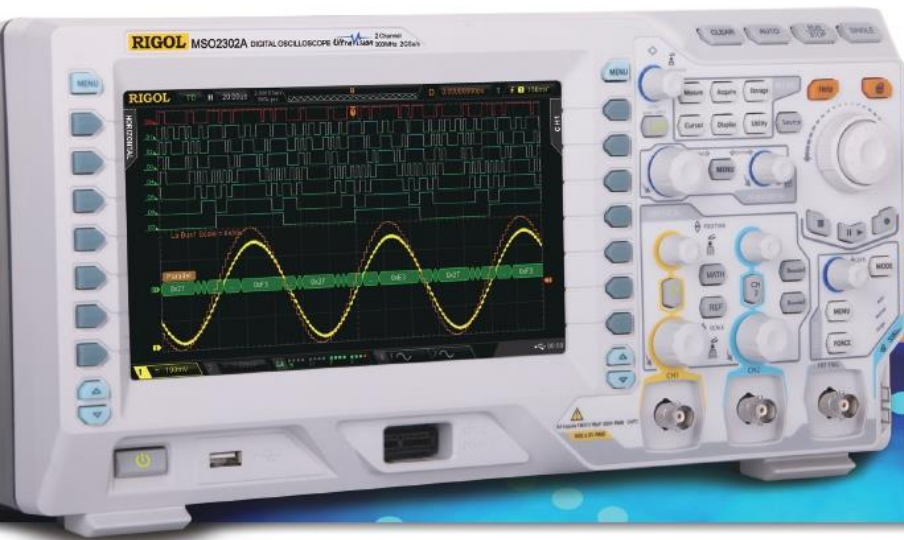


RIGOL
Innovation or nothing



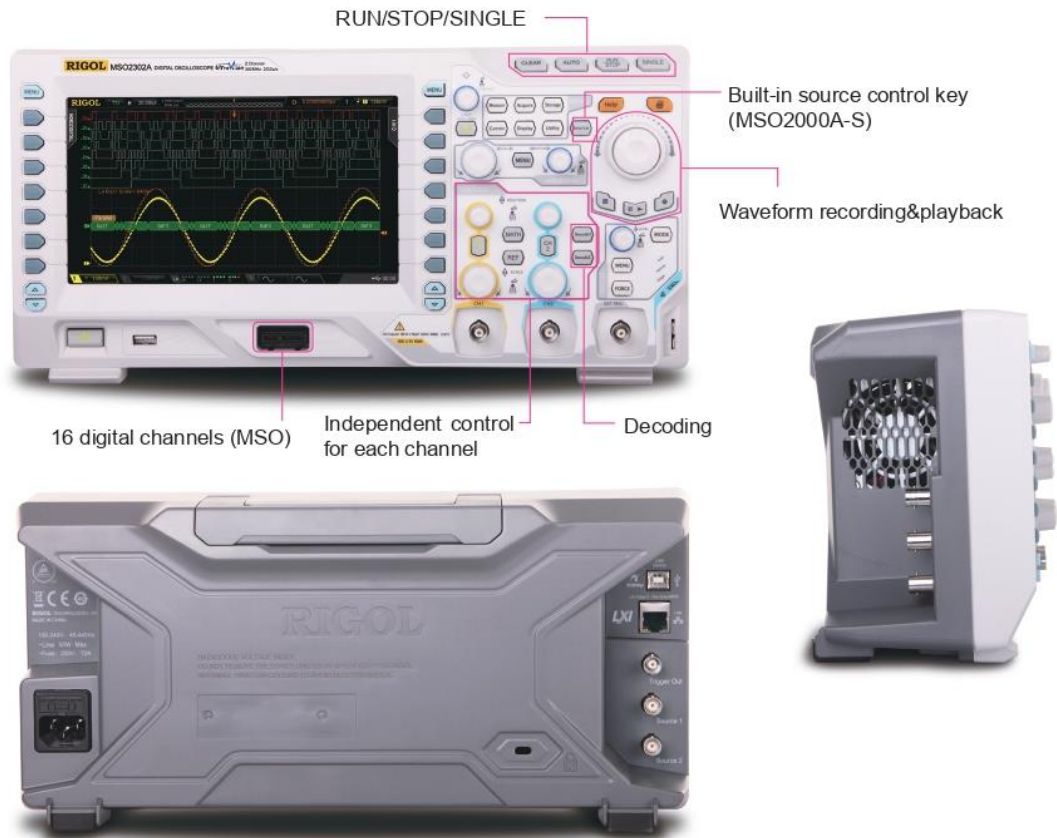
MSO/DS2000A Series Digital Oscilloscope

UltraVision

- Bandwidth up to 300 MHz, standard with 50 Ω input
- 2 analog channels, 16 digital channels (MSO)
- Lower noise floor, wider vertical range: 500 $\mu\text{V}/\text{div}$ ~10 V/div
- Real-time Sample Rate: analog channel up to 2 GSa/s , digital channel up to 1 GSa/s (MSO)
- Memory Depth: analog channel up to 14 Mpts (standard)/56 Mpts (optional), digital channel up to 14 Mpts (standard)/28 Mpts (optional, MSO)
- Innovative "UltraVision" technology
- Waveform capture rate up to 52,000 wfms/s
- Up to 256 levels intensity grading waveform display
- Up to 65,000 frames hardware real-time waveform record, playback and analysis functions (standard)
- A variety of trigger and bus decoding functions (Parallel, RS232, I2C, SPI, CAN)
- Built-in dual-channel 25 MHz signal source (MSO2000A-S)
- Complete connectivity: USB Host&Device, LAN (LXI), AUX, USB-GPIB (optional)
- 8 inch TFT (800x480) WVGA

MSO/DS2000A series is the new mainstream digital scope to meet the customer's applications with its innovative technology. MSO2000A series has 2+16 channels, targeting for the embedded design and test market with its industry leading specifications, powerful trigger functions and broad analysis capabilities.

MSO/DS2000A Series Digital Oscilloscope



Product Dimensions: Width×Height×Depth = 361.6 mm×179.6 mm×130.8 mm
Weight: 3.9 kg±0.5 kg (Without Package)

► Innovative UltraVision Technology (Analog Channel)



- Deep memory depth (up to 56 Mpts)
