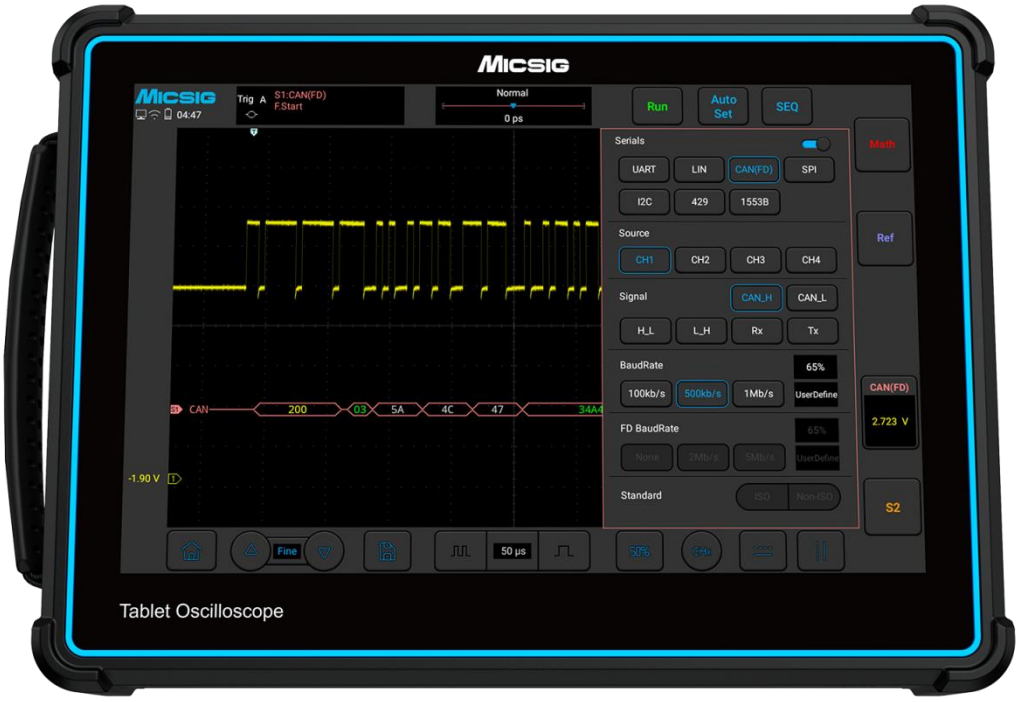
# Tablet Oscilloscope TO Series

## Data Sheet

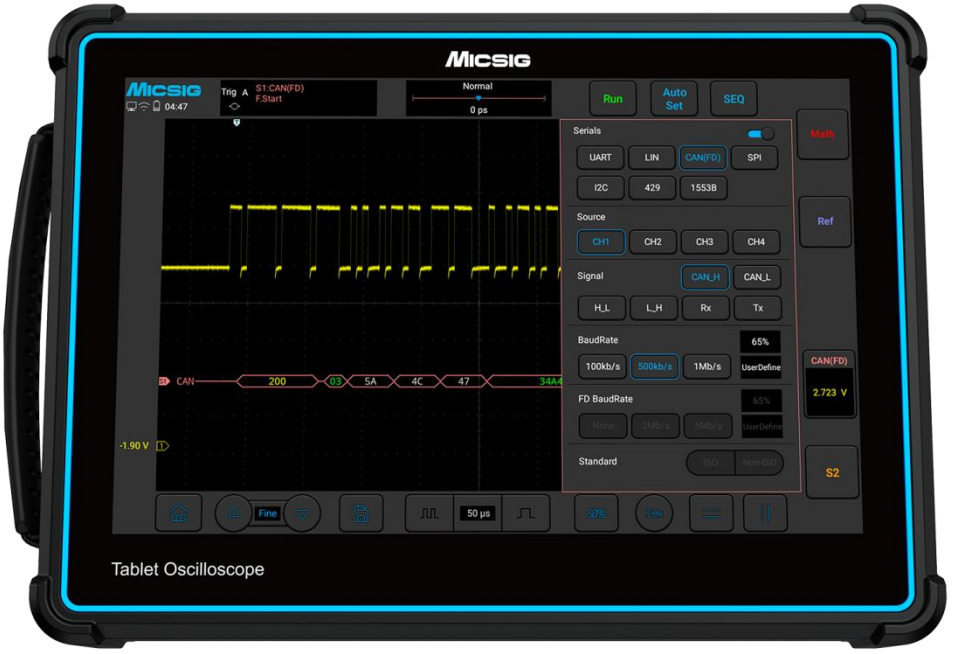



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## Overview

The TO series Tablet Oscilloscope features 2&4 analog channels, up to 300MHz bandwidth, 2GSa/s sampling rate and max. 220Mpts memory depth, running with Micsig latest SigtestUI™ multitasking system, make sure long-time stable and smooth performance. 10.1-inch integrated full touch screen with 1280 x 800 high resolution, combined with Micsig's over 10 years of experience in touch control algorithms, the TO series brings touch experience to another level.

