

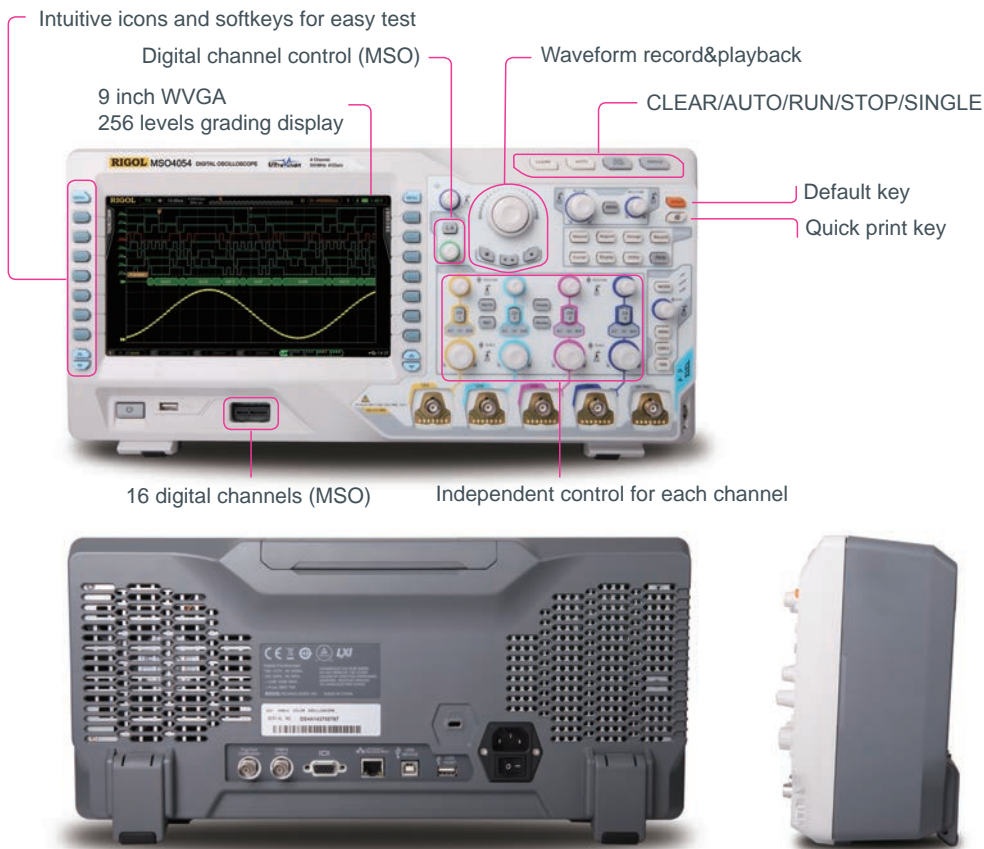


## MSO/DS4000 Series Digital Oscilloscope

- Bandwidth: 500 MHz, 350 MHz, 200 MHz, 100 MHz
- Real-time Sample Rate: analog channel up to 4 GSa/s, digital channel up to 1 GSa/s (MSO)
- Standard Memory Depth: analog channel up to 140 Mpts, digital channel up to 28 Mpts (MSO)
- 2 or 4 analog channels, 16 digital channels (MSO)
- Waveform capture rate up to 110,000 waveforms per second
- Hardware real-time waveform record, playback and analysis functions (standard up to 200,000 frames)
- Lower noise floor, the minimum vertical sensitivity is 1mV/div
- Innovative "UltraVision" technology
- A variety of trigger and bus decoding functions (both analog and digital channels)
- Supports bandwidth update for 200 MHz and 350 MHz bandwidth models
- Complete Connectivity: USB HOST&DEVICE, LAN (LXI-C), VGA, AUX, USB-GPIB (optional)
- 9 inch WVGA (800×480), 256 level intensity grading display

MSO/DS4000 series is the new mainstream digital scope to meet the customer's applications with its innovative technology. MSO4000 has 2+16 or 4+16 channels, target for the embedded design and test market with its industry leading specifications, powerful trigger functions and broad analysis capabilities.

# MSO/DS4000 Series Digital Oscilloscope



Product Dimensions: WidthxHeightxDepth = 440.0 mmx218.0 mmx130.0 mm  
Weight: 4.8 kg±0.2 kg (Without Package)

## ► Innovative UltraVision Technology (Analog Channel)



- Deeper memory depth (standard 140 Mpts)
- Higher waveform capture rate (up to 110,000 wfms/s)
- Real-time waveform record, playback and analysis (up to 200,000 frames)
- Multi-level intensity grading display (up to 256 levels)

