# Tadiran HLC (Hybrid Layer Capacitor)
# Model HLC-1550A

## 1. Scope

This data sheet describes the mechanical design and performance of Tadiran HLC (Hybrid Layer Capacitor) model HLC-1550A, optimized for extreme temperatures, used in a Pulses Plus™ battery.

## 2. Characteristics

### 2.1. Physical

2.1.1. Length: 50.3± 0.3 mm.

2.1.2. Diameter: 15.1 mm. max.

2.1.3. Weight: 18.8± 0.3 gr.

### 2.2. Electrical

Discharge

- Discharge capacity (at RT):
  - When charged to 3.67V: 560A*sec
  - When charged to 3.90V: 850A*sec
  - Discharge end voltage: 2.5V (discharge below 2.5V at RT and discharge below 2 V at –40°C may increase the HLC internal impedance)
- Maximum discharge current: Continuous: 2.0 A

  Pulse: 5 A

2.2.2. Charge (constant current)

- Max. charge voltage: 3.95 V
- Max. charging current: 100 mA

2.2.3. Shelf life (Reversible Capacity):

The table below describes the shelf life at different storage temperatures to 80% of initial capacity specified at paragraph 2.2.1.

| Temperature | HLC used independently | HLC in Pulses Plus™ battery |
|---|---|---|
| RT | 3 years | 10 years |
| 60°C | 4 weeks | 7 years |
| 85°C | 1 week | At least 1 year |

2.2.4. Self discharge current in Pulses Plus™ battery:

At RT: 3 µA

At 80°C: 15 µA

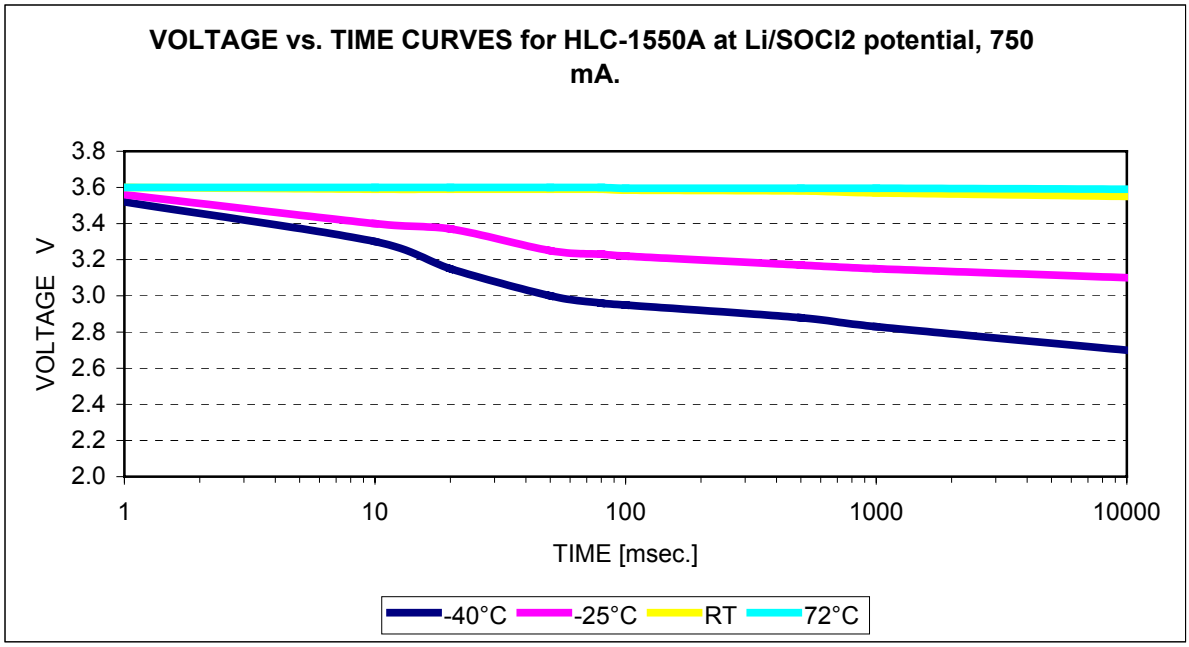
2.2.5. Number of charge-discharge cycles to 80% of initial capacity :