The TO series Tablet Oscilloscope comes in a compact form factor,  making it a go-to oscilloscope for electronic debug and test, integrates comprehensive measurement and mathematical functions, supports serial bus triggering and decoding, also equipped with hardware digital filtering modules and other functions. Powered by built-in battery, it helps engineers work where they work.




# Key Specifications

| Model | TO3004 | TO2004 | TO2002 |
|---|---|---|---|
| Bandwidth | 300MHz | 200MHz | 200MHz |
| Analog channels | 4 | 4 | 2 |
| Rise time | ≤1.16ns | ≤1.75ns | ≤1.75ns |
| Max. Sampling rate | 2GSa/s | 2GSa/s | 1GSa/s |
| Max. Memory depth | 220Mpts | 220Mpts | 110Mpts |
| Waveform capture rate | 300,000 wfms/s | 300,000 wfms/s | 78,000 wfms/s |
| Bus decoding | RS-232/422/485/UART, CAN, CAN FD, LIN, SPI, I²C | | |
| Input impedance | 1MΩ/50Ω | | 1MΩ |
| Interfaces | Wi-Fi, USB 3.0/2.0 Host, USB Type-C, Grounding, HDMI, Trigger out | | |
| Vertical resolution | 8 bits | | |
| Display | 10.1 Inch LCD capacitive touch display，1280*800 resolution，11*10 grids | | |
| Size/Net weight | 265*192*50mm / 1.9kg（with battery） | | |
| Battery | 7.4V, 7500mAh Li-Ion battery | | |

# Product Features

**Wi-Fi**

**Rugged & Compact Design**
ABS+TPU rubber protector, TPE side handle, weighs only 1.9KG

**Robust Hardware**
Upgraded core hardware, faster CPU, support video recording and large file storage



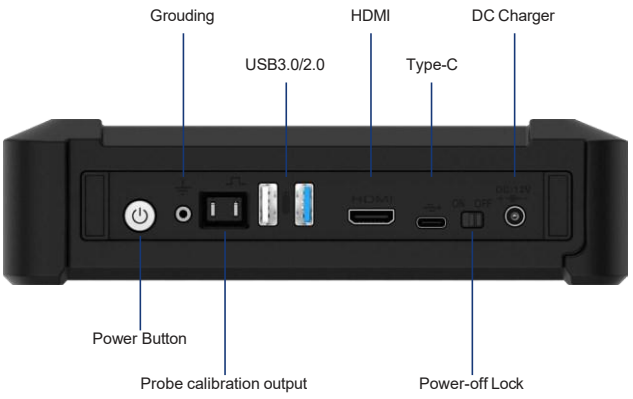

**Superior Touch Experience**
10.1 inch, 1280 x 800 pixels, upgraded seamless TFT LCD screen

**Intuitive User Interfaces**
Android-based OS, impressive UI interactions

**Standard Protocol Decoding**
RS-232/422/485/UART、CAN、CAN FD、LIN、SPI、I²C



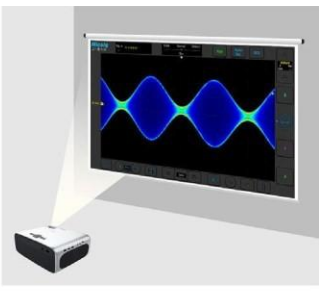
- Built-in 7500mAh Li-ion battery, Support Power-off lock, more secure to travel with.




