18650 Li-ion Cell — 2500 mAh (Model: INR18650-2500A)

---

1. Overview

This report summarizes the key electrical characteristics, operating limits, and performance parameters of the 18650 lithium-ion cell (TinyCircuits ASR00050), based on the manufacturer's datasheet. The goal is to present the most essential information in simple, easy-to-understand terms for quick reference.

---

2. Key Specifications

Electrical Ratings

- **Nominal Capacity:** 2500 mAh (minimum 2450 mAh)
- **Nominal Voltage:** 3.7 V
- **Charge Voltage:** 4.20 ± 0.05 V
- **Discharge Cut-Off Voltage:** 2.75 V
- **Internal Impedance:** ≤ 60 mΩ

Current Ratings

Charging:

- Standard Charge: **500 mA (0.2C)**
- Maximum Charge: **1250 mA (0.5C)**

Discharging:

- Standard Discharge: **500 mA (0.2C)**
- Maximum Continuous Discharge: **2500 mA (1C)**
- Maximum Instantaneous Discharge: **5000 mA (2C)**

---

3. Performance Characteristics

Cycle Life

- ≥ **300 cycles** until capacity reduces to 80% of initial.

Temperature Limits

- **Charging:** 0°C to +45°C
- **Discharging:** –10°C to +60°C
- **Storage (1 month):** –5°C to +45°C
- **Storage (6 months):** 0°C to +45°C

---

4. Simplified Explanation of Key Terms

- **Capacity (mAh):** Indicates battery runtime. Higher value = longer usage time.
- **Nominal Voltage:** The typical operating voltage during normal discharge.
- **Charge Voltage:** Maximum safe charging limit; exceeding 4.2 V damages the cell.
- **Cut-Off Voltage:** Minimum safe discharge level; going below 2.75 V harms the battery.
- **C-Rate (0.2C, 0.5C, 1C):** A way to express charge/discharge current relative to capacity.
- **Cycle Life:** Number of charge–discharge cycles before major capacity loss.
- **Temperature Limits:** Safe environmental range; operation outside this range can cause degradation or safety issues.

---

5. Safety Notes (Critical)

- Avoid overcharging or over-discharging.
- Prevent short circuits; can cause heating or fire.
- Use only supported Li-ion chargers.
- Do not expose to excessive heat, impact, or puncture.
- Store partially charged (40–60%) if unused for long periods.