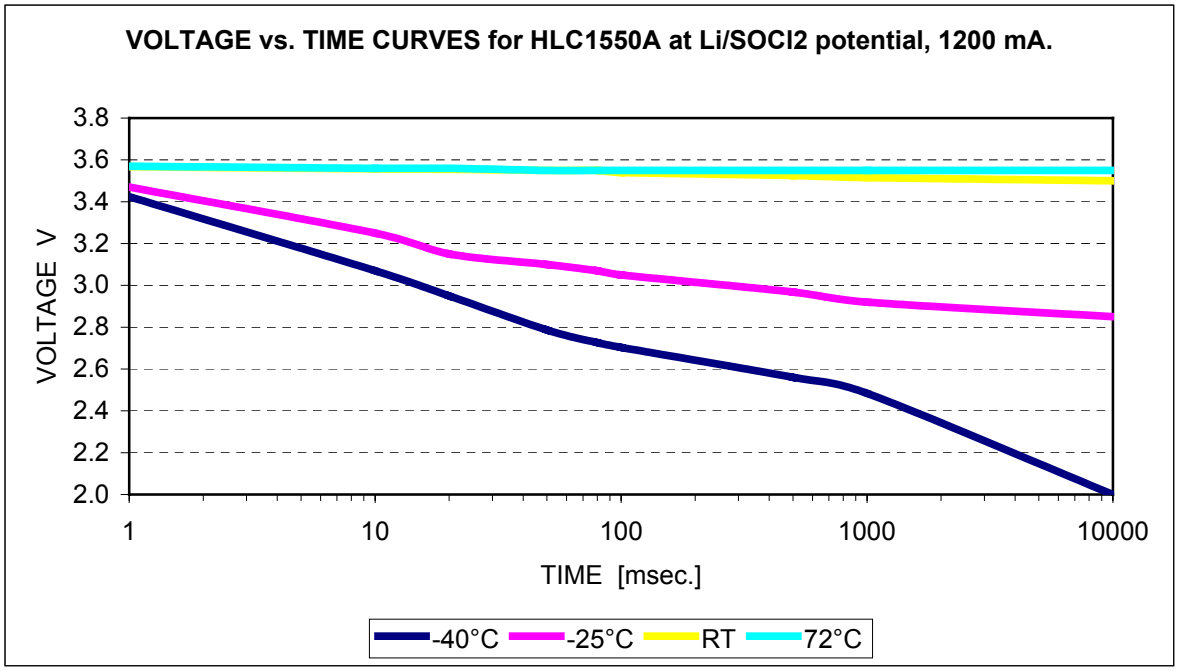
| | 100% DOD | 10% DOD | 1% DOD |
|---|---|---|---|
| Charged to 3.67V | 4000 | 40,000 | 400,000 |
| Charged to 3.90V | 1000 | 10,000 | 100,000 |

