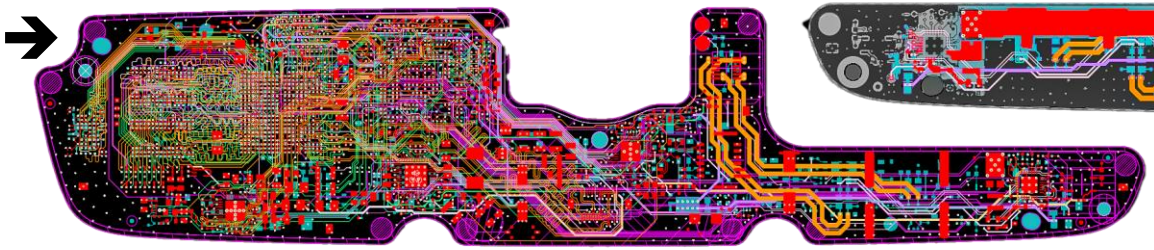
- PCB
  - Total components → 1087
  - Layer count → 10
  - Total connection → 2493
  - Pin count: 3184
  - Devices → SOC (XA Zynq-7000 SoC), DDR4(x2), Flash, Microcontroller, Ethernet, Light sensor, CAN Transceiver, SBC, PMIC, LED Driver, Buck Converter, LDO, Load Switch, Regulators.

Challenges in PCB

- Interface:
- DDR4, CSI, I2C, MDI, NOR, UART, USB, advanced image sensor pipeline (ISP), JTAG
- Contains 13 different Powers
- High Speed signals with GND reference
- BGA Pitch – 0.8mm

