SCM5B36

Potentiometer-input Modules

DESCRIPTION

Each SCM5B36 potentiometer-input module provides a single channel of Potentiometer-input which is filtered, isolated, amplified, and converted to a high-level analog voltage output (Figure below). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B module family is designed with a completely isolated computer-side circuit which can be floated to ± 50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

Excitation for the potentiometer is provided from the module by two matched current sources. When using a three-wire potentiometer, this method allows cancellation of the effects of lead resistances. The excitation currents are very small (less than 1.0mA) which minimizes self-heating of the potentiometer.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are in the output stage. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common-mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the SCM5B36 module provides protection against accidental connection of power-line voltages up to 240VAC.

FEATURES

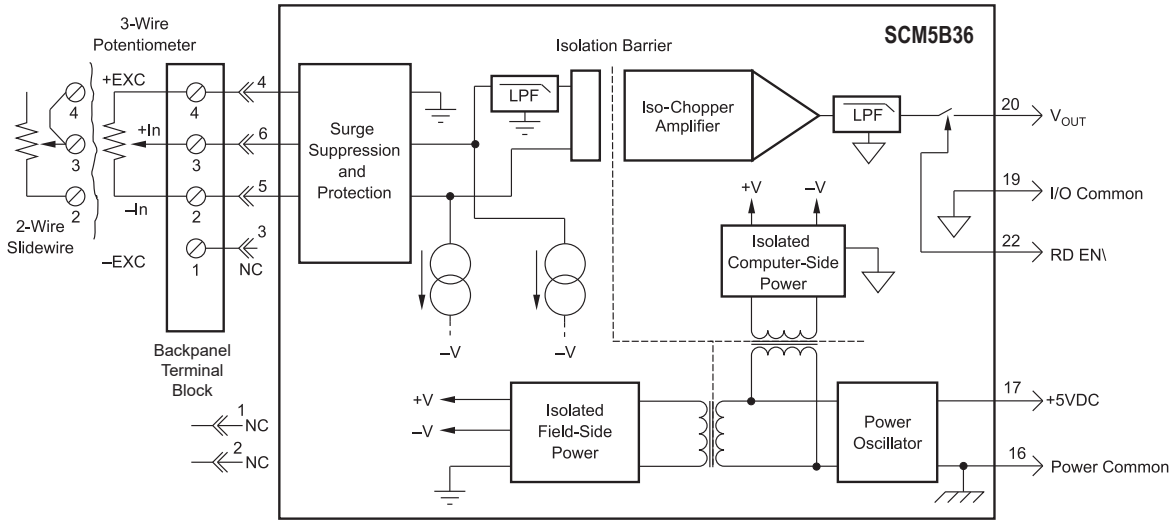
- Interfaces to Potentiometers up to 10,000Ω
- High-level Voltage Output
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC, Continuous
- 160dB CMR
- 95dB NMR at 60Hz, 90dB at 50Hz
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified
- CE and ATEX Compliant
- Manufactured per RoHS III Directive 2015/863
- Mix and Match SCM5B Types on Backpanel

BENEFITS

- Protects User Equipment from Lightning and Heavy Equipment Power-line Voltage
- Reduces EMC Concerns and Electrical Noise in Measured Signals
- Convenient System Expansion and Repair
- Signal Filtering in Noisy Environments
- Simplifies Sensor Interface and Signal Conditioning Design
- Provides Isolation of External Sensors
- Breaks Ground Loops

APPLICATIONS

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



SCM5B36 Block Diagram - For Module Dimensions and Pinouts, See Page 1-44

Specifications

Typical* at T_A = +25°C and +5VDC Power

Module	SCM5B36
Input Range	0 to 10kΩ
Input Resistance	
Normal	50MΩ
Power Off	40kΩ
Overload	40kΩ
Input Protection	
Continuous	240Vrms (max)
Transient	ANSI/IEEE C37.90.1
Sensor Excitation Current	0.25mA; 100Ω, 500Ω, 1kΩ Sensor 0.10mA; 10kΩ Sensor
Lead Resistance Effect	±0.01Ω/Ω; 100Ω, 500Ω, 1kΩ Sensor ±0.02Ω/Ω; 10kΩ Sensor
CMV, Input to Output	
Continuous	1500Vrms (max)
Transient	ANSI/IEEE C37.90.1
CMR (50 or 60Hz)	160dB
NMR	95dB at 60Hz, 90dB at 50Hz
Accuracy(1)	±0.03% Span
Linearity	±0.005% Span
Stability	
Input Offset	±0.004Ω/°C; 100Ω, 500Ω, 1kΩ Sensor ±0.010Ω/°C; 10kΩ Sensor
Output Offset	±20µV/°C
Gain	±50ppm of Reading/°C
Noise	
Input, 0.1 to 10Hz	0.2µVrms
Output, 100kHz	200µVrms
Bandwidth, –3dB	4Hz
Response Time, 90% Span	0.2s
Output Range	See Ordering Information
Output Resistance	50Ω
Output Protection	Continuous Short-to-Ground
Output Selection Time (to ±1mV of V_{OUT})	6µs at C_{LOAD} = 0 to 2000pF
Output Current Limit	+8mA
Output Enable Control	
Max Logic "0"	+0.8V
Min Logic "1"	+2.4V
Max Logic "1"	+36V
Input Current "0,1"	0.5µA
Open Input Response	Downscale
Open Input Detection Time	3s
Power Supply Voltage	+5VDC ±5%
Power Supply Current	30mA
Power Supply Sensitivity	±2µV/% RTI(2)
Mechanical Dimensions (h)x(w)x(d)	2.28" x 2.26" x 0.60" (58mm x 57mm x 15mm)
Environmental	
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

NOTES:
*Contact factory for maximum values.
(1) Includes linearity, hysteresis and repeatability.
(2) RTI = Referenced to input.

Ordering Information

Model	Input Range	Output Range
SCM5B36-01	0 to 100Ω	0V to +5V
SCM5B36-01D	0 to 100Ω	0V to +10V
SCM5B36-02	0 to 500Ω	0V to +5V
SCM5B36-02D	0 to 500Ω	0V to +10V
SCM5B36-03	0 to 1kΩ	0V to +5V
SCM5B36-03D	0 to 1kΩ	0V to +10V
SCM5B36-04	0 to 10kΩ	0V to +5V
SCM5B36-04D	0 to 10kΩ	0V to +10V