- Higher waveform capture rate (up to 52,000 wfms/s)
- Real-time waveform recording, playback and analysis functions (up to 65,000 frames)
- Multi-level intensity grading display (up to 256 levels)

► Models and Key Specifications

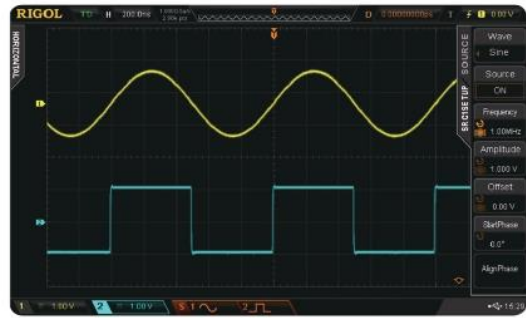
| Model | DS2102A | MSO2102A-S | DS2202A | MSO2202A-S | DS2302A | MSO2302A-S |
|--|---|------------|----------|------------|----------|------------|
| | MSO2102A | | MSO2202A | | MSO2302A | |
| Analog BW | 100 MHz | | 200 MHz | | 300 MHz | |
| Number of Analog Channels | 2 | | | | | |
| Number of Digital Channels (MSO) | 16 (support digital channel ungrouping and grouping operation) | | | | | |
| Max. Real-time Sample Rate | Analog channel: 2 GSa/s (single-channel), 1 GSa/s (dual-channel) Digital channel: 1 GSa/s (8-channel), 500 MSa/s (16-channel) | | | | | |
| Max. Memory Depth | Analog channel: 14 Mpts (single-channel), 7 Mpts (dual-channel) standard; 56 Mpts (single-channel), 28 Mpts (dual-channel) optional Digital channel: 14 Mpts (8-channel), 7 Mpts (16-channel) standard; 28 Mpts (8-channel), 14 Mpts (16-channel) optional | | | | | |
| Max. Waveform Capture rate | 52,000 wfms/s | | | | | |
| Hardware Real-time Waveform Recording, Playback and Analysis Functions | Up to 65,000 frames (digital channel turned off) Up to 32,000 frames (digital channel turned on) | | | | | |
| Standard Probes | 2 sets of PVP2350 350 MHz BW passive probes for all models; 1 set of RPL2316 logic analyzer probe also available for MSO | | | | | |
| Built-in Dual-channel 25 MHz Source | No | Yes | No | Yes | No | Yes |

