

Four-Channel Thermocouple Measurement with Integrated Conditioning Now Possible with $\pm 1.5^{\circ}\text{C}$ System Accuracy

Microchip's MCP9604 thermocouple conditioning IC reduces the cost and complexity of in-line production applications that operate in high and low temperature extremes

CHANDLER, Ariz., Sept. 25, 2025 (GLOBE NEWSWIRE) -- Precision four-channel temperature measurement is critical for production-line applications ranging from chemical and food processing, manufacturing process control and medical and HVAC equipment to refrigerated, cryogenic and other carefully controlled environments. With the introduction of the [MCP9604 integrated thermocouple conditioning IC](#), Microchip Technology (**Nasdaq: MCHP**) has overcome a thermal measurement and integration barrier with the first single-chip, four-channel I²C thermocouple conditioning IC to deliver up to $\pm 1.5^{\circ}\text{C}$ accuracy and provide an alternative to discrete and multichip thermocouple conditioning solutions that can introduce errors and add system design complexity.

"For more than two centuries, the thermocouple has been a critical tool for measuring extremely high temperatures, but the necessary precision and accuracy could not be achieved with the level of integration and cost-effectiveness that is required for today's demanding production-line applications," said Keith Pazul, vice president of Microchip's mixed-signal linear business unit. "Our device now delivers a combination of precision, integration and cost-effectiveness, helping reduce the need for as many as 15 discrete components and associated system design challenges."

The MCP9604 device delivers its advanced measurement accuracy at four thermocouple locations by using higher-order NIST ITS-90 equations rather than the single-order linear approximations of analog amplifier designs. As an example, it achieves ninth-order accuracy with K-type thermocouples, all in one integrated chip containing the ADCs, cold junction compensation temperature sensors, amplifiers and other components required for the signal chain, temperature measurement and math engine.

Removing the need for external components simplifies PCB design, reduces bill of materials costs, and can help eliminate the weeks of costly, time-consuming and complex unit-by-unit in-line validation and calibration that discrete solutions require in the thermocouple measurement signal chain before they can begin reporting data to the host system.

The MCP9604 also offers flexibility and versatility by supporting the eight most common thermocouple types including the J option as well as the K option for operating at temperatures as low as -200°C . In addition to supporting a wide, -200°C to $+1372^{\circ}\text{C}$ temperature range across a diverse range of industrial applications, the MCP9604 also

supports I²C communication to allow easy integration with microcontrollers and other digital systems.

Building on Earlier Advancements

The MCP9604 builds on the release of Microchip's single-channel thermocouple conditioning IC, the first all-in-one device to deliver up to $\pm 1.5^{\circ}\text{C}$ accuracy. The core competencies that made this device possible have paved the way for the company's four-channel single-chip MCP9604 device that delivers its digital temperature reading with industry-high accuracy levels for an I2C thermocouple conditioning device.

Development Tools

The MCP9604 device is supported by the [Microchip EV19L27A evaluation board](#). It can connect to and read information from as many as four thermocouples and includes a microcontroller that acts as a host system for receiving this information and plotting the selected thermocouple. The evaluation board also includes free software that can be downloaded from either the [MCP9604](#) or [EVB](#) web pages.

Pricing and Availability

The MCP9604 thermocouple conditioning IC is available in a tape-in-reel (MCP9604T-E/3YW) or rail (MCP9604-E/3YW) configuration. Each device is available for \$10.56 each in 10,000-unit quantities and packaged in a 24-pin 5x5 Land Grid Array (LGA). The price of the EV19L27A evaluation board is \$96.00 each and is available now.

For additional information and to purchase, contact a Microchip sales representative, authorized worldwide distributor or visit Microchip's Purchasing and Client Services website, www.microchipdirect.com.

Resources

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

- Application image:
www.flickr.com/photos/microchiptechnology/54515257814/sizes/o/
- Evaluation board photo:
www.flickr.com/photos/microchiptechnology/54515355613/sizes/o/
- Videos available through YouTube or editorial contact (feel free to post):
 - [Streamline Your Sensing: Four Thermocouples, One Solution](#)
 - [Ultra-Accurate 4-Channel Thermocouple Conditioning IC: Simplify Design, Maximize Precision](#)
- Blog post: [Accurate Thermal Measurements at Extremes with MCP9604](#)

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