- Power button, Grounding plug, Probe Calibration Output, USB3.0/2.0, HDMI, Type-C, Power Supply, Power-off Lock (Note: switch to ON for first-time use)

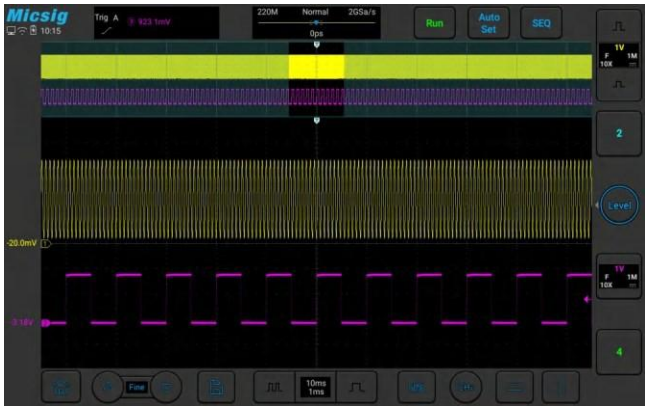






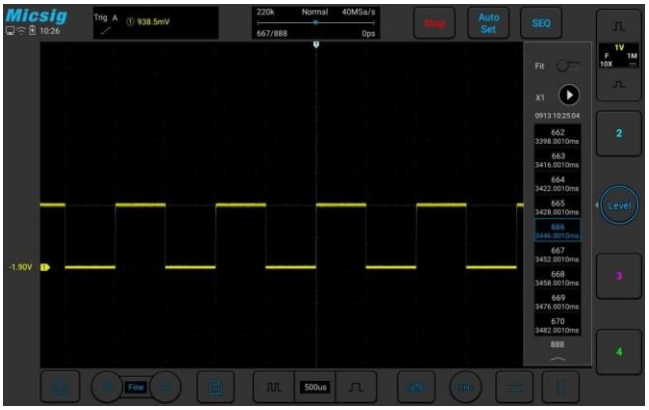


- The TO series supports PC software + Mobile App (Android / iOS) remote control via Wi-Fi, USB, able to access internet for online upgrade, it also can be projected through HDMI port for demonstrations for training and education purpose.



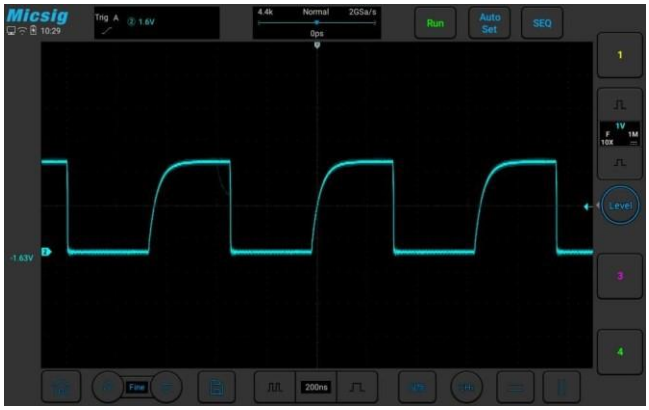
## Ultra Memory Depth

Using hardware-based Zoom technique and memory depth of up to 220Mpts, allow users to move and browse waveforms much easier and quickly zoom in/out to interested events.



## Segmented Storage Acquisition

Up to 10,000 waveform events can be captured for efficient analysis, helping users to capture occasional signals and more optimally save the data required. (Only available on TO3004/TO2004)



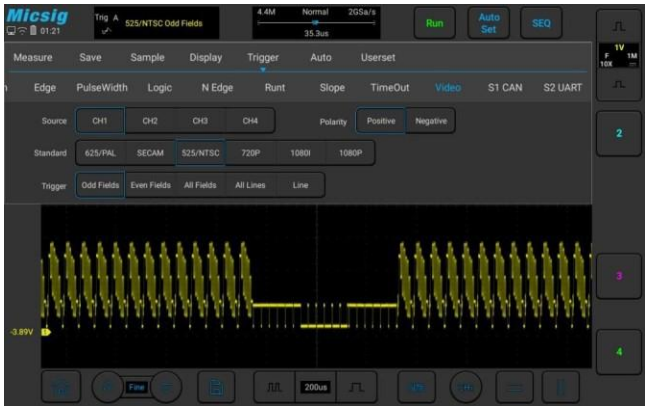
## High Waveform Update Rate

Up to 300,000 wfms/s update rate, the TO series can easily capture unusual or low probability events.