## ► Models and Key Specifications

| Model Number  | DS4054  | DS4052  | DS4034  | DS4032  | DS4024  | DS4022  | DS4014  | DS4012  |
|---|---|---------|---------|---------|---------|---------|---------|---------|
|   | MSO4054   | MSO4052 | MSO4034 | MSO4032 | MSO4024 | MSO4022 | MSO4014 | MSO4012 |
| Analog BW   | 500 MHz   |         | 350 MHz |         | 200 MHz |         | 100 MHz |         |
| Number of Analog Channels   | 4   | 2       | 4       | 2       | 4       | 2       | 4       | 2       |
| Number of Digital Channels (MSO)                                    | 16  |         |         |         |         |         |         |         |
| Max. Real-time Sample Rate  | Analog channel: 4 GSa/s (interleaved), 2 GSa/s (non-interleaved)<br>Digital channel: 1 GSa/s per channel  |         |         |         |         |         |         |         |
| Max. Memory Depth   | Analog channel: 140 Mpts (interleaved), 70 Mpts (non-interleaved)<br>Digital channel: 28 Mpts per channel |         |         |         |         |         |         |         |
| Max. Waveform Capture Rate  | 110,000 wfms/s (digital channels turned off), 85,000 wfms/s (digital channel turned on)                   |         |         |         |         |         |         |         |
| Hardware Real-time Waveform Record, Playback and Analysis Functions | Analog channel: up to 200,000 frames (standard)<br>Digital channel: up to 64,000 frames (standard)        |         |         |         |         |         |         |         |
| Standard Probes   | 2 or 4 sets RP3500A 500 MHz BW Passive Probe; 1 set RPL2316 LA Probe (MSO only)                           |         |         |         |         |         |         |         |

## ► Features and Benefits

UltraVision: up to 110,000 wfms/s waveform capture rate



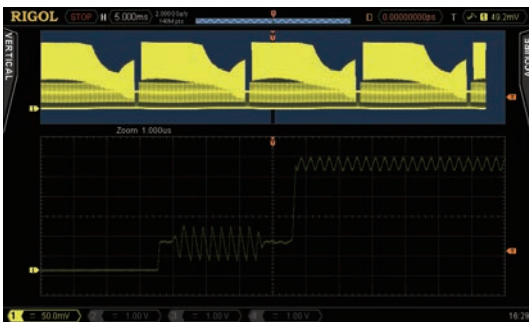
Find the infrequent problem easily

UltraVision: real-time waveform record, playback and analysis functions (standard)



- Up to 200,000 frames could be recorded
- “WaveFinder”-dedicated data search knob
- Play back and analyze the recorded waveforms

UltraVision: deeper memory with up to 256-level intensity grading display



Provide the capability to see both the panorama and detail simultaneously

Advanced math function (user defined)

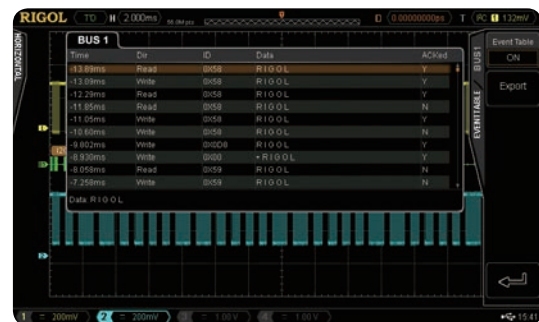


Serial bus triggering and decoding (supports both analog and digital channels)

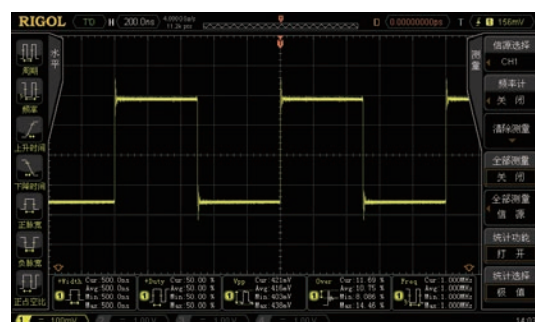
Mask test functions



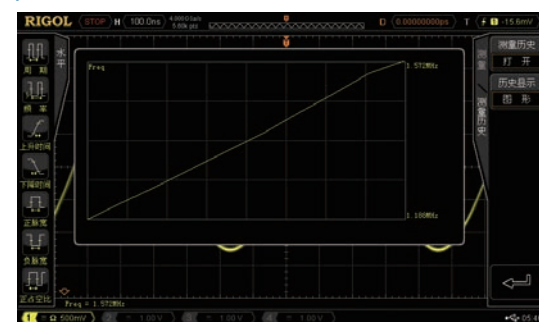
User defined mask, Pass/Fail counts, stop on fail, fail alarm



