10D-POT

Potentiometer Input, Analog-Sensor-to-Digital Front End Signal Conditioner

DESCRIPTION

10D-POT potentiometer input modules are designed to interface with 2-wire and 3-wire resistance sensors used in industrial, test, and measurement applications.

Each module provides a single channel of potentiometer input that is filtered, isolated, amplified, and converted into 24-bit digital data for precise measurement of resistance signals.

Excitation for the potentiometer is provided using two matched current sources. When using a 3-wire connection, this method allows equal current to flow through the sensor leads, canceling the effects of lead resistances. Low excitation current minimizes self-heating of the potentiometer, further reducing measurement errors.

Discrete output pins can be mapped to configurable low and high alarms to provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation.

Input-to-digital isolation is rated at a robust 1500Vrms and all field-side inputs are protected against accidental power-line connections up to 240Vrms. These features safeguard measurement and control equipment from the harmful effects of signal noise, transient surges, ground loops, and other industrial hazards.

Over-range and under-range up to 10% beyond specified input values are supported with accuracy guaranteed to ±full-scale. All 10D modules are housed in rugged thermoplastic packages and are specified to operate over the industrial temperature range of –40°C to +85°C.

FEATURES

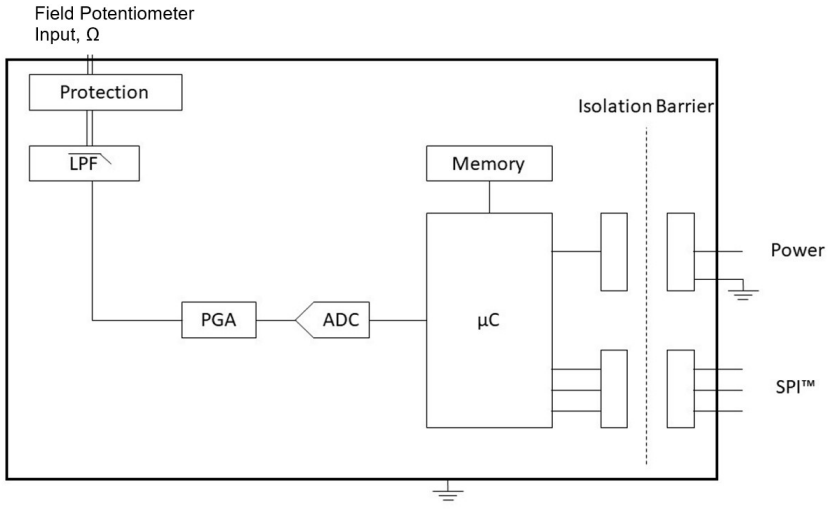
- Interface to Potentiometers
- 1 Input Channel
- Configurable for Alarms and Averaging
- 1500Vrms Input-to-Digital Isolation
- Input Protected up to 240Vrms
- CE compliant
- 24-Bit Resolution
- Operating Temperature: –40°C to +85°C

BENEFITS

- Small Footprint
- Simplifies Sensor Interface and Signal Conditioning Design
- Reduces System BOM
- Provides Isolation of External Sensors
- Protects Sensitive System Components
- Breaks Ground Loops
- Reduces EMC Concerns

APPLICATIONS

- Signal Conditioning
- Signal Isolation
- Signal Filtering
- Industrial Process Control
- Test and Measurement
- System and Signal Monitoring



10D-POT Block Diagram

Specifications

Typical* at T_A = +25°C and +3.3VDC power

Module	10D-POT-xxx-xx
10D-POT-xxx-xx	1-channel Potentiometer Input
Input Range	See Ordering Information
Input Protection	
Continuous(1)	240Vrms (max)
Transient	EN61000-6-2
Sensor Excitation	250µA: 125Ω, 250Ω, 500Ω Sensor 40µA: 1.25kΩ, 2.5kΩ, 5kΩ, 10kΩ Sensor
Lead Resistance Effect	±0.01Ω/Ω: 125Ω, 250Ω, 500Ω ±0.05Ω/Ω: 1.25kΩ, 2.5kΩ, 5kΩ, 10kΩ
CMV	
Input-to-Digital	1500Vrms (max)
Transient	EN61000-6-2
CMR (50Hz or 60Hz)	120dB
NMR	40dB/decade
Accuracy(2)	±0.03% Span
Linearity	±0.01% Span
Stability	
Offset	±20ppm/°C
Gain	±50ppm/°C
Bandwidth, -3dB	3Hz
Sampling Rate	4000 S/s
Alarms	Low, High
Open Input Response	Upscale
ADC Resolution	24-bit
Discrete Inputs	1
Discrete Outputs	2
Discrete Output Drive Current	4mA
Interface	SPI(3)
Clock Input	1MHz (max)
SPI Mode	1
Bit Order	MSB First
Power Supply Voltage	+3.0 to +5.25VDC
Power Supply Current	52mA
Mechanical Dimensions (h)(w)(d)	0.350" x 2.00" x 1.00" (8.89mm x 50.8mm x 25.4mm)
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted Immunity	Class A
EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

Ordering Information

Model	Input Range	Output
10D-POT-1H1-01	0 to 10kΩ	SPI
10D-POT-1H1-02	0 to 5kΩ	SPI
10D-POT-1H1-03	0 to 2.5kΩ	SPI
10D-POT-1H1-04	0 to 1.25kΩ	SPI
10D-POT-1H1-05	0 to 500Ω	SPI
10D-POT-1H1-06	0 to 250Ω	SPI
10D-POT-1H1-07	0 to 125Ω	SPI

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240Vrms between +IN and -IN pins.
120Vrms between -IN and +EXC, or -EXC pins.
120Vrms between +EXC and -EXC pins.
(2) Includes conformity, hysteresis, and repeatability.
(3) Refer to timing diagram in user manual.