EFL700A39

EnFilm™ - rechargeable solid state lithium thin film battery

Features

- All solid-state
- Ultra thin
- Fast recharge
- Long cycle life
- RoHS compliant
- UL file number: MH47669

Applications

Device is intended to be used in following applications:

- Sensors and sensor networks
- Smart card
- RF ID tags
- Energy storage for energy harvesting devices
- Non implantable medical applications
- Backup power

Description

The EFL700A39 is a thin film rechargeable lithium battery. The battery has a $LiCoO_2$ cathode, LiPON ceramic electrolyte and a lithium anode. This device has a footprint of 25.4 x 25.4 mm.

Table 1. Device summary

Capacity	0.7 mAh
$V_{nominale}$	3.9 V
V_{op}	3.6 to 4.2 V
R_{int}	100 ohm
I_p	10 mA
Dimension	25.4 x 25.4 mm
Thickness	200 µm

TM: EnFilm is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings

Symbol	Parameter	Value	Unit
V_{op}	Operating voltage	3.6 – 4.2	V
I_c	Maximum continuous discharge current	5	mA
I_p	Maximum pulsed discharge current(1)	10	mA
T_{stg}	Storage temperature range	- 40 to 60	°C
T_{op}	Operating temperature range(2)	- 40 to 60	°C
C_{lfe}	Cycle life (to minimum of 80% of initial capacity)(3)	1000	cycle

1. Pulsing conditions: 100 ms on, 0.9 s off
2. 1/100 C discharge at -40 °C: operating at 60 °C reduces the cycle life
3. 1C discharge rate: 50% depth of discharge, cycle at room temperature

Table 3. Electrical characteristics

Symbol	Parameter		Test conditions	Min	Typ	Max	Unit
C	Nominal capacity (minimum)		T = 30 °C Discharge @ 1 mA Cut-off voltage = 3.6 V	0.7	-	-	mAh
R_{int}	Internal resistance		T= 30 °C	-	100	120	ohm
C_t	Charge time to 80% of full capacity		Constant voltage= 4.2 V	-	-	20	mn
S_{Disch}	Self discharge	total self discharge (recoverable and non-recoverable)	Room temperature	-	-	18	%/year
		non-recoverable	Room temperature	-	-	5	% first year
				-	-	15	% over 5 years

Figure 1. Typical discharge curve

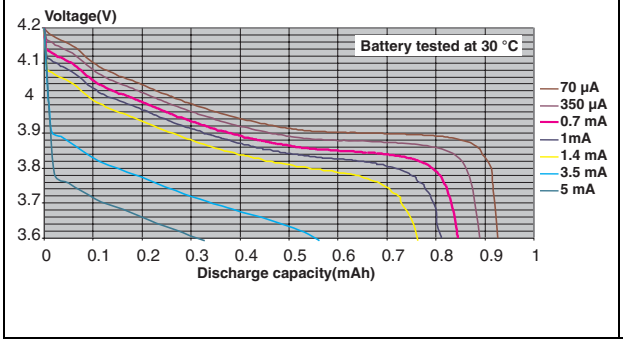


Figure 2. Typical pulsed discharge curve

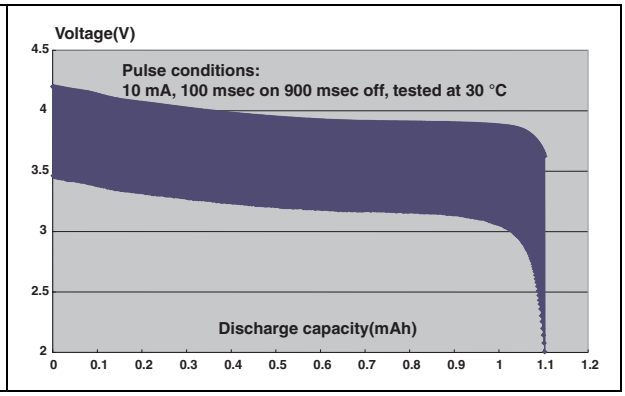
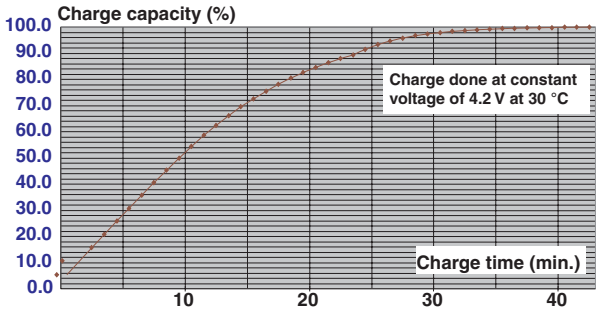


