All specifications are subject to change without notice.
Typical for 25 °C unless otherwise specified.
Specifications in *italic* text are guaranteed by design.

Analog input

Table 1. Analog input specifications

Parameter	Condition	Specification
A/D converter type		Successive approximation
ADC resolution		16 bits
Input modes		Single ended (CHx – AGND) Differential (CHxH – CHxL)
Number of channels		8 single-ended or 4 differential; software-selectable
Input voltage ranges		±10 V, ±5 V, ±2 V, ±1 V
Absolute maximum input voltage	*CHx relative to AGND*	*±30 V max (power on)* *±20 V max (power off)*
Input impedance		*>1 GΩ*
Input bias current		*±200 pA, typ*
INL		±1.8 LSB
DNL		16 bits no missing codes
CMRR	DC to 5 kHz	±10 V range: 56 dB ±5 V range: 57 dB ±2 V range: 61 dB ±1 V range: 65 dB
Input bandwidth	Small signal (-3 dB)	220 kHz
Maximum working voltage	Input range relative to AGND	±10.1 V max
Crosstalk	Adjacent channels, DC to 10 kHz	-70 dB
Input coupling		DC
Recommended warm up time		1-minute min
Sampling rate, hardware paced	Internal scan clock	1 S/s to 100 kS/s, software-selectable
	External scan clock	100 kS/s max
Sampling mode		One A/D conversion for each configured channel per clock
Conversion time	Per channel	9.8 µs
Scan clock source		■ Internal scan clock ■ External scan clock input on terminal CLK
Channel queue		Up to eight unique, ascending channels in a single range and mode
Throughput, Raspberry Pi® 2 / 3 / 4	Single board	100 kS/s max
	Multiple boards	Up to 320 kS/s aggregate (Note 1)
Throughput, Raspberry Pi A+ / B+	Single board	Up to 100 kS/s (Note 1)
	Multiple boards	Up to 100 kS/s aggregate (Note 1)

Note 1: Depends on the load on the Raspberry Pi processor. The highest throughput may be achieved by using a Raspberry Pi 3 B+. Accuracy

Analog input DC voltage measurement accuracy

Table 2. Absolute accuracy

Range	At full scale (typical at 25 °C)	At full scale (maximum over temperature)
SE ±10 V	±6 mV	±34 mV
SE ±5 V	±3 mV	±17 mV
SE ±2 V	±1.2 mV	±7 mV
SE ±1 V	±600 µV	±3.4 mV
Diff. ±10 V	±14 mV	±42 mV
Diff. ±5 V	±6.5 mV	±21 mV
Diff. ±2 V	±2.1 mV	±8 mV
Diff. ±1 V	±900 µV	±3.7 mV

Noise performance

For the peak to peak noise distribution test, the input channel is in single-ended mode connected to AGND at the input terminal block, and 100,000 samples are acquired at the maximum throughput. The performance is the same for single-ended and differential mode.

Table 3. Noise performance specifications

Range	Vrms
±10 V	350 µV
±5 V	220 µV
±2 V	150 µV
±1 V	100 µV

External digital trigger

Table 4. External digital trigger specifications

Parameter	Specification
Trigger source	TRIG input
Trigger mode	Software configurable for edge or level sensitive, rising or falling edge, high or low level.
Trigger latency	Internal scan clock: 1 µs max External scan clock: 1 µs + 1 scan clock cycle max
Trigger pulse width	125 ns min
Input type	Schmitt trigger, 100 kΩ pull-down to ground
Input high voltage threshold	1.3 V min
Input low voltage threshold	1.5 V max
Input hysteresis	0.4 V min
Input voltage limits	5.5 V absolute max –0.5 V absolute min 0 V recommended min

External scan clock input/output

Table 5. External scan clock I/O specifications

Parameter	Specification
Terminal name	CLK
Terminal types	Bidirectional, defaults to input when not sampling analog channels
Direction (software selectable)	Output: Outputs internal scan clock, active on rising edge Input: Receives scan clock from external source, active on rising edge
Input clock rate	100 kHz max
Input clock pulse width	400 ns min
Input type	Schmitt trigger, 100 kΩ pull-down to ground
Input high voltage threshold	1.3 V min
Input low voltage threshold	1.5 V max
Input hysteresis	0.4 V min
Input voltage limits	5.5V absolute max -0.5V absolute min 0V recommended min
Output high voltage	3.0 V min (IOH = -100 µA) 2.4 V min (IOH = –4 mA)
Output low voltage	0.1 V max (IOL = 100 µA) 0.4 V max (IOL = 4 mA)
Output current	±4 mA max

Memory

Table 6. Memory specifications

Parameter	Specification
Data FIFO	72 K (73,728) analog input samples
Non-volatile memory	4 KB (ID and calibration storage, no user-modifiable memory)

Power

Table 7. Power specifications

Parameter	Conditions	Specification
Supply current, 5V supply	Typical	85 mA
	Maximum	135 mA

Interface specifications

Table 8. Interface specifications

Parameter	Specification
Raspberry Pi ™ GPIO pins used	GPIO 8, 9, 10, 11 (SPI interface) ID_SD, ID_SC (ID EEPROM) GPIO 12, 13, 26 (Board address) GPIO 16, 20 (Reset, IRQ)
Data interface type	SPI slave device, CE0 chip select
SPI mode	1
SPI clock rate	18 MHz, max

Environmental

Table 9. Environmental specifications

Parameter	Specification
Operating temperature range	0 °C to 55 °C
Storage temperature range	–40 °C to 85 °C
Humidity	0% to 90% non-condensing

Mechanical

Table 10. Mechanical specifications

Parameter	Specification
Dimensions (L × W × H)	65 × 56.5 × 12 mm (2.56 × 2.22 × 0.47 in.) max

Screw terminal connector

Table 11. Screw terminal connector specifications

Parameter	Specification
Connector type	Screw terminal
Wire gauge range	16 AWG to 30 AWG

Table 12. Differential mode terminal pinout

Connector J2		
Pin	**Signal name**	**Pin description**
1	CH0H	Analog input 0 Hi
2	CH0L	Analog input 0 Lo
3	AGND	Analog ground
4	CH1H	Analog input 1 Hi
5	CH1L	Analog input 1 Lo
6	AGND	Analog ground
Connector J3		
Pin	**Signal name**	**Pin description**
7	CH2H	Analog input 2 Hi
8	CH2L	Analog input 2 Lo
9	AGND	Analog ground
10	CH3H	Analog input 3 Hi
11	CH3L	Analog input 3 Lo
12	AGND	Analog ground
13	CLK	Scan clock input / output
14	GND	Digital ground
15	TRIG	Digital trigger input
16	GND	Digital ground

Table 13. Single-ended mode terminal pinout

Connector J2		
Pin	**Signal name**	**Pin description**
1	CH0	Analog input 0
2	CH4	Analog input 4
3	AGND	Analog ground
4	CH1	Analog input 2
5	CH5	Analog input 3
6	AGND	Analog ground
Connector J3		
Pin	**Signal name**	**Pin description**
7	CH2	Analog input 4
8	CH6	Analog input 5
9	AGND	Analog ground
10	CH3	Analog input 6
11	CH7	Analog input 7
12	AGND	Analog ground
13	CLK	Scan clock input / output
14	GND	Digital ground
15	TRIG	Digital trigger input
16	GND	Digital ground