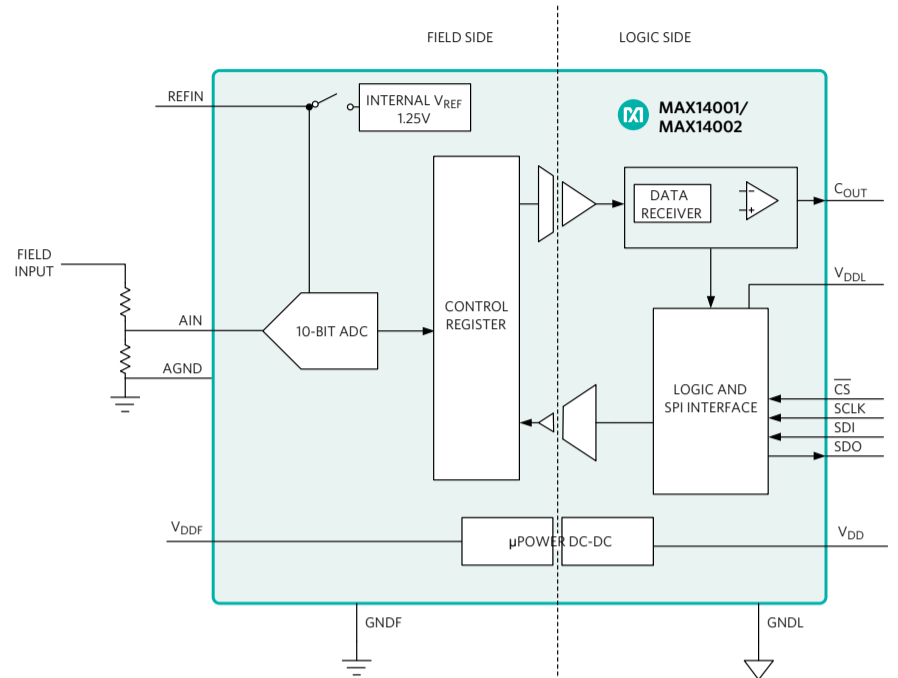


## Isolated ADCs with Integrated DC-DC Converter Configurable 10-Bit ADCs Simplify Field-Side Circuitry

### DESCRIPTION

High-voltage measurement presents a safety concern for operators of industrial equipment. To ensure the equipment is safe to use, galvanic isolation must be inserted between the high-voltage “field-side” and the low-voltage “logic-side” circuits. The MAX14001/MAX14002 configurable, 3.75kV<sub>RMS</sub> isolated 10-bit ADCs introduce a new approach to data and power isolation to protect equipment and operators from high voltage concerns, while reducing cost and design footprint.

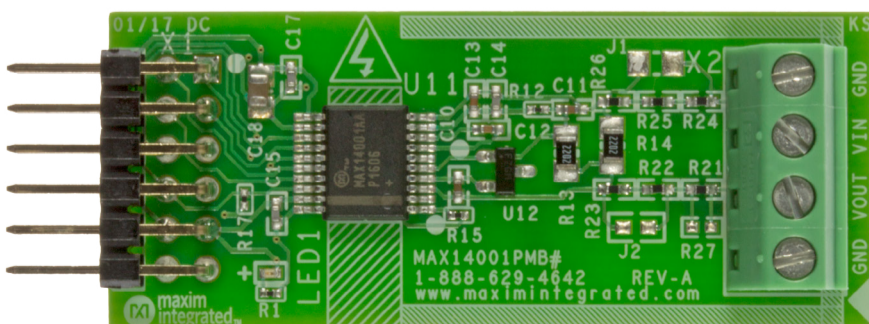


### KEY BENEFITS

- Integrated DC-DC converter eliminates the need for a separate field-side power supply and saves board space
- 3.75kV<sub>RMS</sub> isolation between field and logic sides provides isolation for both data and supply
- Two output options:
  - SPI: Read-filtered or unfiltered ADC data
  - Comparator (<150µs response): Programmable upper and lower thresholds

Part Number	Sensor Interface Type	µC Interface Type	ADC	V <sub>SUPPLY</sub>		I <sub>SUPPLY</sub> (µA) typ	Oper. Temp (°C)	Programmable Wetting Current	Package/Pins
				(V) Min	(V) Max				
MAX14001	Multi-level Binary Input	SPI	10-bit, 10ksps	3	3.6	4800	-40 to +125	Yes	SSOP/20
MAX14002								No	

