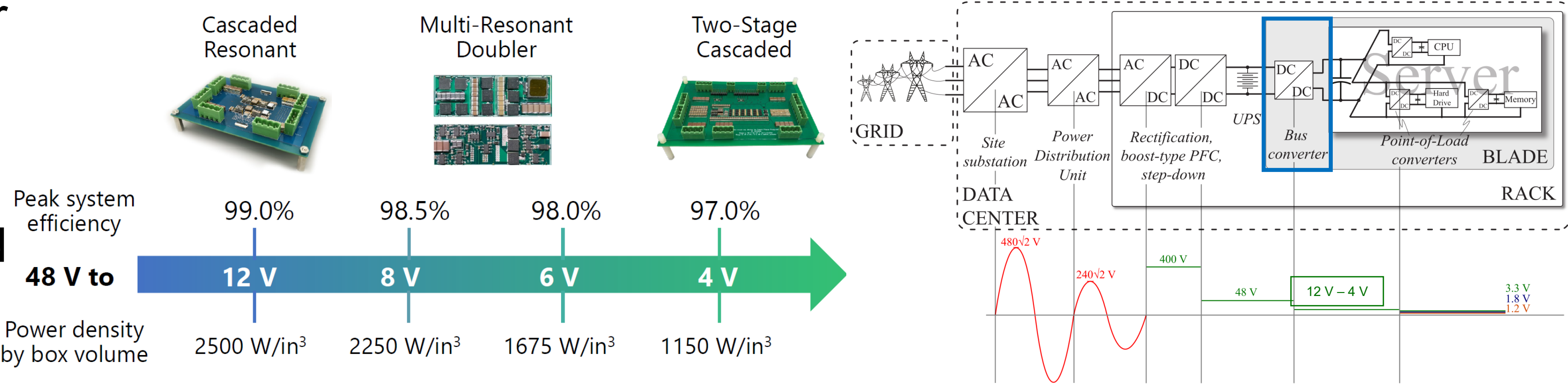


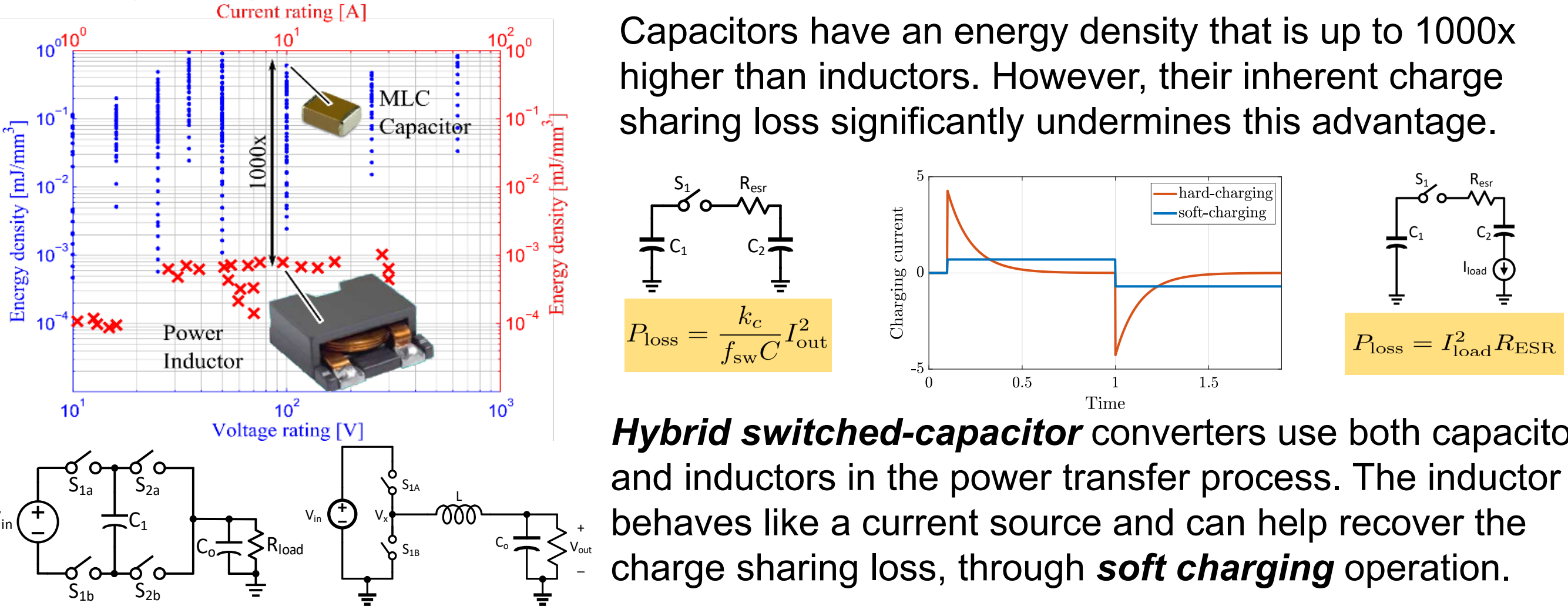
# Hybrid Resonant Switched-Capacitor Converters: Achieving Ultra-Efficient and Compact High-Step-Down DC-DC Power Conversion for Datacenters

