**BATTERY TYPE**

- **Makeup:** Solid State Rechargeable Microbattery
- **Electrolyte:** All Solid State (LiPON, Lithium Phosphorus Oxynitride)
- **Anode:** Lithium
- **Cathode:** Lithium Cobalt Oxide
- **Form:** Thin Film, ~15 microns total thickness (not including substrate)
- **Substrate:** Metal Foil or Rigid Ceramic or OEM Component
- **Encapsulant:** Fully encapsulated in thin membrane

**VOLTAGE (V) Nominal**

- 4.0 V Open Circuit

**CAPACITY**

- Up to: ~0.2mAhr/cm²
- Can be increased by surface area or parallel cell stacks

**OPERATING RANGE**

- Survivorability -50°C to 180°C
- Sustained Operation 0°C-120°C

**CHARGING**

- >85% Charging efficiency
- Capability to charge at C rates greater than 50 at lower efficiencies

**ENERGY DENSITY**

- Wh/kg (gravimetric): 200
- Wh/l (volumetric): 450

**LIFE**

- Cycle Life: >60,000 charge/discharge cycles
- Shelf Life: Infinite prior to activation
- Quiescent Storage Life: <1% total energy loss per year after initial activation

**MECHANICAL**

- Designed to Application Specific Form Factor Requirements

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**Product Design Optimization:**

The **LiTE*STAR™** battery is most effective when the system applications and product designs are developed to take full advantage of the long life cycle performance of the battery. With **LiTE*STAR™**, battery power is now available in packages that have previously been too constrained for traditional primary and secondary batteries. The **LiTE*STAR™** recharging features enable a micro-battery to deliver the overall system performance of larger primary batteries.

**Representative Smart Card Solution: Battery Sizing Example**

A multi-functional Smart Card powered by a **LiTE*STAR™** battery can accommodate any number of operations including multiple account data storage, real-time memory, biometrics, displays, etc. Each operation requires a defined amount of current and voltage when activated. The number of uses over a desired time defines the duty cycle that the battery must support between charges. A design consideration is to provide full operational capability for all functions when the battery has greater than a pre-defined level of charge (35-50%). Below this pre-defined level, only quiescent mode operations would remain active to extend the life of vital functions-such as memory-retention, until the battery can be recharged.

Once the duty cycle required to operate the Smart Card features and functions is defined, and the user demographics for mean-time between charges is established- a custom LiTE*STAR™ battery design can be developed to provide an optimized form, function, and low cost solution.
The LiTE*STAR™ rechargeable battery delivers 4.0 Volts of high energy power to support multi-functional Smart Card applications and real time displays. The rechargeability feature (>60,000 cycles) allows the micro-battery package to provide years of high energy, reliable power for applications requiring current impulses up to 10 mAmp and higher.

Multi-functional Smart Cards can be powered by LiTE*STAR™, a thin-film rechargeable lithium battery. A small chip-like or flexible battery can be integrated directly into the Smart Card electronics package. A miniature LiTE*STAR™ battery can be recharged thousands of times, providing long-life, reliable power ...Leading the Charge in the next generation of Smart Card Solutions.

Quick Charge: The solid state LiTE*STAR™ battery is rechargeable in a matter of seconds and can easily and quickly be energized during normal Smart Card use.

LiTE*STAR™ is available in either flexible or rigid formats.

LiTE*STAR™ is recharged quickly during ATM & Card Reader Operations.