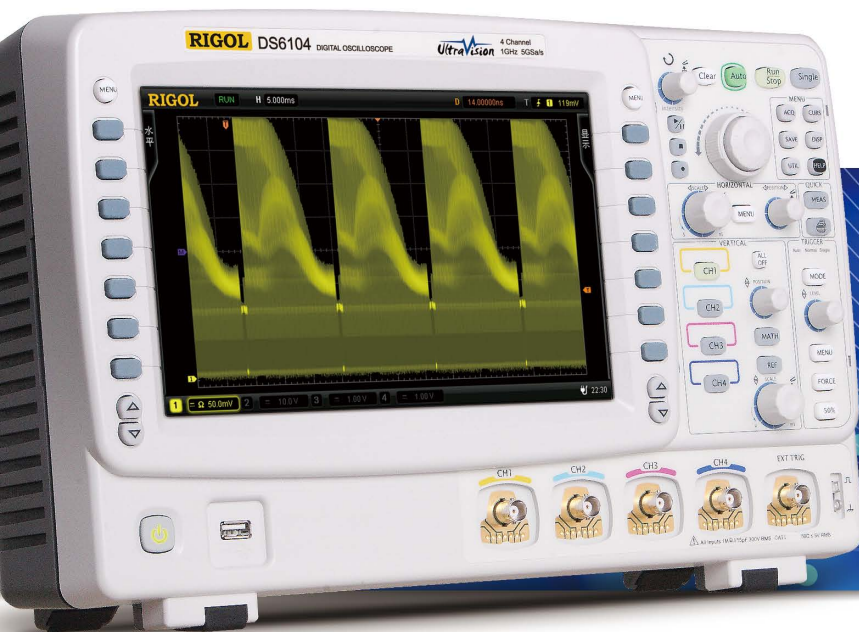




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2

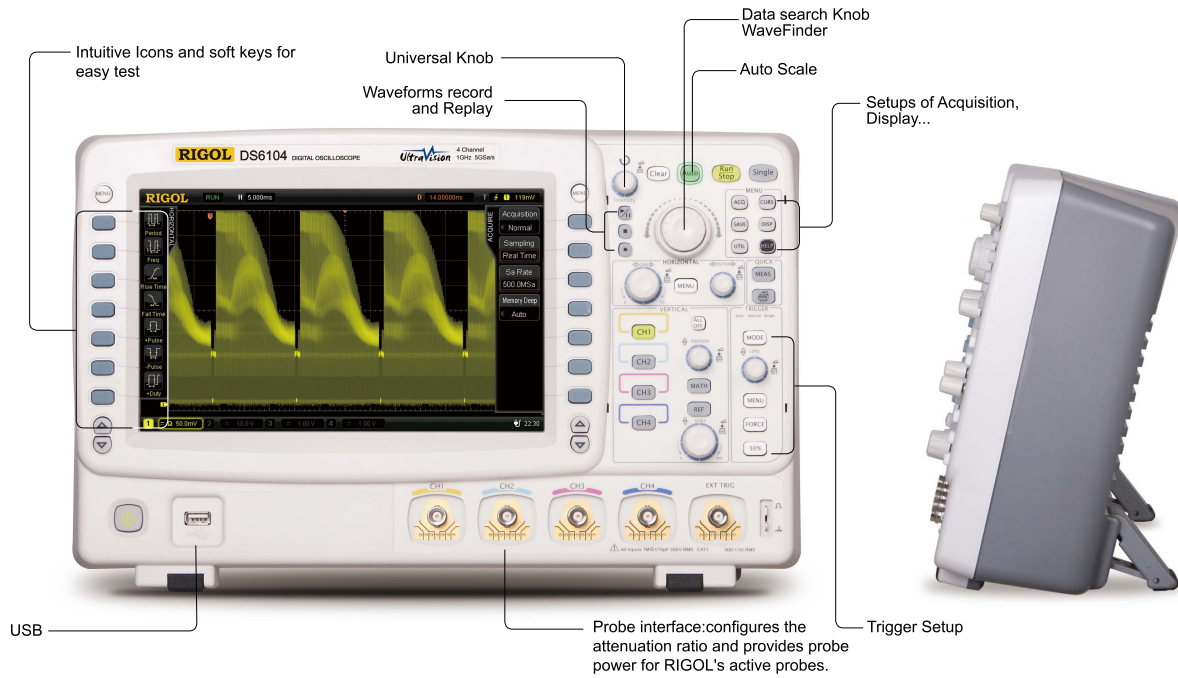


DS6000 Series Digital Oscilloscope

- Bandwidth 1 GHz, 600 MHz
- Sample Rate Up to 5 GSa/s
- Channels 2 or 4
- Memory 140 Mpts (Standard)
- Capture rate Up to 180,000 waveforms per second
- Waveform recording Up to 180,000 frames
- Innovative "UltraVision" technology
- A variety of Trigger functions and Automatic measurements with statistics
- Support serial bus trigger and decode
- Dedicated data search knob "WaveFinder"
- Complete Connectivity USB, LAN(LXI-C), WVGGA, GPIB(Option)...
- Built-in 1GBytes Flash Memory
- Battery power option

RIGOL DS6000 series is designed to aim at the requirements of the largest digital Oscilloscope market segment from the Communications, Semiconductor, Computing, Aerospace Defense, Instrumentation, Research/Education, Industrial Electronics, Consumer Electronics and Automotive industries with its innovative technology, industry leading specifications, powerful trigger functions and broad analysis capabilities.

DS6000 Series Digital Oscilloscope



Product Dimensions : Width x Height x Depth=399mm x 255.3mm x 123.8mm Weight:5.35 kg(without battery)

► Key features of DS6000 series

1. Industry-leading specifications

- Up to 1 GHz BW with 5 GSa/s sample rate
- Standard 140 Mpts deep memory
- Up to 180,000 waveforms per second capture rate