### RELATED RESOURCES



MAX14001PMB: Evaluation Kit for the MAX14001/MAX14002

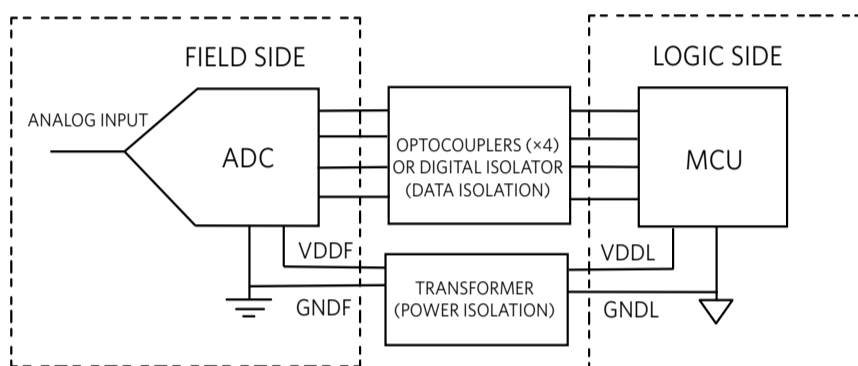


Design Solution: Isolated ADC with Integrated DC-DC Converter Simplifies Field-Side Circuitry

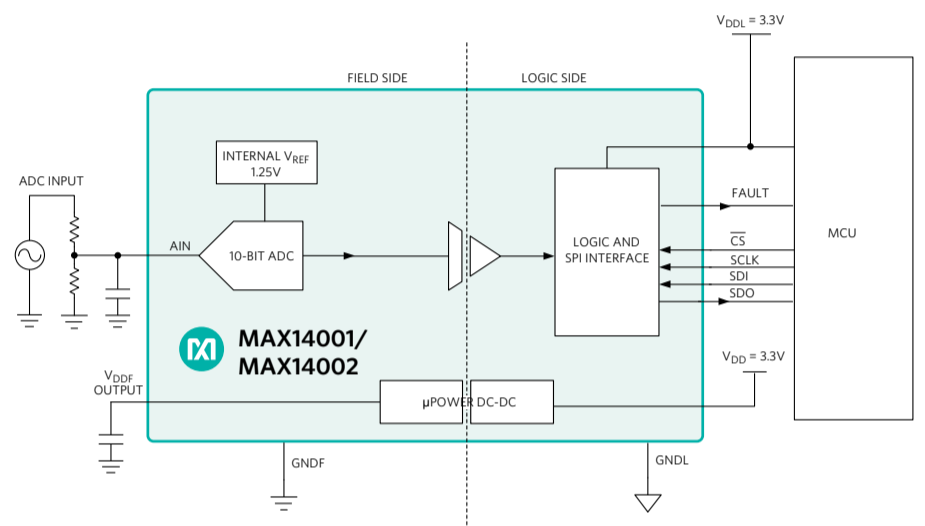
## INTEGRATION DELIVERS SMALLER FOOTPRINT, SIMPLIFIES DESIGN

In a typical discrete application, the field-side digital signal is transmitted to the logic-side MCU via digital isolation circuitry. A disadvantage of this configuration is that the isolator circuitry requires a separate power supply while also consuming valuable board space. The MAX14001/MAX14002 integrate a single-channel, 10-bit SAR ADC with CMOS capacitive digital isolation circuitry and an isolated DC-DC converter. Thus, a single-supply voltage ( $V_{DD}$ ) can be used to provide power to both the field-side and logic-side circuitry while maintaining isolation between both sides and saving board space.

DISCRETE SOLUTION



INTEGRATED SOLUTION



## APPLICATION EXAMPLE

This example of a multi-level binary input module shows the MAX14001 monitoring a DC voltage (24V to 300V binary input) through a high-voltage relay or circuit breaker.

Circuit Features:

- ADC Monitoring DC Voltage (24V to 300V) Passes through HV Relay/Circuit Breaker
- Configurable Comparator Thresholds for Different Full-Scale System Voltages
- GATE Voltage to Bias External Power FET
- Configurable Current DAC (IFET) Provides:
  - Bias Current to Clamp the Capacitively Coupled Noise on the Relay/Circuit Breaker
  - Inrush Current to Clean the Oxides from Mechanical Relays
- Multiple Fault Monitoring Functions to Ensure Field-Side Safety
- Daisy Chain to Support a Multi-Channel Solution
- Small Solution Size Achieved by Integrated Isolated Power, ADC, and Current DAC

## MULTI-LEVEL BINARY INPUT MODULE

