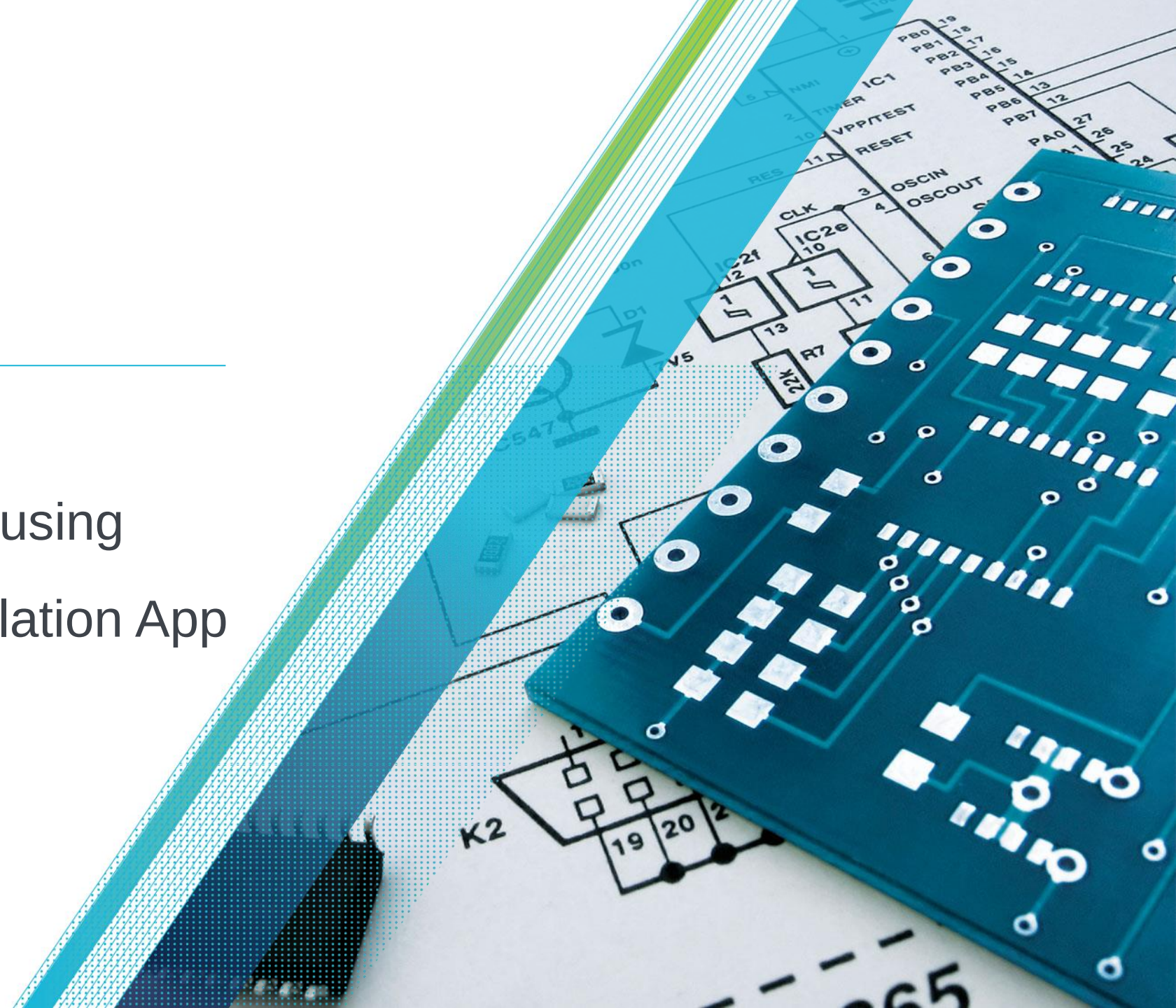
Tektronix

Optimizing the device using Kickstart Battery Simulation App

이호수 과장



Agenda

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- Overview of IoT(Internet of Things)
- Overview of Battery Types, Application and Optimization
- Introduction to Kickstart Software
  - Creating a Model with the 2380 Electronic Load
  - Simulating the Model with the 2281S Battery Simulator

Overview of IoT(Internet of Things)

Battery Types(Non-rechargeable)

