TIDA-00318 Test Report

Marco Hsieh *BMS/WLPC*

Abstract

TI design TIDA-00318 is suitable for low power wearable devices and incorporates a Qi-compliant wireless power receiver (bq51003) and low current 1 cell Li-Ion linear charger (bq25100). It features an ultra-small size (5 mm x 15 mm), capable of charging currents down to 10 mA and up to 250 mA with support of termination currents as low as 1 mA. The included schematic is designed for 135 mA charge current and 8 mA termination current application.

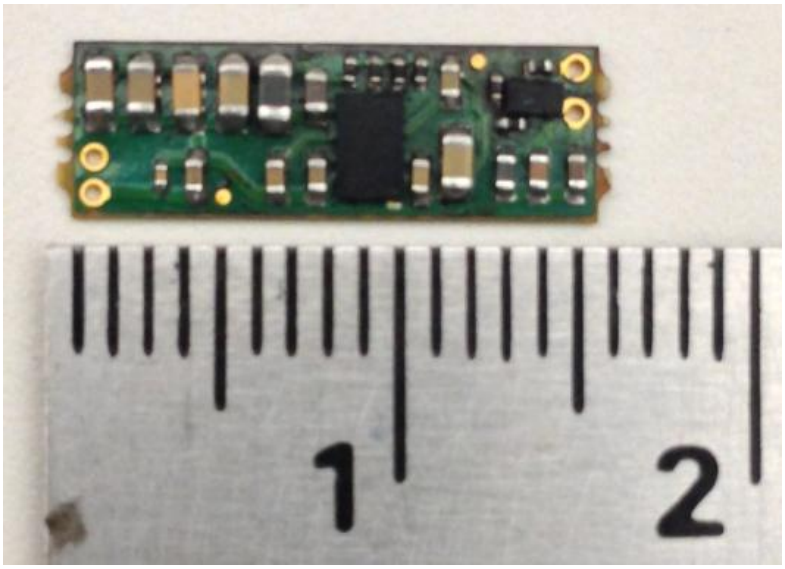

Figure 1. Board Photo

Document History

Version	Date	Author	Notes
1.0	August 2014	Marco Hsieh	First release

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Bench Set up

- TIDA-00318 was tested on a bench setup with wireless receiver coil TDK WR222230 and a 110 mAh Li-Ion battery as shown in the Figure 1. The test equipment is as follows:
  - Oscilloscope: Tektronix DPO3034, 300 MHz
  - Passive Voltage Probes (4) : Tektronix P6139B – 500 Mhz, 8 pF, 10 MΩ, 10x
  - Current Probe: Tektronix TCP202A Current Probe
  - Power Supply: HP E3681A
  - Electronic Load: Keithley Source Meter 2420
  - Keithley Multi-meter 2000 (5)
  - Lithium-Ion batteries (various capacities / chemistries)
  - FLUKE Thermal Couple : 80TK
  - Wireless Power Transmitter: TI bq500212AEVM-550 PWR550

