Optical Isolated Voltage Probe

(Power on Fiber series)

OPL6015 (2.5V~5000V/150MHz)

OPL6035 (2.5V~5000V/350MHz)

OPL6050 (2.5V~5000V/500MHz)

OPL6080 (2.5V~5000V/800MHz)

OPL6100 (2.5V ~ 5000V / 1GHz)

Shenzhen Zhiyong Electronics Co., Ltd

Preface

First of all, thank you for purchasing our products, this instruction manual is the description about the function, usage, operation attention points, etc. Before use, please read the instructions carefully and use correctly.

Manual annotation will use the following symbols to distinguish.

This symbol means it is harmful to the machine and human body; you must strictly follow the instruction manual to operate.

Warning **In the case of wrong operation, the user risk injury. The content under this mark records the relevant matters needing attention to avoid such dangers.**

Notice **The user may suffer minor injuries and material damage with the wrong operation. To avoid such situation, the matters under this mark need attention.**

Note **This symbolizes important note about how to use the machine.**

To the safely use the machine, you must abide by the following safety precautions strictly. The violation against the manual is likely to damage the protective function of the machine. In addition, the company is not responsible for any safety problem caused by the violation of matters needing attention in operation.

- Please be careful to the danger of electric shock and pay attention to highest input voltage.
- Do not operate in wet or combustible conditions.
- Make sure the circuit under test is turned off before access it to the probe.
- Turn off the circuit after the measurement, and then remove the probe.
- When BNC cables are connected to the oscilloscope or other devices, ensure the BNC terminal is well grounded.
- Check the probe skin and probe lead regularly. If there is any breakage, stop using it immediately.

1. Introduction

OPL6000 series is the latest POF(power on fiber) optical isolated voltage probe with remarkably high CMRR. The CMRR of traditional differential probe decreases fast in high-frequency range, as a result, measuring the small voltage signal waveform (e.g., the driving voltage when measuring the upper MOSFET of the half-bridge circuit) under high CM interference voltage accurately become a extremely hard task. OPL6000 applies optical isolation technologies and gains remarkably high CMRR in all working bandwidth, helping our customers to deal with these kinds of challenging measurement with low cost.

Product Characteristics:

- Power on optical fiber, able to operating continuously.
- Can be calibrated and zeroed online without disconnecting from the equipment under measurement.
- Extremely high CMRR.
- Bandwidth over 1GHz.
- Isolation voltage over 60kV.
- High precision in wide temperature range.
- Highly stable and low temperature drift.
- Smaller size.

2. Application

OPL6000 series can be widely applied in the R&D, debugging or maintenance of switching power supply, motor driver, new energy inverter, converter, LED power supply, household appliances and other electrical power devices.

- Floating signal test
- The gate driving signal measurement of upper bridge MOSFET can also be applied to the measurement of high-speed driving waveform of Si/SiC and GaN.
- Small signal measurement of differential mode under high CM interference voltage

3. Electric Specification

Model	OPL6015	OPL6035	OPL6050	OPL6080	OPL6100
Bandwidth(-3dB)	150MHz	350MHz	500MHz	800MHz	1GHz
Rise time	≤ 2.3ns	≤ 1.0ns	≤ 0.7ns	≤ 0.43ns	≤ 0.35ns
Terminal load	1MΩ	1MΩ	50Ω	50Ω	50Ω
Output voltage range	±1.25V	±1.25V	±0.5V	±0.5V	±0.5V
Typical output voltage noise(RMS)	2mV	2mV	1mV	1mV	1mV
Precision	≤±1%				
Isolated voltage(DC + Peak AC)	±60kV				
Standard configuration attenuator + host delay	15.3 ns (2-meter optical fiber)				
Power supply	USB 5V/2A				
Auto-zero set function	Yes				