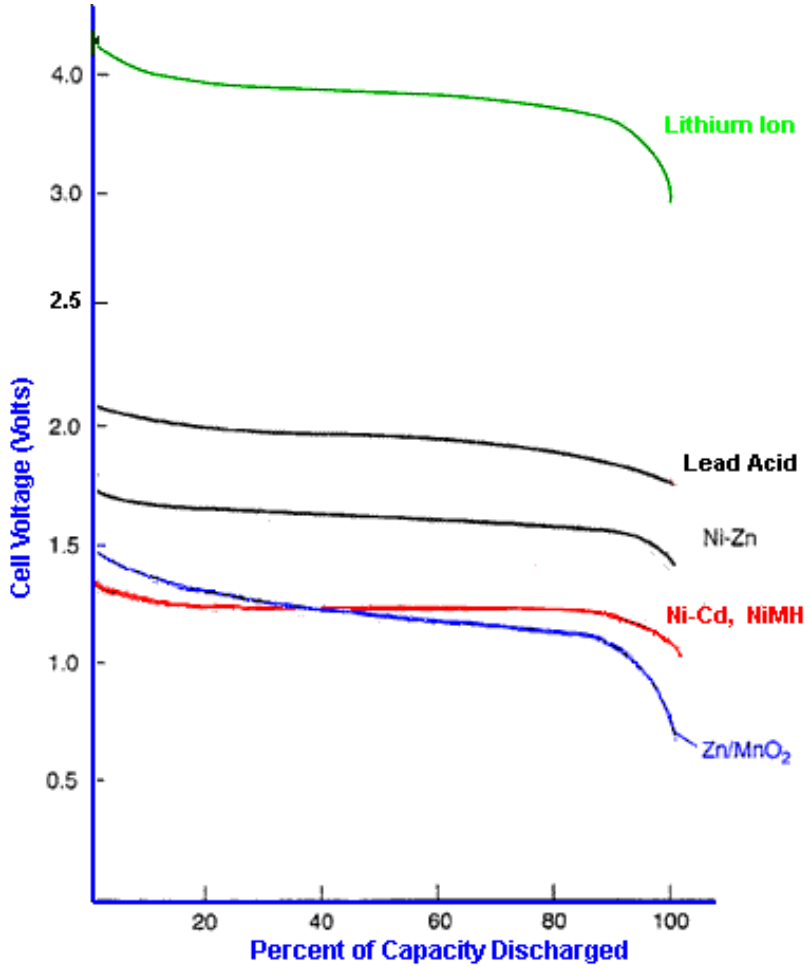
- Longer shelf life
- Higher energy density
- Lower self discharge rate
- Lower initial cost

Battery Types(Rechargeable)