► Features and Benefits

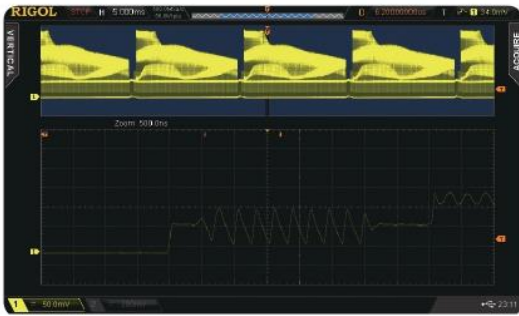
Wide vertical range (500 uV/div~10 V/div), low noise floor, better for small signal capturing



Built-in dual-channel 25 MHz source (MSO2000A-S)



UltraVision: deep memory (analog channel up to 14 Mpts (standard)/56 Mpts (optional))



UltraVision: up to 52,000 wfms/s waveform capture rate



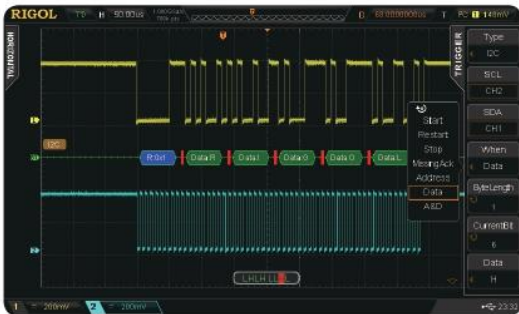
UltraVision: real-time ceaseless waveform recording, playback and analysis functions



UltraVision: multi-level intensity grading display (up to 256 levels)



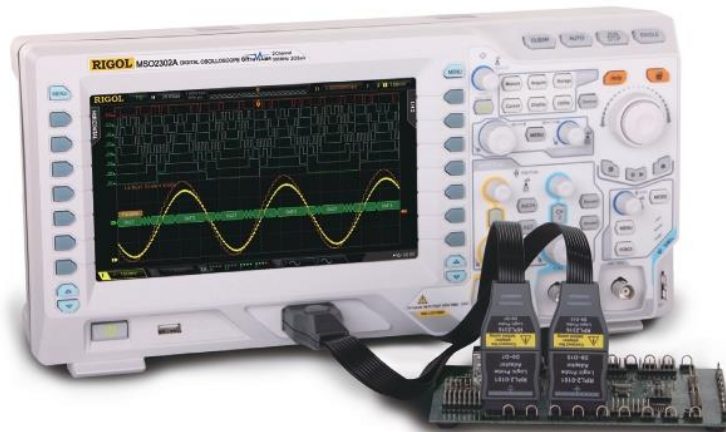
Serial bus trigger&decoding functions (RS232, I2C, SPI, and CAN)



Various trigger functions (Runt, Setup/Hold, Nth Edge...)



► MSO2000A Series Mixed Signal Oscilloscope



Besides the powerful functions of DS2000A, you could get more from MSO2000A with:

- 16 digital channels
- Sample rate of digital channel up to 1 GSa/s
- Memory depth of digital channel up to 28 Mpts
- Waveform capture rate of digital channel up to 52,000 wfms/s
- Hardware real-time waveform recording and playback functions, up to 65,000 frames can be recorded
- Triggering and decoding across analog and digital channels
- Easy ungrouping and grouping operation of the digital channels
- Supports a variety of logic levels
- Up to 2+16 channels; trigger across the analog and digital channels
- Time correlated display and analysis for both the analog and digital channel waveforms

Innovative UltraVision Technology (Digital Channel)

UltraVision

- Deep memory depth (up to 28 Mpts)
- High waveform capture rate (up to 52,000 wfms/s)
- Real-time waveform recording and playback functions (up to 65,000 frames)
- Multi-level intensity grading display

Mixed signal analysis with analog and digital channels



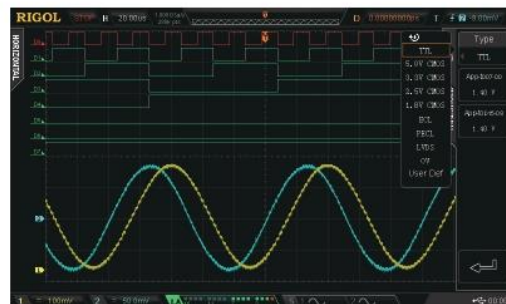
Easy to be grouped and labeled for digital channels



