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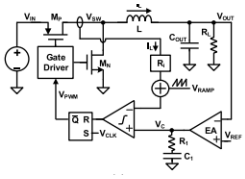
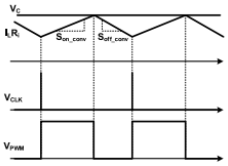
ST Internship proposal

Division	Automotive Division Group
Group	Smart Power Solutions RnD
Title of the Internship Project	Time domain current mode buck converter
Description of the Thesis work (tasks that the student will be performing, objectives of the position)	Modeling and design of a time domain buck converter control loop for automotive ADAS PMIC solutions (high efficiency, optimized load response, 2MHz operating frequency for external component size reduction)
Field of application and competence development  	Advance Driver Assistance Systems penetration in the automotive market is feeding introduction of more and more complex microcontrollers with high power computation and huge current requirements, on the same hand, electrification is demanding for efficient systems to limit battery drain and ensure superior autonomy, so dc-dc converters become the most attractive solution as MCU power supplies. Configurability and flexibility are key parameters to have a flexible system design so, thanks to advanced scaling technologies, digitalization and time domain control loops are gaining attention to ensure optimized load transient response and adaptive current consumption depending on the different car operation modes. With the proposed work the candidate will investigate and design a time domain current mode buck converter, comparing achievable performances (by mean of dynamic performances, efficiency, area occupation) vs state of the art solution. Student will acquire basics of mixed signal design in latest BCD technologies, learning usage of latest CAD simulation tools and methodologies (cadence framework and Simulink among others) together with strong analog design skills.
Profile related to the position	• Basic analog structure knowledge (band-gap reference, current mirrors, operational amplifiers, compensation methods, vco) • DC-DC Converter architecture knowledge • Simulink and/or simplis usage basis • Cadence design suite or equivalent spice simulation experience is a plus
Location	Cornaredo (MI)
Company Tutor	S. Castorina, M. Landini
Duration (at least 720 h, 4 months and a half)	6-9 months
Starting Date/Ending Date	
Reimbursements (€) and benefits	800€/month, canteen lunch and transportation from Milano included