

Product Dimensions: Weight: 2.4 kg
 Width×Height×Depth = 303mm×154mm×133mm

Applications

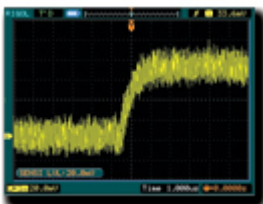
1. Design and Debug 2. Manufacturing 3. Education & Training 4 . Service & Maintenance

Model	DS1102E	DS1052E	DS1102D	DS1052D
Bandwidth	100 MHz	50 MHz	100 MHz	50 MHz
Logic Analyze	x		√	

Advanced Features

1. A true mixed signal oscilloscope with 16 channel Logic Analyzer (DS1000D)
2. 1 GSa/s maximum Real-time Sample Rate and 1 Mpts of memory depth
3. Bandwidth options: 50MHz and 100MHz
4. Extensive set of trigger modes including: Edge, Video, Pulse Width, Slope, Alternate
5. 64 k TFT Color LCD, bright and vivid waveform display
6. Direct print to PictBridge compatible printers via USB Device interface
7. Compact design to save your desktop space

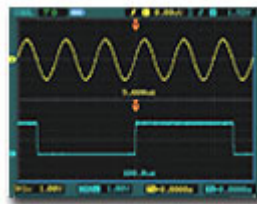
Advanced Performance



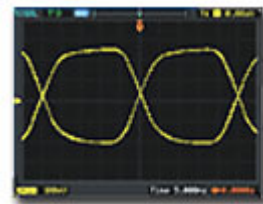
Adjustable Trigger Sensitivity
 The ability to filter noise from the signal avoids false triggers



Slope Trigger
 Triggers on the signals rise time or fall time is user defined

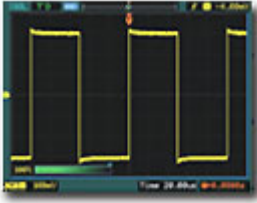


Alternate Trigger
 Provides a true dual timebase display



Rising and Falling Edge Trigger
 Mainly used to view eye-diagrams normally only available in more advanced DSO's

Easy To Use Features



Waveform Intensity
Adjustable waveform intensity provides a personalized waveform display.



Built-in Help System
Press current key for 3 seconds to enter help system



File System
Easy-to-use file system allows for both USB flash drive and local file storage

Logic Analyzer Module

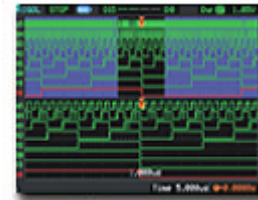
Mixed Signal Oscilloscope (MSO) with 16 channels Logic Analyzer (LA). LA is divided into two groups: D7-D0, D15-D8. Each works separately.



Logic Analyzer Module



Pattern Trigger
The trigger condition is a combination of the level of the signal and the edge



Duration Trigger
A combination of Pattern Trigger and Pulse Width Trigger capabilities make isolation of events

Standard Accessories



Power Cord



Probe x 2



CD-ROM (Include USER Manual and Ultrascope Software)

Optional Accessories



USB-GPIB Adapter



RS-232 Cable



Instrument Bag

Optional Accessories



Logic Analyzer Module



Logic Analyzer Clips



Data Connection Cable

Performance Characteristics

Model	DS1102E		DS1052E	
	DS1102D		DS1052D	
Bandwidth	100 MHz		50 MHz	
Channels	Dual Channels + External Trigger			
Real-time Sample Rate	1 GSa/s (Single Channel) , 500 MSa/s (Dual Channels)			
Equivalent-time Sample Rate	25GSa/s		10GSa/s	
Rise Time	3.5ns		7ns	
Memory Depth	Channel Mode	Sample Rate	Normal Memory	Long Memory
	Single Channel	1GSa/s	16 kpts	N.A.
	Single Channel	500MSa/s or lower	16 kpts	1Mpts
	Dual Channels	500MSa/s or lower	8 kpts	512 kpts
Timebase Range	2 ns/div ~50s/div		5 ns/div ~50s/div	
Trigger Modes	Edge, Video, Pulse Width, Slope, Alternate			
Vertical Resolution	8 bits			
Vertical Sensitivity	2 mV/div ~10V/div			
Maximum Input Voltage	All inputs 1M Ω 15pF 300V RMS CAT I			
Input Coupling	DC,AC,GND			
Roll Range	500ms/div ~50s/div			
Cursor Measurements	Manual,Track and Auto Measure modes			
Math	+, -, \times , FFT			
Internal Strobe	10 Waveforms and 10 Setups			
USB Storage	BMP, CSV, Waveforms and Setups			
Connectivity	USB Device, USB Host, RS-232, P/F Out			
Display	5.6" TFT (64 k, Color LCD), 320 \times 234 resolution			
Power Supply	AC:100 ~ 240 VACRMS, 45 ~ 440 Hz, CAT II, 50 VA Max			

