

上海市质量监督检验技术研究院

Shanghai Institute of Quality Inspection and Technical Research



中国认可
国际互认

校准

CALIBRATION
CNAS L0128

校准证书

CALIBRATION CERTIFICATE

证书编号: J18126002901 号
Certificate No.

客户名称

Customer

客户地址

Address of customer

计量器具名称

Name of Samples

型号 / 规格

Type/Specification

出厂编号

Series No.

制造单位

Manufacturer

Surge Generator (雷击发生器)

SG61000-5H15

No. 0515P32018018

Lisun Electronics Inc.

批准人

Approved by

孙晓虹 副主任

核验员

Checked By

徐静婷

校准员

Calibrated By

倪华



校准日期 2018 年 12 月 11 日
Date of calibration Year Month Day

地址(Address): 上海市江月路900号

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本次计量所依据的技术文件(代号、名称):

Reference documents for the calibration (code, name)

GB/T 17626.5-2008 电磁兼容 试验和测量技术 浪涌(冲击)抗扰度试验

Electromagnetic compatibility-Testing and measurement techniques-Surge immunity test

计量地点及环境条件:

Location and environmental condition

计量地点: 江月路900号5号楼416室

其它: /

Location: NO.900 Jiangyue Rd, Shanghai,China

Others

环境温度: 22 °C;

相对湿度: 60 %

Ambient temperature: 22 °C;

Relative humidity :60 %

本次计量所使用的主要计量标准器具:

Main measurement standards used in this verification

名称/型号 Name/Type	编号 Number	测量范围/准确度 Measuring range/Accuracy	证书编号/有效期限 Certificate No./Due date
示波器/DP04104B-L	C023952	时基: 400ps~1000s / $\pm 1 \times 10^{-4}$ 电压: (0~100) V / $\pm 1.5\%$	2018F32-10- 1395821001/ 2019-3-20
高压探头/P6015A	30-17	1000:1 / $\pm 2\%$	J18126001797/ 2019-7-31
电流探头	JL-A-A1- A081211-2	500A/1V / $\pm 2\%$	J18125000167/ 2019-10-7

以上计量标准器具的量值均可溯源到国家基准。

Quantity values of above measurement standards used in this calibration are traced to those of the national primary standards in the P.R. China.

结果/说明:

Results and additional explanation

所测数据符合仪器技术要求

数据见后页

本证书提供的结果仅对本次被检(校)样品有效, 未经本院许可, 不得部分采用本证书的内容。

The data are valid only for the Sample(s),Partly using this certificate will not be admitted unless allowed.

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结果/说明 (续页):

Results and additional explanation (continued page)

OUT

开路电压波 (1.2μs/50μs)测试 (Open Circuit Voltage Wave(1.2μs/50μs) Test)

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.50	0.45~0.55	1.20	0.84~1.56	56.2	40~60
1	1.02	0.9~1.1	1.22	0.84~1.56	58.1	40~60
2	2.00	1.8~2.2	1.22	0.84~1.56	59.3	40~60
4	4.04	3.6~4.4	1.24	0.84~1.56	56.6	40~60
6	6.05	5.4~6.6	1.22	0.84~1.56	55.1	40~60
10	10.09	9~11	1.21	0.84~1.56	53.8	40~60
15	15.13	13.5~16.5	1.28	0.84~1.56	51.3	40~60
-0.5	-0.51	-0.55~-0.45	1.21	0.84~1.56	56.5	40~60
-1	-1.02	0.9~1.1	1.25	0.84~1.56	58.2	40~60
-2	-2.02	-2.2~-1.8	1.22	0.84~1.56	59.2	40~60
-4	-4.05	-4.4~-3.6	1.24	0.84~1.56	56.1	40~60
-6	-6.09	-6.6~-5.4	1.26	0.84~1.56	54.8	40~60
-10	-10.11	-11~-9	1.25	0.84~1.56	52.6	40~60
-15	-15.17	-16.5~-13.5	1.26	0.84~1.56	52.4	40~60

短路电流波 (8μs/20μs)测试 (Short Circuit Current(8μs/20μs) Wave Test)

