ADS3000A Series Technical Specifications

Unless otherwise stated, all technical specifications apply to digital oscilloscope with the attenuation switch of the probe set to 10X.

- The instrument must be operated continuously for more than thirty minutes under the specified operating temperature.
- If the operating temperature range changes not less than 5℃, it is required to open the system function menu and execute “Self-calibration” program .

All specifications are guaranteed except those marked with “Typical”.

Oscilloscope

Vertical System

Analog Channel

Characteristics	Instruction	
Input Coupling	DC, AC, Ground	
Input Impedance	1 MΩ±2%, parallel with 15 pF±5 pF, 50Ω± 2%	
Probe attenuation coefficient setting	Common	10.00μX,20.00μX,50.00μX,100.00μX, 200.00μX,500.00μX,1.00mX,2.00mX, 5.00mX,10.00mX,20.00mX,50.00mX, 100.00mX,200.00mX,500.00mX,1.00X, 2.00X,5.00X,10.00X,20.00X,50.00X, 100.00X,200.00X,500.00X,1.00kX,2.00kX, 5.00kX,10.00kX,20.00kX, 50.00kX
	Custom	1.00μX - 1.00MX
Maximum Input Voltage	1MΩ: ≤300 Vrms 50Ω: ≤5 Vrms	
Vertical Resolution	12 bits	
Vertical Sensitivity	500 μV/div～10 V/div [1]	
Displacement	±2 V (500μV/div – 50 mV/div) ±20 V (100 mV/div – 500 mV/div) ±200 V (1 V/div – 10 V/div)	
Analog bandwidth	ADS3102A/ADS3104A	100 MHz
	ADS3202A/ADS3204A	200 MHz
	ADS3352A/ADS3354A	350 MHz
	ADS3502A/ADS3504A	500 MHz
Single bandwidth	Full bandwidth	
Low Frequency (AC coupling, -3dB)	≥10 Hz (at BNC)	

Rising Time(at BNC, typical)	ADS3102A/ADS3104A	≤3.5 ns
	ADS3202A/ADS3204A	≤1.75 ns
	ADS3352A/ADS3354A	≤1 ns
	ADS3502A/ADS3504A	≤0.7 ns
DC Gain Accuracy	≤1 mV	3%
	2 mV	2%
	≥5 mV	1.5%
DC accuracy (average)	Delta Volts between any two averages of ≥16 waveforms acquired with the same scope setup and ambient conditions (△V): ±(3% rdg + 0.05 div)	
Channel–channel isolation	50 Hz: 100:1 10 MHz: 40:1	
Time delay between channel(typical)	150 ps	
Waveform inverted	Support	
Bandwidth limit	20 MHz, full bandwidth	

Description:

[1] : 500 μV/div is a digital magnification of 1mV/div.

Horizontal System

Analog Channel

Characteristics	Instruction
Scanning speed (s/div)	500 ps/div - 1000s/div, step by 1-2-5
Time base accuracy	±1 ppm (typical value, ambient temperature: +25℃)
Time interval (△T) measurement accuracy(DC ～ 100MHz)	Single: ±(1 interval time+|time base accuracy|×reading+0.6 ns) Average>16: ±(1 interval time +|time base accuracy|×reading+0.4 ns)
Sampling rate range	0.05 Sa/s～2.5 GSa/s
Maximum Storage Depth	100M

Acquire System

Characteristics	Instruction		
Acquire mode	Sample, Peak, High Res, Average, Segmentation		
Maximum	ADS3102A	Dual Channel	1.25 GSa/s

real-time acquire rate	ADS3202A ADS3352A ADS3502A	Single Channel	2.5 GSa/s
	ADS3104A ADS3204A ADS3354A ADS3504A	Four Channel, Dual Channel[1]	1.25 GSa/s
		Dual Channel[2]	2.5 GSa/s
		Single Channel	2.5 GSa/s
Waveform capture rate	Max. 50,000 wfms/s		
Record length	1k,10k,100k,1M,10M,100M		
	Note: The record length is dynamic, changing with the acquire mode		
Interpolation	Auto, Sinx/x, x		

Description:

[1] : Limited to four-channel models, the maximum real-time sampling rate of dual channels must be one of the following conditions: CH1 and CH2 are both on, or CH3 and CH4 are both on.