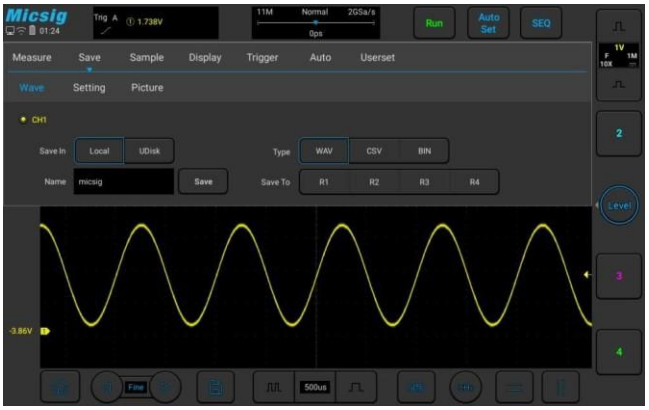
## Serial Bus Decoding and Analysis

Support RS-232/422/485/UART, LIN, CAN, CAN FD, I²C, SPI hardware-based serial bus decoding and triggering, display waveform and data at the same time.



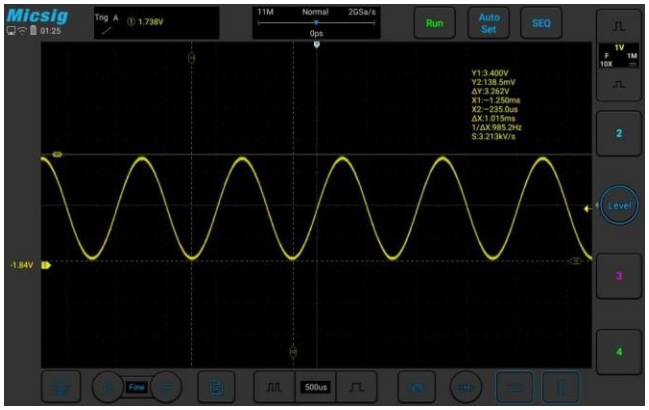
## Powerful Trigger Functions

Support Edge, Pulse, Logic, N Edge, Runt, Slope, Timeout, Video and Serial trigger, most intuitive trigger settings, fast and easy trigger source switching.



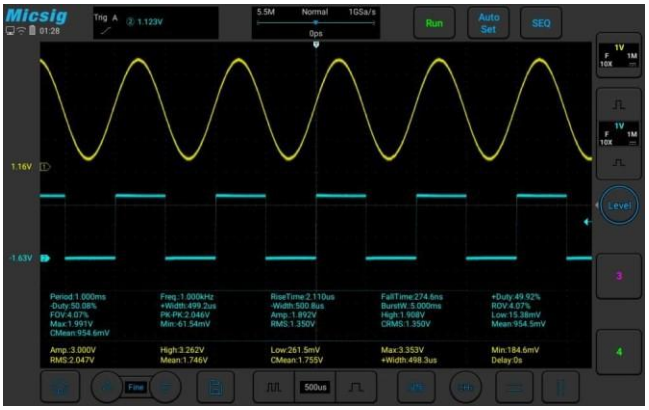
## Fast Storage Function

Micsig's unique fast storage function allow users quickly save waveforms with one press, a full screen of 220M waveform data can be completely saved in BIN format. More than 70% faster than traditional oscilloscopes.



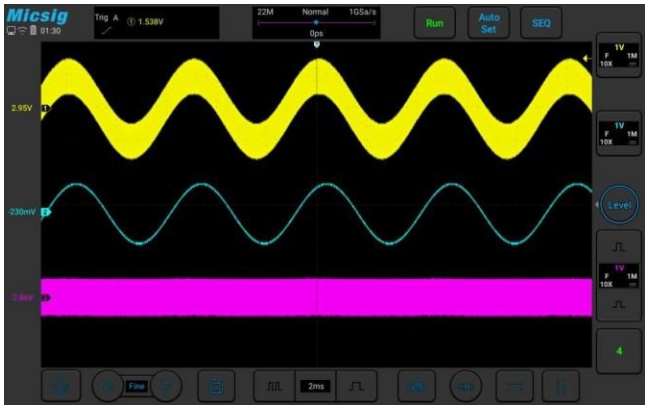
## Convenient Cursor Measurements

One touch to open horizontal and vertical cursors, each cursor can be moved separately or simultaneously, brings unmatched user experience.