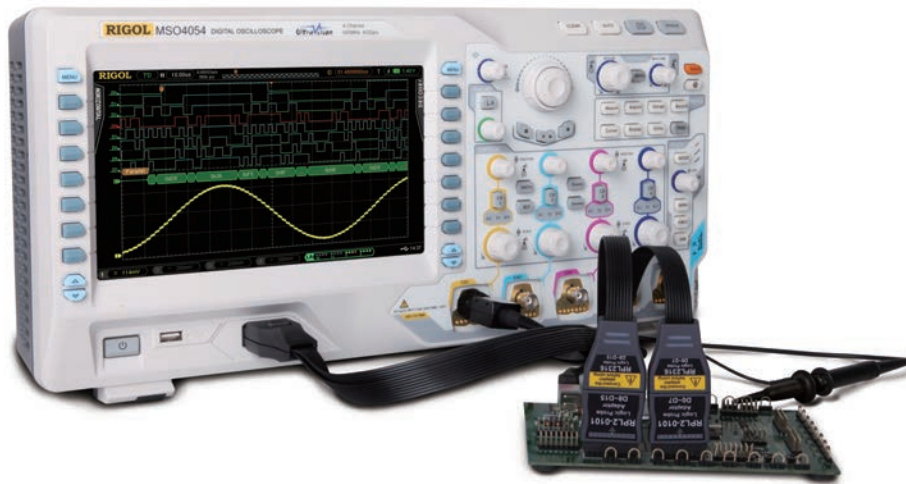
Automatic measurements with statistics



Measurement history: show the trend of the parameters



## ► MSO4000 Series Mixed Signal Oscilloscope



Besides the powerful functions of DS4000, you could get more from MSO4000 with:

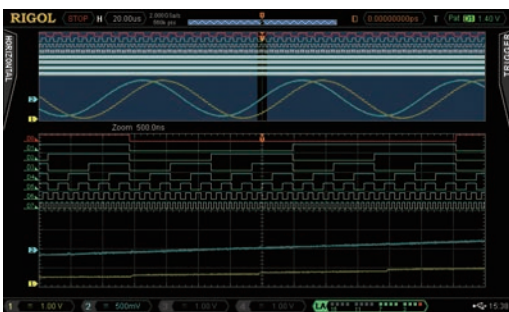
- 16 digital channels
- Sample rate of digital channel up to 1 GSa/s
- Memory depth of digital channel up to 28 Mpts per channel
- Waveform capture rate of digital channel up to 85,000 wfms/s
- Hardware real-time waveform record and playback functions, up to 64,000 frames can be recorded
- Triggering and decoding across analog and digital channels
- Easy to be grouped for digital channels
- Supports a variety of logic levels
- Time correlated display for both analog and digital channel waveforms

Innovative UltraVision Technology (Digital Channel)

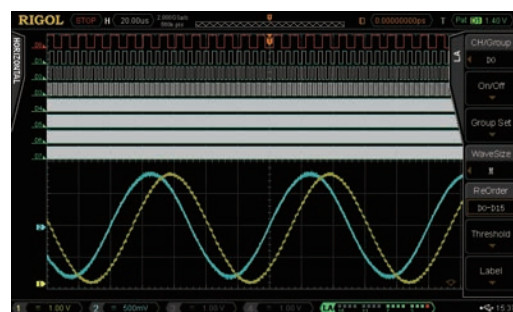
*UltraVision*

- Deeper memory depth (standard 28 Mpts per channel)
- Higher waveform capture rate (up to 85,000 wfms/s)
- Real-time waveform record and playback functions (up to 64,000 frames)
- Multi-level intensity grading display

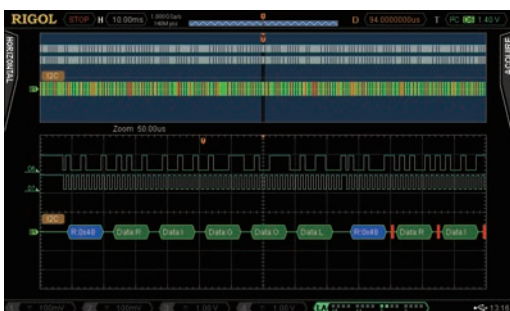
Mixed signal analysis with analog and digital channels



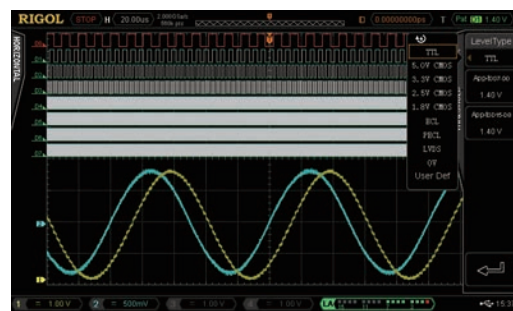
Easy to be grouped and labeled for digital channels



Deeper memory depth for the digital channels, serial bus triggering and decoding on digital channels