This work presents a family of high-performance hybrid resonant switched-capacitor (SC) power converters for datacenter power delivery, from 48 V<sub>dc</sub> to an intermediate bus voltage (12, 8, 6 or 4 V<sub>dc</sub>). This technology can achieve significantly higher efficiency and power density than the current state-of-the-art and has the potential to greatly reduce the power distribution loss in future datacenters.

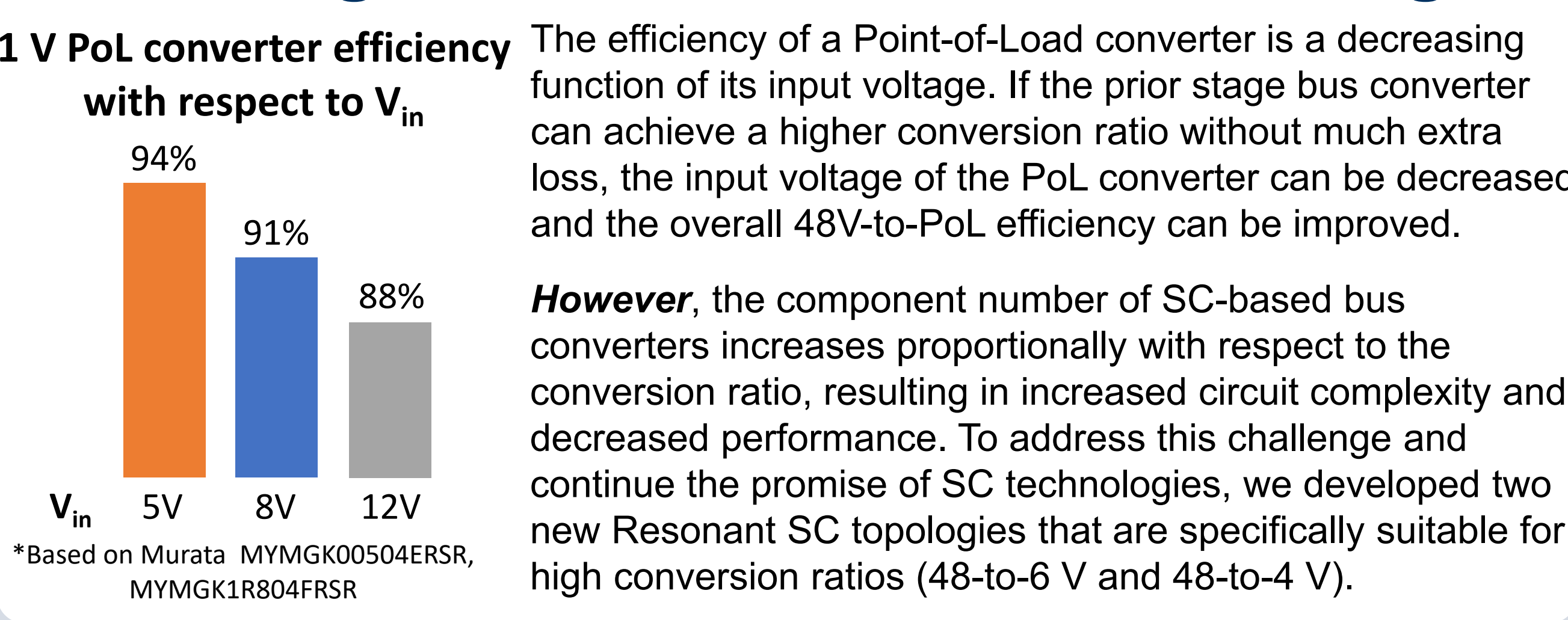
## Introduction



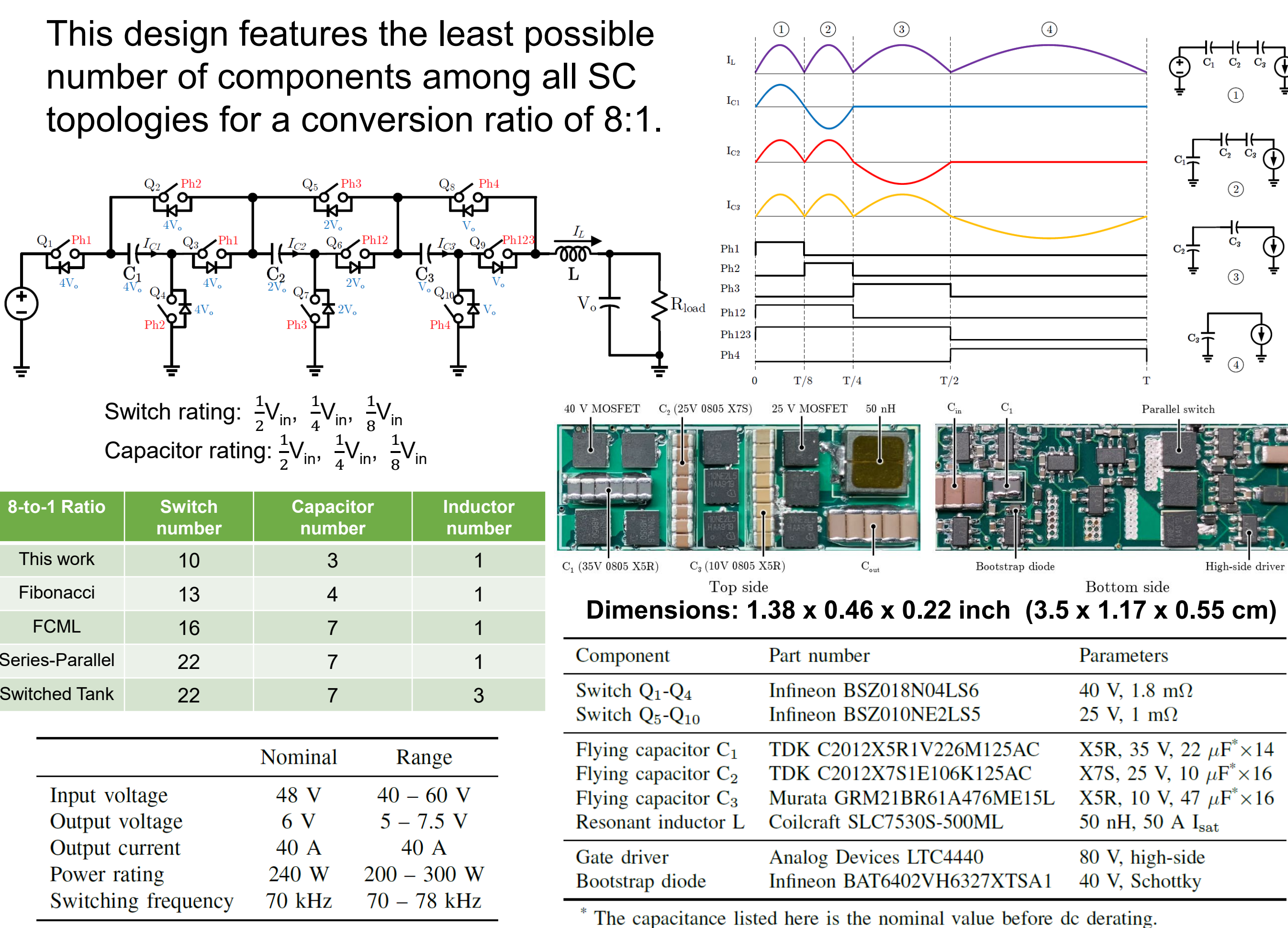
## Why Hybrid Switched-Capacitor Converters



## Moving Towards A Lower Bus Voltage



## 48-to-6 V Multi-Resonant-Doubler Converter



## 48-to-4 V Two-stage Resonant Converter

