

Moore's Law, a groundbreaking concept introduced by Gordon Moore in 1965, has shaped the trajectory of technological advancements. It asserts that the number of transistors on a microchip doubles every two years or 18 months in some documentations, leading to remarkable increases in computing power and cost reduction.

However, the relentless pursuit of this exponential growth has encountered substantial physical constraints that impede its further realization. Let's delve into these limitations:

1. Higher power consumption results in elevated temperatures.
2. Increased transistor density necessitates more power.
3. Voltage scaling is employed to reduce power usage, primarily dynamic power.
4. Leakage power loss persists despite voltage scaling efforts.
5. Noise and threshold voltage pose limitations to effective voltage scaling.