Attenuator specifications

Probe Model	Attenuator Model	Connector type	Attenuation ratio	Measurement range	Maximum undamaged voltage	Input impedance
OPL6015 OPL6035	CK-AT2X-1	SSMB	2:1	±2.5Vpk	2kVpp	1MΩ‖28pF
	CK-AT5X-1	SSMB	5:1	±6.25Vpk	2kVpp	1MΩ‖6pF
	CK-AT10X-1	SSMB	10:1	±12.5Vpk	2kVpp	10MΩ‖6pF
	CK-AT20X-1	SSMB	20:1	±25Vpk	2kVpp	10MΩ‖4pF
	CK-AT50X-1	SSMB	50:1	±62.5Vpk	3kVpp	10MΩ‖2pF
	CK-AT100X-1	SSMB	100:1	±125Vpk	3kVpp	10MΩ‖2pF
	CK-AT200X-1	2.54mm socket	200:1	±250Vpk	5kVpp	10MΩ‖2pF
	CK-AT500X-1	2.54mm socket	500:1	±625Vpk	5kVpp	20MΩ‖2pF
	CK-AT1000X-1	5.08mm socket	1000:1	±1250Vpk	6kVpp	20MΩ‖2pF
	CK-AT2000X-1	5.08mm socket	2000:1	±2500Vpk	6kVpp	40MΩ‖2pF
	CK-AT4000X-1	5.08mm socket	4000:1	±5000Vpk	12kVpp	40MΩ‖2pF
OPL6050 OPL6080 OPL6100	CK-AT5X-2	SSMB	5:1	±2.5Vpk	2kVpp	1MΩ‖28pF
	CK-AT10X-2	SSMB	10:1	±5Vpk	2kVpp	1MΩ‖6pF
	CK-AT20X-2	SSMB	20:1	±10Vpk	2kVpp	5MΩ‖6pF
	CK-AT50X-2	SSMB	50:1	±25Vpk	2kVpp	10MΩ‖4pF
	CK-AT100X-2	SSMB	100:1	±50Vpk	3kVpp	10MΩ‖2pF
	CK-AT200X-2	SSMB	200:1	±100Vpk	3kVpp	10MΩ‖2pF
	CK-AT500X-2	2.54mm socket	500:1	±250Vpk	5kVpp	10MΩ‖2pF
	CK-AT1000X-2	2.54mm socket	1000:1	±500Vpk	5kVpp	20MΩ‖2pF
	CK-AT2000X-2	5.08mm socket	2000:1	±1000Vpk	6kVpp	20MΩ‖2pF
	CK-AT5000X-2	5.08mm socket	5000:1	±2500Vpk	6kVpp	40MΩ‖2pF
	CK-AT10000X-2	5.08mm socket	10000:1	±5000Vpk	12kVpp	40MΩ‖2pF

PS：OPL6015/OPL6035 with standard CK-AT20X-1；OPL6050/OPL6080/OPL6100 with standard