Figure 3. Typical charge curve



2 Application information

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3 Recommended charge and discharge processes

3.1 Charge

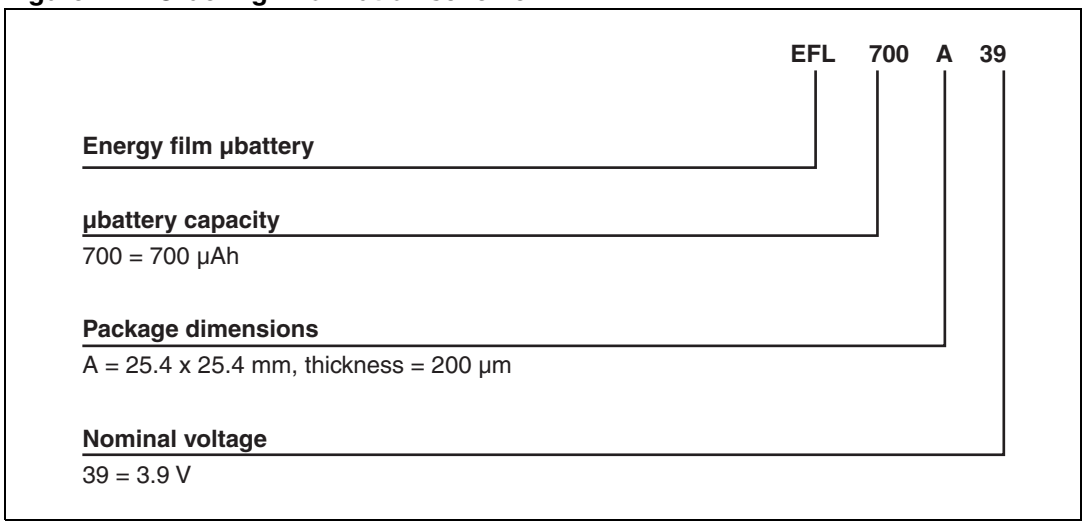
Battery can be charged from a 4.2 V ± 0.05 V constant voltage source with or without current limit. More than 90% of the total capacity is recharged when the charge current falls below 0.1 mA.

3.2 Discharge

When discharging under constant current or constant load, the cut-off voltage should be no less than 3.6 V. Cut-off voltage can be lowered to 2.0 V for pulsed discharge.

