

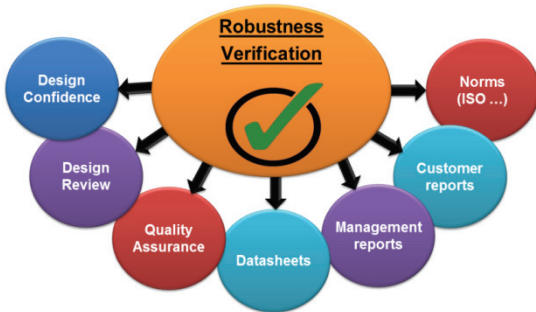
Robustness Verification with MunEDA WiCkeD™

WiCkeD for Robustness Verification - User Benefits

- Increased Design Confidence prior to Tape-out
- Structured Reports for Design Reviews and Management
- Powerful Circuit Robustness Verification Tools and Functionalities
- Fully integrated in Standard Design Environments
- Minimum effort required, Easy step-by-step guidance

Why Robustness Verification for Custom Circuits ?

Robustness Verification performs systematic, thorough checks across combinations of worst-case scenarios. By this way potential issues can be identified prior to tape-out to increase design confidence and avoid costly production of bad silicon. The verification generates a customizable report to be used for design reviews, management and customers. The robustness measured in multiples of sigma per specification and for the overall design provides a quality measure suitable for datasheets quality assurance documentation.



MunEDA WiCkeD for Circuit Robustness Verification

The MunEDA WiCkeD Robustness Verification Flow delivers the designer an easy and simple application flow to verify the circuit designs for the given requirements. Based on the designer's circuit schematics, testbenches and netlists there are only a few simple and easy to do steps to achieve the verification results.

- | | |
|--|--|
| ➤ Correct treatment of variable types and combinations | Operating Parameters: entire range
Process parameters: statistical variation |
| ➤ Monte-Carlo @ worst-case operating conditions | Unique in WiCkeD (vs. common frameworks)
• One MC vs. many MCs (1 per OP corner)
• Samples correlate → true total yield calc. |
| ➤ Solid proven methodologies and analyses in WiCkeD | ... as known from optimization technology (i.e. worst case analysis for high-σ design) |
| ➤ Easy setup / flow integration | Integration/Interfaces to major frameworks
Minimal setup in WiCkeD for verification |
| ➤ Automated regression runs with customizable Reports | ... at the push of a button |
| ➤ Further Analysis & Optimization tools available | Useful ... in case Problems are detected ! |

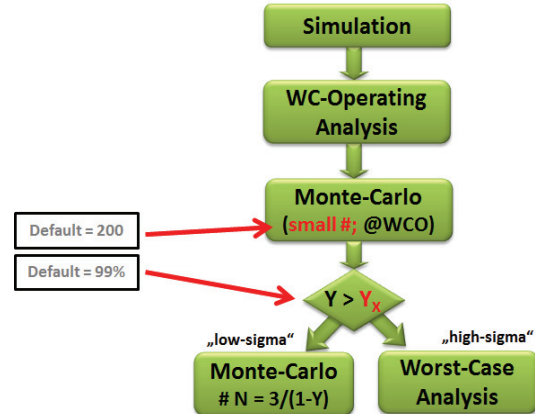
MunEDA WiCkeD Tools for Circuit Robustness Verification

Besides the WiCkeD Basic and Constraint Editor the Robustness Verification requires the Worst Case Operating Analysis, the Monte Carlo Analysis, the Worst-Case Distance Analysis and the scripting interface.



WiCkeD Robustness Verification Flow

The MunEDA WiCkeD Robustness Verification Flow is a systematic, thorough check across combinations of worst-case scenarios. It executes WiCkeD analyses sequentially dependent on analysis results.



It is efficient because

- it avoids unnecessary statistical analyses when nominal results are insufficient
- It avoids brute-force approach of many Monte Carlo analyses in all operating corners by leveraging **WiCkeD Monte-Carlo at worst-case operating conditions** functionality

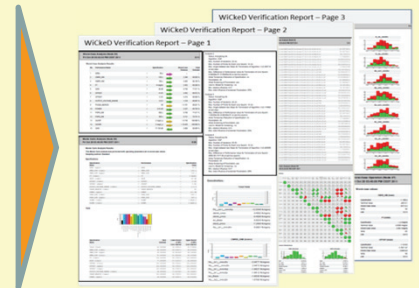
It is uniquely effective because

- It finds worst-case operating conditions even when they are inside the operating range boundaries
- It leverages WiCkeD Worst-Case Analysis for high sigma calculations and the Monte Carlo Analysis with adequate number of samples to achieve a desired confidence

Result: Detailed Verification Reports – Structure & Content

After the described simple steps the designer can easily generate a detailed VERIFICATION REPORT for design review reason containing following information:

- Process Parameters
- Operating Parameters
- Circuit Sensitivities
- Performances & Specifications
- Worst-Case Values
- Partial Yield (% & sigma)
- Total Circuit Yield (% & sigma)
- Statistical Data & Variance (e.g. Mean (Max/Min) Value, Standard Deviation, Estimated Accuracy, Correlations)
- Performance Distributions
- Scatter Plots
- Margin Distributions
- Graphs
- and more



MunEDA WiCkeD – Technology Support

- WiCkeD is integrated and supports the major design frameworks and simulators as well as stand-alone or customized environments
- MunEDA WiCkeD supports many different foundry technologies and PDKs in many different technology nodes
- For more information and support contact www.muneda.com

Customer References:

- ZMDI Robustness Verification - Sign-off Regression Flow using WiCkeD (DATE 2014)
- Atmel – Efficient Regression for Robustness Verification of Full-Custom Design Blocks with MunEDA WiCkeD (DASS 2014)