

N5831 Series Distributed Supercapacitor Module Capacitance & DCIR Tester

Product Introduction

N5831 series is specially developed by NGI for the R&D and production of supercapacitor modules. N5831 provides accurate measurement for electrical parameters such as charging capacitance, discharging capacitance, charging DCIR, discharging DCIR, energy conversion efficiency, cycle life, etc. It also supports multiple test methods, which allows users to select according to their needs.

N5831 PC application software supports customization. Users can customize the test files according to the test procedure. The test results can be stored in database and exported in the formats of Excel and JPG.

Application Fields

- ▶ R&D, production and quality inspection of supercapacitor ▶ Supercapacitor material research
- ▶ Other related fields of supercapacitor

Main Features

- ▶ Voltage range: 0-200V
- ▶ Transition speed from CV to CC up to 1ms
- ▶ User-defined test process
- ▶ Sampling rate up to 1ms
- ▶ Settable sorting function for different specifications
- ▶ Current range: 0- 1200A
- ▶ High measurement accuracy
- ▶ Editable test procedure to improve configuration efficiency
- ▶ Supporting various DCIR test methods
- ▶ Standard 19 inch chassis

Various models and specifications to meet different needs

- 1) Voltage range: 0-200V, current range: 0-1200A, power range: 0-200kW.
- 2) Modular design, power customization available
- 3) Various test fixtures and widely covered power range to support both cells and modules test
- 4) Voltage output accuracy: 0.05%, current output accuracy: 0.05%

High frequency sampling to improve measurement accuracy

The voltage and current sampling rate is up to 1ms. The high sampling rate provides feasibility for accurate capacitance calculation.

Various test fixtures to meet different test demands

N5831 series provides four optional types of test fixture. The first type is universal fixture, suitable for various cylindrical batteries. The second type is crocodile clip, suitable for scientific research (including for high-current equipment). Any special-shaped batteries for research purpose can be clamped by leading out the charging & discharging electrodes and measuring electrodes. The third type is special texture for polymer batteries. The fourth type is special texture for button batteries.

Fast response during charge-to-discharge

N5831 is designed with precision circuit to ensure fast and accurate charging and discharging transition. During the charging process, there is no overcharge during CC charging converting to CV charging, which can protect the DUT from being damaged.

N5831 has the features of seamless transition from CV charging to CC charging and up to 1ms sampling rate, which can meet the test requirements of QC/T 741, six-step method, and charge-to-discharge method for DCIR.



▲ CC to CV/CC to CC Transition Waveform

Four-electrode measurement to reduce measuring error

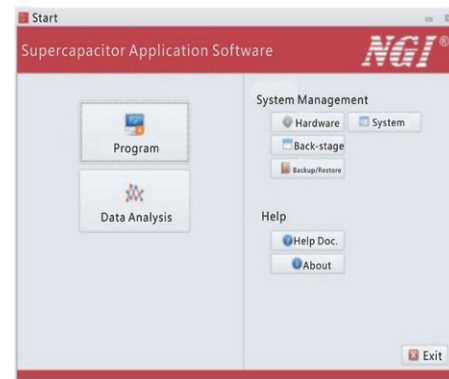
The test fixtures supplied are with 4 electrodes. Two output electrodes are used to provide test current, and two measurement electrodes are used to measure battery voltage. Multi-electrode measurement not only improves the measurement accuracy, but also supports reference electrode test, which is suitable for the research of electrode materials.

Multi-channel temperature acquisition

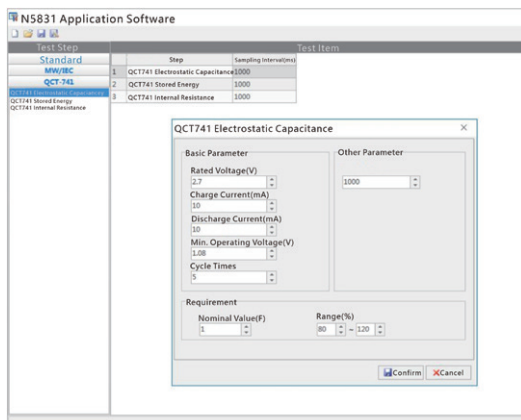
N5831 series supports 16-channel temperature acquisition, which is suitable for various NTCs(Negative Temperature Coefficient), satisfies the needs of real-time monitoring of the supercapacitor module internal temperature, and ensures the safety and stability during the test.

Application software

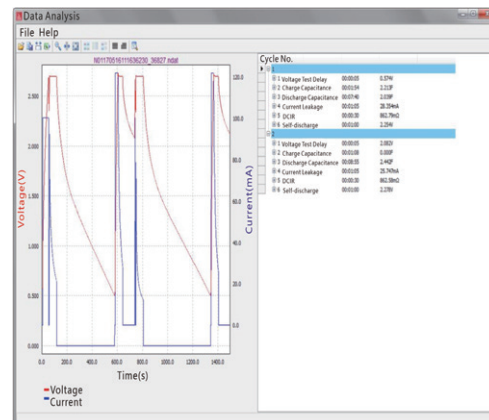
- 1) N5831 software adopts a platform design, which allows the users to customize the test process according to their requirements.
- 2) Office-like interface, independent display of each channel, supporting voltage and current waveform generation, and result display in tabular form make this professional software multifunctional and easy-to-use.
- 3) N5831 is designed with power limit circuit and has fast response, which can prevent N5831 from being damaged due to over power.
- 4) N5831 adopts shielding technology, which has wide adaptability to harsh test environment, and improves the anti-interference ability.



