ZAHNER

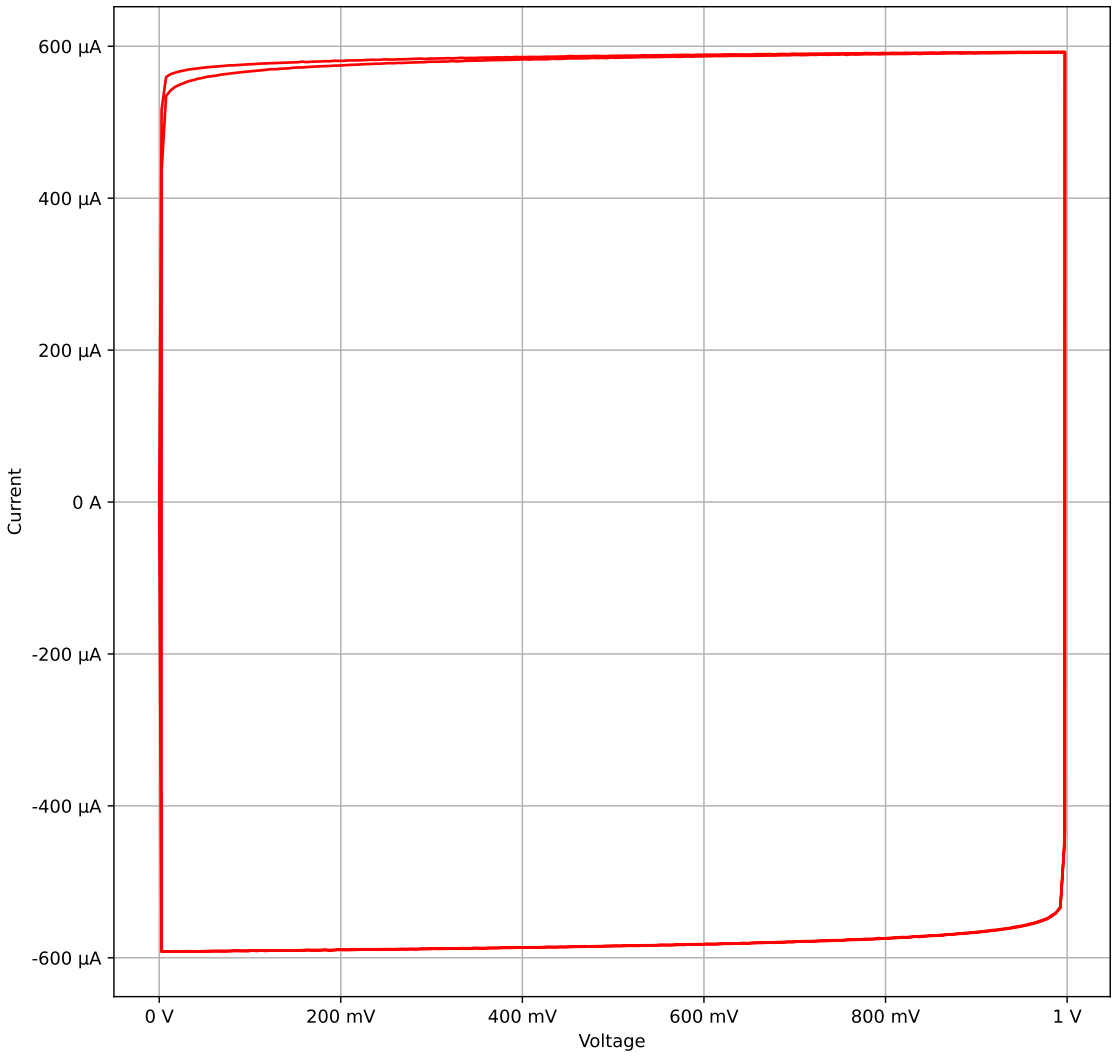
Capacitor Test Report

1 Informations

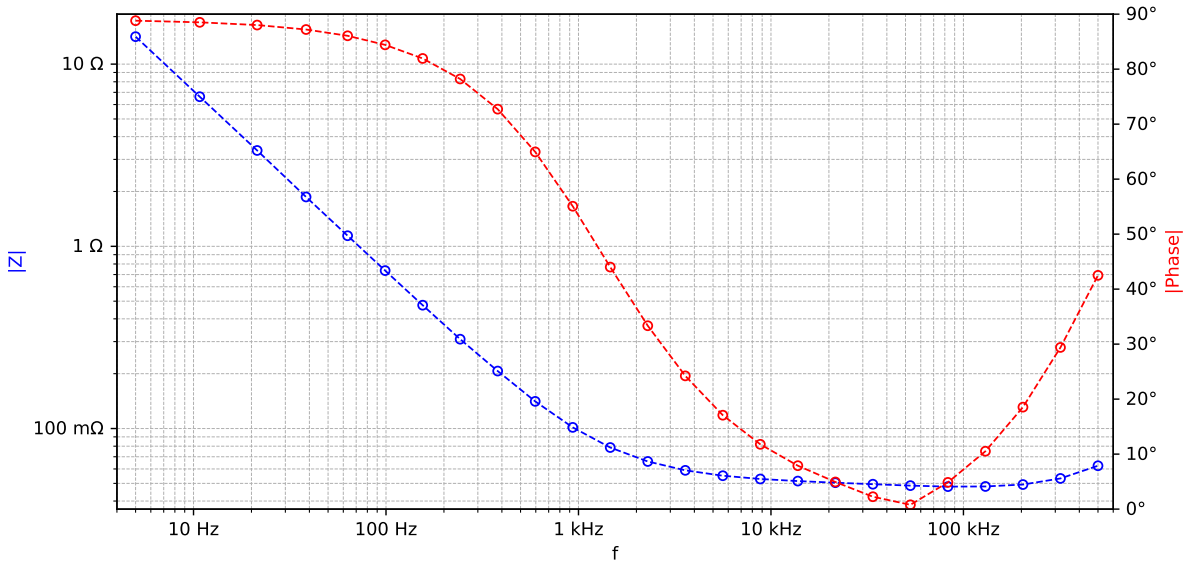
Test object name:	C1234
Date of test:	March 15, 2023
Time of test:	08:27:37

2 Measurement

2.1 CV



2.2 EIS



Frequency $[Hz]$	**|Impedance|** $[\Omega]$	**Phase** [°]
5.000	14.151	-88.811
10.772	6.624	-88.513
21.410	3.358	-88.018
38.431	1.866	-87.208
63.178	1.143	-86.067
98.966	735.948m	-84.415
155.030	475.296m	-81.945
242.840	309.276m	-78.213
380.410	206.783m	-72.727
595.890	140.939m	-64.953
933.440	101.462m	-55.073
1.462k	78.668m	-44.011
2.291k	65.957m	-33.343
3.588k	58.955m	-24.227
5.620k	55.085m	-17.077
8.804k	52.862m	-11.778
13.791k	51.480m	-7.896
21.604k	50.439m	-4.934
33.841k	49.478m	-2.253
53.011k	48.607m	786.197m
83.040k	48.000m	4.858
130.080k	48.091m	10.524
203.770k	49.271m	18.542
319.190k	53.224m	29.398
500.000k	62.476m	42.507

3 Evaluation

3.1 CV

The basic equation for the relationship between voltage, capacitance and charge is:

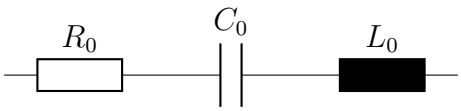
$$C = \frac{Q}{U} \text{ or } C = \frac{I * t}{U}$$

Where C = capacity, Q = charge, I = current, t = time and U = voltage. If we assume a linearly increasing or decreasing voltage (dU/dt - as in CV) as well as a voltage of zero volts at the beginning of the experiment, we get the following equation:

$$C = \frac{I}{\frac{dU}{dt}} = \frac{\frac{592.838\mu A - (-591.877\mu A)}{2}}{0.25\frac{V}{s}} = 2.369mF$$

3.2 EIS

The parameters of the following simplified equivalent circuit model of a capacitor are fitted with the impedance spectrum:



Results of fitting the model parameters to the measured data are shown in the table:

Element	Fitted Value	Fit Error
R_0	51.749mΩ	5.3%
C_0	2.130mF	4.8%
L_0	11.493nH	40.2%

In the following figure, the measurement data and the curve for the simulated model with the fitted parameters are shown: