Study on connector miniaturization

How miniaturized connector systems support smaller, lighter electronic components to reduce space consumption and weight, thereby improving fuel efficiency and reducing carbon dioxide emissions.

Increasingly complex driver assistance systems are accelerating the electrification trend of power systems.Carmakers' desire to build more electronic content for their vehicles has led to many sensor-driven control units on printed circuit boards, which already have miles of new wiring and a plethora of new connections, crowding out already dense structural space.At the same time, the use of lightweight components to improve fuel efficiency and make cars more environmentally friendly is becoming a growing consensus.So manufacturers need to find smarter electronic solutions to save space and weight.

Industrial manufacturers are widely using miniaturized connectors in vehicles because of reduced line sizes and packaging space in control units.In some cases, so-called "black box" components contain non-automotive miniaturized connectors.When the car is in a harsh environment, these connectors lack robustness, which can lead to application problems.Automotive oems need to ensure that their purchased subsystem modules are equipped with truly automotive grade connectors designed to meet specifications and validation requirements such as LV214 (Europe) and USCAR2 (United States).

In this white paper, we examine how manufacturers can achieve strategic space savings by using miniaturized connectors to provide true automotive class robustness.Specifically, we studied how two miniaturized interconnected platforms (NanoMQS and MCON 0.50) for automotive applications meet industry specifications, provide key technical advantages, and save up to 50% of space.We also consider other factors that affect the robustness of miniaturized components, such as the quality of small wire bonding, and discuss how to solve the risk of increasing the growth of metal whiskers on high-density PCB pin connections.