▲ Main Interface



▲ Parameters Setting Interface



▲ Data Analysis Interface

Capacitance test

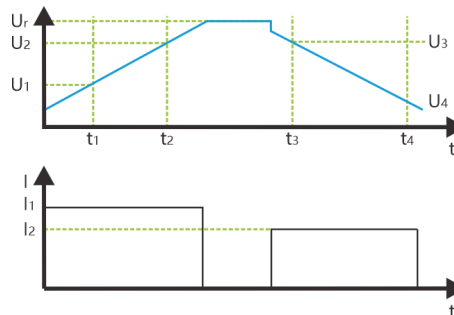
N5831 can measure the charging capacitance and discharging capacitance of supercapacitor. The test method is as follows: charge or discharge the measured supercapacitor under CC mode, record the time and voltage during the charging or discharging process, and calculate the capacitance by calculating the slew rate of the voltage and time during the process.

Users can choose voltage and time for calculation according to various measurement standards, such as IEC.

Charging capacitance calculation: $C = \frac{I_1 * (t_2 - t_1)}{U_2 - U_1}$

Discharging capacitance calculation: $C = \frac{I_2 * (t_4 - t_3)}{U_3 - U_4}$

U_r	Rated voltage
U_1	Start voltage for charging capacitance
U_2	End voltage for charging capacitance
U_3	Start voltage for discharging capacitance
U_4	End voltage for discharging capacitance
I_1	Charging current
I_2	Discharging current

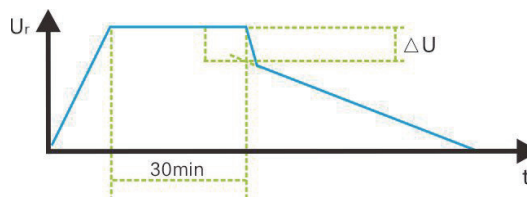


▲ Capacitance Calculation Graph

DCIR test

N5831 supports a variety of DCIR test methods: multi-pulse, single-pulse, charge-to-discharge, six-step test and IEC test, which can meet the test needs of most users. NGI core technology ensures that highly accurate results are obtained in various test methods.

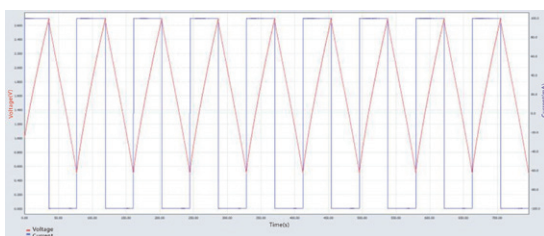
IEC DCIR calculation: $DCIR = \frac{\Delta U}{I}$



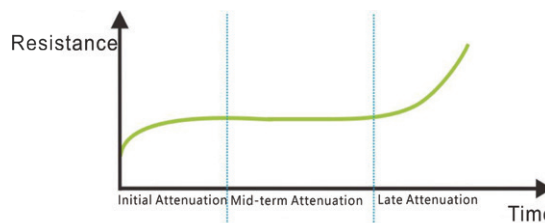
▲ DCIR Test Theory (IEC Method)

Life test

N5831 can measure the physical parameters of the supercapacitor during the repeated charging and discharging process and extract its attenuation curves. By analyzing the parameters and curves, users can obtain the expected life of supercapacitor in different application environments, charging and discharging cycles, and performance index at different stages. Life test results can be used to improve the materials, craft, storage and many other links.



