



# Missing EDA Links

## SCROOGE TLA

DOLPHIN INTEGRATION

PRELIMINARY

Regulator sizing for supplying logic load

Quantification of the need for capacitances

Logic loads need to be supplied with a power regulator or converter which provides enough current at the appropriate voltage value. In addition, such a regulator must react fast enough to absorb current changes occurring at mode transitions of the system-on-chip (SoC). Of course, the regulator or converter must also be properly sized to handle the maximum average current consumed by the load.

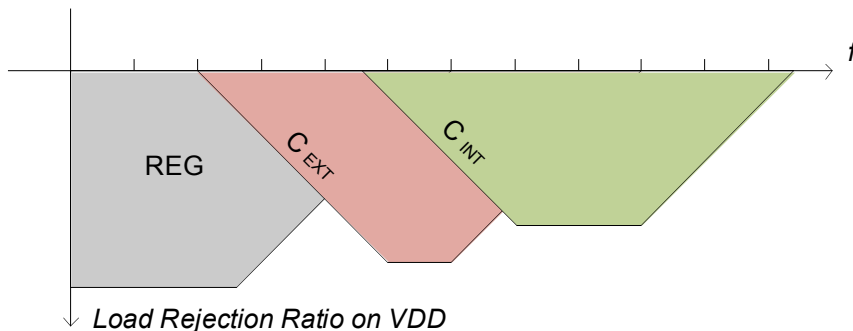
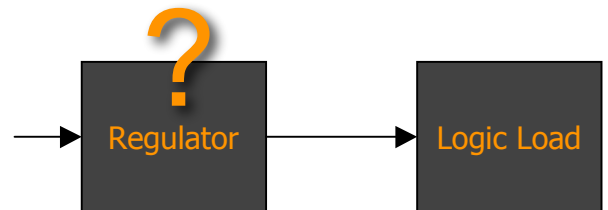
Integrated regulators are praised for reducing the overall cost of a system, but a safe and cost effective integration involves properly sizing them. Undersized regulators will not provide enough charges to maintain the required voltage. Oversized regulators can supply more current than needed, but will waste silicon area. Adequate sizing therefore requires identification of the current required by the logic load.

Current solutions, based on estimations, are too inaccurate so that designers have no other choice than taking a significant margin (up to 100%) for avoiding any risk.

The unique feature of SCROOGE TLA, the power consumption analyzer, provides SoC designers with the capability to accurately quantify the average maximum power consumption which the regulator must sustain.

### KEY BENEFITS

- ✓ Insurance of selecting the appropriate regulator for supplying efficiently the logic load
- ✓ Automatic extraction of the maximum average current and of current transitions
- ✓ Quantification of the need for internal and external capacitances
  - Intrinsic capacitances of standard cells are taken into account
- ✓ What-if analysis with behavioral models of the regulator and the load
  - Simulate the impact of the regulator on the load to validate and optimize the power network

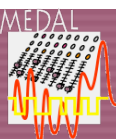


NOTE: All amplitudes and frequencies depend on parasitics (power grid impedance bonding, ESR)  
 $C_{EXT}$  is the output tank capacitor  
 $C_{INT}$  is the equivalent internal decoupling capacitor

SCROOGE, powered by SMASH, is available identically under Linux and Windows.



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Discover the unique  
feature

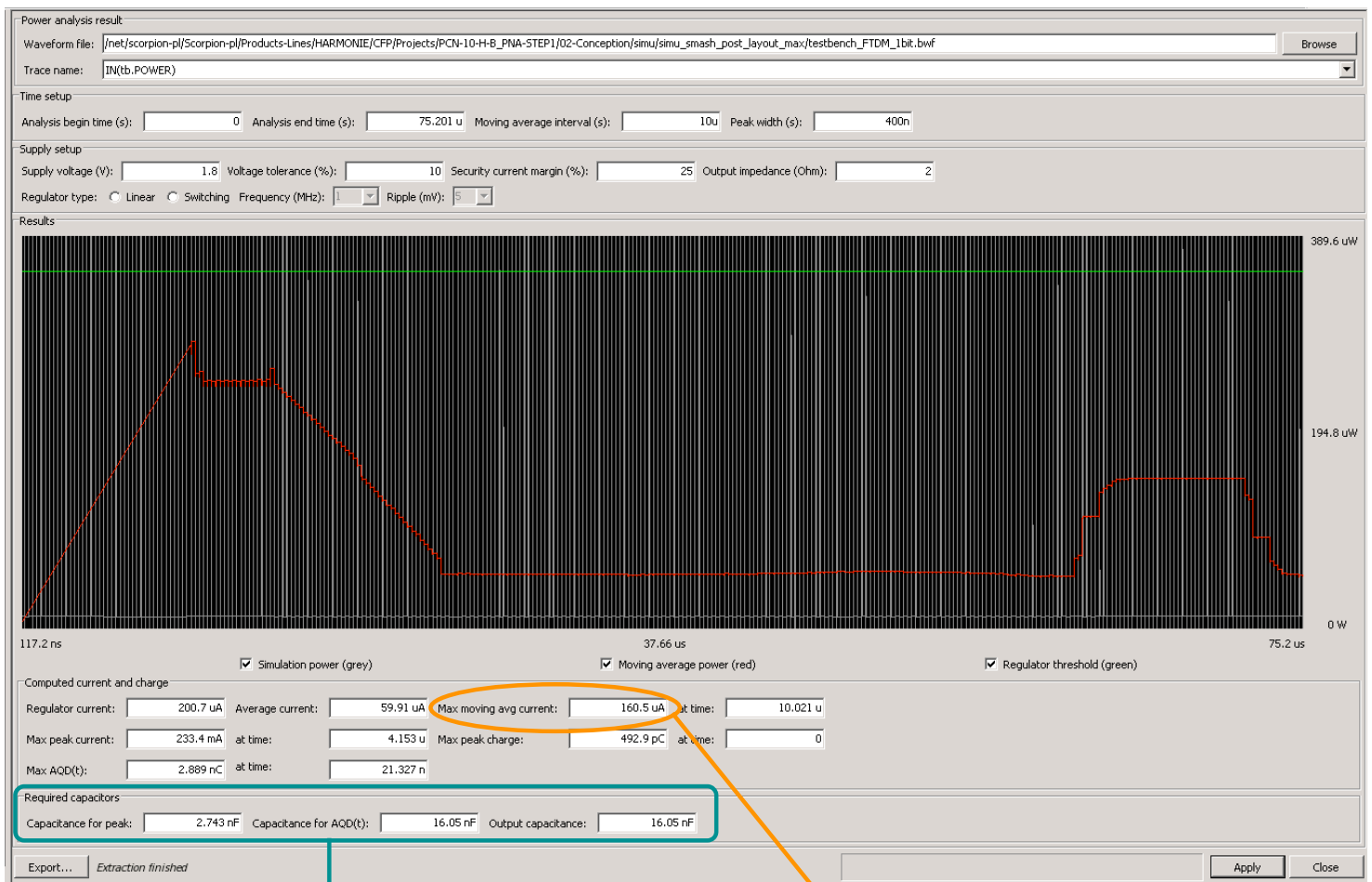
DOLPHIN INTEGRATION

PRELIMINARY

Identify the ideal regulator in only a few clicks !

## Easy set up

- Use the result of the logic load power consumption analysis as input
- Few parameters to enter
- Works for both linear and switching regulators



**Main dimensioning criteria for a regulator supplying logic circuits**

- Can be used as a specification

Estimates also the **need for additional intrinsic and/or external capacitors** to complement the regulator



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