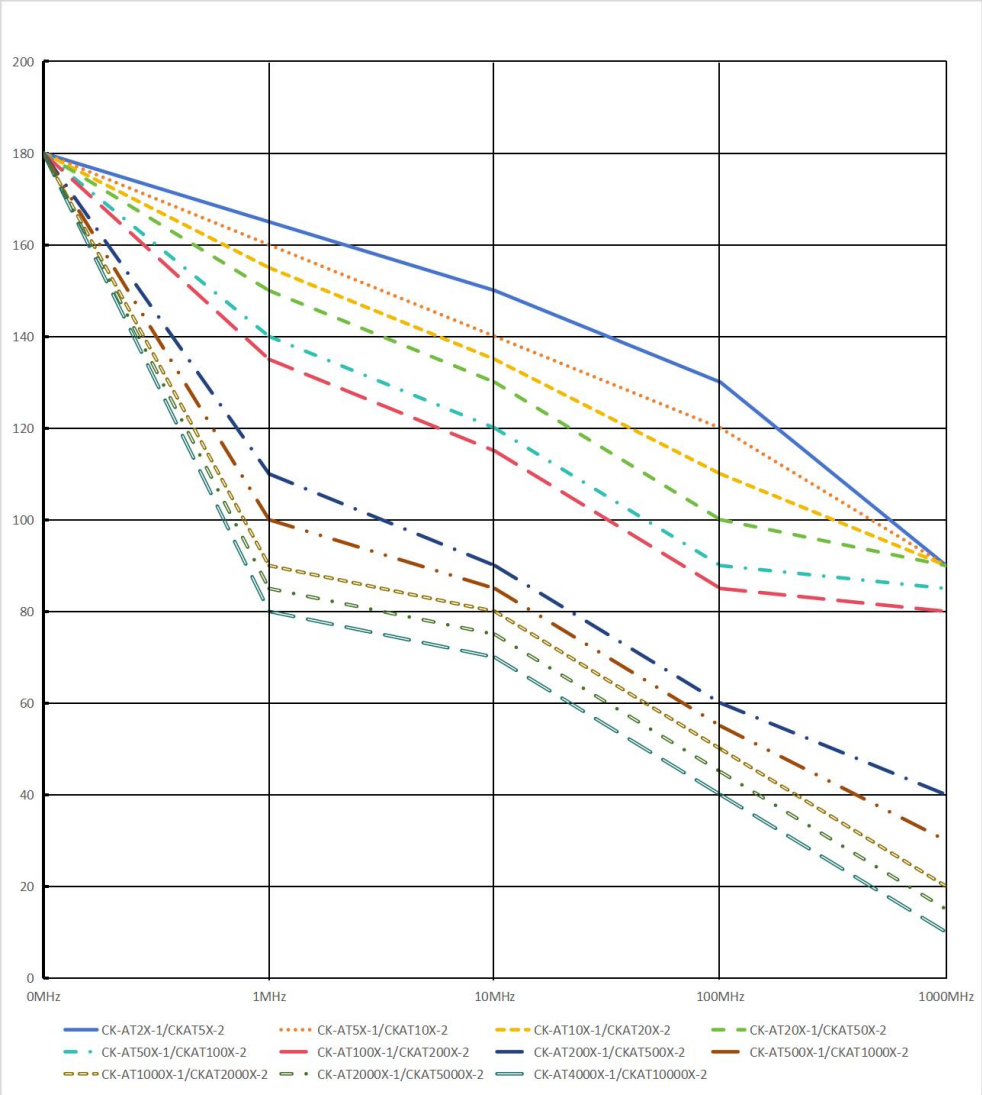
CK-AT50X-2；If you need other attenuator, please purchase independently.The maximum test voltage decreases as the test frequency increases, as shown in the table below.

Maximum test voltage	Maximum test frequency
±5000Vpk/±2500Vpk	700kHz/800kHz
±1000Vpk/±500Vpk	2MHz/3MHz
±250Vpk/±100Vpk	20MHz/50MHz
±50Vpk/±25Vpk	100MHz/200MHz

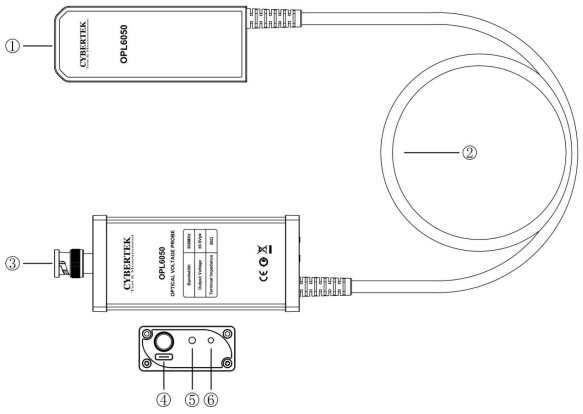
Optional attenuator packing list

Connector type	SSMB	2.54mm socket	5.08mm socket
CK-201(2.54_2p)	-	5	-
CK-202（5.08_2p）	-	-	5

Common mode rejection ratio curve of different attenuators



4. Probe briefing



① Attenuator input connector: able to plugin by both side. Do not insert forcefully, or the connector may be damaged.