Deep 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/DS2000A Series:

► RIGOL Passive Probes

| Model | Type | Description |
|--|----------------------|---|
|  PVP2150 | High Z Probe | 1X: DC to 35 MHz 10X: DC to 150 MHz Compatibility: all RIGOL scopes. |
|  PVP2350 | High Z Probe | 1X: DC to 35 MHz 10X: DC to 350 MHz Compatibility: all RIGOL scopes. |
|  RP3500A | High Z Probe | DC to 500 MHz Compatibility: all RIGOL scopes. |
|  RP1300H | High Voltage Probe | DC to 300 MHz CAT I 2000 V (DC+AC), CAT II 1500 V (DC+AC) Compatibility: all RIGOL scopes. |
|  RP1010H | High Voltage Probe | DC to 40 MHz DC: 0 to 10 kV DC, AC: pulse ≤ 20 kVp-p, AC: sine wave ≤ 7 kVrms Compatibility: all RIGOL scopes. |
|  RP1018H | High Voltage Probe | DC to 150 MHz DC+AC Peak: 18 kV CAT II AC RMS: 12 kV CAT II Compatibility: all RIGOL scopes. |
|  RPL2316 | Logic Analyzer Probe | Logic analyzer probe (for MSO4000& MSO2000A) |

► RIGOL Active & Current Probes

| Model | Type | Description |
|---|---------------------------------|---|
|  RP1001C | Current Probe | BW: DC to 300 kHz Max. input DC: ± 100 A, AC P-P: 200 A, AC RMS: 70 A Compatibility: all RIGOL scopes. |
|  RP1002C | Current Probe | BW: DC to 1 MHz Max. input DC: ± 70 A, AC P-P: 140 A, AC RMS: 50 A Compatibility: all RIGOL scopes. |
|  RP1003C | Current Probe | BW: DC to 50 MHz Max. input AC P-P: 50 A (noncontinuous), AC RMS: 30 A Compatibility: all RIGOL scopes. Must order RP1000P power supply. |
|  RP1004C | Current Probe | BW: DC to 100 MHz Max. input AC P-P: 50 A (noncontinuous), AC RMS: 30 A Compatibility: all RIGOL scopes. Must order RP1000P power supply. |
|  RP1005C | Current Probe | BW: DC to 10 MHz Max. input AC P-P: 300 A (noncontinuous), 500 A (@pulse width ≤ 30 us), AC RMS: 150 A Compatibility: all RIGOL scopes. Must order RP1000P power supply. |
|  RP1000P | Power Supply | Power supply for RP1003C, RP1004C and RP1005C, support 4 channels. |
|  RP1025D | High Voltage Differential Probe | BW: 25 MHz Max. voltage ≤ 1400 Vpp Compatibility: all RIGOL scopes. |
|  RP1050D | High Voltage Differential Probe | BW: 50 MHz Max. voltage ≤ 7000 Vpp Compatibility: all RIGOL scopes. |
|  RP1100D | High Voltage Differential Probe | BW: 100 MHz Max. voltage ≤ 7000 Vpp Compatibility: all RIGOL 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: 2 GSa/s (single-channel), 1 Gsa/s (dual-channel) Digital channel: 1 GSa/s (8-channel), 500 MSa/s (16-channel) |
| Peak Detect | Analog channel: 500 ps (single-channel), 1 ns (dual-channel) Digital channel: 1 ns (8-channel), 2 ns (16-channel) |
| 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 bits of resolution when $\geq 5 \mu\text{s}/\text{div}$ @ 1 GSa/s (or $\geq 10 \mu\text{s}/\text{div}$ @ 500 MSa/s). |
| Minimum Detectable Pulse Width | Digital channel: 5 ns |
| Memory Depth | Analog channel: Single-channel: Auto, 14 kpts, 140 kpts, 1.4 Mpts, 14 Mpts and 56 Mpts (optional) are available Dual-channel: Auto, 7 kpts, 70 kpts, 700 kpts, 7 Mpts and 28 Mpts (optional) are available Digital channel: 14 Mpts (8-channel), 7 Mpts (16-channel) standard; 28 Mpts (8-channel), 14 Mpts (16-channel) optional |

