SOJALAB

dProbe1000

900 MHz Low voltage Differential oscilloscope probe

Datasheet

1 Features

Low voltage Differential oscilloscope probe

1.1 Key Features

- 900MHz bandwidth
- Small size (110 x 21 x 17mm)
- 50Ω output

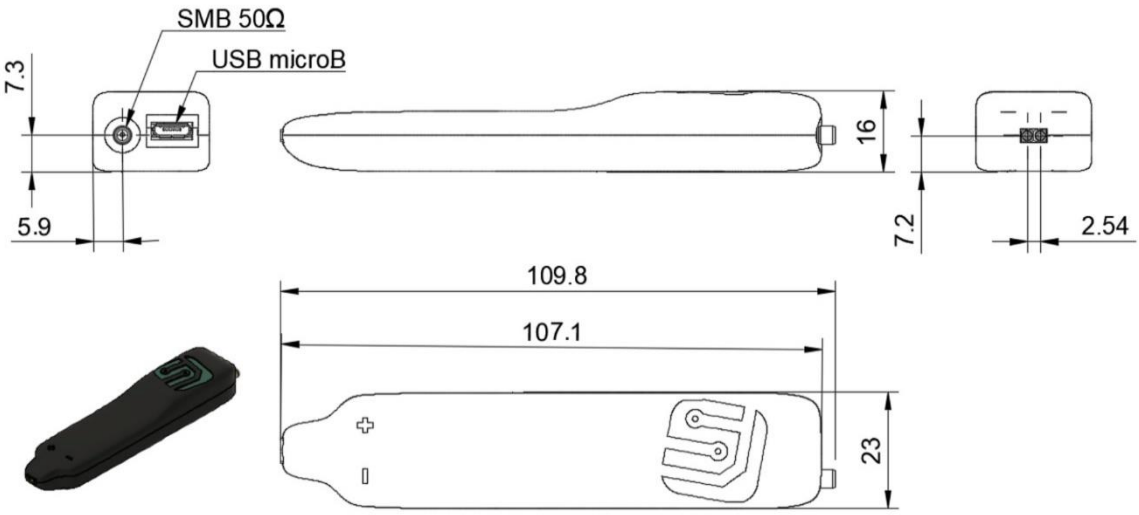
1.2 Applications

- SubGHz LVDS signal probing
    - USB 2.0 HighSpeed
    - 1 Gb ETHERNET
    - 100+ MHz data communication over LVDS/ECL data

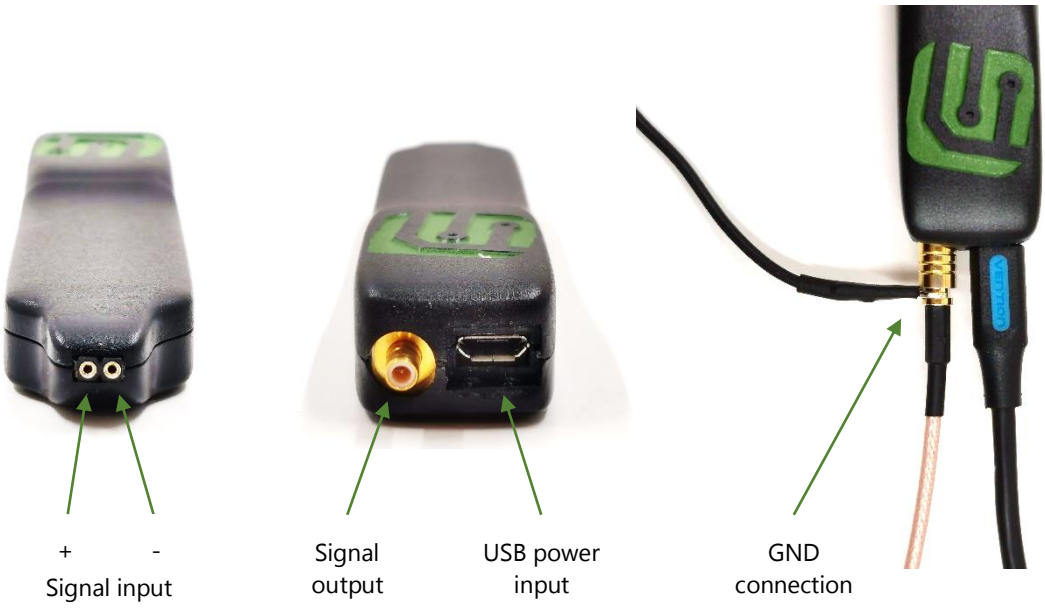
- Switching mode Power Supplies probing
    - Voltage on non-grounded components e.g. Inductor, High-side FET