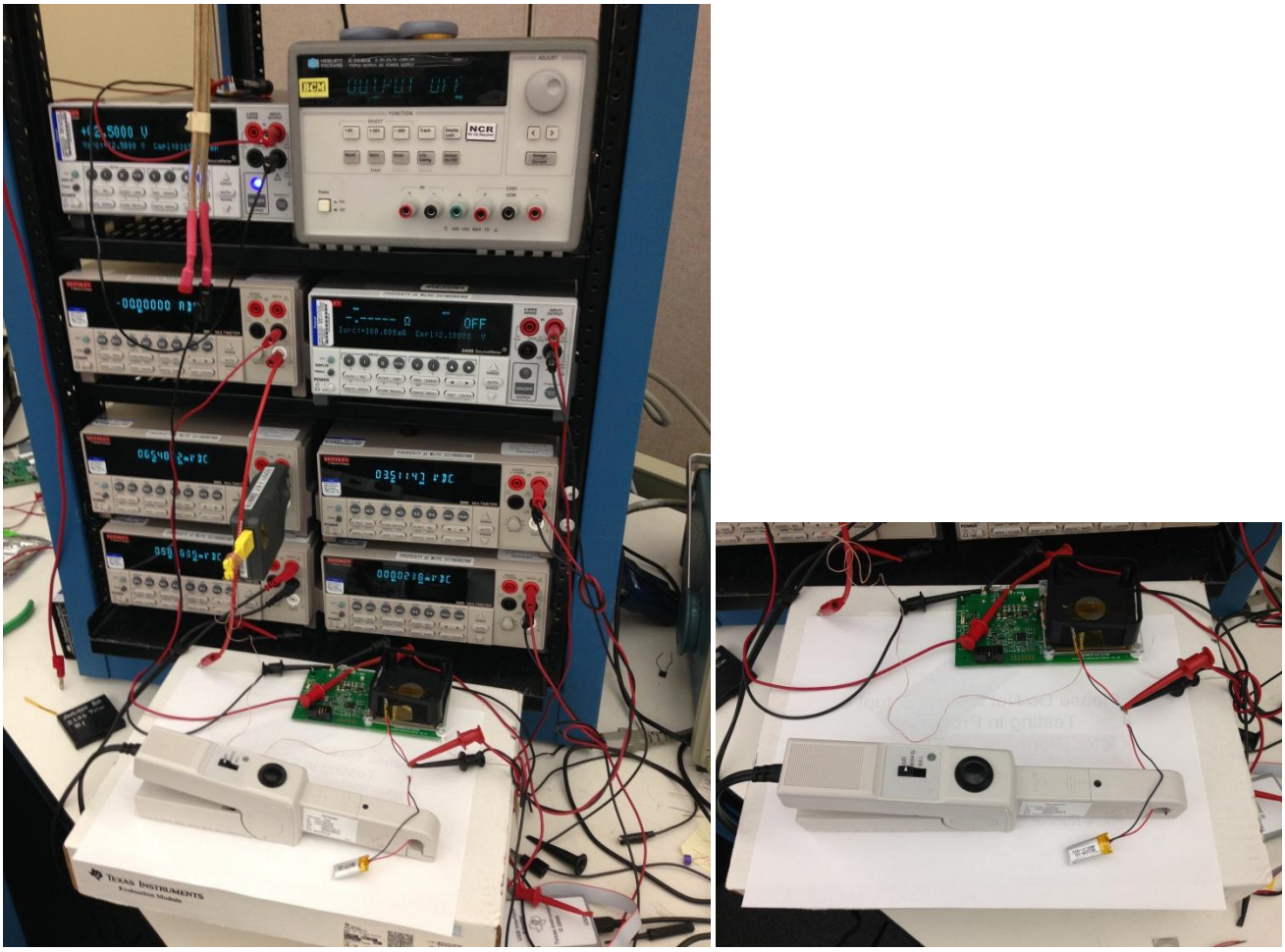

Figure 2. Bench Setup

Receive Coil

- A TDK WR222230 was used as the receiver coil in this experiment.

  The shield diameter is 22 mm and the coil outer diameter is 17 mm.