Input

| | |
|---------------------------------------|---|
| Number of Channels | MSO2XX2A/2XX2A-S: 2 analog channels+16 digital channels DS2XX2A: 2 analog channels |
| Input Coupling | DC, AC or GND |
| Input Impedance | Analog channel: $(1 \text{ M}\Omega \pm 1\%) \parallel (16 \text{ pF} \pm 3 \text{ pF})$ or $50 \Omega \pm 1.5\%$ 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 Ω) | Analog channel: CAT I 300 Vrms, CAT II 100 Vrms, transient overvoltage 1000 Vpk Digital channel: CAT I 40 Vrms, transient overvoltage 800 Vpk |

Horizontal

| | |
|--------------------------------------|---|
| Time Base Scale | MSO2302A/2302A-S/DS2302A: 1.000 ns/div to 1.000 ks/div MSO2202A/2202A-S/DS2202A: 2.000 ns/div to 1.000 ks/div MSO2102A/2102A-S /DS2102A: 5.000 ns/div to 1.000 ks/div |
| Channel to Channel Skew | 1 ns (typical), 2 ns (maximum) |
| Maximum Record Length | 14 Mpts (standard), 56 Mpts (optional) |
| Time Base Accuracy ^[1] | $\leq \pm 25 \text{ ppm}$ |
| Time Base Drift | $\leq \pm 5 \text{ ppm/year}$ |
| Maximum Delay Range | Memory Depth/Sample Rate |
| Time Base Mode | Y-T, X-Y, Roll |
| Number of X-Ys | 1 path |
| Waveform Capture Rate ^[2] | 52,000 wfms/s (dots display) |

Vertical

| | |
|---|---|
| Bandwidth (-3 dB) (50 Ω) | MSO2302A/2302A-S/DS2302A: DC to 300 MHz MSO2202A/2202A-S/DS2202A: DC to 200 MHz MSO2102A/2102A-S/DS2102A: DC to 100 MHz |
| Single Bandwidth (50 Ω) | MSO2302A/2302A-S/DS2302A: DC to 300 MHz MSO2202A/2202A-S/DS2202A: DC to 200 MHz MSO2102A/2102A-S/DS2102A: DC to 100 MHz |
| Vertical Resolution | Analog channel: 8 bit Digital channel: 1 bit |
| Vertical Scale ^[3] | When the input impedance is 50 Ω: 500 μV/div to 1 V/div When the input impedance is 1 MΩ: 500 μV/div to 10 V/div |
| Offset Range | When the input impedance is 50 Ω: 500 μV/div to 50 mV/div: ±2 V 51 mV/div to 200 mV/div: ±10 V 205 mV/div to 1 V/div: ±12 V When the input impedance is 1 MΩ: 500 μV /div to 50 mV/div: ±2 V 51 mV/div to 200 mV/div: ±10 V 205 mV/div to 2 V/div: ±50 V 2.05 V/div to 10 V/div: ±100 V |
| Bandwidth Limit ^[1] | MSO2302A/2302A-S/2202A/2202A-S/DS2302A/2202A: 20 MHz/100 MHz MSO2102A/2102A-S/DS2102A: 20 MHz |
| Low Frequency Response (AC Coupling, -3 dB) | ≤5 Hz (on BNC) |
| Calculated Rise Time ^[1] | MSO2302A/2302A-S/DS2302A: 1.2 ns MSO2202A/2202A-S/DS2202A: 1.8 ns MSO2102A/2102A-S/DS2102A: 3.5 ns |
| DC Gain Accuracy ^[3] | ±2% full scale |
| DC Offset Accuracy | ±0.1 div ± 2 mV ± 1% offset value |
| Channel to Channel Isolation | DC to maximum bandwidth: >40 dB |

Vertical (Digital Channel)