Specifications

Acquisition			
Sampling Modes	Real-Time	Equivalent	
Sampling Rate	1GSa/s, 200MSa/s ^[1]	DS1102X	DS1052X
		25GSa/s	10GSa/s
Averages	N time acquisitions, all channels simultaneously, N is selectable from 2, 4, 8, 16, 32, 64, 128 and 256.		

Inputs	
Input Coupling	DC, AC, GND
Input Impedance	1MΩ±2%, in parallel with 15pF±3pF
Probe Attenuation Factors	1X, 5X, 10X, 50X, 100X, 500X, 1000X
Maximum Input Voltage	400V (DC+AC Peak, 1MΩ input impedance)
	40V (DC+AC Peak) ^[1]
Time delay between channel (typical)	500ps

Horizontal				
Sample Rate Range	Real-Time: 13.65Sa/s-1GSa/s			
	Equivalent: 13.65Sa/s-25GSa/s			
Waveform interpolation	Sin(x)/x			
Record Length	Channel Mode	Sample rate	Record Length (normal)	Record Length (long record)
	Single channel	1GSa/s	16Kpts	N.A.
	Single channel	500MSa/s Or lower	16 Kpts	1Mpts
	Double channel	500MSa/s Or lower	8 Kpts	512Kpts
Scan speed Range (Sec/div)	2ns/div~50s/div, DS1102X 5ns/div~50s/div, DS1052X 1-2-5 Sequence			
Sample Rate and Delay Time	±50ppm (over any 1ms time interval)			

Accuracy	
Delta Time Measurement Accuracy (Full Bandwidth)	Single-shot: $\pm(1 \text{ sample interval} + 50\text{ppm} \times \text{reading} + 0.6 \text{ ns})$ >16 averages: $\pm(1\text{sample interval} + 50\text{ppm} \times \text{reading} + 0.4 \text{ ns})$

Vertical	
A/D converter	8-bit resolution, each channel samples simultaneously ^[2]
Volts/div Range	2mV/div~10V/div at input BNC
Maximum Input	Analog channel maximum input voltage CAT I 300Vrms, 1000Vpk; instantaneous voltage 1000Vpk CAT II 100Vrms, 1000Vpk RP2200 10:1: CAT II 300Vrms RP3200 10:1: CAT II 300Vrms RP3300 10:1: CAT II 300Vrms
Offset Range	$\pm 40\text{V}(200\text{mV}-10\text{V}), \pm 2\text{V}(2\text{mV}-100\text{mV})$
Analog Bandwidth	100MHz (DS1102D, DS1102E) 50MHz (DS1052D, DS1052E)
Single-shot Bandwidth	80MHz (DS1102D, DS1102E) 50MHz (DS1052D, DS1052E)
Selectable Analog Bandwidth Limit (typical)	20MHz
Lower Frequency Limit (AC -3dB)	$\leq 5\text{Hz}$ (at input BNC)
Rise Time at BNC, typical	<3.5ns, <7ns, On (100M, 50M) respectively
DC Gain Accuracy	2mV/div-5mV/div: $\pm 4\%$ (Sample or Average acquisition mode) 10mV/div-10V/div: $\pm 3\%$ (Sample or Average acquisition mode)
DC Measurement Accuracy, Average Acquisition Mode	Average of ≥ 16 Waveforms with vertical position at zero: $\pm(\text{DC Gain Accuracy} \times \text{reading} + 0.1\text{div} + 1\text{mV})$ Average of ≥ 16 Waveforms with vertical position not at zero: $\pm[\text{DC Gain Accuracy} \times (\text{reading} + \text{vertical position}) + (1\% \text{ of vertical position}) + 0.2\text{div}]$ Add 2mV for settings from 2mV/div to 200 mV/div

