

## APPLICATION NOTE

### Introduction

A fuel cell stack sensor board, sometimes referred to as a fuel cell stack monitoring system, is a crucial component to help ensure the efficient operation of fuel cell vehicles. This sensor board monitors the main parameters, such as its temperature, and voltage.

This application note discusses the usage of Bourns Thick Film on Stainless Steel (TFOS) technology in a fuel cell stack sensor board application. It outlines the important protection features and functionality the stack sensor board provides to fuel cell vehicles. The Stack Sensor Board serves the purpose of monitoring, protecting, and transferring energy from the fuel cell stack to the vehicle. Its function includes active discharge functions, in which safety and reliability are most critically ensured.

### Primary Functions

The stack sensor board continuously monitors the fuel cell stack and ensures that its operating parameters are within specified limits. It also helps protect the fuel cell stack from potential issues such as overvoltage, impedance, and excess temperature. TFOS technology provides excellent thermal and electrical performance, which helps to prevent short circuits and other electrical faults. An additional function of the stack sensor board is to synthesize with the active discharge functions.

The synthesize function is used to discharge excess energy from fuel cells, ensuring that there are no overvoltage conditions which could potentially cause damage. The precision and thermal stability qualities of the thick film on steel technology offers state-of-the-art capabilities in managing excess energy discharge.



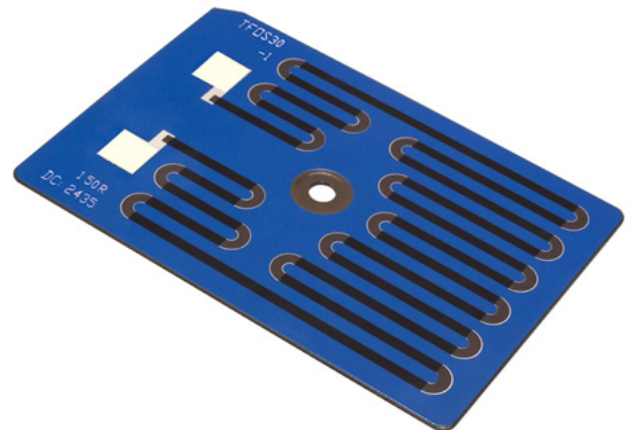
*Stack Sensor Board*

### Bourns® Thick Film on Steel in Action

The low profile design and the ease of attachment of TFOS components to heat sinks make them ideal for compact or space-constrained applications, which aids in streamlining manufacturing. Plus, the material's excellent thermal stability helps maintain consistent performance under varying temperature conditions, which is crucial for accurate monitoring and protection functions especially in vehicle applications.

Thick film on steel technology enables more precise measurement and control. This precision enables all key fuel cell parameters to be accurately monitored and maintained within specified limits - a vital capability for safe and efficient operation.

The high power rating of Bourns® TFOS component specification is a crucial feature that works to ensure excess energy is effectively managed in the active discharge function. This prevents damage from overvoltage conditions and protects the overall system.



*Bourns® Thick Film on Steel (TFOS)*

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### Conclusion

The stack sensor board with TFOS technology is designed as an essential component that meets the monitoring, protection and energy transfer requirements of modern fuel cell vehicles. The benefits from incorporating Bourns® TFOS component include enhanced durability, reliability, thermal stability, precision, and overall performance. Its role in the active discharge function underscores its importance in maintaining the safety and reliability of the vehicle's power system as well. The stacked fuel cell sensor board also provides the capability to promptly identify potential issues so that they may be addressed, ensuring optimal safety and performance.

By incorporating Bourns Thick Film on Stainless Steel technology, the sensor board delivers reliability and efficiency advantages due to its exceptional thermal transfer characteristics and power rate, providing an overall improvement to current methodologies utilized. Bourns TFOS products are both reliable and efficient.