电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	245	225~275	7.73	6.4~9.6	19.5	16~24
1	497	450~550	7.72	6.4~9.6	19.8	16~24
2	995	900~1100	7.75	6.4~9.6	19.4	16~24
4	1995	1800~2200	7.82	6.4~9.6	18.6	16~24
6	2973	2700~3300	7.75	6.4~9.6	19.7	16~24
10	4975	4500~5500	7.82	6.4~9.6	18.6	16~24
15	7452	6750~8250	7.79	6.4~9.6	18.3	16~24
-0.5	247	225~275	7.69	6.4~9.6	18.6	16~24
-1	494	450~550	7.53	6.4~9.6	19.1	16~24
-2	993	900~1100	7.82	6.4~9.6	19.2	16~24
-4	1986	1800~2200	7.72	6.4~9.6	19.3	16~24
-6	2982	2700~3300	7.76	6.4~9.6	18.8	16~24
-10	4985	4500~5500	7.71	6.4~9.6	18.3	16~24
-15	7462	6750~8250	7.65	6.4~9.6	18.6	16~24

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三相网络 (Three Phase CDN)

L1-N

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.19	0.84~1.56	52.1	40~60
4	4.07	3.6~4.4	1.26	0.84~1.56	54.8	40~60
15	15.12	13.5~16.5	1.14	0.84~1.56	49.2	40~60
-0.5	-0.52	-0.55~-0.45	1.17	0.84~1.56	53.2	40~60
-4	-4.11	-4.4~-3.6	1.14	0.84~1.56	52.7	40~60
-15	-15.16	-16.5~-13.5	1.23	0.84~1.56	49.6	40~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	245	225~275	7.55	6.4~9.6	20.5	16~24
15	7450	6750~8250	7.62	6.4~9.6	20.4	16~24

L2-N

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.20	0.84~1.56	54.2	40~60
4	4.07	3.6~4.4	1.19	0.84~1.56	54.1	40~60
15	15.12	13.5~16.5	1.18	0.84~1.56	49.7	40~60
-0.5	-0.52	-0.55~-0.45	1.19	0.84~1.56	54.5	40~60
-4	-4.11	-4.4~-3.6	1.16	0.84~1.56	52.8	40~60
-15	-15.16	-16.5~-13.5	1.19	0.84~1.56	51.1	40~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	245	225~275	7.55	6.4~9.6	20.2	16~24
15	7437	6750~8250	7.63	6.4~9.6	20.4	16~24

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L3-N

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.18	0.84~1.56	52.2	40~60
4	4.07	3.6~4.4	1.21	0.84~1.56	51.9	40~60
15	15.10	13.5~16.5	1.19	0.84~1.56	50.1	40~60
-0.5	-0.52	-0.55~-0.45	1.17	0.84~1.56	53.1	40~60
-4	-4.14	-4.4~-3.6	1.21	0.84~1.56	52.8	40~60
-15	-15.14	-16.5~-13.5	1.23	0.84~1.56	50.1	40~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	245	225~275	7.52	6.4~9.6	20.1	16~24
15	7450	6750~8250	7.59	6.4~9.6	20.7	16~24

L1-L2

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.21	0.84~1.56	51.9	40~60
4	4.08	3.6~4.4	1.24	0.84~1.56	53.1	40~60
15	15.14	13.5~16.5	1.21	0.84~1.56	50.1	40~60
-0.5	-0.52	-0.55~-0.45	1.14	0.84~1.56	53.1	40~60
-4	-4.10	-4.4~-3.6	1.18	0.84~1.56	49.9	40~60
-15	-15.14	-16.5~-13.5	1.17	0.84~1.56	49.2	40~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	244	225~275	7.54	6.4~9.6	19.9	16~24
15	7452	6750~8250	7.58	6.4~9.6	20.2	16~24

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L1-L3

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.23	0.84~1.56	54.8	40~60
4	4.05	3.6~4.4	1.21	0.84~1.56	54.2	40~60
15	15.12	13.5~16.5	1.16	0.84~1.56	49.2	40~60
-0.5	-0.52	-0.55~-0.45	1.17	0.84~1.56	54.5	40~60
-4	-4.11	-4.4~-3.6	1.14	0.84~1.56	52.7	40~60
-15	-15.18	-16.5~-13.5	1.24	0.84~1.56	49.1	40~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	247	225~275	7.55	6.4~9.6	20.5	16~24
15	7447	6750~8250	7.62	6.4~9.6	20.6	16~24