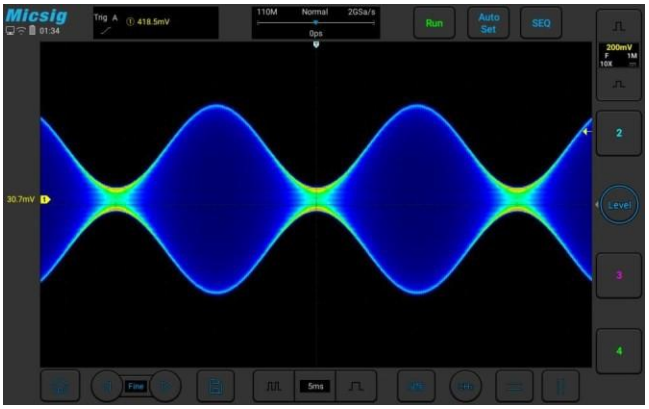
## 31 Auto Measurements

All 31 types of automatic measurements can be displayed on one screen, one touch to clear, the best auto measurement on the market.



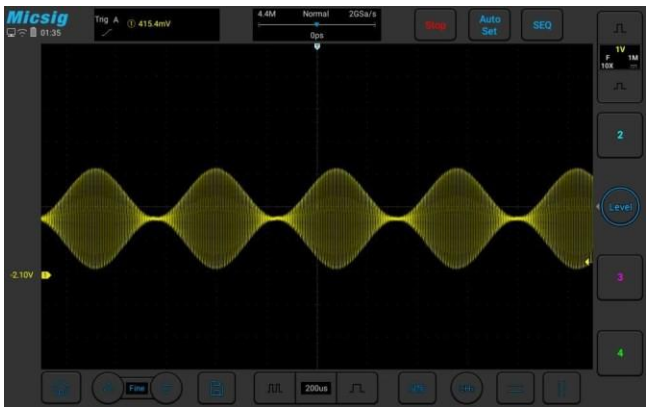
## Hardware Digital Filtering

The TO series high pass / low pass filter function helps engineers rule out insignificant frequency so to eliminate interference, and observe the true state of the signal.



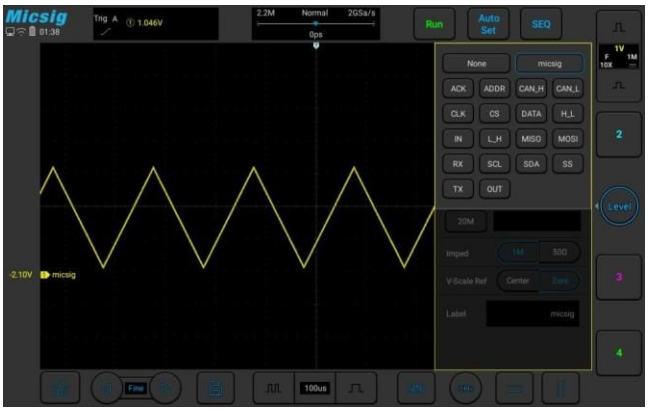
## Color Temperature Display

The Color temperature display is similar to the intensity-graded trace function, but the trace occurrence is represented by different colors as opposed to changes in the intensity of one color. Red colors represent more frequently occurred events, while the bule represents less frequently ones.



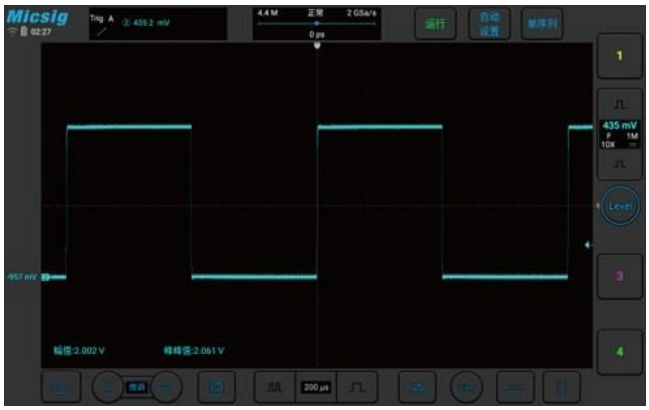
## 256-Level Intensity Grading

The TO series has digital fluorescent display, the resulting intensity-graded trace is brighter for events that occur with more frequency and dims when the events occur with less frequency.



## User Defined Channel Label

Users can set different labels for different sources to facilitate observation and readout.



## Vertical scale fining

By pinching two fingers apart on the screen, you can adjust the vertical scale as you like, no longer limited by the 1/2/5 step limit.



## Statistics Function

Using statistics to read the current measurement item multiple times, monitor the change trend, the maximum number of readings can reach 10,000.