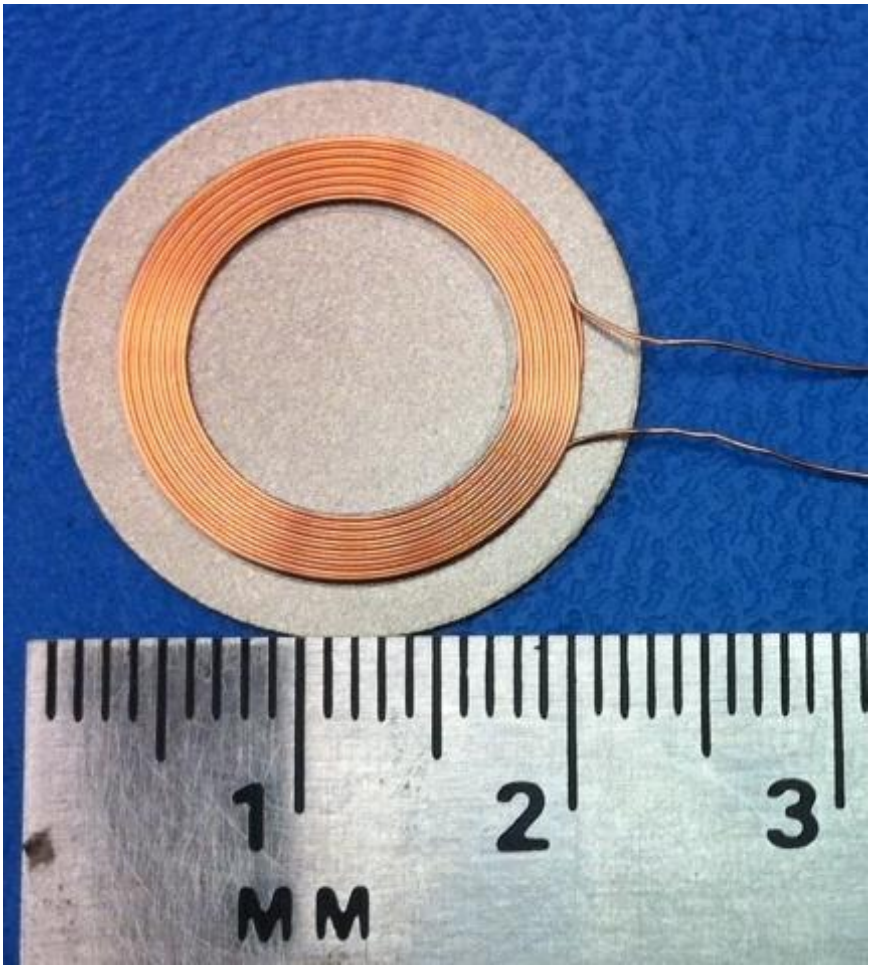

Figure 3. Receiver Coil

Block Diagram

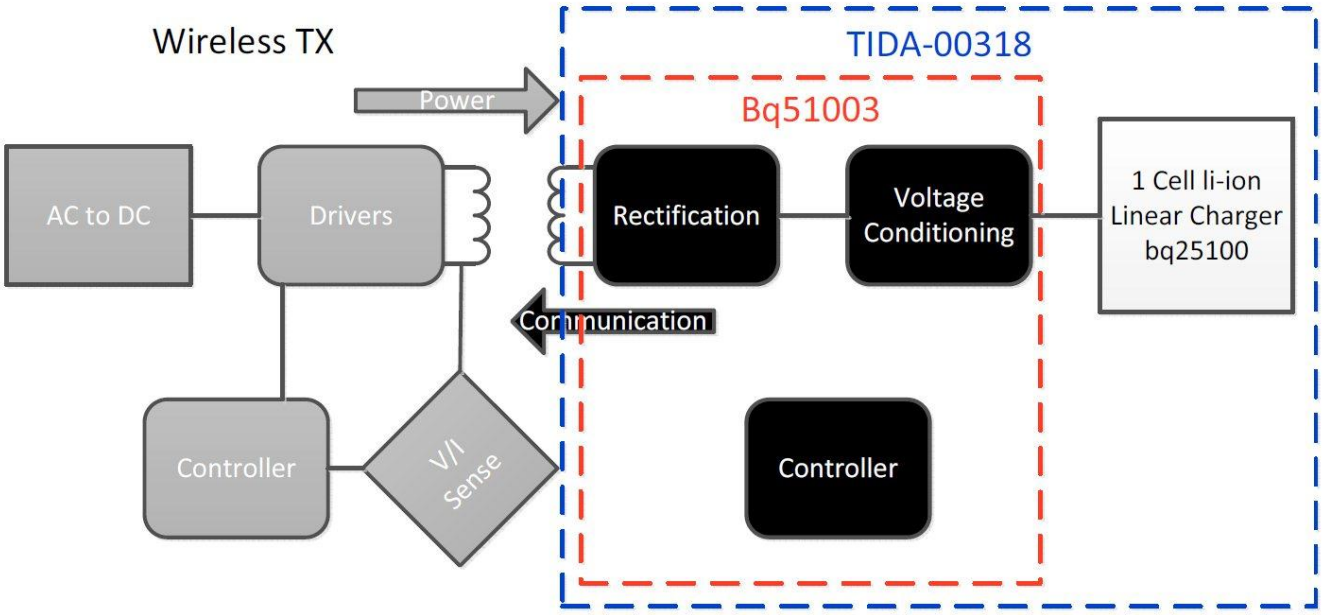

Figure 4. Block Diagram

Charging Cycle Test

- The charging cycle test in this document shows five measurements: battery voltage, battery current, input voltage, input current and device temperature.