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

Trigger

| | |
|---|--|
| Trigger Level Range | Internal: ± 5 div from center of the screen EXT: ± 4 V |
| Trigger Mode | Auto, Normal, Single |
| Holdoff Range | 100 ns to 10 s |
| High Frequency Rejection ^[1] | 75 kHz |
| Low Frequency Rejection ^[1] | 75 kHz |
| Trigger Sensitivity ^[1] | 1 div (below 10 mV or noise rejection is enabled) 0.3 div (above 10 mV and noise rejection is disabled) |
| Edge Trigger | |
| Edge Type | Rising, Falling, Rising/Falling |
| Pulse Trigger | |
| Pulse Condition | Positive Pulse Width (greater than, lower than, within specific interval) Negative Pulse Width (greater than, lower than, within specific interval) |
| Pulse Width Range | 2 ns to 4 s |
| Runt Trigger | |
| Pulse Condition | None, >, <, <> |
| Pulse Polarity | Positive, Negative |
| Pulse Range | 2 ns to 4 s |
| Windows Trigger (Optional) | |
| Windows Type | Rising, Falling, Rising/Falling |
| Trigger Position | Enter, Exit, Time |
| Windows Time | 16 ns to 4 s |
| Nth Edge Trigger (Optional) | |
| Edge Type | Rising, Falling |
| Idle Time | 16 ns to 4 s |
| Number of Edges | 1 to 65535 |
| Slope Trigger | |
| Slope Condition | Positive Slope (greater than, lower than, within specific interval) Negative Slope (greater than, lower than, within specific interval) |
| Time Setting | 10 ns to 1 s |
| Video Trigger (Optional) | |
| Signal Standard | NTSC, PAL/SECAM, 480P, 576P (standard) 720P, 1080P and 1080I (optional) |
| Pattern Trigger | |
| Pattern Setting | H, L, X, Rising Edge, Falling Edge |
| Delay Trigger (Optional) | |
| Edge Type | Rising, Falling |
| Delay Type | >, <, <>, >< |
| Delay Time | 2 ns to 4 s |
| TimeOut Trigger (Optional) | |
| Edge Type | Rising, Falling, Rising/Falling |
| Timeout Time | 16 ns to 4 s |
| Duration Trigger (Optional) | |
| Pattern Setting | H, L, X |
| Trigger Condition | >, <, <> |
| Duration Time | 2 ns to 4 s |
| Setup/Hold Trigger | |
| Edge Type | Rising, Falling |
| Data Type | H, L |
| Setup Time | 2 ns to 1 s |

| | |
|-------------------------------|---|
| Hold Time | 2 ns to 1 s |
| RS232/UART Trigger | |
| 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, 1 Mbps, User |
| Data Bits | 5 bit, 6 bit, 7 bit, 8 bit |
| I2C Trigger | |
| 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 |
| SPI Trigger | |
| Trigger Condition | Timeout |
| Timeout Value | 100 ns to 1 s |
| Data Bits | 4 bit to 32 bit |
| Data Setting | H, L, X |
| CAN Trigger (Optional) | |
| 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, Over Load |
| Error Type | Bit Fill, Answer Error, Check Error, Format Error, Random Error |
| USB Trigger (Optional) | |
| Signal Speed | Low Speed, Full Speed |
| Trigger Condition | SOP, EOP, RC, Suspend, Exit Suspend |

Measure

| | | |
|------------------------|---|---|
| Cursor | Manual Mode | Voltage Deviation between Cursors (ΔV) Time Deviation between Cursors (ΔT) Reciprocal of ΔT (Hz) ($1/\Delta T$) |
| | Track Mode | Voltage and Time Values of the Waveform Point |
| | Auto Mode | Allow to display cursors during auto measurement |
| Auto Measurement | <p>Analog channel: Maximum, Minimum, Peak-Peak Value, Top Value, Bottom Value, Amplitude, Average, Vrms-N, Vrms-1, Overshoot, Pre-shoot, Area, Period Area, Frequency, Period, Rise Time, Fall Time, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Delay A\uparrow→B\uparrow, Delay A\downarrow→B\downarrow, Delay A\uparrow→B\downarrow, Delay A\downarrow→B\uparrow, Phase A\uparrow→B\uparrow, Phase A\downarrow→B\downarrow, Phase A\uparrow→B\downarrow, Phase A\downarrow→B\uparrow</p> <p>Digital channel: Frequency, Period, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Delay A\uparrow→B\uparrow, Delay A\downarrow→B\downarrow, Delay A\uparrow→B\downarrow, Delay A\downarrow→B\uparrow, Phase A\uparrow→B\uparrow, Phase A\downarrow→B\downarrow, Phase A\uparrow→B\downarrow, Phase A\downarrow→B\uparrow</p> | |
| Number of Measurements | Display 5 measurements at the same time. | |
| Measurement Range | Screen Region or Cursor Region | |
| Measurement Statistic | Current, 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, Exp, Sqrt, Sine, Cosine, Tangent |
| Number of Buses for Decoding | 2 |
| Decoding Type | Parallel (standard), RS232 (optional), I2C (optional), SPI (optional), CAN (optional) |

