

Universal $\pm 25\text{ V}$ 8-input low-power AFE with integrated DAC and sense resistor with protection switch



The transition to Industry 4.0 is reshaping manufacturing, pushing factories to become more agile and responsive to rapidly changing market conditions. Traditional automation systems rely on controllers connected to fixed I/O modules for gathering sensor data and driving actuators. While effective in stable environments, this approach lacks the flexibility needed for modern, dynamic production lines.

Next-generation smart factories demand systems that can be reconfigured entirely through software—without manual rewiring or hardware changes. This capability enables faster adaptation, minimizes downtime, and reduces operational costs.

Recent breakthroughs in semiconductor technology have made this possible. Fully programmable Analog Front End ICs now allow input and output channels to be defined digitally, delivering unprecedented configurability and paving the way for truly adaptive automation systems.

With the aim of offering the above advantages to the PLC, DCS and Data Acquisition markets, NXP has developed a family of compact, 8 channels, fully configurable Analog Input Front End which features a 24 bits ADC, 13 bits DAC, an integrated sense resistor with protection switch for 4–20mA current measurement, high level of integration, extensive diagnostic functions, and a small size. This product family is not a simple replacement of a discrete solution but a significant innovation which extends its benefit outside the mere PCB or BOM reduction but touches several aspects of the overall system solution.