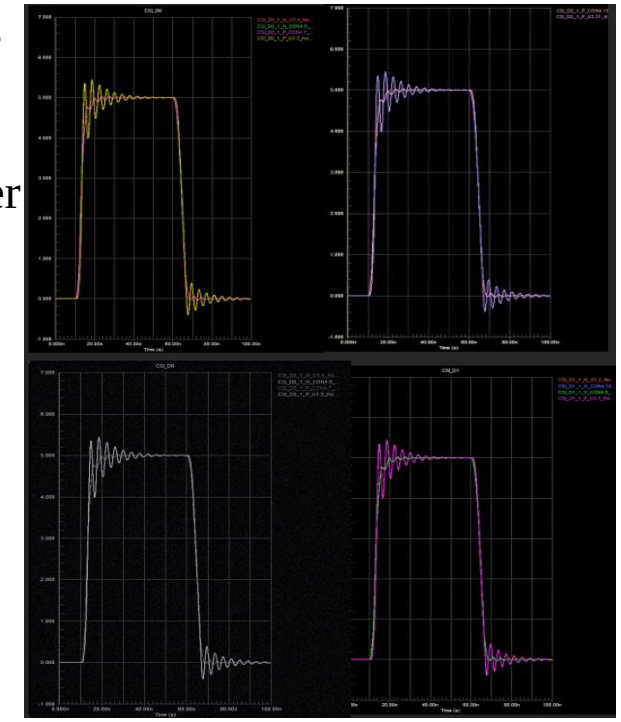


- Output ➔

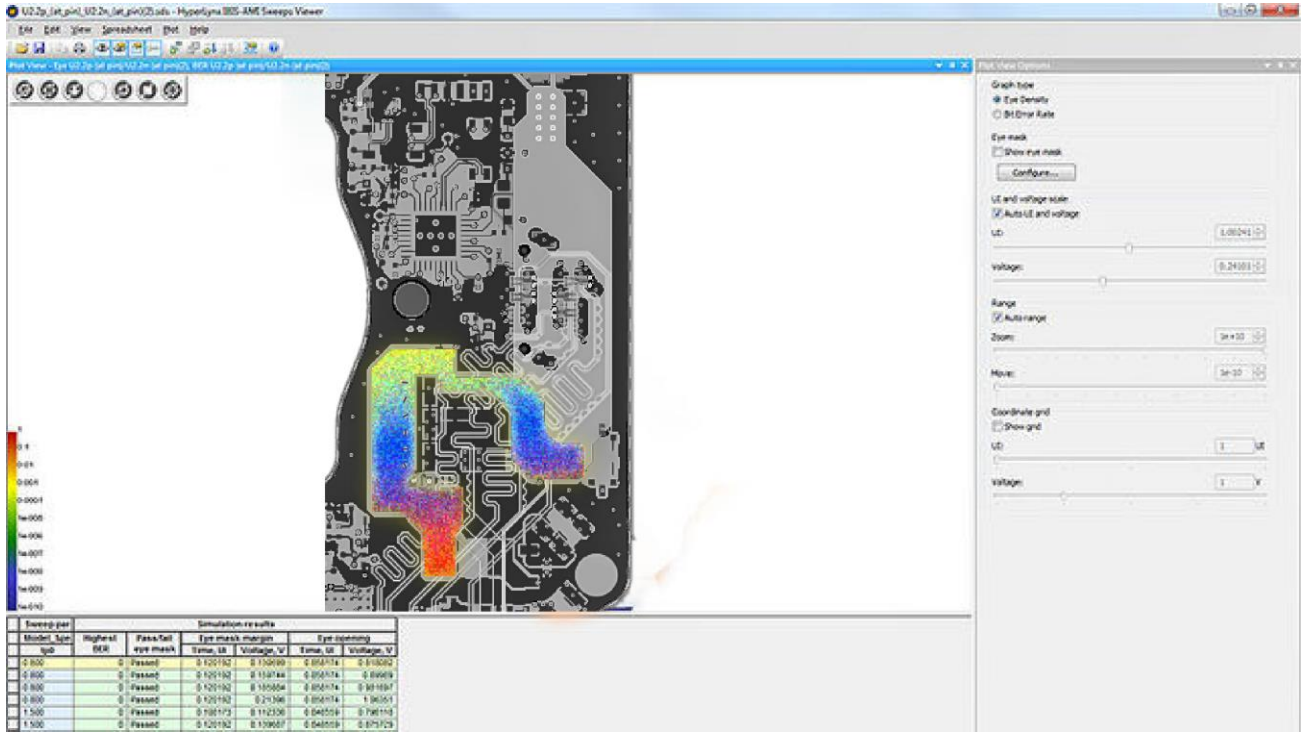


Analysis

- SI
  - Tool – HyperLynx
  - Checked for Overshoot in CSI signal
  - CSI – 5 Signal Pairs
  - Result:
  - The Overshoot under acceptable limit

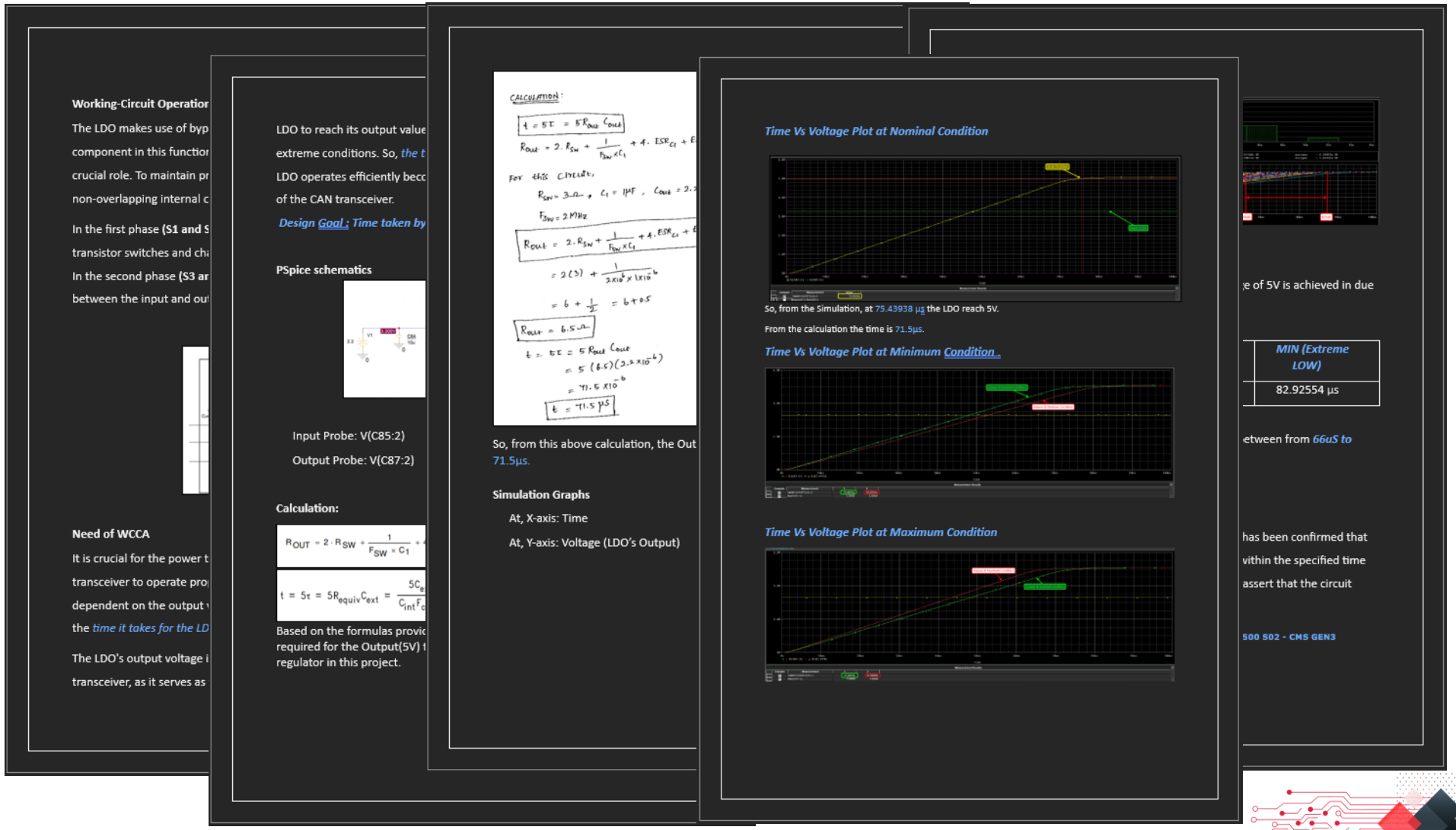


- PI
  - Tool – HyperLynx



Analysis

- WCCA
- Tool – PSpice
- Checked for the time taken by the LDO to reach within required time even in Worst Condition.
- Result:
- From the theoretical and practical result it is within it's required limit.