Display

| | |
|--------------------|---|
| Display Type | 8.0 inches (203 mm) TFT LCD display |
| Display Resolution | 800 horizontal×RGB×480 Vertical Pixel |
| Display Color | 160,000 Color (TFT) |
| 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) |

Signal Source (MSO2000A-S)

| | | |
|---------------------|--|--|
| Channels | 2 | |
| Sample Rate | 200 MSa/s | |
| Vertical Resolution | 14 bits | |
| Max. Frequency | 25 MHz | |
| Standard Waveform | Sine, Square, Pulse, Ramp, Noise, DC | |
| Built-in Waveform | Sinc, Exponential Rise, Exponential Fall, ECG, Gauss, Lorentz, Haversine | |
| Sine | Frequency Range | 100 mHz to 25 MHz |
| | Flatness | ±0.5 dB (relative to 1 kHz) |
| | Harmonic Distortion | -40 dBc |
| | Stray (Non-harmonic) | -40 dBc |
| | Total Harmonic Distortion | 1% |
| | S/N Ratio | 40 dB |
| Square/Pulse | Frequency Range | Square: 100 mHz to 15 MHz Pulse: 100 mHz to 1 MHz |
| | Rise/Fall Time | <15 ns |
| | Overshoot | <5% |
| | Duty Cycle | Square: 50% Pulse: 10% to 90% (user adjustable) |
| | Duty Cycle Resolution | 1% or 10 ns (the larger of the two) |
| | Min. Pulse Width | 20 ns |
| | Pulse Width Resolution | 10 ns or 5 bits (the larger of the two) |
| Jitter | 500 ps | |
| Ramp | Frequency Range | 100 mHz to 100 kHz |
| | Linearity | 1% |
| | Symmetry | 0 to 100% |
| Noise | Bandwidth | 25 MHz (typical) |
| Built-in Waveform | Frequency Range | 100 mHz to 1 MHz |
| Arbitrary Waveform | Frequency Range | 100 mHz to 10 MHz |
| | Waveform Length | 1 to 16k points |
| | Internal Storage Location | 10 |

| | | |
|------------|--------------|--|
| Frequency | Accuracy | 100 ppm (lower than 10 kHz) 50 ppm (higher than 10 kHz) |
| | Resolution | 100 MHz or 4 bits, the larger of the two |
| Amplitude | Output Range | 20 mVpp to 5 Vpp, HighZ 10 mVpp to 2.5 Vpp, 50 Ω |
| | Resolution | 100 μV or 3 bits, the larger of the two |
| | Accuracy | ±(2% of the setting value + 1 mV) (frequency = 1 kHz) |
| DC Offset | Range | ±2.5 V, HighZ ±1.25 V, 50 Ω |
| | Resolution | 100 μV or 3 bits, the larger of the two |
| | Accuracy | ±(2% of the set offset value + 5 mV + 0.5% of the amplitude) |
| Modulation | AM, FM | |

I/O

| | |
|-----------------------|---|
| Standard Ports | USB Host (support USB-GPIB), USB Device, LAN, Aux Output (TrigOut/PassFail) |
| Printer Compatibility | PictBridge |

General Specifications

| | |
|-------------------------------|---------------------------------|
| Probe Compensation Output | |
| Output Voltage ^[1] | About 3 V, peak-peak |
| Frequency ^[1] | 1 kHz |
| Power | |
| Power Voltage | 100 V to 240 V, 45 Hz to 440 Hz |
| Power | Maximum 50 W |
| Fuse | 2 A, T degree, 250 V |

Environment

| | |
|-------------------|--|
| Temperature Range | Operating: 0°C to +50°C |
| | Non-operating: -40°C to +70°C |
| Cooling Method | Fan cooling |
| Humidity Range | 0°C to +30°C : ≤95% relative humidity |
| | +30°C to +40°C : ≤ 75% relative humidity |
| | +40°C to +50°C : ≤45% relative humidity |
| Altitude | Operating: under 3,000 meters |
| | Non-operating: under 15,000 meters |

Physical Characteristics

| | | |
|-----------------------|---|---------------|
| Size ^[4] | Width×Height×Depth = 361.6 mm×179.6 mm×130.8 mm | |
| Weight ^[5] | Package Excluded | 3.9 kg±0.5 kg |
| | Package Included | 4.5 kg±0.5 kg |

Calibration Interval

The recommended calibration interval is 18 months.