L2-L3

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.23	0.84~1.56	53.1	40~60
4	4.07	3.6~4.4	1.21	0.84~1.56	49.9	40~60
15	15.12	13.5~16.5	1.16	0.84~1.56	50.3	40~60
-0.5	-0.52	-0.55~-0.45	1.17	0.84~1.56	51.3	40~60
-4	-4.11	-4.4~-3.6	1.14	0.84~1.56	52.7	40~60
-15	-15.16	-16.5~-13.5	1.23	0.84~1.56	50.3	40~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值Td (μs) (Measured Value of Half Peak Time)	半峰值时间范围Td (μs) (Half Peak Time Range)
0.5	248	225~275	7.52	6.4~9.6	20.5	16~24
15	7458	6750~8250	7.54	6.4~9.6	20.6	16~24

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L1-PE

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值T2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围T2 (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.13	0.84~1.56	38.4	25~60
4	4.07	3.6~4.4	1.17	0.84~1.56	31.1	25~60
15	15.15	13.5~16.5	1.16	0.84~1.56	31.6	25~60
-0.5	-0.51	-0.55~-0.45	1.21	0.84~1.56	39.9	25~60
-4	-4.11	-4.4~-3.6	1.24	0.84~1.56	30.9	25~60
-15	-15.17	-16.5~-13.5	1.16	0.84~1.56	30.8	25~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值T2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围T2 (μs) (Half Peak Time Range)
0.5	38.5	37.5~45.8	2.23	2~3	26.6	20~30
15	1158	1125~1374	2.24	2~3	26.7	20~30

L2-PE

电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值T2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围T2 (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.11	0.84~1.56	36.8	25~60
4	4.05	3.6~4.4	1.16	0.84~1.56	33.2	25~60
15	15.19	13.5~16.5	1.16	0.84~1.56	35.1	25~60
-0.5	-0.52	-0.55~-0.45	1.21	0.84~1.56	36.8	25~60
-4	-4.15	-4.4~-3.6	1.13	0.84~1.56	34.1	25~60
-15	-15.18	-16.5~-13.5	1.14	0.84~1.56	32.4	25~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测tr (μs) (Measured Wavefront Time)	波前时间范围tr (μs) (Wavefront Time Range)	半峰值时间实测值T2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围T2 (μs) (Half Peak Time Range)
0.5	38.8	37.5~45.8	2.26	2~3	26.3	20~30
15	1156	1125~1374	2.31	2~3	25.7	20~30

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L3-PE

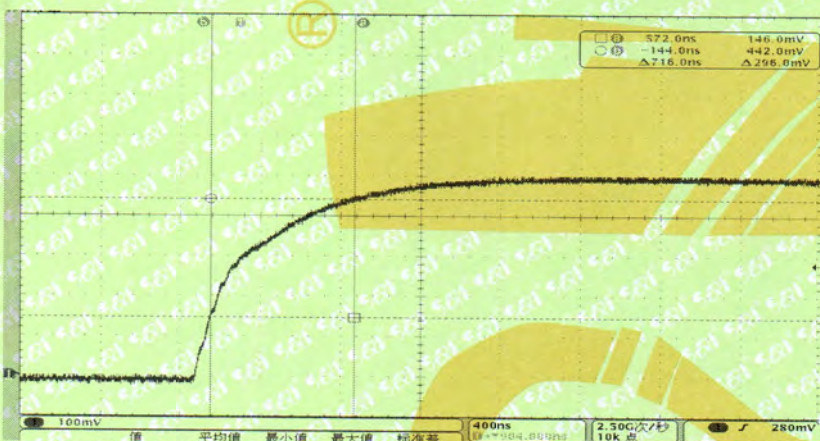
电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测值 t_r (μs) (Measured Wavefront Time)	波前时间范围 t_r (μs) (Wavefront Time Range)	半峰值时间实测值 T_2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围 T_2 (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.17	0.84~1.56	35.6	25~60
4	4.11	3.6~4.4	1.23	0.84~1.56	33.4	25~60
15	15.16	13.5~16.5	1.16	0.84~1.56	31.6	25~60
-0.5	-0.52	-0.55~-0.45	1.21	0.84~1.56	35.6	25~60
-4	-4.13	-4.4~-3.6	1.16	0.84~1.56	31.6	25~60
-15	-15.19	-16.5~-13.5	1.19	0.84~1.56	30.3	25~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测值 t_r (μs) (Measured Wavefront Time)	波前时间范围 t_r (μs) (Wavefront Time Range)	半峰值时间实测值 T_2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围 T_2 (μs) (Half Peak Time Range)
0.5	38.5	37.5~45.8	2.23	2~3	26.2	20~30
15	1158	1125~1374	2.25	2~3	26.7	20~30