- Cost savings
- Environmental benefits
- Convenience
- Improved performance

Battery Application

Battery Optimization



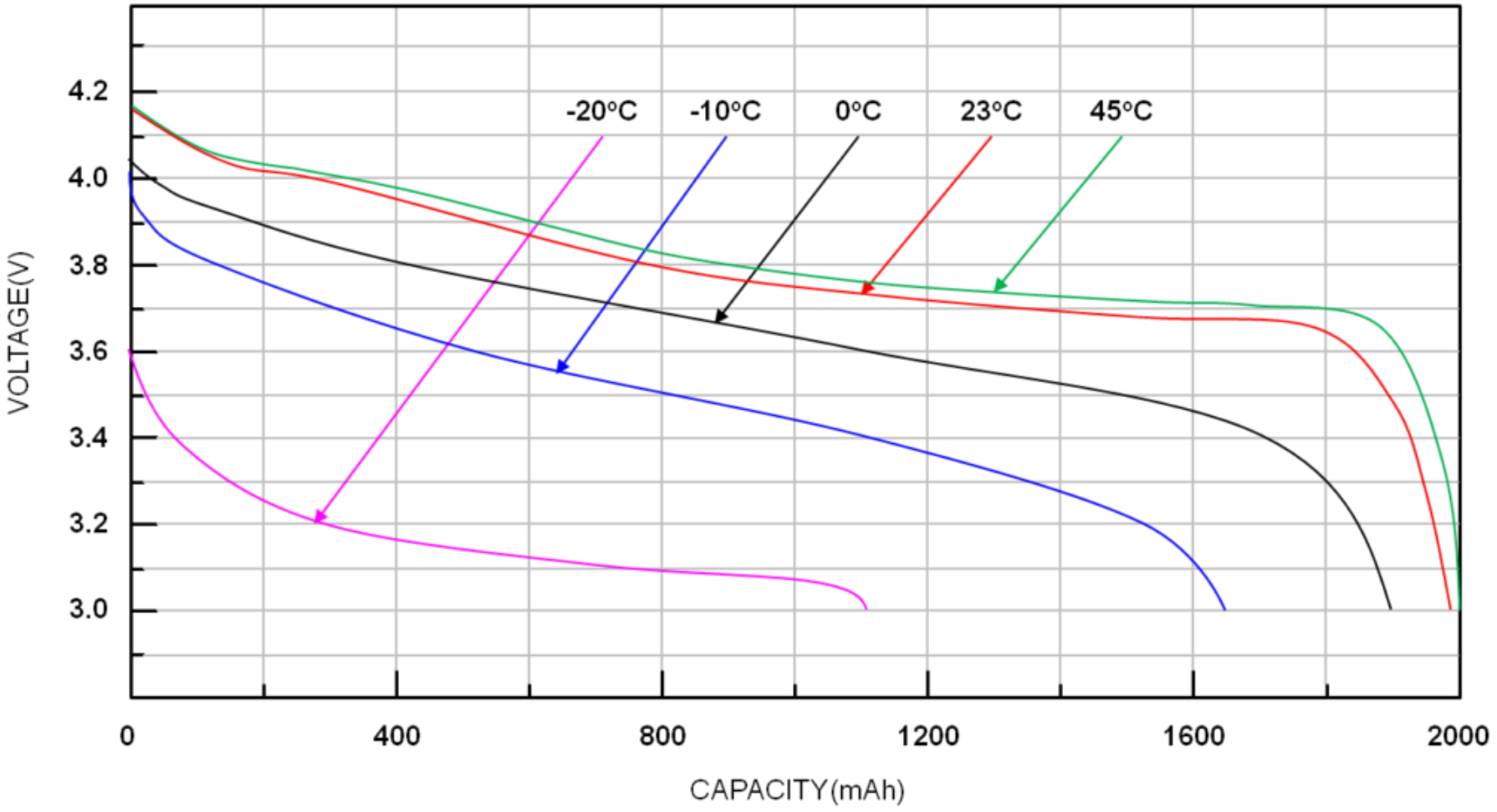
Material

Size

Temperature

Discharge current

Battery Optimization



Material

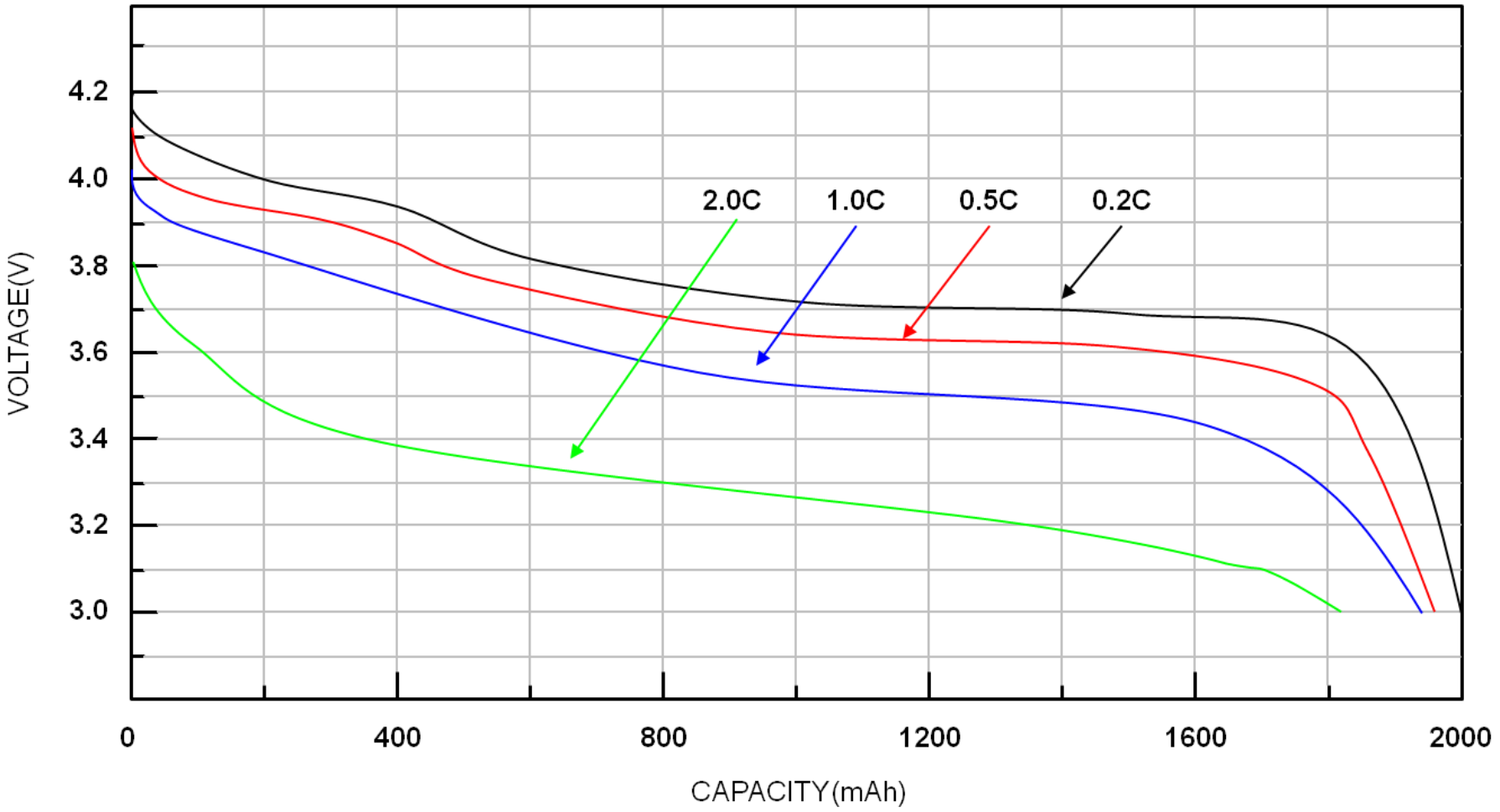