[2]: Limited to four-channel models, the maximum real-time sampling rate of two channels should meet one of the following conditions: only one channel of CH1 and CH2 can be turned on, and only one channel of CH3 and CH4 can be turned on.

Trigger

Trigger System

Characteristics	Instruction	
Trigger source	CH1, CH2, CH3, CH4, EXT TRIG, AC Lines	
Trigger mode	Auto, Normal, Single	
Trigger type	Edge trigger, Video trigger, Pulse trigger, Slope trigger, Runt trigger, Windows trigger, Timeout trigger, Nth trigger, Logic trigger, RS232/UART trigger, I2C trigger, SPI trigger, CAN trigger, LIN trigger	
50% level setting (typical)	Input signal frequency ≥ 50 Hz	
Holdoff range	100 ns to 10s	
Trigger sensitivity	0.3 div ~ 10 div	
Trigger offset range	Internal	±5 divs from the center of the screen
	EXT	±2V
	EXT/5	±10V

Trigger Type

Characteristics	Instruction	
Edge Trigger	Couple	DC, AC, HF
	Slope	Rising, Falling
Video Trigger	Modulation	Support standard NTSC, PAL and SECAM broadcast systems
	Line number range	1-525 (NTSC) and 1-625 (PAL/SECAM)
Pulse Trigger	Trigger condition	Positive pulse: ＞, ＜, ＝ Negative pulse: ＞, ＜, ＝
	Pulse Width range	30 ns to 10 s
Slope Trigger	Trigger condition	Positive pulse: ＞, ＜, ＝ Negative pulse: ＞, ＜, ＝
	Time setting	30 ns to 10 s
Runt Trigger	Trigger condition	Positive pulse: ＞, ＜, ＝ Negative pulse: ＞, ＜, ＝
	Time setting	30 ns to 10 s
Windows Trigger	Trigger condition	Positive pulse: superamplitude entry, superamplitude exit, and superamplitude time Negative pulse: superamplitude entry, superamplitude exit, and superamplitude time
	Time setting	30 ns ~ 10 s
Timeout Trigger	Slope	Rising, Falling
	Idle Time	30 ns ~ 10 s
The Nth Edge Trigger	Slope	Rising, Falling
	Idle Time	30 ns ~ 10 s
	Edge Number	1 ~ 128
Logic trigger	Logic Mode	AND, OR, XOR,XNOR
	Input Mode	H, L, X, Rising, Falling
	Output Mode	Goes True, Goes False, Is True >, Is True <, Is True =
RS232/UART Trigger	Polarity	Normal, Inverted
	Trigger Condition	Start, Error, Chk Error, Data
	Baud Rate	Common, Custom
	Data Bits	5 bits, 6 bits, 7 bits, 8 bits
I2C Trigger	Trigger Condition	Start, Restart, Stop, Ack Lost, Addr, Data, Addr/Data
	Address Range /Byte Length	7 bits---->0 to 127 8 bits---->0 to 255 10 bits--->0 to 1023
	ByteLength	1 to 5
SPI Trigger	Trigger Condition	Timeout

	Timeout value	30 ns to 10s
	Data Bits	4 bits to 32 bits
	Edge	Rising, Falling
CAN Trigger	Signal Type	CAN_H, CAN_L, TX, RX, DIFF
	Trigger Condition	Start, Type, Data, ID, ID/Data, End, Lost, Error
	Baud Rate	Common, Custom
	Sample Point	0.5% to 95%
	Frame Type	Data, Remote, Error, Overload
LIN Trigger	Condition	Break, ID, ID/Data, Data Error
	Baud Rate	Common, Custom