- Up to 180,000 frames for waveform record and replay

2. Innovative UltraVision technology

- Higher Waveform capture rate
- Deeper Memory
- Real Time waveform record and replay
- Multi-Level intensity grading display



3. Broad applications

- A variety of Trigger functions and Automatic measurements with statistics
- Serial bus trigger and decode such as I2C, SPI, RS232, CAN...
- Advanced math function
- Complete Connectivity
- A variety of Probes and accessories

4. Attractive profile

- Large display: 10.1 inch WVGA (800x480), LED backlight
- Shallow depth: reduces the space occupied
- Light weight: easy for hand carry even with battery power option

| Model | DS6104 | DS6102 | DS6064 | DS6062 |
|-----------------------|------------------------------------|----------|----------|----------|
| Bandwidth | 1 GHz | 1 GHz | 600 MHz | 600 MHz |
| Max. Sample rate | 5 GSa/s | 5 GSa/s | 5 GSa/s | 5 GSa/s |
| Memory(Standard) | 140 Mpts | 140 Mpts | 140 Mpts | 140 Mpts |
| Channels | 4 | 2 | 4 | 2 |
| Waveform capture rate | Up to 180,000 waveforms per second | | | |
| Frames recorded | Up to 180,000 frames | | | |

► Recommended RIGOL probes

| Model | Descriptions |
|--------|---|
| RP3500 | 500MHz Passive Probe (Standard for DS6062,DS6064) |
| RP5600 | 600MHz Passive Probe (Standard for DS6102,DS6104) |
| RP7150 | 1.5GHz Active Probe (Option for DS6000 series) |
| RP6150 | 1.5GHz Passive Probe (Option for DS6000 series) |