Table 1. Measurement Conditions

Measurement	Units
Battery voltage	V
Battery current	A
Input voltage	V
Input current	A
Device temperature	°C

Battery

- The battery pack using in this experiment is a 110 mAh Li-Ion battery pack.

Figure 5. 110 mAh Li-Ion Battery Pack

Temperature Measurement

- Temperature measurements were made with a FLUKE 80TK thermal couple.

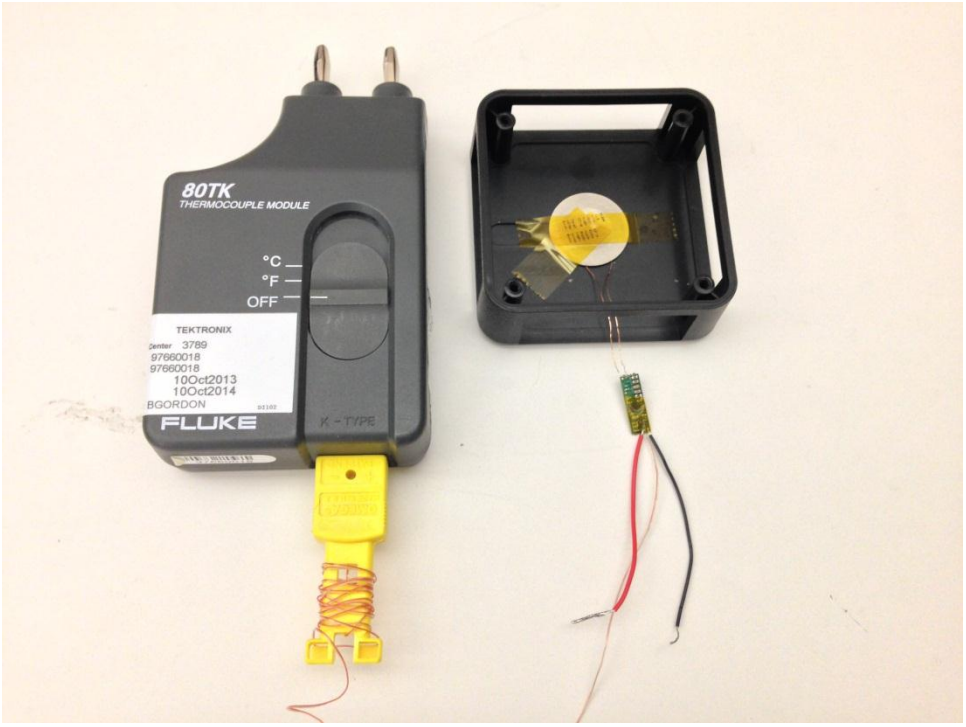

Figure 6. FLUKE 80TK Thermal Couple

4.2 V 250 mA Charge Cycle with 10 mA Charge Termination

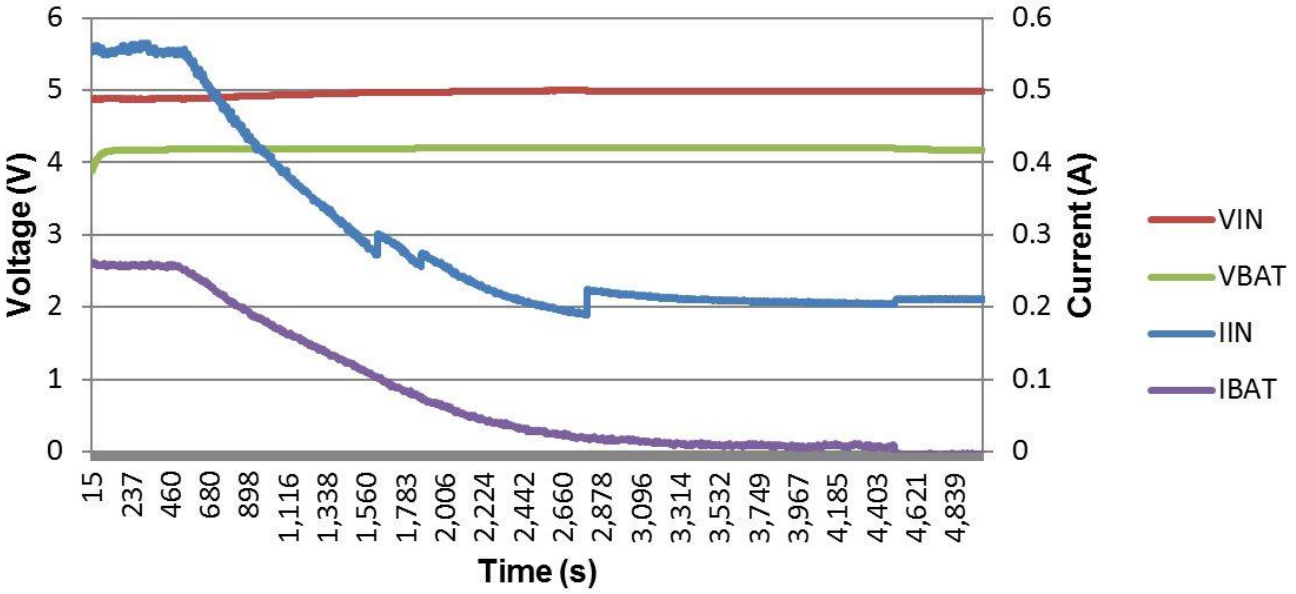

Figure 7. 4.2 V 250 mA Charge Cycle with 10 mA Charge Termination

4.2 V 135 mA Charge Cycle with 20 mA Charge Termination

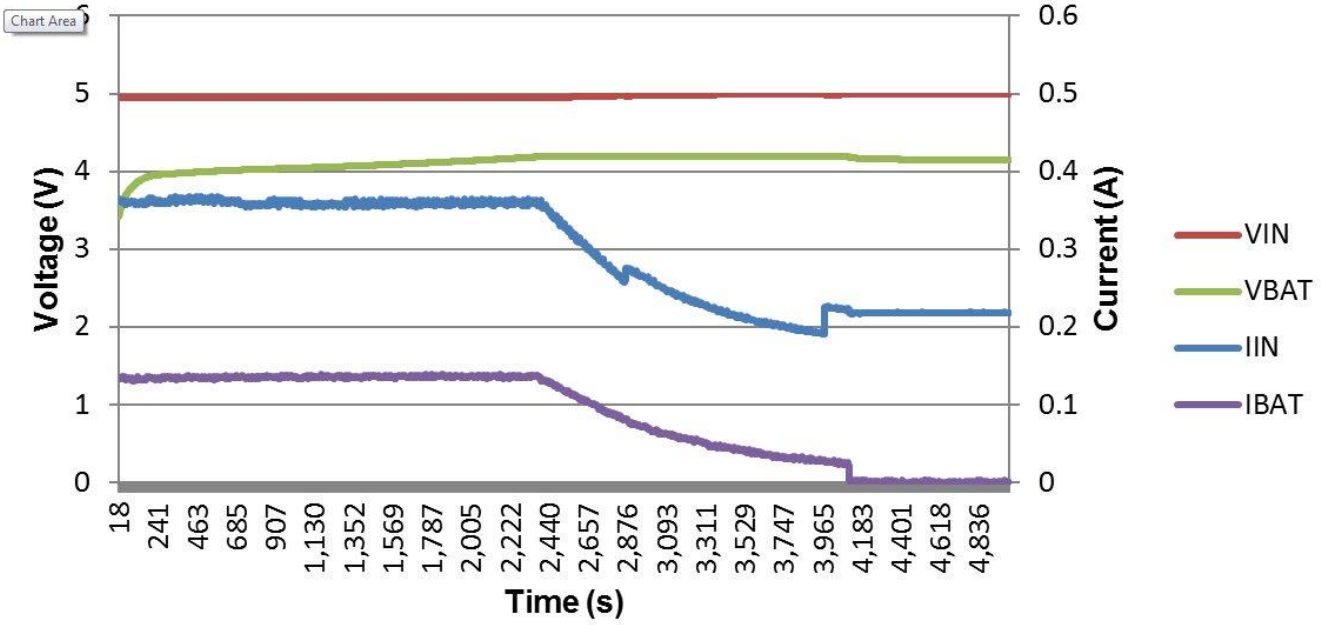

