Excited to share my first learning experience at NSIC Chennai! I explored the intricate design of charging adapter circuits, including EMI filtering, rectification, voltage regulation, and protection mechanisms. This hands-on experience has been invaluable in enhancing my understanding of electronics.

A charging adapter's circuit typically includes an EMI filter to reduce noise, a bridge rectifier to convert AC to pulsating DC, and a bulk capacitor to smooth the DC voltage. A high-frequency transformer steps down the voltage and provides isolation. A switching regulator, controlled by a MOSFET and a control IC, adjusts the energy transfer to maintain a stable output. On the secondary side, a rectifier, usually using Schottky diodes, converts the AC voltage back to DC, which is then smoothed by filter capacitors. Feedback mechanisms and protection circuits ensure consistent performance and safety.

Why are relays used instead of transistors ?

Relays are often chosen over transistors because they provide electrical isolation between the control circuit and the load, handle higher currents and voltages, and offer greater robustness, tolerating spikes and surges that might damage a transistor. They can switch both AC and DC loads, whereas transistors typically handle only one type of load. Additionally, relays can be simpler to design and implement for certain applications, especially when the switching frequency is low, making them suitable for controlling heavy loads like motors and large electrical devices.