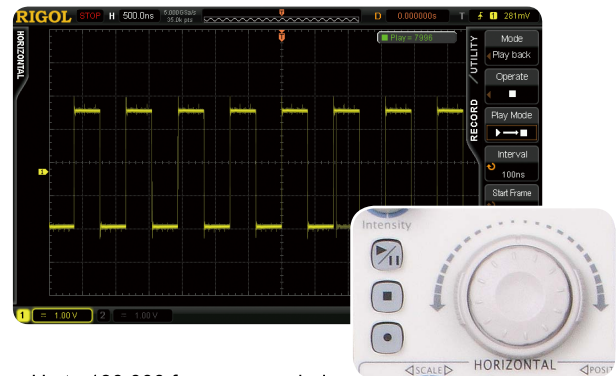
► Features and Benefits

UltraVision: Up to 180K Waveforms/s Waveform capture rate



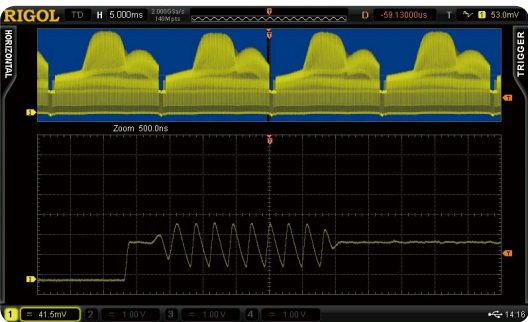
Find the infrequent problem easily

UltraVision: Real time waveform record and replay



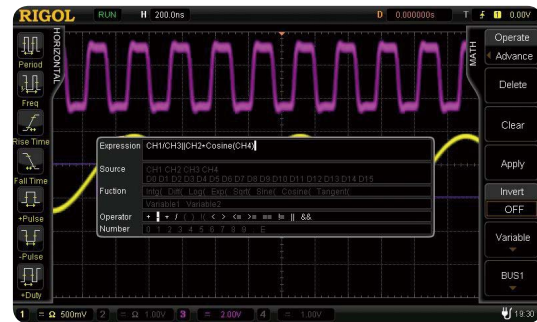
- Up to 180,000 frames recorded
- "WaveFinder"--Dedicated data search knob
- Replay and analyze the recorded waveforms

UltraVision: Deeper Memory with Multi-Level intensity grading display



Provide the capability to see both the panorama and detail simultaneously

Advanced math function (user defined)



Mask test functions



User defined Mask, Pass/Fail counts, Stop on Fail, Fail Alarm

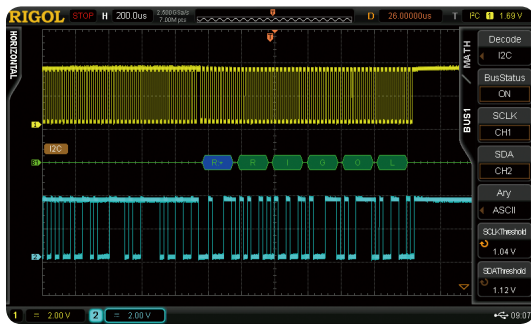
Automatic measurements with statistics



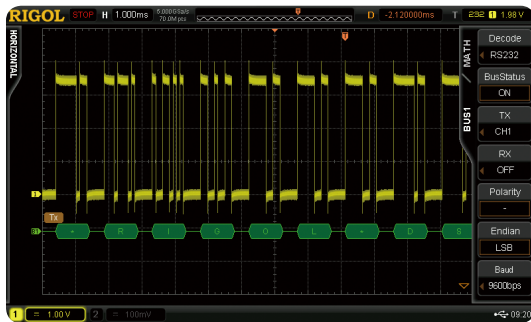
- Automatic measurements for Horizontal and vertical parameters
- Display up to 5 measurement items with statistics simultaneously
- Display all measurement items with the current value in the screen
- Intuitive icon and soft key operation for simplified testing