# Recommended Options

| | |
|---|---|
| **Handbag & Suitcase** | |
| **Special Handbag** | Black nylon canvas, suitable for all Micsig oscilloscopes |
| | |
| **Current Probes** | |
| **High Frequency AC/DC Current Probe** | Bandwidth: 50 / 100MHz, Range: 6A/30A, Accuracy: ±1%, BNC interface |
| **Rogowski Coil AC Current Probe RCP500** | Bandwidth: 15-300KHz, Range: 200mApk-500Apk, Accuracy: 1%, BNC interface |
| **AC Current Probe ACP1000** | Bandwidth: 10Hz-100KHz, Range: 0.1Apk-1000Apk, BNC interface |
| **Low Frequency AC/DC Current Probe CP2100B** | Bandwidth: DC~2.5MHz, Range: 10A/100A, BNC interface |
| **Low Frequency AC/DC Current Probe CP2100A** | Bandwidth: DC~800KHz, Range: 10A/100A, BNC interface |
| **Voltage Probes** | |
| **High Voltage Differential Probe DP750-100 (EOL)** | Bandwidth: 100MHz, Max. input differential voltage(DC+AC PK): 75V(50X), 750V(500X), Accuracy: ±2%, BNC interface |
| **High Voltage Differential Probe DP series (EOL)** | Bandwidth: 100MHz, 700V - 5600Vpk, Accuracy: ±2%, BNC interface |
| **High Voltage Differential Probe MDP series** | Bandwidth: 100MHz, 700V - 3000Vpk Accuracy: ±2%, BNC interface |
| **SigOFIT™ optical-fiber isolated probe** | Bandwidth: 100MHz - 1GHz, common mode voltage: 60kVpk, CMRR: DC -160dB. |

# Technical Parameters

| Vertical system | |
|---|---|
| **Invert** | Support |
| **Bandwidth filter** | TO3004 / TO2004: 20MHz, high pass / low pass (to 30Hz)<br>TO2002 : 20MHz, high pass / low pass (to 30KHz) |
| **Coupling** | DC, AC, GND |
| **Input Impedance and Accuracy** | TO3004 / TO2004: 1MΩ±1% \|\| 50Ω±1%<br>TO2002 : 1MΩ±1% |
| **Vertical resolution** | 8 bits |
| **Vertical scale factor** | TO3004 / TO2004: 1mV/div~10V/div @ 1MΩ; 1mV/div~1V/div @ 50Ω<br>TO2002 : 1mV/div~10V/div @ 1MΩ |
| **DC Gain accuracy** | 5mV/div ~10V/div: ≤ ±2.0%<br>≤ 2mV/div: ≤ ±3.0% |
| **Vertical offset range(1MΩ/50Ω)** | ±2.5V(@probe 1X, ＜500mV/div), ±120V(@probe 1X, ≥ 500mV/div) |
| **Noise floor** | ≤1.2mVpp (1mV/div, 1MΩ) |
| **Probe Attenuation Ratio** | 1mX~10kX, 1-2-5 sequence |
| **Max. input voltage** | CAT I 300Vrms 400Vpk (1MΩ), 5Vrms (50Ω) |
| **Channel isolation** | ＞40dB (≤100MHz), ＞35dB (＞100MHz) |
| **Channel label** | Support |

| Sampling System | TO3004 / TO2004 | TO2002 |
|---|---|---|
| **Real-time sample rate** | 2G Sa/s (single CH), 1G Sa/s (all CHs) | 1G Sa/s (single CH), 250M Sa/s (all CHs) |
| **Memory depth (Max.)** | 220Mpts | 110Mpts |
| **Segmented storage** | Support | Not support |
| **Average** | 2,4,8,16,32,64,128,256 | |
| **Envelope** | 2,4,8,16,32,64,128,256,∞ | |

| Horizontal system | |
|---|---|
| **Horizontal scale** | 1ns/div~1ks/div（TO2002 ： 2ns/div-1ks/div） |
| **Time base accuracy** | 20ppm |
| **Horizontal divisions** | 11 divs |
| **Time base delay time range** | -11 div ~ 11ks, resolution: 1 pixel |