2 Device description

2.1 Drawing



2.2 Interfaces



2.3 Absolute maximum ratings

Parameter	Value	Note
Probe Signal Input		
Voltage Range	-42.4 V to +42.4 V	Each input to Scope GND (EN 61010)
Mating Pin diameter Size	0.9 mm	
Mating Pin length	6.0 mm	Fully inside
Temperature range operational	-10 to 40 °C ()	Ambient
Temperature range storage	-10 to 50 °C ()	Ambient
Humidity range Relative	5% to 95%	Operating and nonoperating, not condensing
Altitude	2000 m	

3 Warnings

⚠ To comply with EN 61010-031, input signals **must not** exceed ±42.4 V.

⚠ Do not immerse the probe in any liquid.

⚠ Do not disassemble the probe.

⚠ Prevent the probe from receiving mechanical shock.

3.1 Specification of electrical characteristics

Parameter	Value/Range	Unit	Note
Signal response			
Bandwidth	DC to 900	MHz	-3 dB
Attenuation Differential Mode	10:1	-	With 50 Ω termination
Attenuation Common Mode @10 kHz	70	dB	
Attenuation Common Mode @10 MHz	44	dB	
Attenuation Common Mode @100 MHz	40	dB	
Attenuation Flatness 100k to 500MHz	0.5	dB	
Attenuation Flatness 500k to 900MHz	1.5	dB	
Noise	4.56	mV_{RMS}	
Propagation delay without cable	1.28	ns	
Propagation delay with 1.3m cable	9.36	ns	
Rise Time	250	ps	10% to 90%
Step response overshoot	10-15	%	
Step response ringing time	3.0	ns	1% Error band
Output offset	±0.3	mV	1 min after power on
Input Impedance			
Single input Resistance	110	kΩ	
Single input Capacitance	2.0	pF	
Differential Resistance	220	kΩ	
Differential Capacitance	1.8	pF	Measured @25MHz
Output Impedance	50	Ω	
Output voltage swing	±1.5	V	
Input Voltage Range			
Differential range	±15	V	
Common mode range	±30	V	
Single input range	±40	V	
USB Power supply			
Voltage range	4 to 6	V	Compliant with USB 2.0
Supply current (@4.5V)	120	mA	typical
Mechanical dimensions			
Length x Width x Height	110 x 21 x 17	mm	Without cables
Weight	50 / 300	g	Without/with cables
Signal cable length	1.6	m	

4 Packing & Accessories

- dProbe1000
- USB power supply cable (USB-A to USB-microB) 1.5 m
- Oscilloscope Signal cable (SMB to BNC 50Ω) 1.6 m
- Storage Box (210 x 260 x 44 mm)
- 2x Cable extenders (socket to pin 100 mm cable)
- 2x Mini test hook
- 4x Pogo pin
- Ground lead

5 Operating Instructions

5.1 Start using the probe

1. Connect dProbe1000 main body to USB and Signal Cable
2. Connect USB cable to PC or phone Charger
3. Connect Signal cable to oscilloscope
4. Set oscilloscope input to 50 Ω mode.
5. Enter scope menu descew in order to adjust the skew on your oscilloscope to match time synchronization

5.2 Ground connection

It is normally not necessary to connect the ground socket of the probe to the ground of the Device Under Test (DUT), as long as the DUT itself is grounded. If the ground of the DUT is floating (such as in the case of a battery operation or a device powered by a two-prong mains adapter), high static potentials between the DUT ground and the probe ground can be beyond the range of the probe to handle. In this case, the probe ground should be connected to the DUT ground. The ground connection can also affect the CMRR of the probe. Adding a ground connection can often mitigate unwanted common mode signal effects. To connect ground lead to the probe assembly see chapter 2.2.

5.3 Signal input

dProbe1000 input connector is 2.54 mm socket header. It is intended to be used is with a 2.54 mm pin header or extension cables. Keep in mind that probing is generally sensitive to adding parasitic impedance (mainly inductance). When connecting DUT, try to minimize the loop area between + and – input signals.