Figure 8. 4.2 V 135 mA Charge Cycle with 20 mA Charge Termination

4.2 V 60 mA Charge Cycle with 1 mA Charge Termination

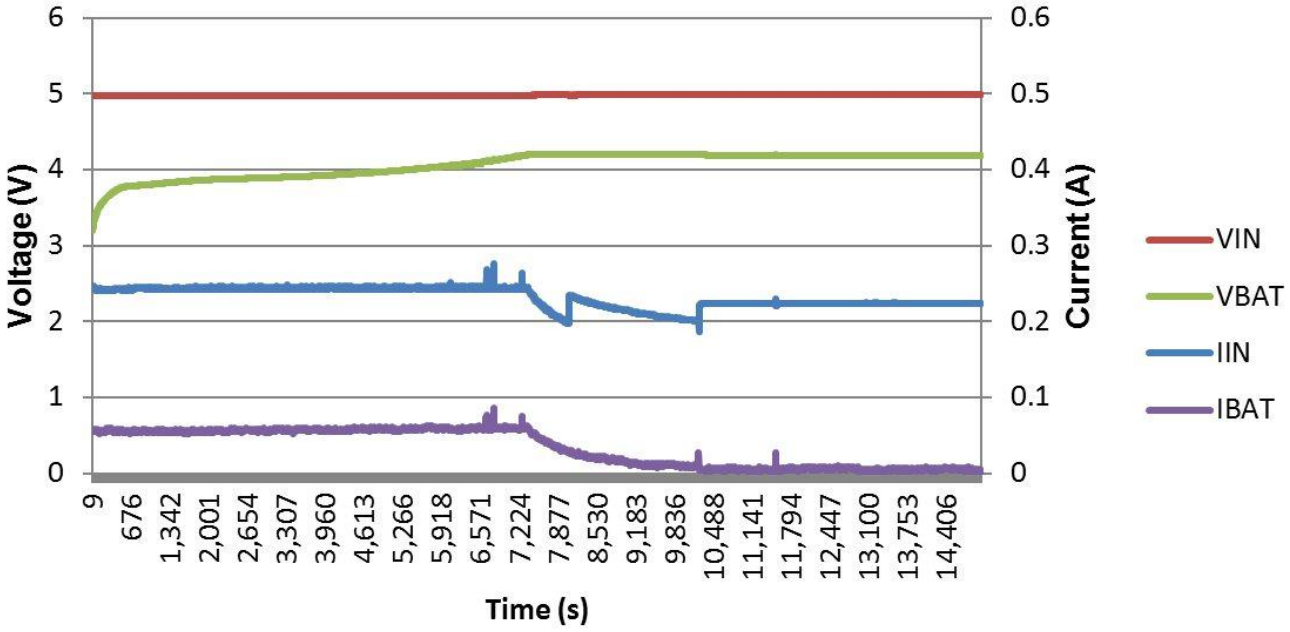

Figure 9. 4.2 V 60 mA Charge Cycle with 1 mA Charge Termination

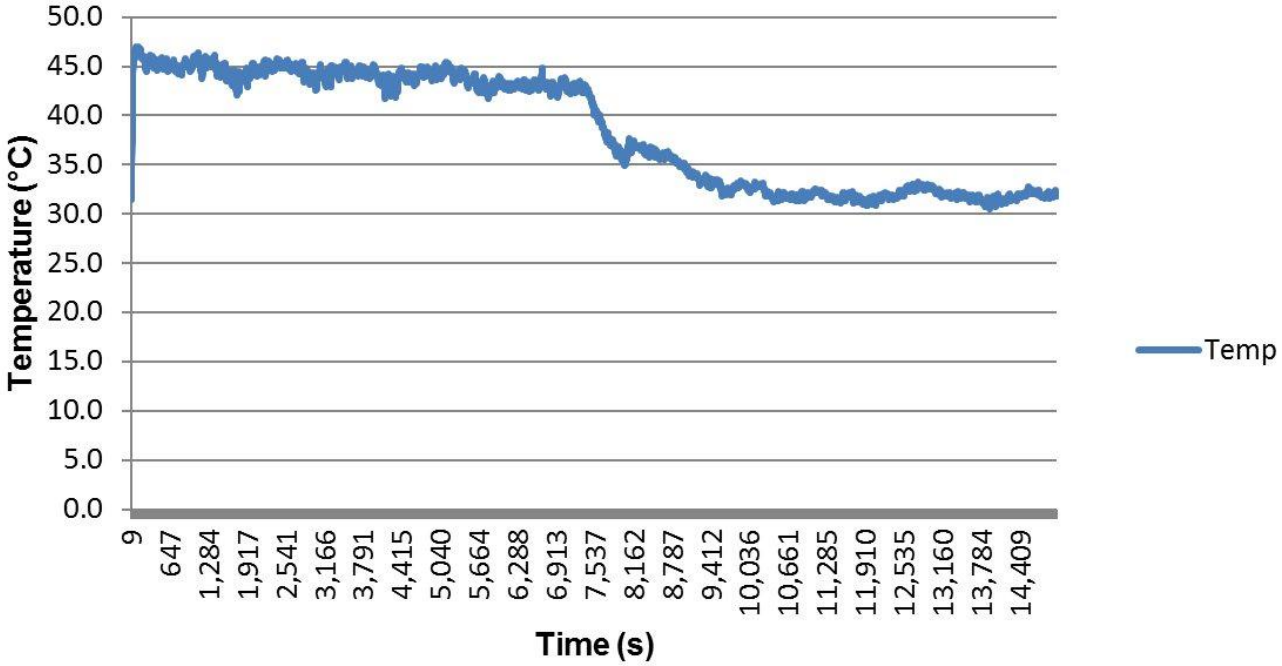

Figure 10. 4.2 V 60 mA Charge Cycle with 1 mA Charge Termination (2)

