Specifications

All specifications are subject to change without notice.
Typical for the range 0 to 60 °C unless otherwise noted.
All voltages are relative to the CH– signal on each channel unless otherwise noted.

Analog input

Table 1. Analog input specifications

Parameter	Conditions	Specification
Number of channels		4
A/D converter resolution		24-bit
A/D converter type		Delta-Sigma with analog pre-filtering
Sampling mode		Simultaneous
Sample rate range (f_s)		Minimum: 1.613 kS/s Maximum: 50 kS/s (Note 1)
Sample rates (f_s)		$\frac{(f_M \div 256)}{n}, n = 1, 2, \ldots 31$
Internal master timebase (f_M)		Frequency: 12.8 MHz Accuracy: ±100 ppm maximum
Input voltage ranges	CH+ to CH–	±10 V, nominal ±10.52 V, typical ±10.3 V, minimum
Overvoltage protection		±100 V
Input coupling		DC
Input impedance	CH+ to CH–	1 MΩ
Input noise		70 µV rms
Gain drift		±5 ppm/ºC
Offset drift		±24 µV/ºC
Post calibration gain match	channel-to- channel, 20 kHz	0.22 dB maximum
Crosstalk	1 kHz	–130 dB
Phase mismatch	channel-to- channel	0.075º/kHz maximum
Phase nonlinearity	f_s = 50 kS/s	0.11º maximum
Input delay		$38.4/f_s$ +3 µs
Passband frequency		0.453 · f_s
Passband flatness	f_s = 50 kS/s	±100 mdB maximum
Stopband frequency		0.547 · f_s
Stopband rejection		100 dB
Alias-free bandwidth		0.453 · f_s
–3 dB pre-filter bandwidth	f_s = 50 kS/s	24.56 kHz
Common mode rejection ratio (CMRR)	f_{in} = 60 Hz	126 dB
Spurious free dynamic range (SFDR)	1 kHz, –60 dBFS	–128 dBFS
Total harmonic distortion	1 kHz, –1 dBFS	–99 dB
	1 kHz, –20 dBFS	–105 dB

Note 1: Full performance requires connections to a USB 2.0 Hi-Speed host controller and USB 2.0 high-speed hubs.) The maximum sample rate may be lower on USB 1.1 ports.

Accuracy

Table 2. Analog input accuracy

Measurement conditions	Percent of reading (gain error)	Percent of range (offset error) (Note 2)
Calibrated maximum (–0 to 60 ºC)	±0.13%	±0.05%
Calibrated typical (25 ºC, ±5 ºC)	±0.03%	±0.008%
Uncalibrated maximum (–0 to 60 ºC)	±1.4%	±0.67%
Uncalibrated typical (25 ºC, ±5 ºC)	±0.3%	±0.11%

Note 2: The range is equal to 10.52 V.

Power

Table 3. Power specifications

Parameter	Specification
Current consumption from USB	500 mA, maximum

Bus interface

Table 4. Bus specifications

Parameter	Specification
USB specification	USB 2.0 Hi-Speed mode (480 Mbps) is recommended. Otherwise USB 1.1 Full-Speed mode (12 Mbps)

Environmental

Table 5. Environmental specifications

Parameter	Specification
Operating temperature range	0 to 60 °C
Storage temperature range	–40 to 85 °C
Operating humidity	10 to 90% relative humidity, non-condensing
Storage humidity	5 to 95% relative humidity, non-condensing
Maximum altitude	2000 meters (6561.679 feet)
Pollution degree (IEC60664)	2

Mechanical

Table 6. Mechanical specifications

Parameter	Specification
Dimensions	4.5" L x 5.5" W x 1.5" H
Weight	1.2 lbs. (544 grams)

Safety voltages

Table 7. Safety specifications (Note 3)

Parameter	Conditions	Specification
Channel-to-earth ground isolation	Continuous	250 Vrms, Measurement Category II (Note 4)
	Withstand	2,300 Vrms, verified by a 5 sec dielectric withstand test
Channel-to-channel isolation	Continuous	250 Vrms, Measurement Category II (Note 4)
	Withstand	1390 Vrms, verified by a 5 sec dielectric withstand test

Note 3: Connect only voltages that are within the limits specified in this table.

Note 4: Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example 115 V for US or 230 V for Europe.

Caution! Do not connect the device to signals or use for measurements within Measurement Categories III or IV.

Screw terminal connectors

Table 8. Screw terminal connector specifications

Connector type	Screw terminal
Screw terminal wiring	16 to 28 AWG copper conductor wire with 7 mm (0.28 in.) of insulation stripped from the end.
Torque for screw terminals	0.22 to 0.25 N· m (1.95 to 2.21 lb. · in.)

Table 9. Screw terminal assignments

Screw terminal	Signal
0	CH0+ (CH0 IN HI)
1	CH0– (CH0 IN LO)
0	CH1+ (CH1 IN HI)
1	CH1– (CH1 IN LO)
0	CH2+ (CH2 IN HI)
1	CH2– (CH2 IN LO)
0	CH3+ (CH3 IN HI)
1	CH3– (CH3 IN LO)

Accessory products

Table 10. Screw terminal connector specifications

ACC-102	Two-position detachable screw terminal connector blocks (quantity ten)
ACC-160	Backshell for use with the ACC-102 two-position screw terminal connector blocks. Provides strain relief and operator protection from high-voltage signals (quantity six)