Serial bus decoding functions

I2C Decoding



RS232/UART



Complete Connectivity

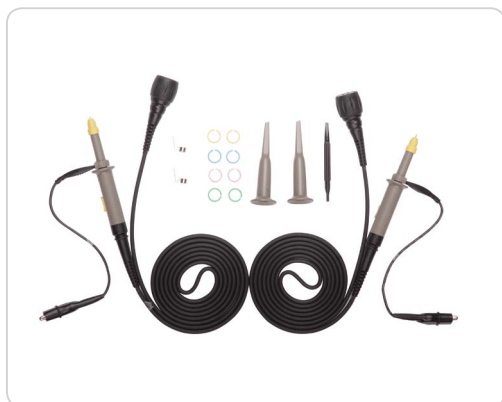


- External Trigger(Front Panel)
- Trigger output and calibration signal output
- 10MHz In/Out: 10MHz reference clock IN/Out
- VGA: Connect to an external monitor or projector
- LAN: For remote control (LXI-C compliant)
- USB: 2 USB HOST ports and 1 USB DEVICE port provide PC, Flash drive, and printer connectivity
- Supports the optional USB-GPIB adapter

► The probes supported by DS6000 series:

| Model Number | Attenuation Ratio | Bandwidth | Input R | Max. Input voltage | Recommended applications |
|--------------|-------------------|--------------------------------|--|---|--|
| RP2200 | 1:1 or 10:1 | 1X: DC~7 MHz 10X:DC~150 MHz | 1X: 1MΩ ±2% 10X: 10 MΩ±2% | 1X: CAT II 150 V AC 10X: CAT II 300V AC | Small signal test (1X) General purpose test |
| RP3300 | 1:1 or 10:1 | 1X: DC~8 MHz 10X:DC~350 MHz | 1X: 1 MΩ ±2% 10X: 10 MΩ±2% | 1X: CAT II 150 V AC 10X: CAT II 300V AC | Small signal test (1X) General purpose test |
| RP3500 | 10:1 | DC~500 MHz | 10 MΩ±2% | CAT II 300VAC | General purpose test |
| RP5600 | 10:1 | DC~600 MHz | 10 MΩ±2% | CAT II 300VAC | General purpose test |
| RP6150 | 10:1 | DC~1.5 GHz | 500 Ω±10 Ω | CAT I 10VAC | High frequency single ended small signal test |
| RP1300H | 100:1 | DC~300 MHz | 100 MΩ | CAT I 2000V (DC+AC), CAT II 1500 V (DC+AC) | High voltage test |
| RP1050H | 1000:1 | DC~50 MHz | 10 MΩ±0.5% | DC: 0~15KV DC AC: pulse <=30 KVp-p AC: sine wave <=10 KVrms | High voltage test |
| RP7150 | 10:1 | DC~1.5 GHz | Differential mode: 50 kΩ±1% Single ended mode: 37 kΩ±1% | 30V Peak, CAT I | Differential /Single ended high frequency signal test |

RP2200 150MHz Passive Probe



RP3300 350MHz Passive Probe



RP6150 1.5GHz Passive Probe



RP3500 500MHz Passive Probe

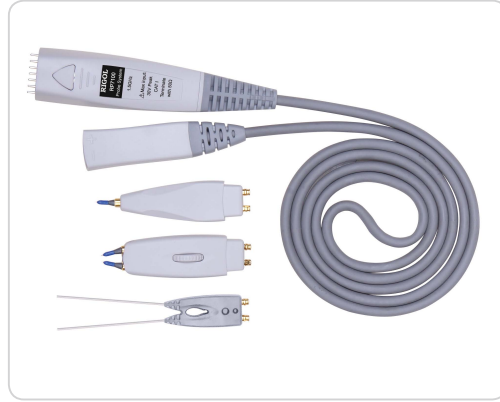


RP5600 600MHz Passive Probe



- 600MHz Bandwidth
- 10:1 passive probe
- Shipped with probe positioner and its accessories
- Identified by DS6000 automatically

RP7150 1.5GHz Active Probe



- 1.5GHz Bandwidth
- Active probe supports both differential and single-ended measurements
- Shipped with the browser probe head
- Provides many kinds of probe connection accessories
- Identified by DS6000 automatically