Size

Temperature

Discharge current

Equivalent
Series
Resistance

Battery Optimization



Material

Size

Temperature

Discharge current

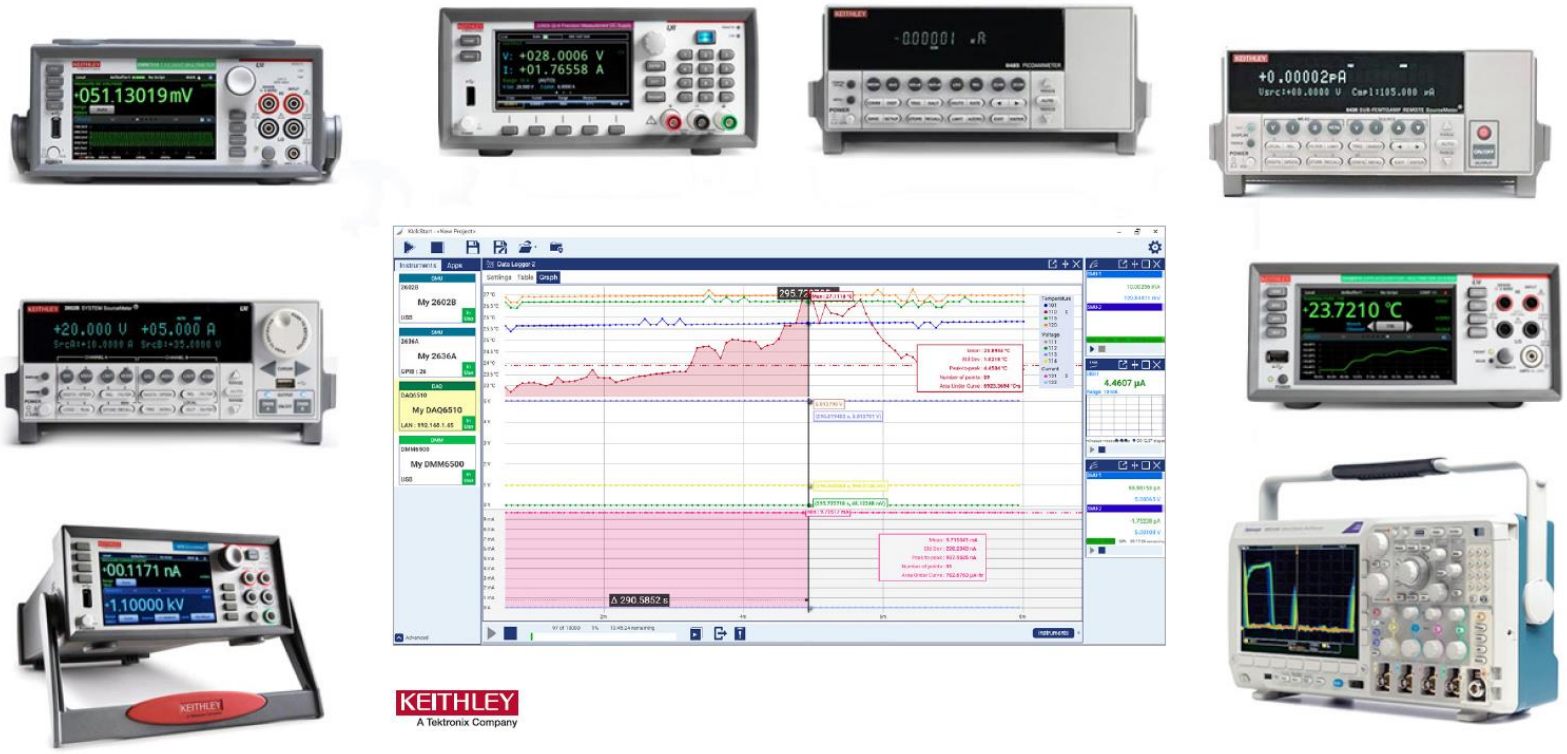
Equivalent
Series
Resistance

KickStart Software Overview

WHAT IS KICKSTART SOFTWARE?

