



CONDUCTIVITY PLUS OPTICAL CLARITY

PEDOT-Based Capacitive Switches Meet Rigorous Auto Standards

Economical touch switches deliver vehicle telematic design freedom—and gain popularity among today's drivers



BUSINESS CHALLENGE

As the global economy improves, numerous analysts cite pent-up consumer demand for new vehicle purchases. An influx of potential buyers looking to replace aging vehicles brings both opportunities and challenges for OEMs to distinguish new model vehicles from their competitors. Leading automakers are leveraging trendsetting in-vehicle electronics for that purpose.

Capacitive printed circuit board (PCB) controls have been one popular way for automakers to incorporate value-added features, while helping brand their line-up in dealer showrooms. Capacitive screens have become an interface of choice in consumer electronics from smart phones to netbooks. Many automakers have started replacing traditional in-vehicle mechanical switches and knob controls with economical and feature-rich capacitive screens.

Whether navigating traffic via GPS or hands-free access to Bluetooth devices or delivering fuel and maintenance schedule alerts, touch panels now feature prominently on many dashboards—ranging from economy to luxury models. In-vehicle capacitive screen telematic applications are gaining popularity and traction among drivers of all ages who have come to appreciate the ease and convenience of capacitive screen technology.

Designing automotive capacitive touch electronics adds a layer of complexity for automotive engineers to ensure proper device and control functioning regardless of ambient vibration, humidity and extreme temperatures. Traditional in-vehicle glass interface-on-glass substrate panels function well under extreme temperatures in harsh-duty automotive environments, but come at a high price for installation and replacement in the event of impact and breakage. Polyethylene film-on-glass substrates have become a low cost touch switch technology in other industries. However, some preparations can not withstand high temperatures and humidity well, which results in substrate degradation, so the technology has been less than ideal for automotive applications.

With touch-based applications becoming increasingly popular, the use of technologies built around Indium Tin Oxide (ITO), with its inherent weaknesses (brittle, inflexible, highly reflective and costly to pattern), has led to a search for alternative materials that offer higher transmission, equal resistivity and easy processing, but at lower overall application costs. Of these, conductive polymers are receiving growing attention, with PEDOT emerging as one of the most promising materials that has excellent electrochemical, thermal and solution-processing properties.

THE PEDOT SOLUTION

In many vehicle applications, Molex PEDOT-based capacitive switches and other advanced switch technologies are making the transition to one-touch controls more economical and efficient from a design standpoint. PEDOT is a conductive polymer successfully deployed in the fabrication of a range of electronic devices.

An acronym for its chemical name, PEDOT represents a polymer mixture with unique elastic, conductive properties that has garnered positive reviews as a technology enabler. The near colorless, water-soluble polymer

mixture can be coated on a variety of substrates including PET, PC, PMMA, glass or other material.

Blending electronic conductivity with optical clarity, PEDOT-based capacitive switches deliver a more economical solution than standard ITO technologies. Replacing a traditional PCB, PEDOT utilizes a thin polyester circuit. Molex uses this compound to meet highly demanding switch applications that traditionally used standard mechanical buttons. Molex PEDOT capacitive solutions optimize design freedom for automakers

seeking a cost effective way to give drivers the sleek, modernized interior touch-based controls they desire, with rugged durability to ensure equipment performs reliably in the harsh automotive environment.



PEDOT TECHNOLOGY ADVANTAGES

Molex PEDOT-based capacitive switches meet stringent automotive industry requirements. In addition to optical transparency, PEDOT offers flexibility and good adhesion qualities for longevity and multiple cycles with finger controls. Low-temperature processing enables easy application and lowers overall production costs.

The key advantage of using PEDOT as a conductive ink for back-lit capacitive switches is that it allows the design of user-friendly automotive interfaces at a significantly reduced cost. From a design standpoint, PEDOT provides a versatile tool with a host of advantages—

- Enhanced driver functionality at a lower price point for the automaker
- Single capacitive switch can replace functionality of mechanical button
- Touch control modality easily configured and customized
- Streamlined user interaction
- Driver appeal – sleek design and resolution

PEDOT-BASE AUTOMOTIVE APPLICATIONS

By leveraging Molex expertise in developing capacitive switch technologies, automakers can break down the design barriers to delivering the total package. With PEDOT, the possibilities are limitless for incorporating controls with user-friendly icons at your fingertips. Molex offers fully qualified PEDOT-based, capacitive switches for automotive applications, including overhead consoles, environmental controls, GPS receivers, satellite navigation, and passenger infotainment systems.

Whether an application is a back-lit capacitive switch or screen, or a PEDOT-based circuitry panel with patterned transparent conductive structures, Molex brings a range of high-quality switch solutions to help automotive customers realize greater design freedom and cost savings.



To learn more www.molex.com/ab/capacitiveswitches1961.html