Electromagnetic Compatibility and Safety

| | | |
|--------|--|--|
| EMC | complies with EMC Directive 2014/30/EU, complies with or above the standard specified in IEC61326-1:2013/EN61326-1:2013 Group 1 Class A CISPR 11/EN 55011 | |
| | IEC 61000-4-2:2008/EN 61000-4-2 | ±4.0 kV (contact discharge), ±8.0 kV (air discharge) |
| | IEC 61000-4-3:2002/EN 61000-4-3 | 3 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz) |
| | IEC 61000-4-4:2004/EN 61000-4-4 | 1 kV power |
| | IEC 61000-4-5:2001/EN 61000-4-5 | 0.5 kV (phase-to-neutral voltage); 1 kV (phase-to-earth voltage); 1 kV (neutral-to-earth voltage) |
| | IEC 61000-4-6:2003/EN 61000-4-6 | 3 V, 0.15 to 80 MHz |
| | IEC 61000-4-11:2004/EN 61000-4-11 | voltage dip: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles short interruption: 0% UT during 250 cycles |
| Safety | complies with IEC 61010-1:2010 (Third Edition)/EN 61010-1:2010, UL 61010-1:2012 R4.16 and CAN/CSA-C22.2 No. 61010-1-12+ G11+ G12 | |

Note^[1]: Typical value.

Note^[2]: Maximum value. 20 ns, single-channel mode, dots display, auto memory depth.

Note^[3]: 500 uV/div is the digital amplification of 1 mV/div. When calculating the DC Gain Accuracy, the full scale should be considered as 8 mV based on 1 mV/div.

Note^[4]: Supporting legs and handle folded, knob height included.

Note^[5]: Standard configuration.

► Ordering Information

| | Description | Order Number |
|-------------------------|--|---------------------|
| Model | DS2102A (100 MHz, 2-analog channel oscilloscope) | DS2102A |
| | MSO2102A (100 MHz, 2-analog channel + 16-digital channel MSO) | MSO2102A |
| | MSO2102A-S (100 MHz, 2-analog channel + 16-digital channel MSO + 2-channel 25 MHz signal source) | MSO2102A-S |
| | DS2202A (200 MHz, 2-analog channel oscilloscope) | DS2202A |
| | MSO2202A (200 MHz, 2-analog channel + 16-digital channel MSO) | MSO2202A |
| | MSO2202A-S (200 MHz, 2-analog channel + 16-digital channel MSO + 2-channel 25 MHz signal source) | MSO2202A-S |
| | DS2302A (300 MHz, 2-analog channel oscilloscope) | DS2302A |
| | MSO2302A (300 MHz, 2-analog channel + 16-digital channel MSO) | MSO2302A |
| | MSO2302A-S (300 MHz, 2-analog channel + 16-digital channel MSO + 2-channel 25 MHz signal source) | MSO2302A-S |
| Standard Accessories | Power Cord conforming to the standard of the destination country | - |
| | USB Data Cable | CB-USBA-USBB-FF-150 |
| | 2 Passive Probes (350 MHz) | PVP2350 |
| | 1 set LA Probe (only available for MSO) | RPL2316 |
| | Quick Guide (Hard Copy) | - |
| Optional Accessories | Rack Mount Kit | RM-DS2000A |
| | Passive Probe (500 MHz) | RP3500A |
| | USB-GPIB Interface Converter | USB-GPIB |
| | Soft Carrying Bag | BAG-G1 |
| Deep Memory Option | Analog channel: 56 Mpts (single-channel)/28 Mpts (dual-channel) Digital channel: 28 Mpts (8-channel)/14 Mpts (16-channel) | MEM-DS2000A |
| Advanced Trigger Option | Windows trigger, Nth edge trigger, HDTV trigger, Delay trigger, TimeOut trigger, Duration trigger, USB trigger | AT-DS2000A |
| Decoding Options | RS232, I2C, SPI Decoding Kit | SD-DS2000A |
| | CAN Analysis Kit (Trigger + Decoding) | CAN-DS2000A |