| Trigger System | |
|---|---|
| **Trigger mode** | Auto, Normal, Single |
| **Trigger level range (analog)** | ±5div from screen center, analog channel |
| **Hold off range** | 200ns~10s |
| **Trigger coupling and frequency (analog channel)** | DC, AC(70Hz), low frequency (40KHz), high frequency (40KHz), noise (10MHz) |
| **Trigger Types** | Edge, Pulse Width, Logic, N Edge, Runt Pulse (Runt), Slope, Time Out, Video |
| **Bus decoding** | RS-232/422/485/UART, CAN, CAN FD, LIN, SPI, $I^2C$ |

| Measurements | |
|---|---|
| **Auto measurements** | Period, Frequency, Rise Time, Fall Time, Delay, Positive Duty Cycle, Negative Duty Cycle, Positive Pulse Width, Negative Pulse Width, Burst Width, Positive Overshoot, Negative Overshoot, Phase, Peak-to-Peak, Amplitude, High, Low, Maximum, Minimum, RMS, Cycle RMS, Mean, Cycle Mean |
| **Hardware frequency counter and resolution** | Support each analog channel, 6bit, 2Hz~max. bandwidth, pk-pk > 0.8div |
| **Cursor** | Horizontal, vertical, cross |
| **Cursor resolution** | 1 pixel |

| Math | |
|---|---|
| **Dual waveform** | +, -, *, /, Analog channel |
| **FFT** | Points: max. 275KdBVrms; Source: Analog channel; Resolution: Max 100Kpts Window: Rectangular, Hamming, Blackman, Hanning |
| **AX+B** | A: ±1k, Min. Resolution 1p or 4it<br>B: ±1k, Resolution 1p or 5bit<br>X: Analog channel |
| **Advance math** | Advanced input, including +, -, *, /, < , > , ≤, ≥, ==, !=, &&, \|\|, (, ), !(, sqrt, abs, deg, rad, exp, diff, ln, sin, cos, tan, intg, lg, asin, acos, atan, |

| Waveform store | |
|---|---|
| **Source** | Analog channel, math channel |
| **Storage location** | Local , USB |
| **Waveform format** | WAV, CSV, BIN |
| **Storage quantity** | Unlimited |
| **Waveform rename** | Support |
| **Quick save** | Support |
| **Store number of user settings** | 10 |
| **Screen record** | Support |

| Auto | |
|---|---|
| **Auto configuration** | Channel switch (threshold level can be set), Trigger source (max. signal, current) |
| **Auto range** | Vertical scale, horizontal scale, trigger level |

| Display | |
|---|---|
| **LCD screen and resolution** | 10.1 inches, 1280*800 resolution, 11*10 Divisions |
| **Waveform Update Rate** | TO3004/TO2004 is 300,000 wfms/s;<br>TO2002 is 78,000 wfms/s |
| **Grid Type** | Full, Line, None, Cross |
| **Brightness** | Adjustable |
| **Waveform Display** | Line, Dot |
| **Persistence** | Auto, 10ms~10s, ∞ |
| **Waveform gray scale** | 256 Level |
| **Color temperature display** | Support |

| Interfaces | |
|---|---|
| **USB3.0 Port** | Support one USB storage device |
| **USB2.0 Port** | 1, readable & writable |
| **USB Type-C** | 1, readable & writable |
| **DC Port** | 1, Supply power to oscillsocope |
| **Probe calibration signal** | 1KHz, 2Vpk-pk |
| **HDMI** | HDMI 1.4 |
| **Wi-Fi** | Support |
| **Android/iOS Remote control application** | Support |

| Others | |
|---|---|
| **Battery** | 7.4V, 7500mAh Li-Ion Battery |
| **Self-calibration** | Support |
| **Languages** | English, Chinese, German, French, Czech, Korean, Spanish, Italian, etc |
| **Factory information** | Model, SN, Bandwidth, Serial Number, Version, Factory Date |
| **Operating System** | Android |
| **Built-in app** | App Store, Browser, Oscilloscope, Calendar, Clock, Gallery, Calculator, User Guide, Electronic Tools, File Manager |

| Power Supply | |
|---|---|
| **Adapter input** | 100~240VAC, 50/60Hz |
| **Power consumption** | < 60W |
| **Adapter output** | 12V DC, 5A（TO2002 is 12V DC, 4A） |
| **Battery** | 7.4V, 7500mAh Li-ion battery |

| Environment | |
|---|---|
| **Temperature** | |
| **Operating** | 0℃ ~ 45℃ |
| **Non-operating** | -40℃ ~ 60℃ |
| **Humidity** | |
| **Operating** | 5% ~ 85%, 25℃ |
| **Non-operating** | 5% ~ 90%, 25℃ |
| **Altitude** | |
| **Operating** | < 3000m |
| **Non-operating** | < 12000m |

| Physical Characteristics | |
|---|---|
| **Dimensions (W x H x D)** | 265*192*50mm |
| **Weight** | Net: 1.9kg (with battery), Volum Weight: 4.5kg |