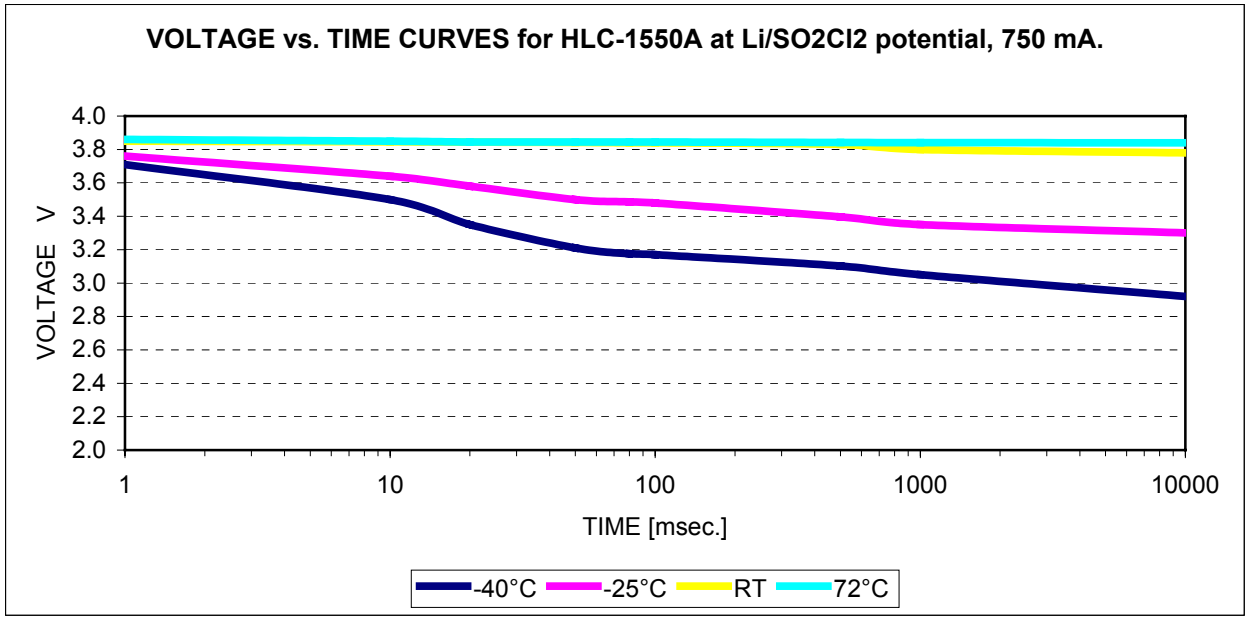
DOD (Depth Of Discharge)

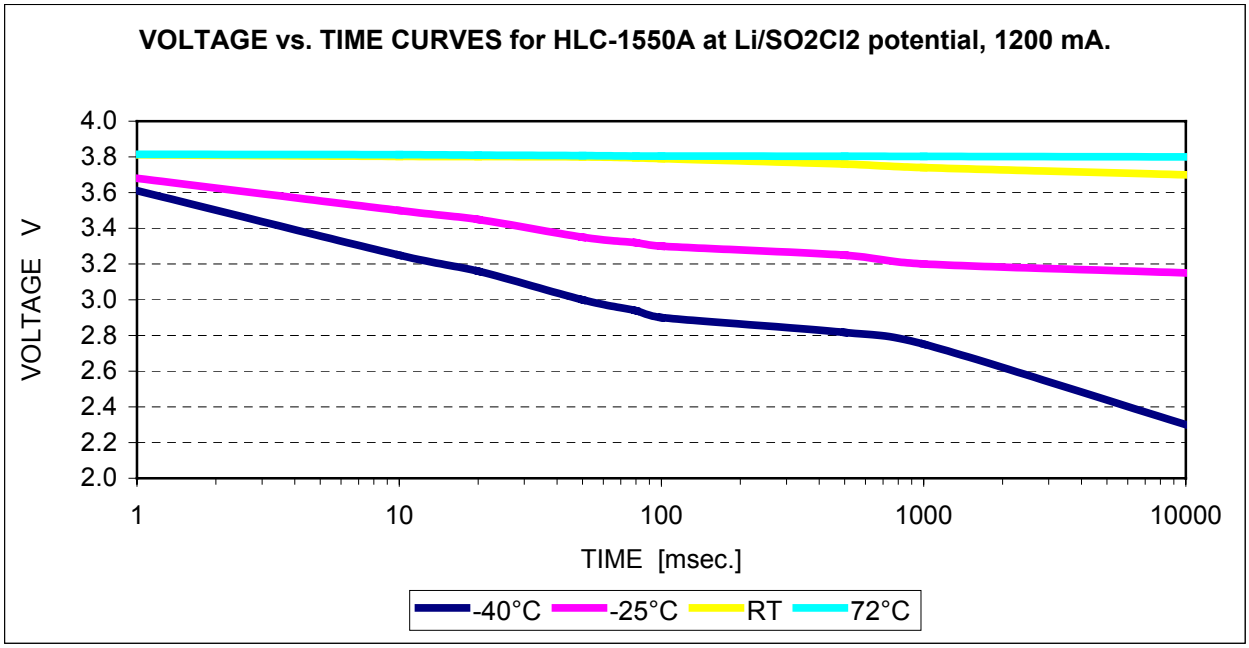
2.2.6. Cell impedance: Less than 100 mOhm (at RT @ 1kHz)