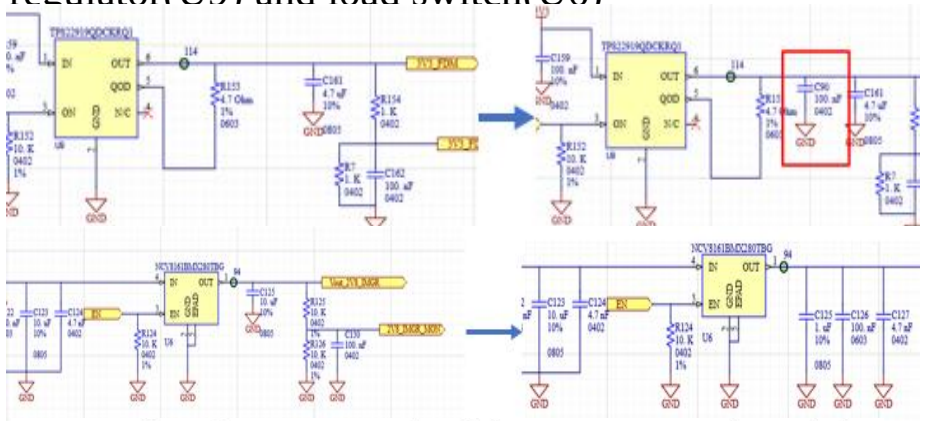
EMI/EMC

The conducted and radiated RF test is conducted in the board to identify the EMI/EMC problems.

Figure shows failed measure signal where Noise occurred at output data.

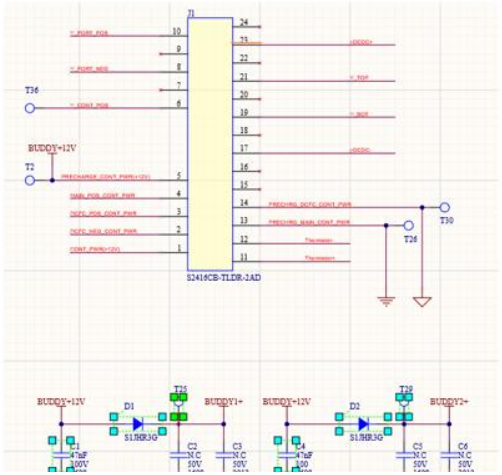
Schematic Level

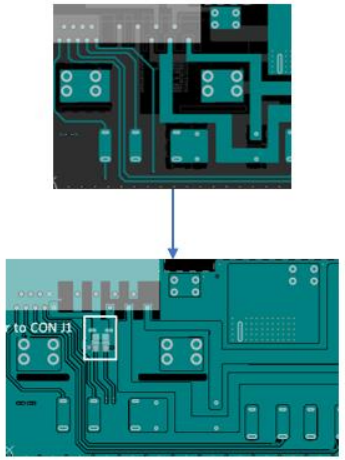
Suggests to add 100nF Capacitor to the output pin of regulator(U9) and load switch(U6)



Power net (+12V) components placed closer to CON J1 as shown below

Layout Level





After implementing this minor correction, the results obtained look truly remarkable

Outsourcing

- Here is a testimonial from a satisfied customer that serves as compelling evidence for the success of outsourcing PCB design

Outsourcing PCB design has been a transformative decision for us.

With access to a global talent pool, we've received high-quality designs at a cost-effective rate.

The seamless collaboration with offshore teams saved us time and resources, delivering exceptional results.

Our PCB design capabilities have been elevated, giving us a competitive edge in the market.

" We highly recommend outsourcing for those seeking success in their engineering projects."

Tier 1 Automotive Supplier North America

GigHz
A Global Engineering partner

An ISO-27001 ISMS Certified Company

Conclusion

- Elevate your electronics to new heights with our expert PCB design services.
- Trust in our precise innovative passion for crafting cutting-edge circuitry. Let us bring your visions to life and optimize your technology for success.
- Experience the future of innovation with our unparalleled design expertise.
- By providing end-to-end solutions, we assist clients in realizing efficient and reliable through our analysis result to produce the finest PCB end product.
- With precision as our compass, we craft designs that stand the test of time. Our focus on quality ensures excellence in every aspect of our work.

Your satisfaction is our priority!