Supports a variety of logic levels













# RIGOL Probes Supported by MSO/DS4000 Series

## ► RIGOL Passive Probes

| Model Number   | Type                 | Description  |
|--|----------------------|--|
| <br>RP2200    | High Z Probe         | 1X: DC to 7 MHz<br>10X: DC to 150 MHz<br>Compatibility: all <b>RIGOL</b> scopes.   |
| <br>RP3300A   | High Z Probe         | 10X: DC to 350 MHz<br>Compatibility: all <b>RIGOL</b> scopes.  |
| <br>RP3500A   | High Z Probe         | DC to 500 MHz<br>Compatibility: all <b>RIGOL</b> scopes.   |
| <br>RP5600A  | High Z Probe         | DC to 600 MHz<br>Compatibility: MSO/DS4000 series and DS6000 series.   |
| <br>RP6150A | Low Z Probe          | DC to 1.5 GHz<br>Compatibility: MSO/DS4000 series and DS6000 series.   |
| <br>RP1300H | High Voltage Probe   | DC to 300 MHz<br>CAT I 2000 V (DC+AC),<br>CAT II 1500 V (DC+AC)<br>Compatibility: all <b>RIGOL</b> scopes.                                 |
| <br>RP1010H | High Voltage Probe   | DC to 40 MHz<br>DC: 0 to 10 kV DC,<br>AC: pulse $\leq 20$ kVpp,<br>AC: sine wave $\leq 7$ kVrms<br>Compatibility: all <b>RIGOL</b> scopes. |
| <br>RP1018H | High Voltage Probe   | DC to 150 MHz<br>DC+AC Peak: 18 kV<br>AC RMS: 12 kV<br>Compatibility: all <b>RIGOL</b> scopes.   |
| <br>RPL2316 | Logic Analysis Probe | Logic analysis probe (for MSO4000 and MSO2000A)  |

## ► RIGOL Active&Current Probes

| Model Number  | Type                             | Description  |
|---|----------------------------------|--|
| <br>RP7150    | Differential /Single Ended Probe | BW: DC to 1.5 GHz<br>30 V peak, CAT I<br>Compatibility: MSO/DS4000 series and DS6000 series.   |
| <br>RP1001C   | Current Probe                    | BW: DC to 300 kHz<br>Max. input<br>DC: $\pm 100$ A,<br>AC P-P: 200 A,<br>AC RMS: 70 A<br>Compatibility: all <b>RIGOL</b> scopes.   |
| <br>RP1002C   | Current Probe                    | BW: DC to 1 MHz<br>Max. input<br>DC: $\pm 70$ A,<br>AC P-P: 140 A,<br>AC RMS: 50 A<br>Compatibility: all <b>RIGOL</b> scopes.  |
| <br>RP1003C   | Current Probe                    | BW: DC to 50 MHz<br>Max. input<br>AC P-P: 50 A (noncontinuous),<br>AC RMS: 30 A<br>Compatibility: all <b>RIGOL</b> scopes.<br>Must order RP1000P power supply.                                       |
| <br>RP1004C | Current Probe                    | BW: DC to 100 MHz<br>Max. input<br>AC P-P: 50 A (noncontinuous),<br>AC RMS: 30 A<br>Compatibility: all <b>RIGOL</b> scopes.<br>Must order RP1000P power supply.                                      |
| <br>RP1005C | Current Probe                    | BW: DC to 10 MHz<br>Max. input<br>AC P-P: 300 A (noncontinuous), 500 A (@ pulse width $\leq 30$ us),<br>AC RMS: 150 A<br>Compatibility: all <b>RIGOL</b> scopes.<br>Must order RP1000P power supply. |
| <br>RP1000P  | Power Supply                     | Power supply for RP1003C, RP1004C and RP1005C, support 4 channels.   |
| <br>RP1025D | High Voltage Differential Probe  | BW: 25 MHz<br>Max. voltage $\leq 1400$ Vpp<br>Compatibility: all <b>RIGOL</b> scopes.  |
| <br>RP1050D | High Voltage Differential Probe  | BW: 50 MHz<br>Max. voltage $\leq 7000$ Vpp<br>Compatibility: all <b>RIGOL</b> scopes.  |
| <br>RP1100D | High Voltage Differential Probe  | BW: 100 MHz<br>Max. voltage $\leq 7000$ Vpp<br>Compatibility: all <b>RIGOL</b> scopes.   |

## ► Specifications

All the specifications are guaranteed except the parameters marked with "Typical" and the oscilloscope needs to operate for more than 30 minutes under the specified operation temperature.

### Sample

|                                |   |
|--------------------------------|---|
| Sample Mode                    | Real-time sample  |
| Real-time Sample Rate          | Analog channel: 4.0 GSa/s (interleaved); 2.0 GSa/s (non-interleaved)<br>Digital channel: 1.0 GSa/s  |
| Peak Detect                    | Analog channel: 250 ps (interleaved); 500 ps (non-interleaved)<br>Digital channel: 1 ns   |
| Averaging                      | After all the channels finish N samples at the same time, N can be 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096 or 8192.  |
| High Resolution                | 12 bit of resolution when $\geq 5 \mu\text{s}/\text{div}$ @ 4 GSa/s (or $\geq 10 \mu\text{s}/\text{div}$ @ 2 GSa/s).  |
| Minimum Detectable Pulse Width | Digital channel: 5 ns   |
| Memory Depth                   | Analog channel:<br>Interleaved: Auto, 14 kpts, 140 kpts, 1.4 Mpts, 14 Mpts and 140 Mpts are available<br>Non-interleaved: Auto, 7 kpts, 70 kpts, 700 kpts, 7 Mpts and 70 Mpts are available<br>Digital channel: maximum 28 Mpts |