RIGOL

	Add 50mV for settings from >200mV/div to 10V/div
Delta Volts Measurement Accuracy (Average Acquisition Mode)	Delta Volts between any two averages of 16 waveforms acquired under same setup and ambient conditions: $\pm(\text{DC Gain Accuracy} \times \text{reading} + 0.05 \text{ div})$

Trigger		
Trigger Sensitivity	0.1div~1.0div (adjustable)	
Trigger Level Range	Internal	± 5 divisions from center of screen
	EXT	$\pm 1.2\text{V}$
Trigger Level Accuracy (typical) applicable for the signal of rising and falling time $\geq 20\text{ns}$	Internal	$\pm(0.3\text{div} \times \text{V/div})(\pm 4 \text{ divisions from center of screen})$
	EXT	$\pm(6\% \text{ of setting} + 200 \text{ mV})$
Trigger Offset	Normal mode: pre-trigger (262144/ sampling rate), delayed trigger 1s	
	Slow Scan mode: pre-trigger 6div, delayed trigger 6div	
Trigger Holdoff range	100ns~1.5s	
Set Level to 50% (Typical)	Input signal frequency $\geq 50\text{Hz}$	
Edge Trigger		
Edge trigger slope	Rising, Falling, Rising + Falling	
Pulse Trigger		
Trigger condition	$(>, <, =)$ Positive pulse, $(>, <, =)$ negative pulse	
Pulse Width range	20ns ~10s	
Video Trigger		
Video standard & line frequency	Support standard NTSC, PAL and SECAM broadcast systems. Line number range: 1~525 (NTSC) and 1~625 (PAL/SECAM)	
Slope Trigger		
Trigger condition	$(>, <, =)$ Positive slope, $(>, <, =)$ negative slope	
Time setting	20ns~10s	
Alternate Trigger		
Trigger on CH1	Edge, Pulse, Video, Slope	
Trigger on CH2	Edge, Pulse, Video, Slope	
Pattern Trigger ^[1]		

Trigger mode	D0~D15 select H, L, X, \neq , \neq
Duration Trigger ^[1]	
Trigger Type	D0~D15 select H, L, X
Qualifier	>, <, =
Time setup	20ns~10s

Measurements		
Cursor	Manual	Voltage difference between cursors (ΔV) Time difference between cursors (ΔT) Reciprocal of ΔT in Hertz ($1/\Delta T$)
	Track	Voltage value for Y-axis waveform Time value for X-axis waveform
	Auto	Cursors are visible for Automatic Measurement
Auto Measure	Vpp, Vamp, Vmax, Vmin, Vtop, Vbase, Vavg, Vrms, Overshoot, Preshoot, Freq, Period, Rise Time, Fall Time, +Width, -Width, +Duty, -Duty, Delay1→2 \neq , Delay1→2 \neq	

[1] For DS1000D Series;

[2] When sampling is 1GSa/s, only single channel can be used.

General Specifications

Display	
Display Type	5.7 in. (145 mm) diagonal TFT Liquid Crystal Display
Display Resolution	320 horizontal ×RGB×234 vertical pixels
Display Color	64K color
Display Contrast (typical)	150:1
Backlight Brightness(typical)	300 nit

Probe Compensator Output	
Output Voltage(typical)	Amplitude ~3Vp-p
Frequency(typical)	1kHz

Power	
Supply Voltage	100 ~ 240 VAC _{RMS} , 45~440Hz, CAT II
Power Consumption	Less than 50W
Fuse	2A, T rating, 250 V

Environmental	
Ambient Temperature	Operating 10°C ~ 40°C
	Non-operating -20°C ~ +60°C
Cooling Method	Fan force air flow
Humidity	+35°C or below: ≤90% relative humidity
	+35°C ~ +40°C: ≤60% relative humidity
Altitude	Operating 3,000 m or below
	Non-operating 15,000 m or below

Mechanical		
Size	Width	303mm
	Height	154mm
	Depth	133 mm
Heavy	Without package	2.4 kg
	Packaged	3.8 kg

IP Degree

IP2X

Calibration Interval

The recommended calibration interval is one year
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