Waveform

Waveform Measurement

Characteristics	Instruction	
Cursor Measurement	△V, △T, △T&△V between cursors, auto cursor, support XY/FFT/ZOOM window, based on screen percentage	
	Number	2 pairs of XY cursors
	Manual mode	△V, △T
	Tracing mode	The voltage value and time value of the X waveform point are tracked by fixing the Y axis The fixed X-axis tracks the voltage value and time value of the Y waveform point
	Auto measurement cursor	Allows the cursor to be displayed during automatic measurements
	XY Mode	The voltage parameters of the corresponding channel waveforms were measured in XY timebase mode X= Channel 1, Y= Channel 2
Auto measurement	Number	43 automatic measurements with up to 8 measurements displayed simultaneously
	Measurement source	CH1 - CH4
	Measurement area	Primary time base, extended time base, cursor area
	Horizontal	Period, + Width, Rise Time, +Duty, Frequency, - Width, Fall Time, -Duty and ScrDuty
	Vertical	Vavg, Vpp, Vamp, StdDev, Vmax, Vtop, VRMS, Overshoot, Vmin, Vbase, CycRms and Preshoot

	Blend	+PulseCnt, -PulseCnt, RiseCnt, FallCnt, Area and CycArea
	Channel	Delay(1 ⏚ -2 ⏚), Delay(1 ⏚ -2 ⏚), Delay(1 ⏚ -2 ⏚), Delay(1 ⏚ -2 ⏚), Phase(1 ⏚ -2 ⏚), Phase(1 ⏚ -2 ⏚), Phase(1 ⏚ -2 ⏚), Phase(1 ⏚ -2 ⏚), FRR(1⏚-2⏚), FRF(1⏚-2⏚), FFR(1⏚-2⏚), FFF(1⏚-2⏚), LRR(1⏚-2⏚), LRF(1⏚-2⏚), LFR(1⏚-2⏚) and LFF(1⏚-2⏚)
Mathematical operation	+, -, * ,/ ,&& ,||, ^, ！(, Tan(, Intg(, Diff(, Sqrt(, Lg(, Ln(, Exp(, Abs(, Sine(, CoSin(, User Defined Function, digital filter (low pass, high pass, band pass, band reject), FFT(Vrms, dBVrms, Radians, Degrees)	

Waveform Analysis

Characteristics	Instruction	
Pass Fail	The signal under test is compared with a user-defined rule (template), providing the number of passes, failures, and the total number of tests. Pass/fail events can trigger immediate stop, buzzer, and screenshot.	
	Source	CH1 - CH4
	Type	Horizontal, vertical and other measurement items
	Measurement	Data statistics: Pass, Fail and the total number
	Acquire mode	All modes are supported except Zoom, XY, FFT and scroll
Color Grade	Provide three view of waveform intensity, color temperature level >16, 256 color scale display	
	Source	CH1 - CH4
	Waveform brightness	brightness
	Acquire mode	Only basic waveforms are supported

Decode

Characteristics	Instruction
Decode Number	2, Both protocol types can be decoded and switched simultaneously
Decode Type	RS232/UART, I2C, SPI, LIN, CAN
RS232/UART	Decode RS232/UART bus TX/RX signals at speeds up to 10 Mb/s (5 to 8 bits), supporting parity bit (odd parity, even parity, or no parity) and stop bit (1 to 2 bits) configuration. Source Channel: CH1~CH4
I2C	Decode the I2C bus addresses (including or excluding

	the read/write bit), data, and ACK. Source Channel: CH1~CH4
SPI	Decode SPI bus MISO/MOSI data (4 to 32 bits). The mode supports timeout and chip select (CS). Source Channel: CH1~CH4
CAN	Decode remote frames of the CAN bus at speeds up to 1 Mb/s (ID, byte count, CRC), as well as overload frames and data frames (standard/extended ID, control field, data field, CRC, ACK). Supported CAN bus signal types include CAN_H, CAN_L, TX, RX, DIFF. Source Channel: CH1~CH4
LIN	Decode LIN bus versions 1.X or 2.X, with speeds up to 10 kb/s. Decode and display synchronization, identifier, data, and checksum. Source Channel: CH1~CH4