▲ Charge-discharge Cycle Diagram



▲ Internal Resistance-Time Graph

Supercapacitor Tester

Product Selection Table

Model	Channels	Voltage	Current	Power	Model	Channels	Voltage	Current	Power
N5831-05-300	1	5V	300A	1500W	N5831-25-960	1	25V	960A	24000W
N5831-12-250	1	12V	250A	3000W	N5831-50-480	1	50V	480A	24000W
N5831-25-120	1	25V	120A	3000W	N5831-100-240	1	100V	240A	24000W
N5831-50-60	1	50V	60A	3000W	N5831-150-160	1	150V	160A	24000W
N5831-100-30	1	100V	30A	3000W	N5831-200-120	1	200V	120A	24000W
N5831-150-20	1	150V	20A	3000W	N5831-25-1080	1	25V	1080A	27000W
N5831-200-15	1	200V	15A	3000W	N5831-50-540	1	50V	540A	27000W
N5831-05-600	1	5V	600A	3000W	N5831-100-270	1	100V	270A	27000W
N5831-12-500	1	12V	500A	6000W	N5831-150-180	1	150V	180A	27000W
N5831-25-240	1	25V	240A	6000W	N5831-200-135	1	200V	135A	27000W
N5831-50-120	1	50V	120A	6000W	N5831-50-600	1	50V	600A	30000W
N5831-100-60	1	100V	60A	6000W	N5831-100-300	1	100V	300A	30000W
N5831-150-40	1	150V	40A	6000W	N5831-150-200	1	150V	200A	30000W
N5831-200-30	1	200V	30A	6000W	N5831-200-150	1	200V	150A	30000W
N5831-05-900	1	5V	900A	4500W	N5831-50-660	1	50V	660A	33000W
N5831-12-750	1	12V	750A	9000W	N5831-100-330	1	100V	330A	33000W
N5831-25-360	1	25V	360A	9000W	N5831-150-220	1	150V	220A	33000W
N5831-50-180	1	50V	180A	9000W	N5831-200-165	1	200V	165A	33000W
N5831-100-90	1	100V	90A	9000W	N5831-50-720	1	50V	720A	36000W
N5831-150-60	1	150V	60A	9000W	N5831-100-360	1	100V	360A	36000W
N5831-200-45	1	200V	45A	9000W	N5831-150-240	1	150V	240A	36000W
N5831-05-1200	1	5V	1200A	6000W	N5831-200-180	1	200V	180A	36000W
N5831-12-1000	1	12V	1000A	12000W	N5831-50-780	1	50V	780A	39000W
N5831-25-480	1	25V	480A	12000W	N5831-100-390	1	100V	390A	39000W
N5831-50-240	1	50V	240A	12000W	N5831-150-260	1	150V	260A	39000W
N5831-100-120	1	100V	120A	12000W	N5831-200-195	1	200V	195A	39000W
N5831-150-80	1	150V	80A	12000W	N5831-50-840	1	50V	840A	42000W
N5831-200-60	1	200V	60A	12000W	N5831-100-420	1	100V	420A	42000W
N5831-25-600	1	25V	600A	15000W	N5831-150-280	1	150V	280A	42000W
N5831-50-300	1	50V	300A	15000W	N5831-200-210	1	200V	210A	42000W
N5831-100-150	1	100V	150A	15000W	N5831-50-900	1	50V	900A	45000W
N5831-200-75	1	200V	75A	15000W	N5831-100-450	1	100V	450A	45000W
N5831-25-720	1	25V	720A	18000W	N5831-150-300	1	150V	300A	45000W
N5831-50-360	1	50V	360A	18000W	N5831-200-225	1	200V	225A	45000W
N5831-100-180	1	100V	180A	18000W	N5831-50-960	1	50V	960A	48000W
N5831-150-120	1	150V	120A	18000W	N5831-100-480	1	100V	480A	48000W
N5831-200-90	1	200V	90A	18000W	N5831-150-320	1	150V	320A	48000W
N5831-25-840	1	25V	840A	21000W	N5831-200-240	1	200V	240A	48000W
N5831-50-420	1	50V	420A	21000W	N5831-50-1020	1	50V	1020A	51000W
N5831-100-210	1	100V	210A	21000W	N5831-100-510	1	100V	510A	51000W
N5831-150-140	1	150V	140A	21000W	N5831-150-340	1	150V	340A	51000W
N5831-200-105	1	200V	105A	21000W	N5831-200-225	1	200V	225A	51000W

Technical Data Sheet

Model	N5831-200-15	N5831-05-600	N5831-200-30	N5831-12-500
Current	15A	600A	30A	500A
Voltage	200V	5V	200V	12V
Power	3000W	3000W	6000W	6000W
Channels	1CH	1CH	1CH	1CH
CC Mode				
Range	0-15A	0-600A	0-30A	0-500A
Setting Resolution	24bits			
Setting Accuracy	0.05%+0.05%F.S.			
CV Mode				
Range	200V	5V	200V	12V
Setting Resolution	24bits			
Setting Accuracy	0.05%+0.05%F.S.			
Internal Resistance Measurement				
Range 0				
Output Range	0-100mV			
Resolution	50μV			
Accuracy	0.2%+0.2%F.S.			
Range 1				
Output Range	0-50mV			
Resolution	25μV			
Accuracy	0.2%+0.2%F.S.			
Range 2				
Output Range	0-30mV			
Resolution	15μV			
Accuracy	0.2%+0.2%F.S.			
Range 3				
Output Range	0-15mV			
Resolution	7.5μV			
Accuracy	0.2%+0.2%F.S.			
Current Measurement				
Range	0-15A	0-600A	0-30A	0-500A
Readback Resolution	24bits			
Readback Accuracy	0.05%+0.05%F.S.			
Voltage Measurement				
Range	200V	5V	200V	12V
Readback Resolution	24bits			
Readback Accuracy	0.02%+0.02%F.S.			
Others				
Operating Temperature	-10℃-40℃			
Relative Humidity	5%-90%			
Atmospheric Pressure	80-110kPa			
AC Input	380V AC ±10% (three-phase five-wire system), frequency 47Hz~63Hz			
Net Weight	Approx. 36kg		Approx. 72kg	
Height	4U		8U	

For other specifications, please contact NGI.