② Optical fiber: do not press it heavily or bend it to 90 degrees, or the fiber will be broken.

③ Output connector: standard BNC output connector.

④ Power supply connector: please use adaptor and power supply cable of 5V/2A. This device may not work properly with insufficient power supply.

⑤ Dual color indicator light: the green light blinking means the auto-zero set is ongoing, and if there's three beeps and the green light remains, the adjustment is successfully done. However if the buzzer sound continuously for 1~2 sec with the green light on, the auto-zero setting is failed. If the red light is on, the probe is malfunctioned, you would probably need to send it back for maintenance.

⑥ Auto-zero set button: press it lightly to activate the auto-zero set function.

NOTE

- **Do not put heavy object (for instance, your chair) on the optical fiber, avoiding stress on the fiber is crucial to avoid malfunction.**
- **Do not squeeze, curl, or bend the optical fiber violently. The diameter of bending should be over 10 cm.**
- **Do not twist or tie the optical fiber. Do not pull or jerk the optical fiber, especially when there are twists or knots.**
- **Do not drop the probe, this could damage the inner optical component.**
- **Please store the probe in our standard case as we did when you don't need to use it.**
- **Please careful exam the optical fiber before usage, and if there's anything broken, please stop using it at once.**

5. Operating Process

Please use our standard adaptor and power supply cable.

- Estimate the range of voltage under test and insert the proper attenuator.
- Connect the probe to the oscilloscope and power it up. Activate the auto-zero set, it will take about 20 sec depends on the environmental temperature and main component temperature.If calibration fails, you can

power off and restart.

- Set up the attenuation ratio of the oscilloscope accordingly, and adjust the sensitivity of the oscilloscope according to the voltage under test.
- Make sure the front end of the probe is elevated if possible, keeping it away from the high voltage pulse circuit can decrease the interference on the probe.
- The front end of the probe is directly connected with the high voltage circuit under test. Do not take the probe off before you turn off the circuit's power supply.

6. Mechanical Specifications

Model		Parameter
Probe size	Front-end E/O transmitter	Around 98*38*25mm
	Rear-end O/E receiver	Around 105*50*27mm
Attenuator length		Around 200mm
Optical fiber length		2m
Probe Weight		Around 315g

7. Warranty

Please refer to the instruction on the warranty card.

8. Packing list

Name	OPL6015	OPL6035	OPL6050	OPL6080	OPL6100
Voltage Probe	1	1	1	1	1
20X attenuator (CK-AT20X-1)	1	1	-	-	-
50X attenuator (CK-AT50X-2)	-	-	1	1	1
SSMB male socket to DuPont cable connector (CK-321)	2	2	2	2	2
SSMB male socket (CK-23)	10	10	10	10	10
SSMB/MMCX Adapter (CK-26)	1	1	1	1	1
USB power supply cable TYPE-C 1.5m（CK-314A）	1	1	1	1	1
Power supply adaptor 5V/2A(CK-605)	1	1	1	1	1
OE transmitter support frame (CK-690A)	1	1	1	1	1
BNC male to SSMB male（CK-25）	1	1	1	1	1
Input extension cable（CK-322）	3	3	3	3	3
Output extension cable(CK-325)	1	1	1	1	1
Instruction manual	1	1	1	1	1
Warranty card	1	1	1	1	1
Test report	1	1	1	1	1

CYBERTEK

SHENZHEN ZHIYONG ELECTRONICS CO., LTD.

Addr: Room A1702, Building 4, TianAn Cyber Park, HuangGe Road, LongGang District, ShenZhen City, China

Tel: （86）400 852 0005 / （86 755）86628000

Q Q: 400 852 0005

Email: cybertek@cybertek.cn

Url: http://www.cybertek.cn

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