

Virtual temperature sensor for power modules based on SiC in electric traction application

Newten and STMicroelectronics (ST) work together to improve the reliability of electric traction systems, adopting digital twin solutions.

THE CHALLENGE

The temperature at which power electronic systems operate is one of the most important parameters for system reliability, especially for automotive applications. In today's systems, the temperature of the power stage is measured by an NTC (Negative Temperature Coefficient) resistance which has limited accuracy and very slow dynamic response compared to the actual junction temperature swing inside the power devices. This lack of accuracy and responsiveness severely limits the ability to estimate die temperatures.

THE SOLUTION

Having a digital model of the power stage with all the physical and electrical parameters can enable real time estimation of the temperature of the power stage and also function as a redundant measurement for the NTC.

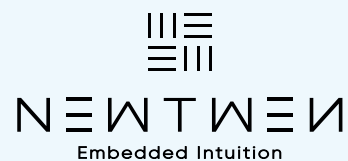
IMPACT

The result of this collaboration is a POC (proof of concept) of a traction inverter kit where the digital twin of the traction system is running at the same frequency of the control, providing measurement of the NTC and as well of the junction temperature of the power devices. This could lead to a further implementation plan in which ST and Newten offer a virtual sensor for the temperature of the power stage in ST microcontrollers for automotive applications.

NEWTWEN

Newtven's technology provides augmented real-time information about system features that are otherwise unmeasurable, by creating an embedded digital twin to model the physics accurately.

Newtven targets customers in the automotive, industrial automation, and energy industries. Their focus is on applications in business areas such as engineering, production, and after-sale data analytics.



HEADQUARTERS

Italy, Padova

FOUNDED

2020

NO. OF EMPLOYEES

11 – 50

WEBSITE

newtven.com

ACKNOWLEDGEMENTS

We would like to express our sincere thanks to Milo De Sorcellis (Newtven CTO & Co-Founder) and Sebastiano Yuri Ciardo (STMicroelectronics senior application engineer) their support.

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ABOUT STARTUP AUTOBAHN

STARTUP AUTOBAHN powered by Plug and Play is an open innovation platform that provides an interface between innovative tech companies and industry-leading corporations. The basis of the program is the partnership that develops between startups and the corporate business units. The two entities hold an equal footing from the get-go: together they evaluate the potential for a joint venture, move forward to pilot the technology, and work to achieve the ultimate goal – a successful production-ready implementation. Designed with the intention to exceed startup acceleration, STARTUP AUTOBAHN powered by Plug and Play moderates a community for collaboration with a focus on implementable results. Over the years, the platform has successfully cultivated over 400 projects with more than 300 startups since its founding in 2016.