Bode Plot

Characteristics	Instruction
Start frequency	10 Hz ~ 25 MHz
End frequency	10 Hz ~ 25 MHz
Points/Decade	10 ~ 100
Amplitude	2mV ~ 6V

AFG

Characteristics	Instruction	
Channel	2	
Sample Rate	160 MSa/s	
Vertical Resolution	14 bits	
Maximum frequency	50 MHz	
Waveform	Standard waveforms	Sine wave, square wave, ramp wave, pulse wave, noise
	Arbitrary waveforms	Butterworth, X^2 and EOG etc 28 built-in waveforms
Frequency Feature		
Sine wave	1 μHz to 50 MHz	
Square wave	1 μHz to 20 MHz	
Ramp wave	1 μHz to 1 MHz	
Pulse wave	1 μHz to 10 MHz	
Noise wave(-3 dB)	20 MHz (Gaussian white noise)	
Arbitrary wave(except DC)	1 μHz to 10 MHz	
Frequency resolution	1 μHz or 9 significant figures	

Frequency stability		±25 ppm, 0 to 40℃
Frequency aging rate		±25 ppm per year
Amplitude characteristic		
Output amplitude	High Z	2 mVpp to 10 Vpp (≤10 MHz) 2 mVpp to 5 Vpp (≤50 MHz)
	50Ω	1 mVpp to 5 Vpp (≤10 MHz) 1 mVpp to 2.5 Vpp (≤50 MHz)
Amplitude accuracy		±(1% of setting + 1 mVpp) (typical 1kHz sine,0V offset)
Amplitude resolution		1mVpp or 5 bits
DC offset range (AC+DC)	High Z	±5 Vpk - Amplitude Vpp/2 (≤10 MHz) ±2.5 Vpk - Amplitude Vpp/2 (≤50 MHz)
	50Ω	±2.5 Vpk - Amplitude Vpp/2 (≤10 MHz) ±1.25 Vpk - Amplitude Vpp/2 (≤50 MHz)
DC offset accuracy		±(1 % of |setting|+ 1 mV + amplitude Vpp * 0.5%)
Offset resolution		1 mVpp
Output Impedance		50Ω (typical)
Waveforms characteristic		
Sine		
Bandwidth flatness(1Vpp,relative 1kHz,50Ω)		≤10 MHz: ±0.3 dB ≤50 MHz: ±0.5 dB
Harmonic distortion		Typical value (0dBm) DC to 1 MHz: <-65 dBc 1 MHz to 50 MHz: <-50 dBc
Total harmonic distortion		<0.2%, 10Hz to 20kHz, 1Vpp
Non-harmonic distortion		Typical value(0dBm) ≤10 MHz: <70 dBc >10 MHz: <70 dBc + 6 c/sound interval
Phase noise		Typical value(0dBm,10kHz offset) 10MHz: ≤-110dBc/Hz
Square		
Rising falling time		<15 ns
Jitter		200 ps +25 ppm
Overshoot		<5%
Ramp		
Linearity		<the 1% of maximum output (typical value 1 kHz,1 Vpp, symmetry50%)
Symmetry		0% to 100%
Pulse		
Period		100 ns to 1Ms

Pulsewidth	≥64 ns
Overshoot	<5%
Jitter	200 ps +25 ppm
Noise	
Type	Gaussian white noise
Bandwidth (-3dB)	20 MHz
Arbitrary	
Bandwidth	10 MHz
Waveforms length	2 to 16384 points
Sample rate	160 MSa/s
Amplitude accuracy	14 bits
Modulation characteristic	
Modulate type	AM, FM, PM, FSK
AM	
Carrier	Sine, Square, Ramp, Arb(Except DC)
Internal modulation waveform	Sine, Square, Ramp, Noise
Internal amplitude modulation frequency	2 mHz to 20 kHz
Depth	0% to 100%
FM	
Carrier	Sine, Square, Ramp, Arb(Except DC)
Internal modulation waveform	Sine, Square, Ramp, Noise
Internal modulation frequency	2 mHz to 20 kHz
Frequency offset	2 mHz to min (Carrier frequency setting: take the smaller value between the set carrier frequency and the maximum carrier frequency.)
PM	
Carrier	Sine, Square, Ramp, Arb(Except DC)
Internal modulation waveform	Sine, Square, Ramp, Noise
Internal phase modulation frequency	2 mHz to 20 kHz
Phase deviation range	0° to 180°
FSK	