RP1300H 300MHz High Voltage Probe



RP1050H 50MHz High Voltage Probe



► Other accessories



ARM option



Optional USB-GPIB adapter for remote control



Rack mount kit option



Battery power option

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, Equivalent Sample |
| Real Time | 5 GSa/s (single-channel) |
| Sample Rate | 2.5 Gsa/s (dual-channel) |
| Equivalent Sample Rate | 100 Gsa/s |
| Peak Detect | 200 ps (single-channel) 400 ps (dual-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 $\geq 5 \mu\text{s}/\text{div}$ @ 5 GSa/s (or $\geq 10 \mu\text{s}/\text{div}$ @ 2.5 GSa/s). |
| Memory Depth | single-channel: Auto, 14k pts, 140k pts, 1.4M pts, 14M pts and 140M pts are available dual-channel: Auto, 7k pts, 70k pts, 700k pts, 7M pts and 70M pts are available |

| Input | |
|--------------------------------------|---|
| Number of Channels | DS6XX4: four channels DS6XX2: two channels |
| Input Coupling | DC, AC or GND (Ground) |
| Input Impedance | $(1 \text{ M}\Omega \pm 1\%) \parallel (14 \text{ pF} \pm 3 \text{ pF})$ or $50 \Omega \pm 1.5\%$ |
| Probe Attenuation Coefficient | 0.001X, 0.01X, 0.1X, 1X, 2X, 5X, 10X, 20X, 50X, 100X, 200X, 500X, 1000X |
| Maximum Input Voltage (1M Ω) | Maximum Input Voltage of the Analog Channel CAT I 300 Vrms, CAT II 100 Vrms, Transient Overvoltage 1000V pk with RP2200 10:1 probe: CAT II 300 Vrms with RP3300 10:1 probe: CAT II 300 Vrms with RP3500 10:1 probe: CAT II 300 Vrms with RP5600 10:1 probe: CAT II 300 Vrms |

| Horizontal | |
|------------------------------------|---|
| Timebase Scale | DS606X: 1 ns/div to 50 s/div DS610X: 500 ps/div to 50 s/div |
| Timebase Accuracy | $\leq \pm(15 + 2 \times \text{instrument age in years}) \text{ ppm}$ |
| Delay Range | Pre-trigger (negative delay): ≥ 1 screen width Post-trigger (positive delay): 1 s to 1000 s |
| Timebase Mode | Y-T, X-Y, Roll, Time Delayed |
| Number of XYs | 2 simultaneously |
| Waveform Capture Rate ¹ | 150,000 wfms (vector display); 180,000 wfms (dots display) |

| Vertical | |
|---|--|
| Bandwidth (-3dB) | DS606X: DC to 600 MHz DS610X: DC to 1 GHz |
| Single-shot Bandwidth | DS606X: DC to 600 MHz DS610X: DC to 1 GHz (each channel) |
| Vertical Resolution | 8bits, two channels sample at the same time |
| Vertical Scale | 2 mV/div to 5 V/div (1 M Ω) 2 mV/div to 1 V/div (50 Ω) |
| Offset Range | 2 mV/div to 120 mV/div: $\pm 1.2\text{V}$ (50 Ω) 125 mV/div to 1 V/div: $\pm 12\text{V}$ (50 Ω) 2 mV/div to 225 mV/div: $\pm 2\text{V}$ (1M Ω) 230 mV/div to 5 V/div: $\pm 40\text{V}$ (1M Ω) |
| Bandwidth Limit ² | 20 MHz or 250 MHz |
| Low Frequency Response (AC Coupling -3dB) | $\leq 5 \text{ Hz}$ (on BNC) |
| DC Gain Accuracy | $\pm 2\%$ full scale |
| DC Offset Accuracy | 200 mV/div to 5 V/div: 0.1 div $\pm 2 \text{ mV} \pm 0.5\%$ offset value 2 mV/div to 195 mV/div: 0.1 div $\pm 2 \text{ mV} \pm 1.5\%$ offset value |
| ESD Tolerance | $\pm 2 \text{ kV}$ |
| Channel to Channel Isolation | DC to maximum band width: $>40 \text{ dB}$ |

