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Microchip Enhances Robotic Tactile Sensing with High-Speed Capacitance Digitizer

ATFCD52 device supports dense capacitive sensor arrays, providing detailed tactile data for real-time grip control and early slip detection

CHANDLER, Ariz., Nov. 10, 2026 (GLOBE NEWSWIRE) -- Reliable robotic manipulation requires more than vision, particularly when handling soft, fragile or irregular objects. Cameras can locate an object, but tactile sensing provides the contact information needed to determine how firmly it is held and whether it is beginning to slip. Microchip Technology **(Nasdaq: MCHP)** has introduced the **ATFCD52 high-speed capacitance digitizer** to convert signals from fine-grid, two-dimensional capacitive sensor arrays into high-sensitivity digital data. An external processor can use this data to calculate normal and shear forces, helping robotic grippers and dexterous humanoid hands adjust how they grasp and manipulate objects.

“Robots have become increasingly capable of seeing and understanding their surroundings, but the ability to feel and respond to physical contact remains a critical challenge,” said Giovanni Fontana, senior director of Microchip’s human machine interface division. “The ATFCD52 is designed to deliver the real-time tactile data that serves as a foundation for the development of more dexterous robots and the advancement of physical AI.”

Supporting up to 52 channels with up to 32 transmit (TX) by 20 receive (RX) lines, the ATFCD52 enables dense, two-dimensional capacitive sensor arrays that capture data across the contact surface. Twenty parallel on-chip analog front ends simultaneously acquire all receive lines, enabling frame rates of up to 800 Hz, depending on the size of the sensor array. This high-speed acquisition helps the system detect the onset of a slip and adjust the grip before objects are dropped or crushed.

Further enhancing performance, the ATFCD52 is designed to resolve capacitance changes below 1 femtofarad (fF), providing the sensitivity needed to detect subtle tactile sensor deformation. This level of sensitivity is particularly important for light touch where capacitance changes can be extremely small and difficult to distinguish in noisy electrical environments. In robotic systems, these signals can be difficult to distinguish from electrical noise generated by servo motors, power electronics and switching regulators. Frequency hopping and oversampling also help mitigate this interference, supporting tactile sensing in electrically noisy environments.

For system-level processing, the ATFCD52 can be paired with Microchip MCUs, MPUs or FPGAs depending on application performance requirements. Developers can select a processing architecture appropriate for localized control or higher-throughput computation while incorporating the capacitance digitizer into a broader Microchip system solution. Beyond robotics, the ATFCD52’s flexibility makes it suitable for applications such as

augmented reality and gaming accessories, data-collecting gloves and foot mats and wearable sensing such as electronic skin. Visit the website to learn more about Microchip's full portfolio of robotics solutions.

Development Tools
The ATFCD52 is supported by the EV-ATFCD52 development board to help customers evaluate their capacitive sensor designs, tactile sensor materials and stack-ups. The ATFCD52 Configurator software enables user parameter configuration and real-time data logging to help accelerate evaluation and design-in.

Availability
The ATFCD52 high-speed capacitance digitizer can be **purchased** directly from Microchip or contact a Microchip **sales representative or authorized worldwide distributor**.

Resources
High-res images available through Flickr or editorial contact (feel free to publish):

- Application image: **https://www.flickr.com/gp/microchiptechnology/610WR97hF4**

About Microchip Technology:
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