Carrier	Sine, Square, Ramp, Arb(Except DC)
FSK rate	2 mHz to 100kHz
FSK hopfreq	1 μHz to Maximum frequency of corresponding carrier
Sweep	
Carrier	Sine, Square, Ramp, Arb(Except DC)
Min/Max start frequent	1μHz(minimum)/Maximum frequency of corresponding carrier
Max/Min stop frequent	1μHz(minimum)/Maximum frequency of corresponding carrier
Type	Linear, Log
Sweep time	1 ms to 500 s ± 0.1%
Trigger source	Internal, Manual
Burst	
Waveforms	Sine, Square, Ramp, Pulse and Arb(Except DC)
Carrier frequency	1μHz to Maximum frequency of corresponding carrier /2
Trigger source	Manual, Internal
N-cycle trigger cycle	1 us to 500s
N periodicity	1 to 60000 (Max =Burst Period / Period)/infinite
Voltage range and sensitivity(No modulation source)	
Input resistance	1M Ω

Counter

Characteristics	Instruction
Source	CH1, CH2, CH3, CH4, Follow trigger
Measurement type	Frequency, period
Statistic parameter	Type, Max, Min, Avg
Maximum frequency	Maximum analog bandwidth
Resolution	6 bits

DVM

Characteristics	Instruction
Source	CH1, CH2, CH3, CH4
Function	AC RMS, DC, AC+DC RMS
Resolution	4 bits
Limit warnings	Support upper and lower limit setting, over-limit condition setting, over-limit prompt

Command

Characteristics	Instruction
Common support	Supports the standard SCPI command set
Error message Definition	Error Message
Support status reporting mechanism	Status Reporting
Support for synchronization mechanisms	Synchronization

General Technical Specification

Display

Characteristic	Instruction
Display Type	10.1 inch Colored LCD (Liquid Crystal Display)
Display Resolution	1024 (Horizontal) × 600 (Vertical) Pixels
Display Colors	24 colors, TFT
Grid	18 horizontal cells * 10 vertical cells
Afterglow	Off, infinity, adjustable time (1 second, 2 seconds, 5 seconds)
Brightness level	256 levels

Processor system

Characteristic	Instruction
System memory	2GB RAM
Operating	Android
Internal non-volatile	8GB

Output of the Probe Compensator

Characteristics	Instruction
Output voltage(typical)	About 3.3 V, with the Peak-to-Peak voltage ≥1MΩ
Frequency(typical)	1 kHz Square

Others

Characteristics	Instruction
Communication Interface	HDMI; USB device *1, USB Host *1 ; Trig Out(P/F); LAN interface
Power Supply	Type-C power supply interface[1]; DC:12V 4A
Power Consumption	Without generator: <35W With generator: <50W
Fuse	2A, T Level, 250 V
Touch Screen	Multi-touch Capacitive screen

Description:

[1]: Without generator:the adapter is required to support a handshake protocol of 12V/≥3A;With generator: the adapter is required to support a handshake protocol of 12V/≥4A.

Environment

Characteristics	Instruction
Temperature	Working temperature: 0℃ ～ 40℃ Storage temperature: -20℃ ～ +60℃
Relative humanity	≤90%
Height	Operating: 3,000 m Non-operating: 15,000 m
Cooling Method	Fan cooling

Mechanical Specifications

Characteristics	Instruction
Dimension	260 mm(L)*160 mm(H)*78 mm(W)
Weight	Approx. 3.2kg

Interval Period of Adjustment:

One year is recommended for the calibration interval period.

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