

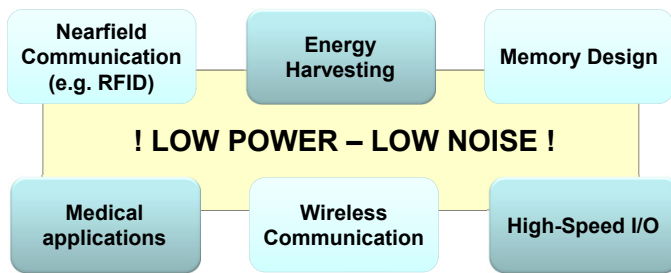
# Low Power Custom IC Design (Analog, RF) with MunEDA WiCkeD™

## MunEDA Low Power Custom IC Design (Analog, RF) – Highlights

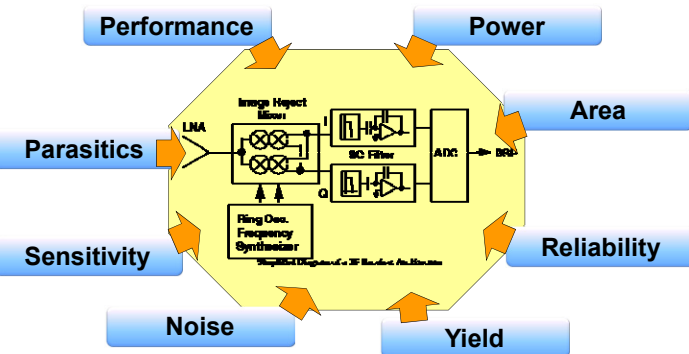
- Automated Circuit Performance Tuning
- Design for Yield & High-Sigma Robustness
- Robustness Verification

## Challenges for Low Power Custom IC Design

In all designs today, power is a concern. For mobile devices, very low power consumption is a main design objective. Especially analog and mixed-signal designers in the fields of:



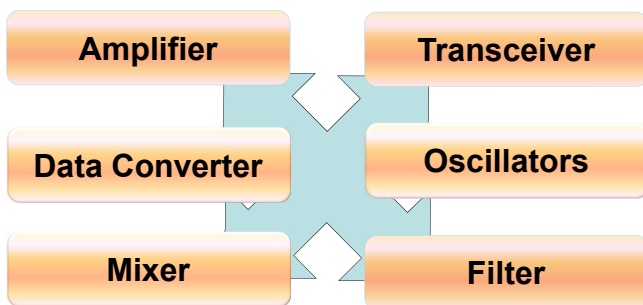
spend much effort to create circuits that fulfill their specification reliably with a small power budget. Within such circuits designers have to consider many influence factors such as:



Within the circuit sizing process in regards to low and ultra-low power design all these influence factors and their trade-offs have to be taken into account.

## Typical Circuit Applications – Full Custom Low Power Design

Typical applications for using WiCkeD in full custom low power design are:



**SAMSUNG**  
 Ji-yeon Park, LSI Business Unit,  
 Samsung Electronics:  
 "Considering PPA, TAT and limited resources in FinFET no other alternative except WiCkeD exists"

## Low Power Custom IC Design Flow with MunEDA WiCkeD

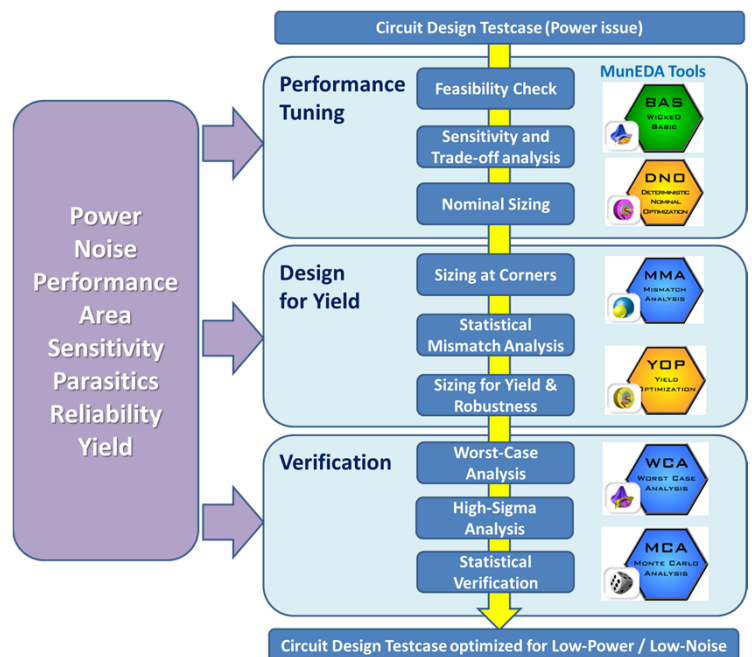
The MunEDA WiCkeD tool set provides significant productivity gains over traditional design methods, and enables advanced circuit architectures with lower power consumption and higher performance. High performance, high speed, low power design, low noise requirements happen pre-dominantly in advanced technology nodes. For this reason designers can benefit from MunEDA's circuit sizing tools to optimize performances, power, noise, area, yield and others.

WiCkeD has sufficient capacity to analyze and size large circuits:

- >100 specifications and constraints handled simultaneously
- >200 design variables, >2000 MOS
- Post-layout effects and parasitics supported
- Multiple test benches, goals, corners, considered

## Solution – WiCkeD Tool Flow for Low-Power Design

MunEDA world-class outstanding circuit optimization tools help designers to save a significant amount of time on circuit sizing and optimization for speed and power consumption.



When having a circuit testcase with a power or noise issue the designer can use the MunEDA WiCkeD tools to analyse design challenges and fix it using the powerful MunEDA optimizers. First step for performance tuning is always a feasibility check if all design constraints are fulfilled. Next a sensitivity and trade-off analysis will be fulfilled to check the circuit performances. A deterministic nominal optimization will be used to bring all performances into their nominal specification bounds. As next the statistical effects such as behavior at process and operating corners will be checked for the given design and a statistical mismatch analysis will be fulfilled. Finally the circuit will be optimized for best robustness and yield with YOP Yield Optimization. All results will be verified using MunEDA WiCkeD high-performance Worst-Case and High-Sigma Analysis methods including statistical verification with WiCkeD's advanced Monte Carlo Analysis. Result is a circuit testcase optimized for low-power and low-noise with best possible performance.

## Customer References (Selection from MunEDA MUGM)

- ALTERA** - Altera - Power and performance optimization with transistor variables on custom circuits using MunEDA WiCkeD
- CEITEC S.R.** - CEITEC - RFID, Wireless Communications and Digital Multimedia Technology using WiCkeD
- ST** - STMicroelectronics - Reducing Mismatch Impact by means of Proper Biasing in Fully Differential, Low Power CMOS Structure

## Design Optimization, Sizing and Centering with MunEDA Tools – Technology Support

- WiCkeD™ & SPT Design Tool Suites
- Integrated into standard EDA design environments
- <http://www.muneda.com/Products>
- For more support contact [www.muneda.com](http://www.muneda.com)