### Input

|                                       |  |
|---------------------------------------|--|
| Number of Channels                    | MSO40X4: 4-analog-channel + 16-digital-channel<br>MSO40X2: 2-analog-channel + 16-digital-channel<br>DS40X4: 4-channel<br>DS40X2: 2-channel   |
| Input Coupling                        | DC, AC or GND  |
| Input Impedance                       | Analog channel: $(1 \text{ M}\Omega \pm 1\%) \parallel (15 \text{ pF} \pm 3 \text{ pF})$ or $50 \Omega \pm 1.5\%$<br>Digital channel: $(101 \text{ k}\Omega \pm 1\%) \parallel (9 \text{ pF} \pm 1 \text{ pF})$  |
| Probe Attenuation Coefficient         | Analog channel: 0.01X to 1000X, in 1-2-5 step  |
| Maximum Input Voltage (1 M $\Omega$ ) | Analog channel:<br>CAT I 300 Vrms, CAT II 100 Vrms, transient overvoltage 1000 Vpk<br>with RP2200 10:1 probe: CAT II 300 Vrms<br>with RP3300A 10:1 probe: CAT II 300 Vrms<br>with RP3500A 10:1 probe: CAT II 300 Vrms<br>with RP5600A 10:1 probe: CAT II 300 Vrms<br>Digital channel: CAT I 40 Vrms, transient overvoltage 800 Vpk |

### Horizontal

|                                      |  |
|--------------------------------------|--|
| Time Base Scale                      | MSO405X/DS405X: 1 ns/div to 1 ks/div<br>MSO403X/DS403X: 2 ns/div to 1 ks/div<br>MSO402X/DS402X: 2 ns/div to 1 ks/div<br>MSO401X/DS401X: 5 ns/div to 1 ks/div |
| Deviation between Channels           | 1 ns (typical), 2 ns (maximum)   |
| Max. Recording Length                | 140 Mpts   |
| Time Base Accuracy <sup>[1]</sup>    | $\leq \pm 4 \text{ ppm}$   |
| Time Base Drift                      | $\leq \pm 2 \text{ ppm/year}$  |
| Delay Range                          | Pre-trigger (negative delay): Memory Depth/Sample Rate<br>Post-trigger (positive delay): 1 s to 100 ks   |
| Time Base Mode                       | Y-T, X-Y, Roll, Delayed  |
| Number of X-Ys                       | 2 paths at the same time (four-channel model)  |
| Waveform Capture Rate <sup>[2]</sup> | 110,000 wfms/s (digital channels are turned off, dots display) or 85,000 wfms/s (digital channels are turned on, dots display)                               |
| Zero Offset                          | $\pm 0.5 \text{ div} * \text{minimum time base scale}$   |

## Vertical (Analog Channel)

|   |  |
|---|--|
| Bandwidth (-3 dB) (50 Ω)                    | MSO405X/DS405X: DC to 500 MHz<br>MSO403X/DS403X: DC to 350 MHz<br>MSO402X/DS402X: DC to 200 MHz<br>MSO401X/DS401X: DC to 100 MHz   |
| Single Bandwidth (50 Ω)                     | MSO405X/DS405X: DC to 500 MHz<br>MSO403X/DS403X: DC to 350 MHz<br>MSO402X/DS402X: DC to 200 MHz<br>MSO401X/DS401X: DC to 100 MHz   |
| Vertical Resolution                         | Analog channel: 8 bit, two channels sample at the same time<br>Digital channel: 1 bit  |
| Vertical Scale                              | 1 MΩ input impedance: 1 mV/div to 5 V/div<br>50 Ω input impedance: 1 mV/div to 1 V/div   |
| Offset Range                                | 1 MΩ input impedance:<br>1 mV/div to 225 mV/div: ±2 V<br>230 mV/div to 5 V/div: ±40 V<br>50 Ω input impedance:<br>1 mV/div to 124 mV/div: ±1.2 V<br>126 mV/div to 1 V/div: ±12 V |
| Dynamic Range                               | ±5 div   |
| Bandwidth Limit <sup>[1]</sup>              | MSO405X/DS405X: 20 MHz/100 MHz/200 MHz<br>MSO403X/DS403X: 20 MHz/100 MHz/200 MHz<br>MSO402X/DS402X: 20 MHz/100 MHz<br>MSO401X/DS401X: 20 MHz                                     |
| Low Frequency Response (AC coupling, -3 dB) | ≤5 Hz (on BNC)   |
| Calculated Rise Time <sup>[1]</sup>         | MSO405X/DS405X: 700 ps<br>MSO403X/DS403X: 1 ns<br>MSO402X/DS402X: 1.8 ns<br>MSO401X/DS401X: 3.5 ns   |
| DC Gain Accuracy                            | ±2% full scale   |
| DC Offset Accuracy                          | 200 mV/div to 5 V/div: ±0.1 div ± 2 mV ± 0.5% offset<br>1 mV/div to 195 mV/div: ±0.1 div ± 2 mV ± 1.5% offset  |
| ESD Tolerance                               | ±2 kV  |
| Channel to Channel Isolation                | DC to maximum bandwidth: >40 dB  |