N-PE

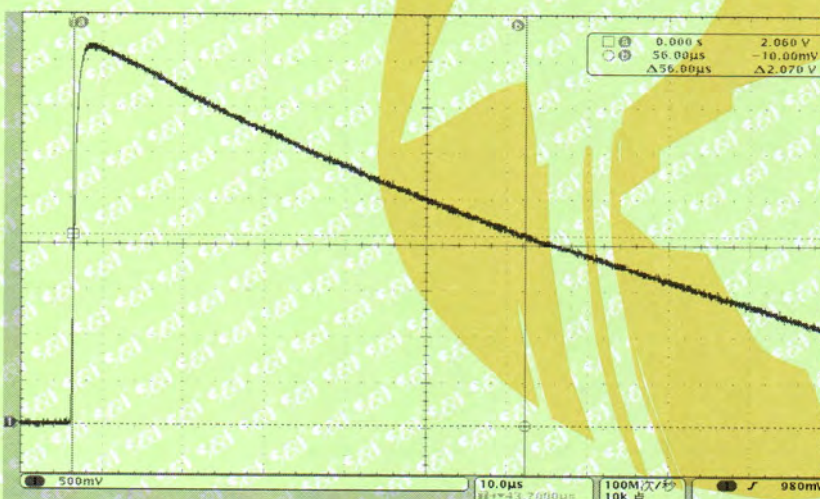
电压指示值 (kV) (Indicating Value of Voltage)	开路电压实测值 (kV) (Actual Measured Value of Open Circuit Voltage)	开路电压值范围 (kV) (Open Circuit Voltage Range)	波前时间实测值 t_r (μs) (Measured Wavefront Time)	波前时间范围 t_r (μs) (Wavefront Time Range)	半峰值时间实测值 T_2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围 T_2 (μs) (Half Peak Time Range)
0.5	0.51	0.45~0.55	1.11	0.84~1.56	31.3	25~60
4	4.07	3.6~4.4	1.06	0.84~1.56	31.1	25~60
15	15.14	13.5~16.5	1.09	0.84~1.56	31.4	25~60
-0.5	-0.52	-0.55~-0.45	1.04	0.84~1.56	30.8	25~60
-4	-4.11	-4.4~-3.6	1.05	0.84~1.56	31.2	25~60
-15	-15.12	-16.5~-13.5	1.11	0.84~1.56	31.5	25~60
电压指示值 (kV) (Indicating Value of Voltage)	短路电流实测值 (A) (Actual Measured Value of Short Circuit Current)	短路电流值范围 (A) (Short Circuit Current Range)	波前时间实测值 t_r (μs) (Measured Wavefront Time)	波前时间范围 t_r (μs) (Wavefront Time Range)	半峰值时间实测值 T_2 (μs) (Measured Value of Half Peak Time)	半峰值时间范围 T_2 (μs) (Half Peak Time Range)
0.5	40.2	37.5~45.8	2.21	2~3	26.2	20~30
15	1185	1125~1374	2.16	2~3	25.9	20~30

本次校准扩展不确定度 $U_{rel}=3.3\%(k=2)$ (The expanded uncertainty of calibration $U_{rel}=3.3\%(k=2)$)

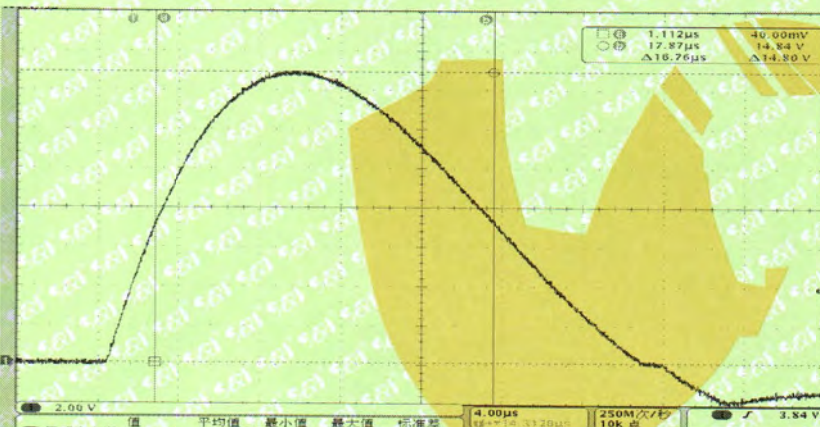
电压波前波形 (OUT) (Voltage Wavefront Waveform)



电压波形 (OUT) (Voltage Waveform)



电流波形 (OUT) (Current Waveform)



以下空白