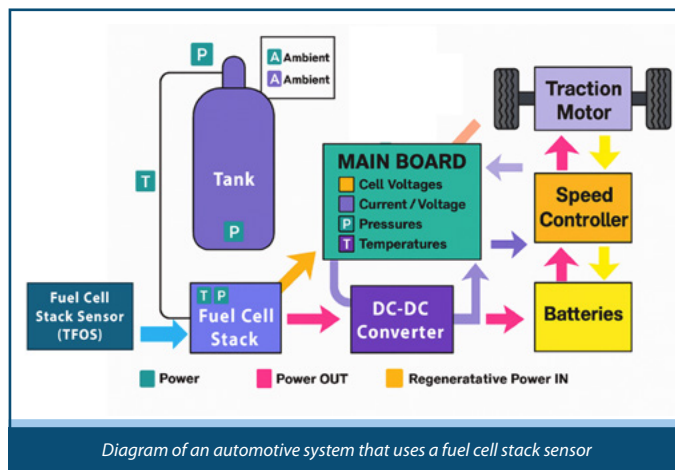


APPLICATION BRIEF

Situation

Fuel cells are primarily used in Electric Vehicles (EVs) to generate electricity. As they offer a continuous power source, these important systems require precise and reliable monitoring to ensure safe and efficient operation. A key component in this system is the fuel cell stack sensor board, which monitors critical parameters such as temperature and voltage.

Traditional technologies such as braking resistors or power resistors, may struggle to meet space limitations and thermal stability requirements, and the ability to manage excess energy effectively in many challenging vehicle designs. This leads to potential operational reliability risks such as overvoltage, overheating, and system inefficiencies.



Solution – Thick Film on Stainless Steel Known as TFOS

Bourns introduced its Thick Film on Stainless Steel (TFOS) technology as an optimized solution for demanding applications such as fuel cell stack sensor boards. Bourns® TFOS components are AEC-Q200 qualified, and RoHS* compliant, making them ideal for automotive applications and any application that requires high reliability. Offering a high power rating, TFOS features excellent thermal transfer, and provides both surge handling and continuous operation support in high-power density applications.



In the fuel cell stack sensor board, TFOS technology enhances the sensors' ability to:

- Monitor and maintain fuel cell parameters within safe limits
- Perform active discharge functions to safely dissipate excess energy
- Provide thermal and electrical stability, preventing short circuits and faults
- Enable a compact design with a thickness of less than 1mm for space-constrained environments
- Easy integration with heat sinks to deliver high power ratings of up to 900 W
- Precision control for improved energy management

TFOS technology provides the following benefits for customers:

- Enhanced safety through precise monitoring and active protection features
- Improved thermal performance, providing consistent operation under varying conditions
- Compact design, ideal for modern vehicle architectures
- Flexible customization available in various footprint sizes and with multiple connection formats
- AEC-Q200 qualified demonstrates TFOS has been tested for reliability and durability in harsh automotive environments, reducing maintenance and operational risk
- RoHS compliant* meets environmental goals

Electrical Characteristics

Series	Size (mm)	Resistance Tolerance	Power Rating on Heat Sink	Dialectric Withstand	TCR	Operating Temperature	Termination	Automotive Grade
TFOS30-1-150T	101 x 70	±10 %	260 W	2500 VDC	600 ppm/ °C	-55 °C to +155 °C	Termination Pads	Yes

*RoHS Directive 2015/863, Mar 31, 2015 and Annex.