## Vertical (Digital Channel)

|                     |  |
|---------------------|--|
| Threshold           | 1 group with 8 channels adjustable threshold   |
| Threshold Selected  | TTL (1.4 V)<br>5.0 V CMOS (+2.5 V)<br>3.3 V CMOS (+1.65 V)<br>2.5 V CMOS (+1.25 V)<br>1.8 V CMOS (+0.9 V)<br>ECL (-1.3 V)<br>PECL (+3.7 V)<br>LVDS (+1.2 V)<br>0 V<br>User |
| Threshold Range     | ±20.0 V, with 10 mV step   |
| Threshold Accuracy  | ±(100 mV + 3% of threshold setting)  |
| Dynamic Range       | ±10 V + threshold  |
| Min Voltage Swing   | 500 mVpp   |
| Input Resistance    | //101 kΩ   |
| Probe Load          | ≈8 pF  |
| Vertical Resolution | 1 bit  |

## Trigger

|   |   |
|---|---|
| Trigger Level Range                     | Internal: $\pm 6$ div from center of the screen<br>EXT: $\pm 0.8$ V   |
| Trigger Mode                            | Auto, Normal, Single  |
| Holdoff Range                           | 100 ns to 10 s  |
| High Frequency Rejection <sup>[1]</sup> | 50 kHz  |
| Low Frequency Rejection <sup>[1]</sup>  | 5 kHz   |
| <b>Edge Trigger</b>                     |   |
| Edge Type                               | Rising, Falling, Rising&Falling   |
| <b>Pulse Trigger</b>                    |   |
| Pulse Condition                         | Positive Pulse Width (greater than, lower than, within specific interval);<br>Negative Pulse Width (greater than, lower than, within specific interval) |
| Pulse Width Range                       | 4 ns to 4 s   |
| <b>Runt Trigger</b>                     |   |
| Pulse Polarity                          | Positive, Negative  |
| Qualifier                               | None, >, <, <>  |
| Pulse Width Range                       | 4 ns to 4 s   |
| <b>Nth Edge Trigger</b>                 |   |
| Edge Type                               | Rising, Falling   |
| Idle Time                               | 40 ns to 1 s  |
| Number of Edges                         | 1 to 65535  |
| <b>Slope Trigger</b>                    |   |
| Slope Condition                         | Positive Slope (greater than, lower than, within specific interval);<br>Negative Slope (greater than, lower than, within specific interval)             |
| Time Setting                            | 10 ns to 1 s  |
| <b>Video Trigger</b>                    |   |
| Polarity                                | Positive, Negative  |
| Synchrony                               | All Lines, Line Num, Odd Field, Even Field  |
| Signal Standard                         | NTSC, PAL/ECAM, 480P, 576P, 720P, 1080P and 1080I   |
| <b>Pattern Trigger</b>                  |   |
| Pattern Setting                         | H, L, X, Rising Edge, Falling Edge  |
| <b>RS232/UART Trigger</b>               |   |
| Polarity                                | Normal, Invert  |
| Trigger Condition                       | Start, Error, Check Error, Data   |
| Baud                                    | 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps, 230400 bps, 460800 bps, 921600 bps, 1Mbps, User                              |
| Data Bits                               | 5 bit, 6 bit, 7 bit, 8 bit  |
| <b>I2C Trigger</b>                      |   |
| Trigger Condition                       | Start, Restart, Stop, Missing ACK, Address, Data, A&D   |
| Address Bits                            | 7 bit, 8 bit, 10 bit  |
| Address Range                           | 0 to 127, 0 to 255, 0 to 1023   |
| Byte Length                             | 1 to 5  |
| <b>SPI Trigger</b>                      |   |
| Trigger Condition                       | CS, Timeout   |
| Timeout Value                           | 100 ns to 1 s   |
| Data Bits                               | 4 bit to 32 bit   |
| Data Line Setting                       | H, L, X   |
| Clock Edge                              | Rising Edge, Falling Edge   |



| CAN Trigger       |  |
|-------------------|--|
| Signal Type       | Rx, Tx, CAN_H, CAN_L, Differential   |
| Trigger Condition | SOF, EOF, Frame Type, Frame Error  |
| Baud              | 10 kbps, 20 kbps, 33.3 kbps, 50 kbps, 62.5 kbps, 83.3 kbps, 100 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, 1 Mbps, User |
| Sample Point      | 5% to 95%  |
| Frame Type        | Data, Remote, Error, OverLoad  |
| Error Type        | Bit Fill, Answer Error, Check Error, Format Error, Random Error  |

| FlexRay Trigger   |                           |
|-------------------|---------------------------|
| Baud              | 2.5 Mb/s, 5 Mb/s, 10 Mb/s |
| Trigger Condition | Frame, Symbol, Error, TSS |

| USB Trigger       |                                     |
|-------------------|-------------------------------------|
| Signal Speed      | Low Speed, Full Speed               |
| Trigger condition | SOP, EOP, RC, Suspend, Exit Suspend |

