

Interview Questions Asked (Client: MOSCHIP)

1. Personal & Background

1. Introduce yourself.
 2. What projects have you worked on?
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2. Analysis Techniques (Analog / AMS Verification)

3. What different analyses have you performed?
 - DC analysis
 - AC analysis
 - Transient analysis
 - Monte Carlo analysis
 4. What did you do specifically in **AC analysis** for:
 - Bandgap Reference (BGR)
 - LDO
 - Two-stage Op-Amp
 5. Why do we perform **transient analysis**?
 - What transient tests did you perform for **BGR** and **LDO**?
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3. Monte Carlo & Corner Analysis

6. Have you performed **Monte Carlo analysis**?
 - During Monte Carlo analysis, what happens to **process corners**?
 - Do process corners change during Monte Carlo?
 - If they do not change, then what values are used?
 - Are you confident about the steps you are explaining?
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4. Parameter Extraction & Automation

7. Do you know how to extract parameters from the schematic level?
 - How exactly do you extract these parameters?
 - Can this extraction be automated using Python?
 - Do you know Python?
 8. Can you write a Python script to extract parameters from a schematic?
 - Rate your Python skills out of 10.
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5. AMS / Verilog-A Knowledge

9. What do you know about **AMS (Analog Mixed Signal)**?

- Do you know Verilog-A?
- Can you write Verilog-A code for an **8-bit ADC**?

Interview Questions Asked in 7 Rays Semiconductor

1. Semi-Custom vs Full-Custom Design

1. **Explain the difference between Semi-Custom and Full-Custom design.**
Assume I am a non-technical person. How will you explain Semi-Custom and Full-Custom in simple terms?
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2. Ring Oscillator (RO) – Fundamental Questions

2. **Do you know about Ring Oscillators?**
(Note: They asked even though Ring Oscillator was not mentioned in the resume.)

3. Design Challenge:

You are given the following specifications:

- (A) Design a Ring Oscillator that generates **50 MHz**.
- (B) Ensure the output remains **50 MHz \pm 20% across PVT** (Process–Voltage–Temperature).
- (C) Power consumption must be **very low**, in the **micro-Watt** range.

Question: How will you approach and solve this design problem?

(Discussion lasted ~30 minutes.)

4. **What is propagation delay?**
 5. **If the propagation delay of each inverter is $t_p=9$ ns , what is the value of N (number of inverter stages) to achieve 50 MHz?**
 6. **Why can't we choose an even number of inverters in a Ring Oscillator?**
 - Why is **odd N** required?
 - Are you sure we *cannot* design a ring oscillator with an even number of inverters?
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3. RC + Inverter Circuit Analysis

7. Consider a circuit:
 - One **capacitor** in series with an **inverter**
 - Input is applied from the **capacitor side**, output taken from the **inverter side**
 - Two different inputs are applied:
 - (a) Step input ($0 \rightarrow 1$)
 - (b) Pulse input (50% duty cycle)

Question: Draw/describe the output waveform for each case.
 8. **What is the function of the above circuit?**
 - Have you seen a similar circuit used anywhere?
 9. **In transient state, does a capacitor behave as an open circuit or a short circuit?**
 10. **What is the impedance of the capacitor?**
 - What is the value of frequency during transient?
 - Why is the frequency not zero?
 11. **For an RC circuit with pulse-wave input, what is the output response?**
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4. Filters & Op-Amp Questions

12. **Can we design filters using Op-Amps?**
 - What type of filters are these called?
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5. LDO (Low Dropout Regulator) Questions

13. **For an LDO generating 3V from a 6V supply, which MOSFET type will you use as the pass device?**

14. For a PMOS-based LDO:

- Where do we connect the op-amp feedback?
 - Inverting input or Non-inverting input?
- Why is it connected that way?
- What is the feedback type?
- Explain the reasoning.