| Trigger | | |
|---------------------------------------|--|--------------------------------|
| Trigger Level Range | Internal | ± 6 div from center screen |
| | EXT | $\pm 0.8 \text{ V}$ |
| Trigger mode | Auto, Normal, Single | |
| Holdoff Range | 100 ns to 10 s | |
| High Frequency Rejection ² | 50 kHz | |
| Low Frequency Rejection ² | 5 kHz | |
| 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 | 4 ns to 4 s | |
| 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 | |
| Signal Standard | Support standard NTSC, PAL and SECAM broadcasting standards, the range of the number of lines is from 1 to 525 (NTSC) and 1 to 625 (PAL/SECAM) |
| Line Frequency Range | |
| Pattern Trigger | |
| Pattern Setting | H, L, X, Rising Edge, Falling Edge |
| RS232/UART Trigger | |
| Trigger Condition | Start, Error, Check Error, Data |
| Baud Rate | 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, 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, 10 bit |
| Address Range | 1 to 127 |
| Data Range | 0 to 255 |
| Data Qualifier | Equal to, Greater than, Less than |
| SPI Trigger | |
| Trigger Condition | CS, Timeout |
| Timeout Value | 100 ns to 999 ns |
| Data Bits | 4 bit to 32 bit |
| Data Line Setting | H, L, X |
| Clock Edge | Rising Edge, Falling Edge |
| Signal Type | Rx, Tx, CAN_H, CAN_L, Differential |
| CAN Trigger | |
| Trigger Condition | SOF, EOF, Frame Type |
| Baud Rate | 10kbps, 20kbps, 33.3kbps, 50kbps, 62.5kbps, 83.3kbps, 100kbps, 125kbps, 250kbps, 500kbps, 800kbps, 1Mbps, User |
| Sample Point | 5% to 95% |
| Frame Type | Data, Remote, Error, OverLoad |
| USB Trigger | |
| Signal Speed | Low Speed, Full Speed |
| Trigger condition | SOP, EOP, RC, Suspended, Exit Suspended |

| | | |
|--|--|--|
| Measure | | |
| Cursor | Manual Mode | Voltage Deviation between Cursors (ΔV) |
| | | Time Deviation between Cursors (ΔT) |
| | Track Mode | Reciprocal of ΔT (Hz) ($1/\Delta T$) |
| Auto Mode | Voltage and Time Values of the Waveform Point | |
| | Allow to display cursors during auto measurement | |
| Auto Measurement | | |
| Measurements of Maximum, Minimum, Peak-Peak Value, Top Value, Bottom Value, Amplitude, Average, Mean Square Root, Overshoot, Pre-shoot, Frequency, Period, Rise Time, Fall Time, Positive Pulse Width, Negative Pulse Width, Positive Duty Cycle, Negative Duty Cycle, Delay A~B \bar{f} , Delay A~B \bar{t} , Phase A~B \bar{f} , Phase A~B \bar{t} | | |
| Number of Measurements | Display 5 measurements at the same time. | |
| Measurement Range | Screen or cursor. | |
| Measurement Statistic | Average, Max, Min, Standard Deviation, Number of Measurements | |
| Frequency Counter | Hardware 6 bits frequency counter (channels available: DS606x, CH1/CH2; DS610x, CH1/CH2/CH3/CH4) | |