| Measure                |  |
|------------------------|--|
| Cursor                 | Manual mode: Voltage deviation between cursors ( $\Delta V$ ), time deviation between cursors ( $\Delta T$ ), reciprocal of $\Delta T$ (Hz) ( $1/\Delta T$ )<br>Track mode: voltage and time values of the waveform point<br>Auto mode: allow to display cursors during auto measurement   |
| Auto Measurement       | Analog channel:<br>Maximum, Minimum, Peak-Peak Value, Top Value, Bottom Value, Amplitude, Average, Vrms-N, Vrms-1, Overshoot, Pre-shoot, Area, Period Area, Period, Frequency, Rise Time, Fall Time, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Delay A $\rightarrow$ B, Delay A $\rightarrow$ B, Delay A $\rightarrow$ B, Delay A $\rightarrow$ B, Phase A $\rightarrow$ B, Phase A $\rightarrow$ B, Phase A $\rightarrow$ B, Phase A $\rightarrow$ B<br>Digital channel:<br>Frequency, Period, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Delay A $\rightarrow$ B, Delay A $\rightarrow$ B, Delay A $\rightarrow$ B, Delay A $\rightarrow$ B, Phase A $\rightarrow$ B, Phase A $\rightarrow$ B, Phase A $\rightarrow$ B, Phase A $\rightarrow$ B |
| Number of Measurements | Display 5 measurements at the same time.   |
| Measurement Range      | Screen Region, Cursor Region   |
| Statistic Mode         | Extremum, Difference   |
| Measurement Statistic  | Average, Max, Min, Standard Deviation, Number of Measurements  |
| Frequency Counter      | Hardware 6 bits frequency counter (channels are selectable)  |

| Math Operation     |   |
|--------------------|---|
| Waveform Operation | A+B, A-B, A×B, A÷B, FFT, Digital Filter, Editable Advanced Operation, Logic Operation |
| FFT Window         | Rectangle, Hanning, Blackman, Hamming   |
| FFT Display        | Split, Full Screen  |
| FFT Vertical Scale | Vrms, dB  |
| Logic Operation    | AND, OR, NOT, XOR   |
| Math Function      | Intg, Diff, Lg, Ln, Exp, Abs, Square, Sqrt, Sine, Cosine, Tangent                     |

| Decoding        |  |
|-----------------|--|
| Number of Buses | 2  |
| Decoding Type   | Parallel (standard), RS232/UART (optional), I2C (optional), SPI (optional), CAN (optional), FlexRay (optional)                     |
| Parallel        | Combine the sample data of the source channel waveforms as a parallel multi-channel bus and display the data as a single bus value |
| RS232/UART      | Display the input signal(s) of the TX source channel or/and RX source channel as bus   |
| I2C             | Display the input signal of the SDA source channel as bus  |
| SPI             | Display the input signal(s) of the MISO source channel or/and MOSI source channel as bus   |
| CAN             | Display the input signal of the source channel (Rx, Tx, CAN_H, CAN_L or differential) as bus                                       |
| FlexRay         | Display the input signal of the source channel (BP, BM or RX/TX) as bus  |

## Display

|                    |   |
|--------------------|---|
| Display Type       | 9 inches (229 mm) TFT LCD display                                       |
| Display Resolution | 800 horizontal×RGB×480 vertical pixel                                   |
| Display Color      | 160,000 color   |
| Persistence Time   | Min, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, Infinite |
| Display Type       | Dots, Vectors   |
| Real-time Clock    | Time and Date (user adjustable)   |

## I/O

|                       |  |
|-----------------------|--|
| Standard Ports        | Dual USB HOST, USB DEVICE, LAN, VGA Output, 10 MHz Input/Output, Aux Output (TrigOut, Fast, PassFail, GND) |
| Printer Compatibility | PictBridge   |

## General Specifications

|   |   |               |
|---|---|---------------|
| Probe Compensation Output                         |   |               |
| Output Voltage <sup>[1]</sup>                     | About 3 V, peak-peak  |               |
| Frequency <sup>[1]</sup>                          | 1 kHz   |               |
| Power   |   |               |
| Power Voltage                                     | 100 to 127 V, 45 to 440Hz<br>100 to 240 V, 45 to 65Hz   |               |
| Power   | Maximum 120 W   |               |
| Fuse  | 3 A, T degree, 250 V  |               |
| Environment                                       |   |               |
| Temperature Range                                 | Operating: 0°C to +50°C<br>Non-operating: -40°C to +70°C  |               |
| Cooling Method                                    | Fan   |               |
| Humidity Range                                    | 0°C to +30°C : ≤95% relative humidity<br>+30°C to +40°C : ≤75% relative humidity<br>+40°C to +50°C : ≤45% relative humidity |               |
| Altitude  | Operating: under 3,000 meters<br>Non-operating: under 15,000 meters   |               |
| Physical Characteristics                          |   |               |
| Size <sup>[3]</sup>                               | Width×Height×Depth = 440.0 mm×218.0 mm×130.0 mm   |               |
| Weight <sup>[4]</sup>                             | Package Excluded  | 4.8 kg±0.2 kg |
|   | Package Included  | 7.1 kg±1.0 kg |
| Adjustment Interval                               |   |               |
| The recommended calibration interval is one year. |   |               |
| Regulatory Information                            |   |               |
| Electromagnetic Compatibility                     | 2004/108/EC<br>Execution standard EN 61326-1:2006 EN 61326-2-1:2006   |               |
| Safety  | UL 61010-1:2004; CAN/CSA-C22.2 NO. 61010-1-2004;<br>EN 61010-1:2001; IEC 61010-1:2001                                       |               |

Note<sup>[1]</sup>: Typical value.