5.4 Signal output

Preferably, use included cables. But in special cases a good quality SMB – BNC cable assembly would be a sufficient replacement for the cable included.

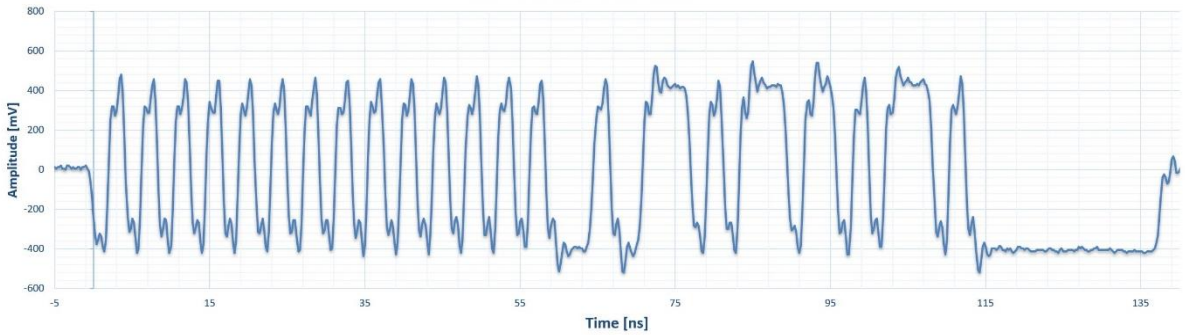
For proper signal propagation, cable should be 50 Ω terminated.

1. Oscilloscope with a build-in 50 Ω termination is **highly recommended**
   - When using this probe, turn on internal termination on the oscilloscope.
2. Oscilloscopes without 50 Ω termination:
   - Use third party 50 Ω feed through Terminator, but this option slightly degrades input signal due to additional capacitance termination.
3. Without termination (usually 1 MΩ || 15 pF) displayed signal appears 2x larger and leads to signal reflections seen as steps on any slope.

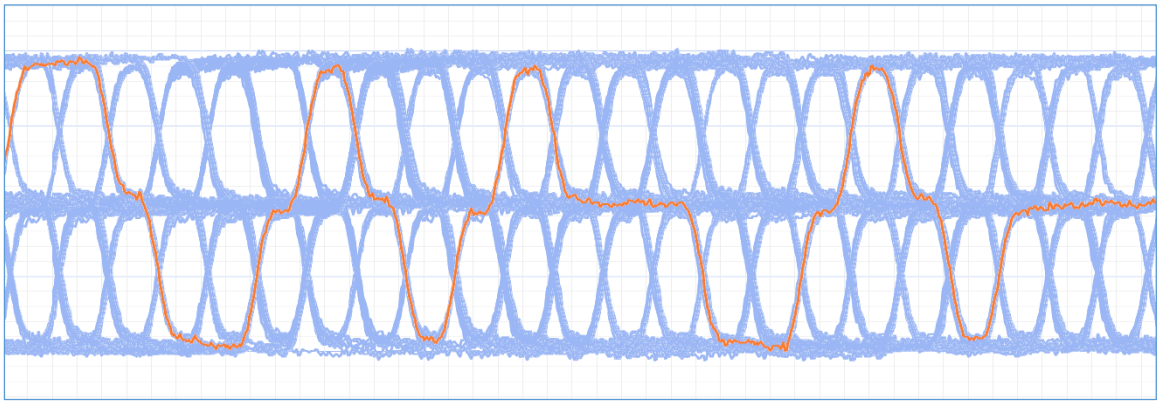
6 dProbe1000 Performance Example

6.1 USB 2.0 HI Speed waveform

Signal generator FTDI 2232H, USB cable length 5 cm



6.2 100BASE-TX Ethernet waveform



7 Maintenance and service

The probe is of high quality and does not require any servicing and repair. However if needed, servicing, repair or calibration require the use of specialized test equipment and must only be performed by SojaLab. Return a defective product to the SojaLab for diagnosis and possible replacement.

7.1 Cleaning

- Clean the product using a soft cloth moistened with either distilled water or isopropyl alcohol. Keep in mind that the casing is not waterproof.
  Note: Do not use these cleaning agents. As solvents (thinners, acetone), acids and bases can damage the labelling or plastic parts.
- Ensure that the probe is thoroughly dry before use.

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