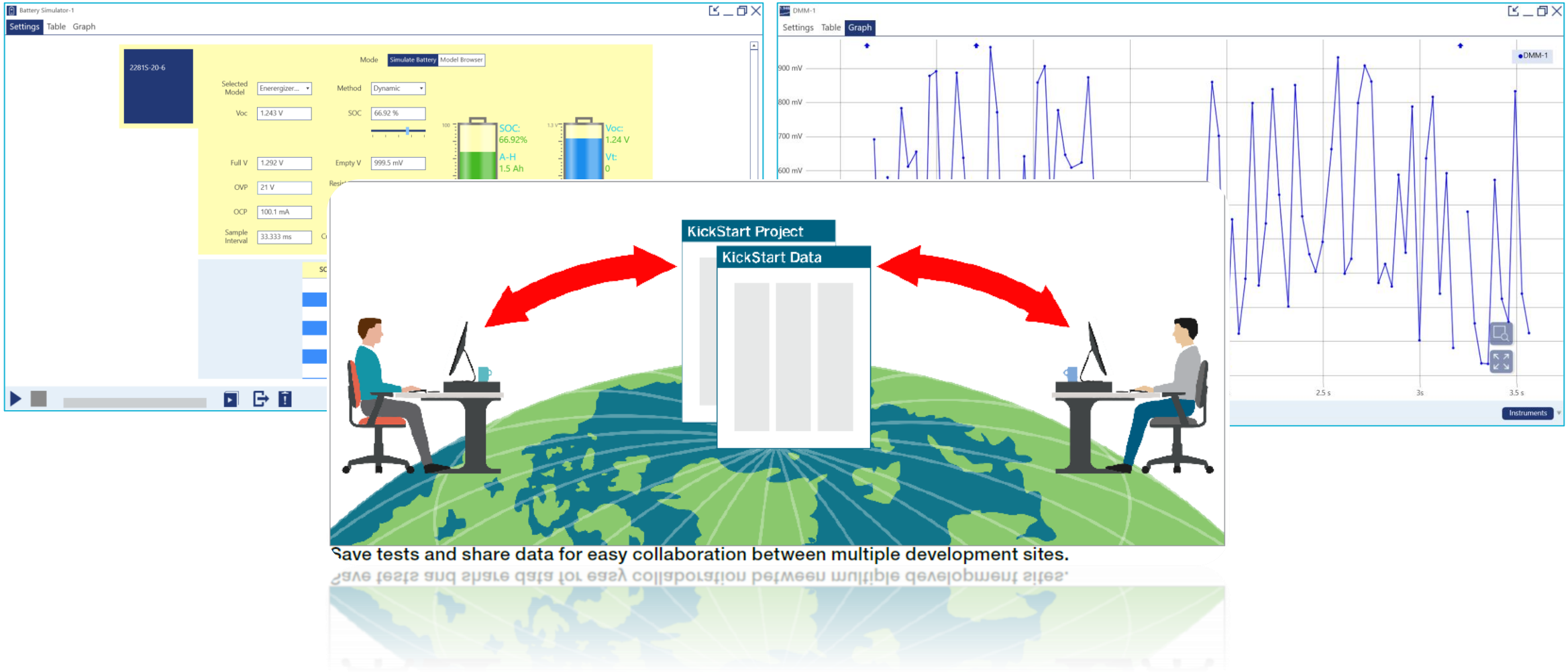
What is KickStart?

- KickStart is control software for bench instruments used on a PC that enables quick test setup, test execution, and data visualization.