| | |
|------------------------------|--|
| Math Operation | |
| Waveform Operation | A+B, A-B, AxB, A/B, FFT, Editable Advanced Operation, Logic Operation |
| FFT Window Function | Rectangle, Hanning, Blackman, Hamming |
| FFT Display | Split, Full Screen |
| FFT Vertical Scale | Linear RMS, dBV RMS |
| Logic Operation | AND, OR, NOT, XOR |
| Math Function | Intg, Diff, Log, Exp, Sqrt, Sine, Cosine, Tangent |
| Number of Buses for Decoding | 2 |
| Decoding Type | Parallel(standard),RS232/UART(option), I2C/SPI(option) |
| Display | |
| Display Type | 10.1 inches (257 mm) TFT LCD display |
| Display Resolution | 800 Horizontal xRGBx480 Vertical Pixel |
| Display Color | 160,000 Color |
| Persistence Time | Minimum, 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 | USB device, two USB host ports, LAN, VGA Output, 10 MHz Input/Output, Aux output (TrigOut, Quick Edge, PassFail, Calibration, GND) |
| Printer Compatibility | PictBridge |

General Specifications

| | | |
|--|---|--------------------|
| Probe Compensation Output | | |
| Output Voltage ² | About 3 V, peak-peak | |
| Frequency ² | 1 kHz | |
| Power | | |
| Power Voltage | 100-120 V/45-440 Hz 100-240 V/45-65 Hz | |
| Power | Maximum 150W | |
| Fuse | 3 A, T Degree, 250 V | |
| Environment | | |
| Temperature Range | Operation: 0°C to +50°C Non-Operation: -20°C to +70°C | |
| Cooling Method | fan cooling | |
| Humidity Range | Under +35°C: $\leq 90\%$ Relative Humidity +35°C to +50°C: $\leq 60\%$ Relative Humidity | |
| Altitude | Operation: under 3,000 meters Non-Operation: under 15,000 meters | |
| Physical Characteristics | | |
| Size ³ | WidthxHeightxDepth = 399.0 mmx255.3 mmx123.8 mm | |
| Weight ⁴ | Package Excluded | 5.345 \pm 0.2 kg |
| | Package Included | 10.8 \pm 1 kg |
| Calibration Interval | | |
| The recommended calibration interval period is one year. | | |
| Regulatory Information | | |
| Electromagnetic Compatibility | 2004/108/EC Execution standard EN 61326-1:2006 EN 61326-2-1:2006 | |
| Safety | UL 61010-1:2004 ; CAN/CSA-C22.2 NO. 61010-1-2004 ; EN 61010-1:2001 ; IEC 61010-1:2001 | |

1. Maximum value. In single-channel mode, sine signal with 10 ns horizontal scale, 4 div input amplitude and 10 MHz frequency, edge trigger.

2. Typical.

3. Tilt tabs and handle folded, knob height included, front panel cover excluded.

4. DS1064 model, standard configuration.

► Ordering Information

| | Description | Order Number |
|--------------------------------------|--|-------------------------------------|
| Model | DS6104 (1 GHz, 4-channel) | DS6104 |
| | DS6102 (1 GHz, dual-channel) | DS6102 |
| | DS6064 (600 MHz, 4-channel) | DS6064 |
| | DS6062 (600 MHz, dual-channel) | DS6062 |
| Standard Accessories | Power Cord conforming to the standard of the country | - |
| | Front Panel Cover | FPC-DS-6 |
| | USB Data Cable | CB-USB-150 |
| | 2 or 4 Passive Probes (600 MHz) | RP5600 (for DS610X) |
| | 2 or 4 Passive Probes (500 MHz) | RP3500 (for DS606X) |
| | Quick Guide | - |
| | Resource CD (User's Guide and Application Software) | - |
| | Optional Accessories | Active Differential Probe (1.5 GHz) |
| Passive Probe (1.5 GHz, 500 Ω Input) | | RP6150 |
| Upgrade RP3500 to RP5600 | | UP-RP35to56 |
| 11.1 V, 147 Wh Lithium Battery Set | | BAT |
| USB to GPIB Module | | USB-GPIB |
| Desk Mount Instrument Arm | | ARM |
| Rack Mount Kit | | RM-DS-6 |
| Decoding Options | RS232/UART Decoding kit | SD-RS232-DS6 |
| | I2C&SPI Decoding Kit | SD-I2C&SPI -DS6 |

RIGOL