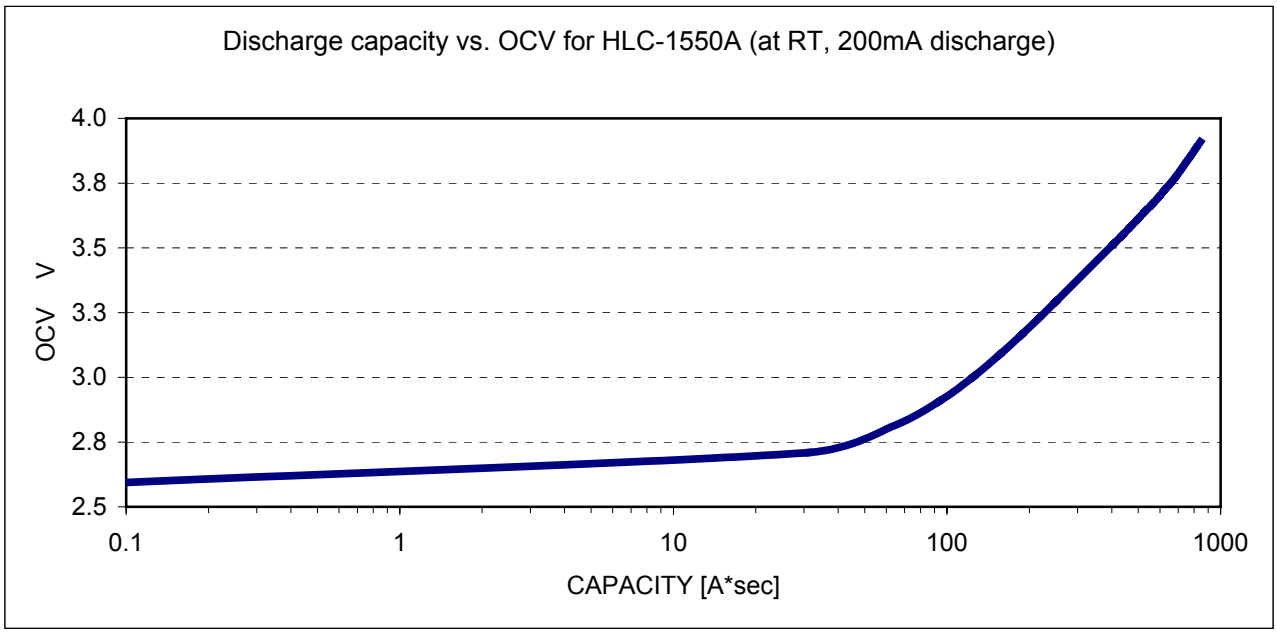
2.2.7. Performance Data:








2.3. Safety:

2.3.1. The HLC successfully passed the following tests:

- Short circuit at RT
- Short circuit at 55°C
- Compression
- Impact
- Overcharge
- High temperature exposure
- Shock and vibration
- Forced discharge

Tadiran Batteries performed the tests according to UL 1642 specification for lithium batteries. The HLC was approved by UL under file no. MH12193 issued on December 7, 2000.

2.3.2. The HLC is not restricted for air transportation.

2.4. Temperature range:

| | HLC used independently | HLC in Pulses Plus™ battery |
|---|---|---|
| Operating temperature | -30 to 60°C | -40 to 85°C |
| Storage temperature | -30 to 60°C | -30 to 60°C |

## Warning:

- **The HLC is designed for use in a Pulses Plus™ battery or in low charge current as specified only. The HLC may explode or violently vent if over-charged above 4.4V.**
- **Charging the HLC at above 3.95V may lead to capacity loss and / or internal impedance rise.**
- **Do not charge the HLC higher than 4.1V, over discharge, short circuit, heat above 100°C, incinerate or expose content to water.**