KickStart Software Overview

EASY COLLABORATION AND TEST



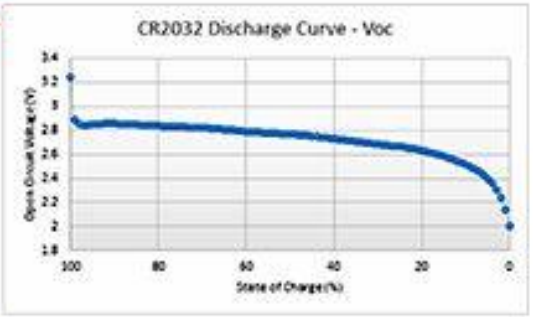
Supported Instruments

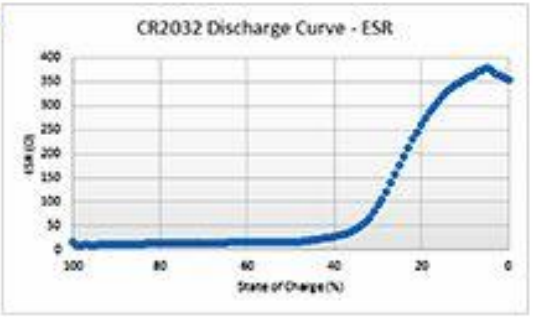
Instrument Type	Model	KickStart App
Arbitrary Function Generators	AFG31000 Series	AFG
SMU Instruments	2400 Series, 2600 Series, 2650 Series, 6430	I-V Characterizer
Oscilloscopes	TBS1000 Series, TBS2000 Series, 2 Series MSO, 3 Series MDO, 4 Series MSO, 5 Series MSO, 5 Series B MSO, 5 Series MSO Low Profile, 6 Series B MSO, MDO3000 Series, MDO4000 Series, MSO3000 Series, MSO4000 Series, DPO3000 Series, DPO4000 Series, TDS1000 Series, TDS2000 Series, and TDS200 Series	Oscilloscopes
Data Acquisition Units	DAQ6510, DMM6500, 2700, 2701, 2750, 3706A	Data Logger
DMMs	DMM6500, DMM7510, DAQ6510, 2700, 2701, 2750, 2000, 2010, 2110	Precision DMM
Power Supplies	2280S-32-6, 2280S-60-3, 2281S-20-6, 2220 Series, 2230 Series, 2231A-30-3, 2260B Series, 2200 Series, and 2306-LAN	Power Supply
Sensitive	6517B, 6514, 6485, 6487, 6517A	Precision DMM

What is a Battery Simulator

KEITHLEY 2281S-20-6

- Uses a model to emulate the response of a battery over its discharge cycle
- Estimate the battery life of IoT and other wireless devices
- **2281S Capabilities:**
  - 20 V, 6 A, 120 W capacity
  - Monitor load currents from 100 nA to 6 A with high acc uracy in power supply mode
  - Measure voltage and current with 6½-digit resolution
  - Sink current up to 1 A and source current up to 6 A





What is E-Load?

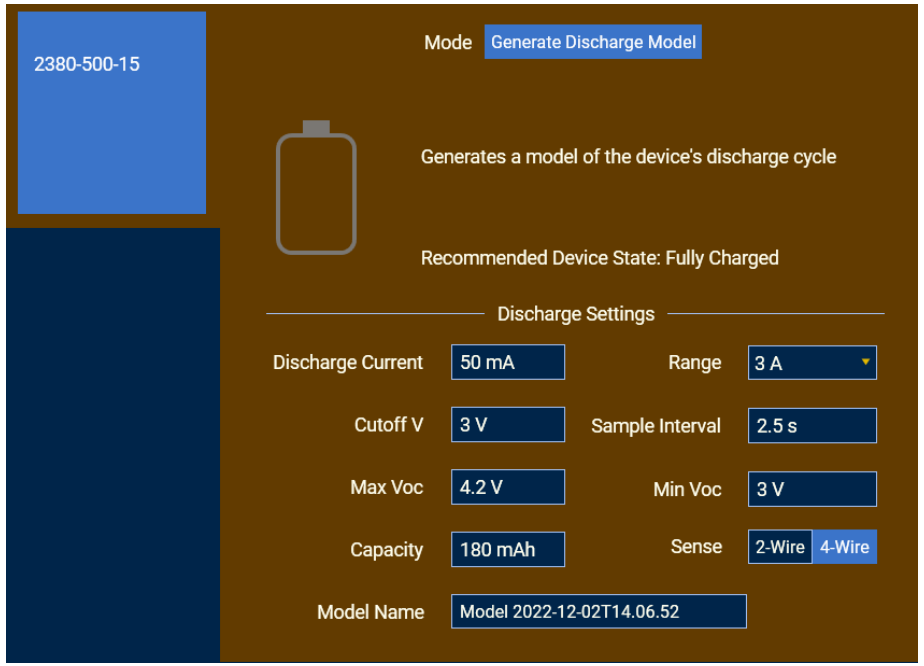
KEITHLEY 2380-120-60, 2380-500-15, 2380-500-30