Note<sup>[2]</sup>: Maximum value. Interleaved, sine signal with 10 ns horizontal time base, 4 div input amplitude and 10 MHz frequency, edge trigger.

Note<sup>[3]</sup>: Supporting legs and handle folded, knob height included, front panel cover excluded.

Note<sup>[4]</sup>: Standard configuration.

## ► Ordering Information

|                                | Description  | Order Number        |
|--------------------------------|--|---------------------|
| <b>Model</b>                   | DS4012 (100 MHz, 4 GSa/s, 140 Mpts, 2-channel Digital Oscilloscope)          | DS4012              |
|                                | DS4014 (100 MHz, 4 GSa/s, 140 Mpts, 4-channel Digital Oscilloscope)          | DS4014              |
|                                | DS4022 (200 MHz, 4 GSa/s, 140 Mpts, 2-channel Digital Oscilloscope)          | DS4022              |
|                                | DS4024 (200 MHz, 4 GSa/s, 140 Mpts, 4-channel Digital Oscilloscope)          | DS4024              |
|                                | DS4032 (350 MHz, 4 GSa/s, 140 Mpts, 2-channel Digital Oscilloscope)          | DS4032              |
|                                | DS4034 (350 MHz, 4 GSa/s, 140 Mpts, 4-channel Digital Oscilloscope)          | DS4034              |
|                                | DS4052 (500 MHz, 4 GSa/s, 140 Mpts, 2-channel Digital Oscilloscope)          | DS4052              |
|                                | DS4054 (500 MHz, 4 GSa/s, 140 Mpts, 4-channel Digital Oscilloscope)          | DS4054              |
|                                | MSO4012 (100 MHz, 4 GSa/s, 140 Mpts, 2+16-channel Mixed Signal Oscilloscope) | MSO4012             |
|                                | MSO4014 (100 MHz, 4 GSa/s, 140 Mpts, 4+16-channel Mixed Signal Oscilloscope) | MSO4014             |
|                                | MSO4022 (200 MHz, 4 GSa/s, 140 Mpts, 2+16-channel Mixed Signal Oscilloscope) | MSO4022             |
|                                | MSO4024 (200 MHz, 4 GSa/s, 140 Mpts, 4+16-channel Mixed Signal Oscilloscope) | MSO4024             |
|                                | MSO4032 (350 MHz, 4 GSa/s, 140 Mpts, 2+16-channel Mixed Signal Oscilloscope) | MSO4032             |
|                                | MSO4034 (350 MHz, 4 GSa/s, 140 Mpts, 4+16-channel Mixed Signal Oscilloscope) | MSO4034             |
|                                | MSO4052 (500 MHz, 4 GSa/s, 140 Mpts, 2+16-channel Mixed Signal Oscilloscope) | MSO4052             |
|                                | MSO4054 (500 MHz, 4 GSa/s, 140 Mpts, 4+16-channel Mixed Signal Oscilloscope) | MSO4054             |
| <b>Standard Accessories</b>    | Power Cord conforming to the standard of the country                         | -                   |
|                                | Front Panel Cover  | FPC-DS4000          |
|                                | USB Data Cable   | CB-USBA-USBB-FF-150 |
|                                | 2 or 4 Passive Probes (500 MHz)  | RP3500A             |
|                                | 1 set logic analysis probe (for MSO)   | RPL2316             |
|                                | Quick Guide (Hard Copy)  | -                   |
|                                | Resource CD (User's Guide and Application Software)                          | -                   |
| <b>Optional Accessories</b>    | Active Differential Probe (1.5 GHz)  | RP7150              |
|                                | Rack Mount Kit   | RM-DS4000           |
|                                | USB-GPIB Interface Converter   | USB-GPIB            |
|                                | TekProbe Interface Adaptor   | T2R1000             |
| <b>Decoding Options</b>        | RS232/UART Decoding Kit  | SD-RS232-DS4000     |
|                                | I2C/SPI Decoding Kit   | SD-I2C/SPI-DS4000   |
|                                | CAN Decoding Kit   | SD-CAN-DS4000       |
|                                | FlexRay Decoding Kit   | SD-FlexRay-DS4000   |
| <b>Bandwidth Update Option</b> | Bandwidth upgrade from 200 MHz to 350 MHz for MSO/DS402x                     | BW2T3-MSO/DS4000    |
|                                | Bandwidth upgrade from 200 MHz to 500 MHz for MSO/DS402x                     | BW2T5-MSO/DS4000    |
|                                | Bandwidth upgrade from 350 MHz to 500 MHz for MSO/DS403x                     | BW3T5-MSO/DS4000    |

## Warranty

Three –year warranty, excluding probes and accessories.



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