

LOW POWER DESIGN TECHNIQUES FOR ANALOG COMPARATOR CIRCUIT

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1. Introduction

Portability becomes the main point in every electronic equipment that requires battery to function. For now, all these devices can operate only in short time using a battery. Although the improvement of battery has been made i.e. lithium ion batteries; but, there is no dramatic improvement in the battery life. It is expected only about 30% improvement in battery performance that can be achieved in the next 5 years or so. Thus, other alternative must be explored to increase the lifespan of battery operated portable devices [1], [2].

High power consumption leads to shorter standby life-time. In Integrated Circuit (IC), there are two types of power consumption which are the static power and dynamic power. Static power is the leakage current of the transistor when the transistor is in the idle state. The leakage current happens due to low threshold voltage, V_{TH} of the transistor. This is because of the non-scalable thermal voltage characteristic ($V_T = kT/q$), which causes relatively fixed sub-threshold swing (S) at the constant temperature. As a result, it makes the sub-threshold leakage current exponentially increase as the V_{TH} reduces [3]. Meanwhile, dynamic power happens when the transistor keeps charging and discharging at the load to transmit information. Continuous charging and discharging contributes to the high-power dissipation. To reduce the total power dissipation, low power design