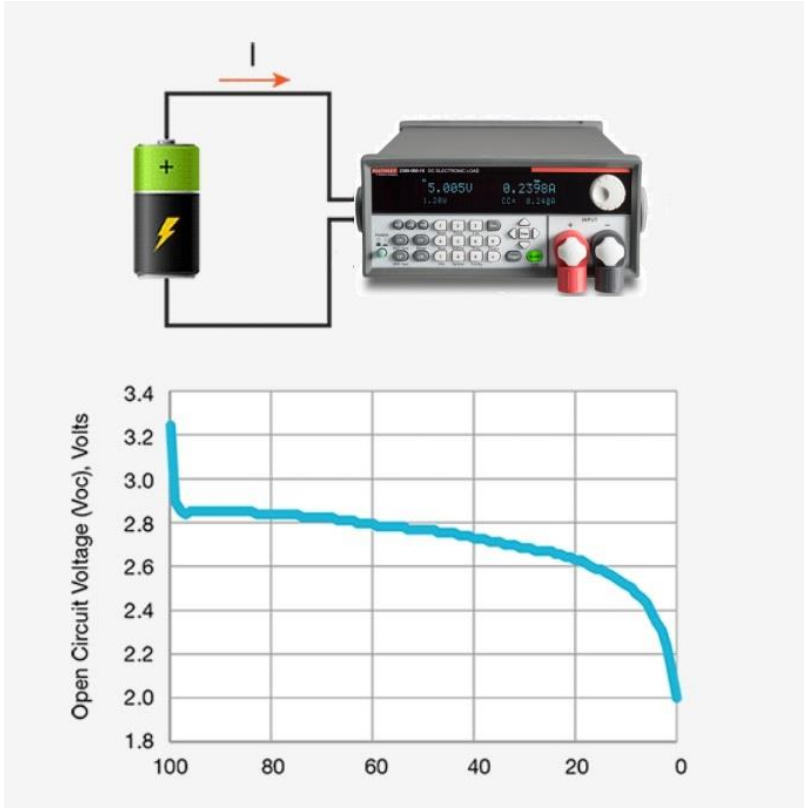
- Test and characterize DC power sources
- Measure voltage, current, resistance and power(Sink only)
- Generates battery models(through KickStart)

Kickstart Battery Simulator App

BATTERY MODEL GENERATION

- Measure the open circuit voltage and ESR
- Converts readings into a 101-point model
- Built-in model browser easily transfers model to 2281S