TIDA-00318 Operation Waveform

IBAT Load Transition from 0 mA to 100 mA

VBAT = 3.8 V

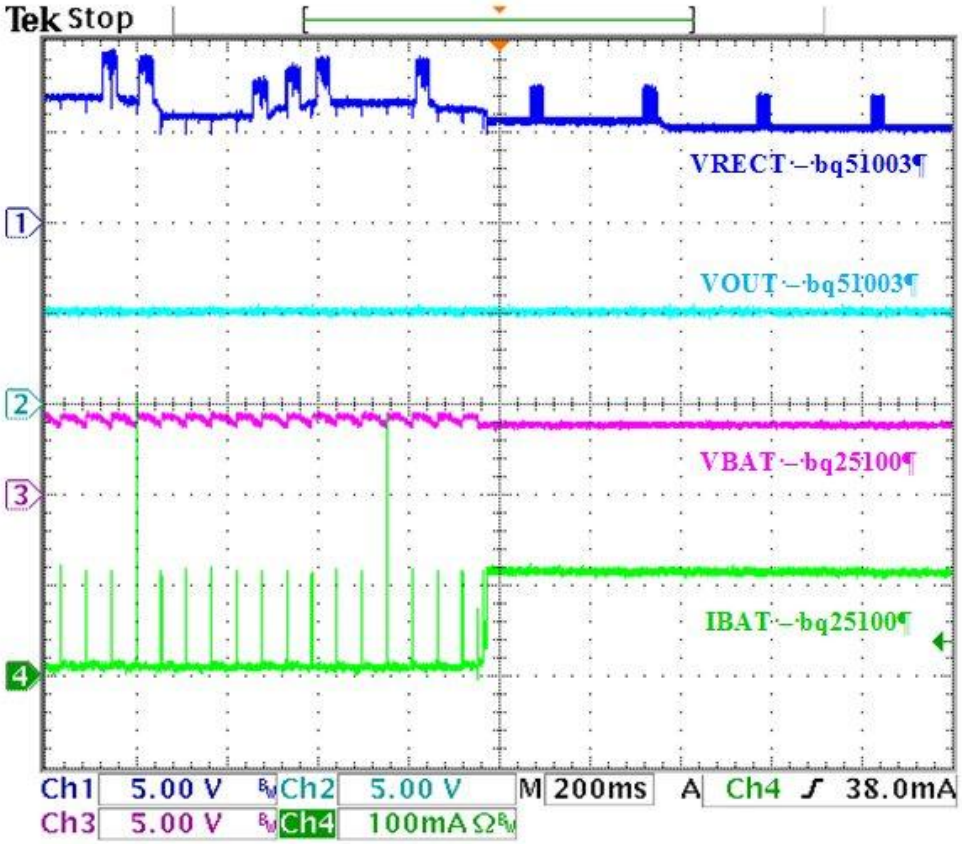

Figure 11. IBAT Load Transition from 0 mA to 100 mA

IBAT Load Transition from 100 mA to 0 mA

VBAT = 3.8 V

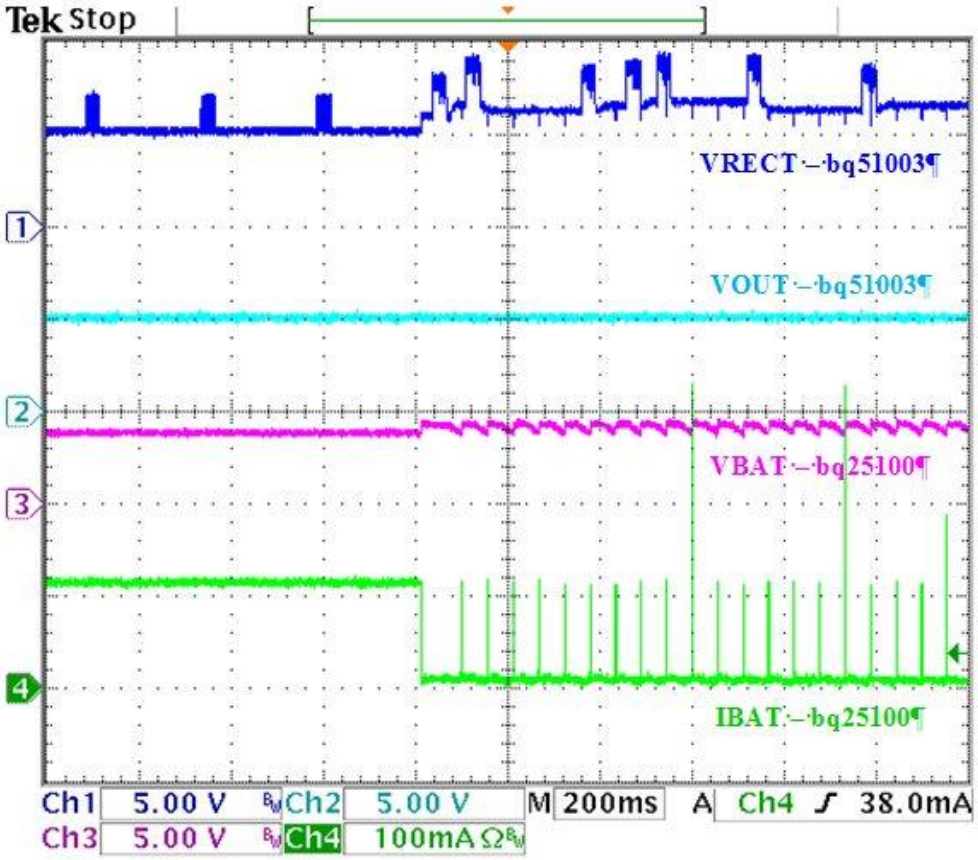

Figure12. IBAT Load Transition from 100 mA to 0 mA

References

1. Highly Integrated Wireless Receiver Qi (WPC v1.1) Compliant Power Supply (SLUSBC8)
2. bq2510x 250-mA Single-Input, Single Cell Li-Ion Battery Chargers (SLUSBV8)

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