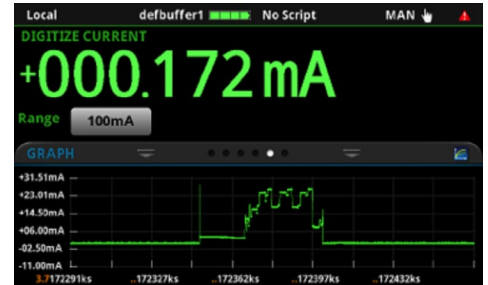
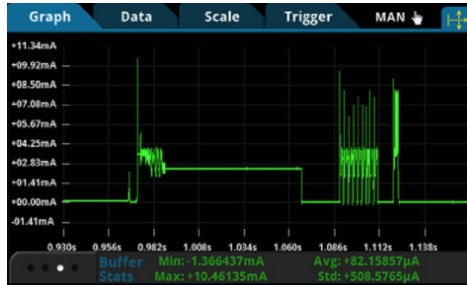
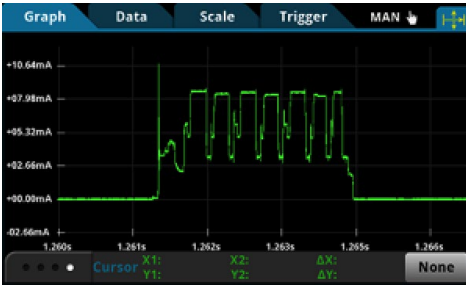


# Power Consumption Profiling and Battery Life Analysis Techniques for Portable, Low-Power Devices

The current profile of your Internet of things (IoT) or medical device, micro-controller unit (MCU), power management chip, or sensor can be as complex as the waveforms illustrated.



**KEITHLEY**  
A Tektronix Company

## Determine the Load Current Profile

Characterizing the load current profile of a prototype device requires measuring the current in all of its operating states: sleep mode (from microamps to milliamps), standby modes (from hundreds of microamps to tens of milliamps), and all active states (from milliamps to amps). But, capturing these widely varying load current levels accurately demands an exceptional measurement solution that offers:

- A wide current measurement range from hundreds of nano-amps to amps
- The measurement speed to capture current pulses just a few microseconds wide
- A large memory buffer to store the prototype device's current profile

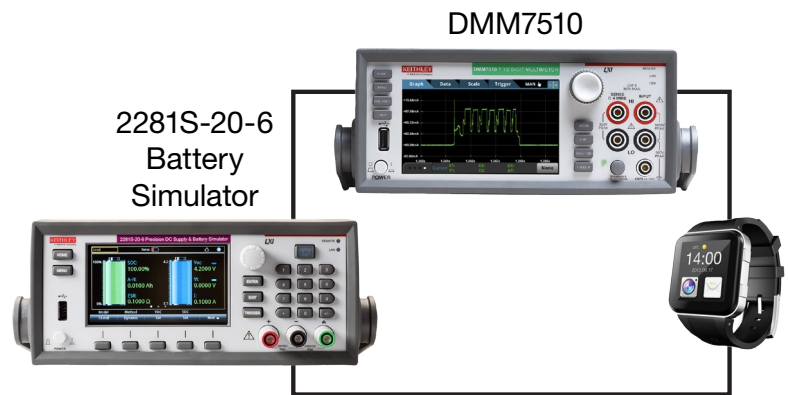
And, Keithley's DMM7510 7½-digit Graphical Sampling Multimeter is well-equipped to meet these demands with:

- pA current sensitivity
- 1 Msample/s sampling
- 27 M data points of memory

## Simulate Any Type of Battery

How low can the battery voltage drop before the device turns off? To gauge battery life and how the DUT performs at different stages of battery discharge, you need a tool that simulates battery performance accurately.

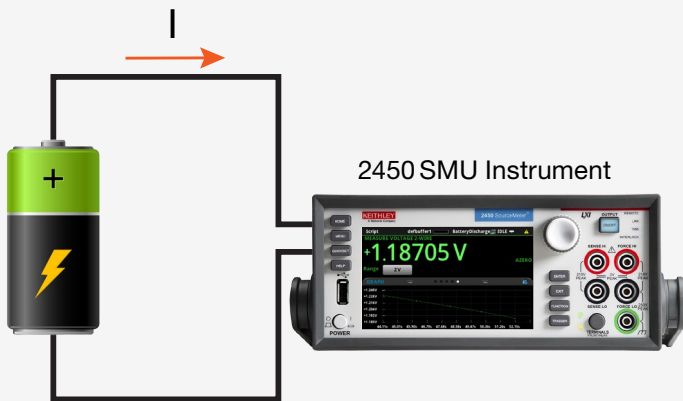
Keithley's 2281S-20-6 Battery Simulator makes it easy to model any type of battery required, so testing prototype devices can be done efficiently and with high repeatability at any battery state, as well as estimating battery life effectively. Combining a 2281S-20-6 with a DMM7510 provides a complete solution for power consumption/battery life assessment.



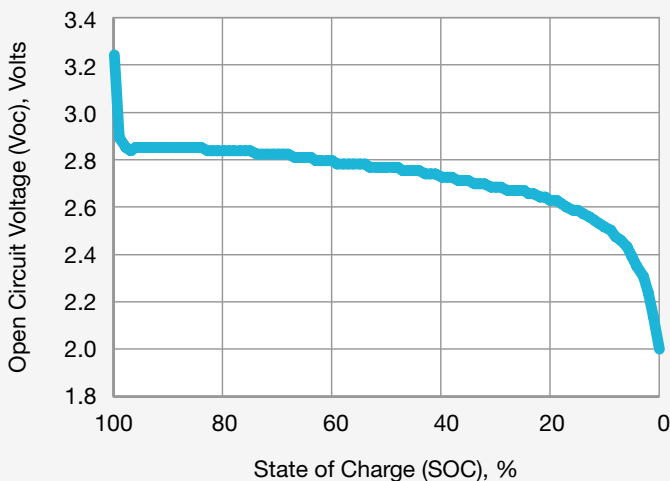
Power profiling and battery life analysis test configuration with a Keithley DMM7510 and 2281S.

## Create Any Battery Model

Keithley's 2450 or 2460 Graphical SourceMeter® Source Measure Unit (SMU) instruments make it so easy to create the model for the battery used by your product. A battery model-generating script operates the SMU instrument as a constant current load and derives the model parameters.



Coin Cell Discharge



## KEY SPECIFICATIONS

### DMM7510 Graphical Sampling Multimeter

- 1 Msamples/s current digitizer
- 100 pA – 10 A measurement range
- 27 million reading storage
- $\mu$ A current triggering
- Touchscreen with graphical display



### 2281S-20-6 Battery Simulator

- 20 V, 6 A, 120 W capacity
- Simulates battery output using dynamic models
- Displays, Voc, SOC, Amp-Hr, and internal resistance
- Display visualization of battery state



### 2450 and 2460 Graphical SourceMeter SMU Instruments

- Constant voltage or constant current sourcing or sinking (four-quadrant operation)
- Up to 200 V, 7 A, 200 W
- Battery model application



To learn more about the test solutions for battery life including measuring power consumption, simulating a battery, creating a model of a battery, and how to provide an optimum solution for assessing battery life, watch the webinar [Determining Power Consumption and Battery Life in Low Power, Portable IoT Devices](#) or visit [www.tek.com](http://www.tek.com).



Find more valuable resources at [TEK.COM](http://TEK.COM)

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