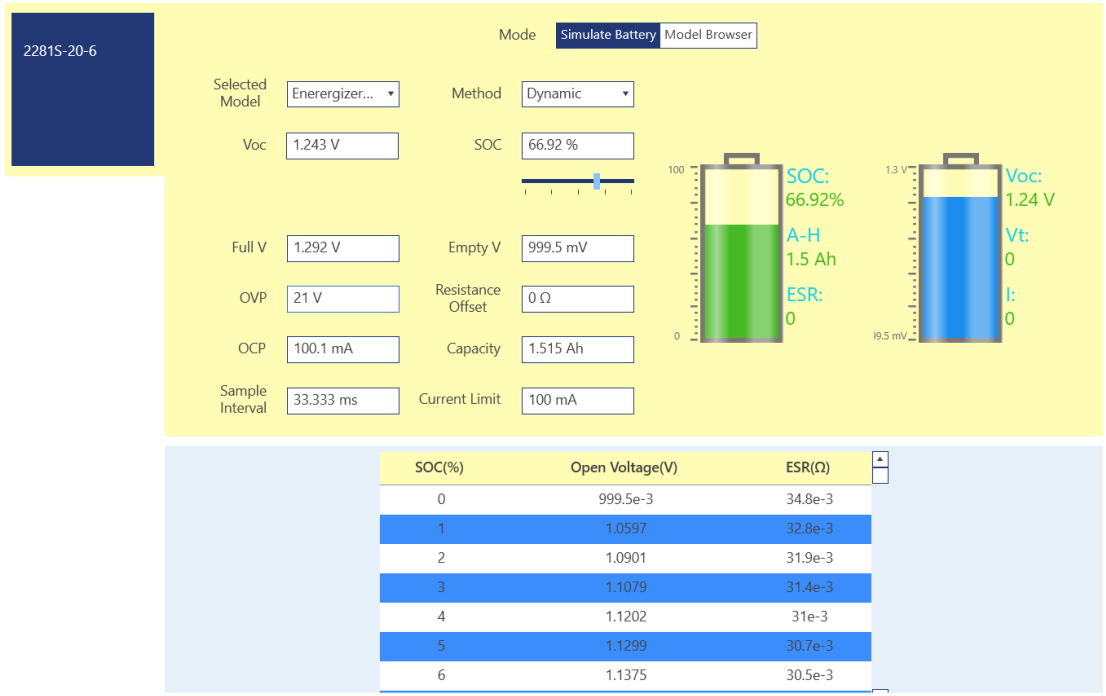


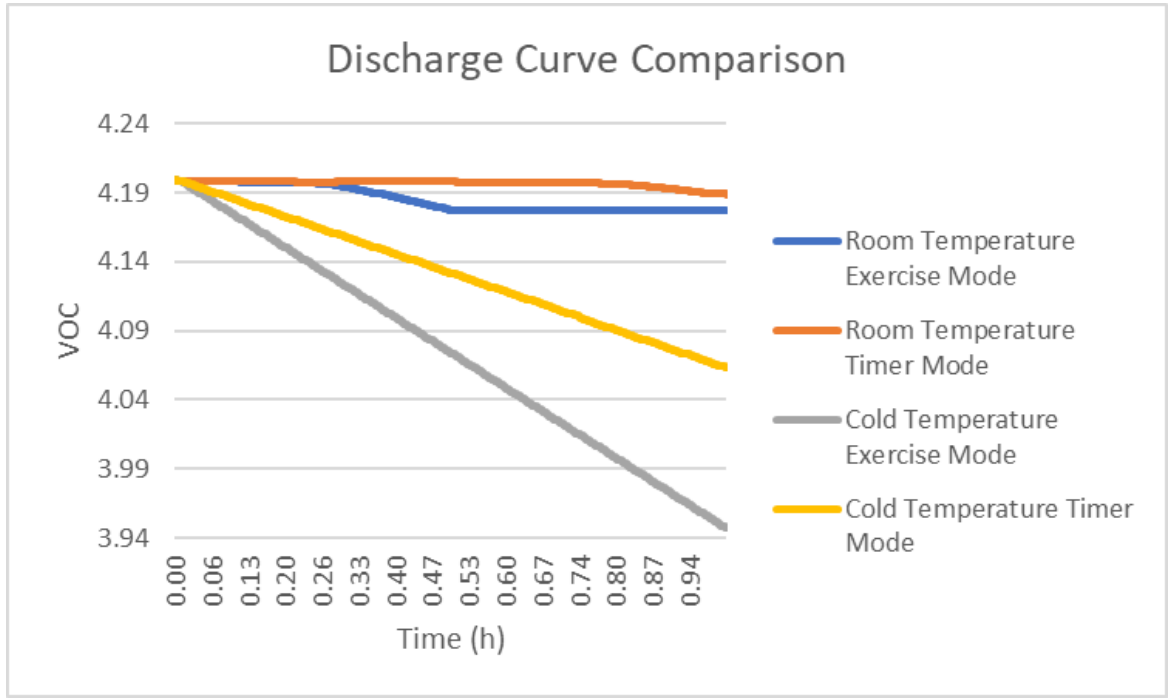


Kickstart Battery Simulator App

BATTERY LIFE OPTIMIZATION

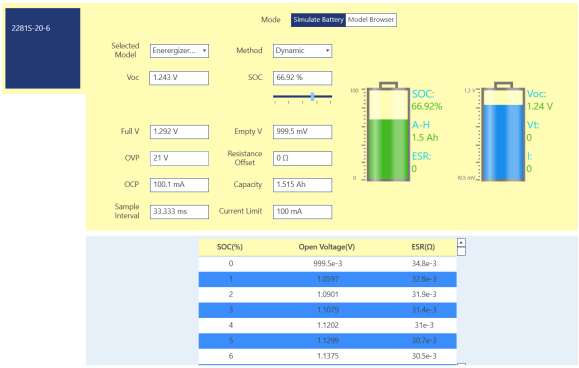
- Reproduceable and consistent simulation
- Model browser allows for quickly swapping among
  Models created under different conditions



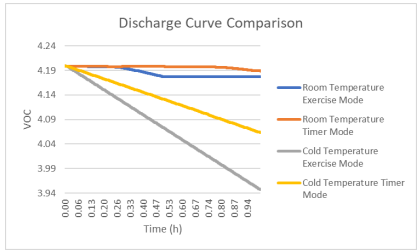


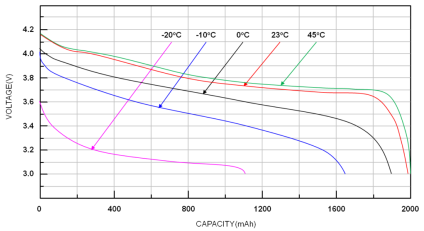
Kickstart Battery Simulator App

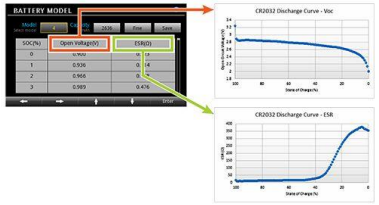
BATTERY LIFE OPTIMIZATION

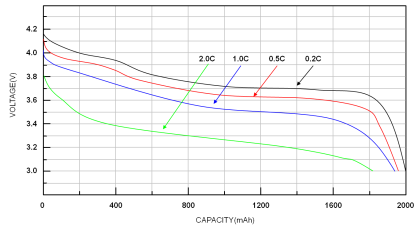


Optimization









Thank you