4 Ordering information scheme

Figure 4. Ordering information scheme



5 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

Figure 5. Package dimensions

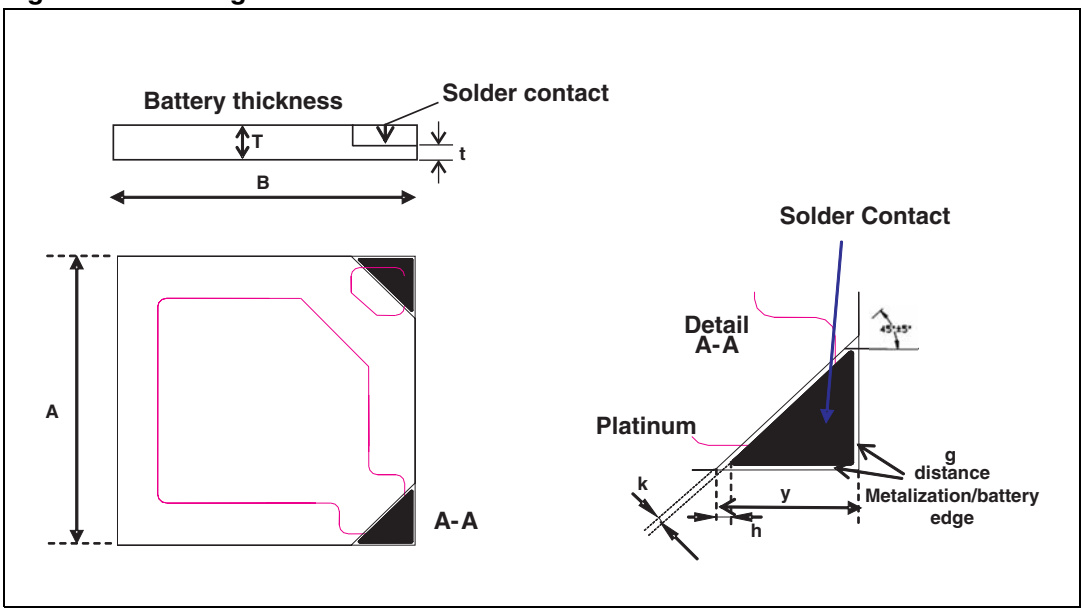


Table 4. Package dimensions

Ref	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	25.2	25.4	25.7	0.992	1.000	1.012
B	25.4	25.4	25.7	1.000	1.000	1.012
T	-	0.16	0.2	-	0.006	0.008
t	-	0.07	-	-	0.003	-
y	5.3	-	5.9	0.209	-	0.232
g	-	0.3	-	-	0.012	-
h	-	-	1	-	-	0.039
k	-	-	1	-	-	0.039

6 Recommendations for the soldering process

The contact pads are solderable.

- Solder on the light gray area. Do not solder on platinum area.
- Most commercially available solder materials (lead or lead-free) can be used.

Soldering wires to the contact pads:

1. Use Cu or Au wire with a diameter no more than 80 µm, including the insulator.
2. Wet the wire with solder material first.
3. Bring the wire in contact with the pad and apply heat and a small pressure through a thin foil of Teflon or mica until the solder melts (note: if the soldering iron is directly in contact with the solder, the solder will attach to the soldering iron instead of the contact pad).
4. Remove heat.

Soldering metal foil to the contact pads:

1. Use Cu, Au or Ni foil, the foil should be about 1 to 2 mm wide and no more than 50 µm thick.
2. Wet one side of the foil with soldering material.
3. Put the foil on the contact pad and the solder is in contact with the pad.
4. Apply heat and a small pressure on the top side of the foil until the solder melts.
5. Remove heat.

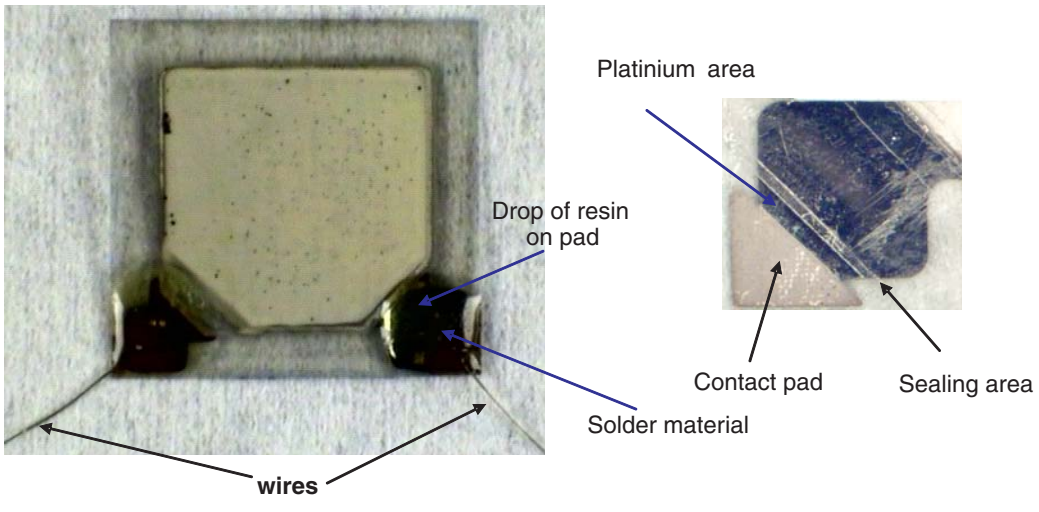
Note: Do not apply excess force on the contact.

Minimize the time of soldering process.

Do not overheat the contact, maximum temperature of the adjacent sealing area: 120 °C

To increase mechanical performance after soldering wires, deposit a drop of resin that polymerizes on the soldered joint at room temperature (see Figure 6).

Figure 6. Using resin to improve mechnical performance with soldered wires.



7 Ordering information

Table 5. Ordering information

Order code	Marking	Weight	Base qty	Delivery mode
EFL700A39	EFL700A39	0.2 g	1	Individual packing

8 Revision history

Table 6. Document revision history

Date	Revision	Changes
08-Apr-2010	1	Initial release.

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