# Product Accessories

| Model | Standard Accessories |
|---|---|
| **TO2002**<br>**TO2004**<br>**TO3004** | Passive Probe (2CH: *2; 4CH: *4) |
| | Power cord *1 |
| | Power adapter *1 |
| | Battery *1 |
| | Calibration Certificate *1 |
| | User Guide *1 |

*TO2002 is 2CH oscilloscope and 2004/3004 is 4CH oscilloscope.

| Professional Hand Carry Bag/ Hard Case Set | |
|---|---|
| **Micsig Handbag set** | Black, Nylon, Custominzed |
| **Micsig Suitcase set** | Impact, Vibration, Crush resistant, Dustproof, Moisture-proof, Customized |

| Optional Instruments | |
|---|---|
| **DP700** | High Voltage Differential Probe: 100MHz, 70V (20X) / 700V (200X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP702** | High Voltage Differential Probe: 200MHz, 70V (20X) / 700V (200X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP1500** | High Voltage Differential Probe: 100MHz, 150V (50X) / 1500V (500X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP1502** | High Voltage Differential Probe: 200MHz, 150V (50X) / 1500V (500X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP3000** | High Voltage Differential Probe: 100MHz, 300V (100X) / 3000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP3002** | High Voltage Differential Probe: 200MHz, 300V (100X) / 3000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP7000** | High Voltage Differential Probe: 100MHz, 700V (100X) / 7000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| **DP7002** | High Voltage Differential Probe: 200MHz, 700V (100X) / 7000V (1000X), Accuracy: ±2% (Customizable 1% accuracy) |
| **CP3008** | High Frequency AC / DC Current Probe: DC-8MHz, 300Arms, 500Apk, Output Sensitivity: 1V/10A, 1V/100A |
| **CP3005** | High Frequency AC / DC Current Probe: DC-5MHz, 300Arms, 500Apk, Output Sensitivity: 1V/10A, 1V/100A |
| **CP1510** | High Frequency AC / DC Current Probe: DC-10MHz, 150Arms, 300Apk, Output Sensitivity: 1V/10A, 1V/100A |
| **CP1003B** | High Frequency AC / DC Current Probe: DC-100MHz, 30Arms, 50Apk, Output Sensitivity: 1V/1A, 1V/10A |
| **CP503B** | High Frequency AC / DC Current Probe: DC-50MHz, 30Arms, 50Apk, Output Sensitivity: 1V/1A, 1V/10A |
| **MOIP200P** | SigOFIT Optical-fiber Isolated Probe: DC-200MHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| **MOIP350P** | SigOFIT Optical-fiber Isolated Probe: DC-350MHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| **MOIP500P** | SigOFIT Optical-fiber Isolated Probe: DC-500MHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| **MOIP1000P** | SigOFIT Optical-fiber Isolated Probe: DC-1GHz, CMRR 180dB, DC Gain Accuracy 1%, 0dB/20dB Switch, Measure both differential and common-mode voltage |
| **RCP-XS Series** | Rogowski AC Current Probe: Peak current12000Apk, coil cross-section φ1.6mm, coil circumference 80mm/200mm<br>The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| **RCP-S Series** | Rogowski AC Current Probe: Peak current12000Apk, coil cross-section φ3.0mm, coil circumference 200mm/700mm<br>The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| **RCP-M Series** | Rogowski AC Current Probe: Peak current12000Apk, coil cross-section φ4.5mm, coil circumference 200mm/700mm<br>The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| **RCP-L Series** | Rogowski AC Current Probe: Peak current12000Apk, coil cross-section φ8.0mm, coil circumference 700mm<br>The coil's cross-sectional diameter, circumference, lead length, peak coil isolation voltage, and working temperature are all customizable. |
| **CP2100A** | Low Frequency AC/DC Current Probe: DC-800kHz, Peak current 100Apk, Max. conductor diameter 13mm |
| **CP2100B** | Low Frequency AC/DC Current Probe: DC-2.5MHz, Peak current 100Apk, Max. conductor diameter 13mm |

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