

## DESCRIPTION

The GLF73614 is a family of I<sub>Q</sub>Smart™ ultra-efficient, full battery protection ICs with an accurate over charge/discharge voltage, shipping mode, over charge/discharge current, and short circuit protection for lithium-Ion/Polymer battery safety.

The overcharge and discharge voltage protections keep a rechargeable battery working within the desired safe operating condition. When the battery is charged past the over voltage detection level, the GLF73614 charging switch opens in a preset delay time. As the battery voltage decreases below the over discharge detection voltage level, the GLF73614 discharging switch is turned off immediately to cut off the battery power rail, consuming an ultra-low leakage current (I<sub>SD</sub>) to save the battery. In addition, when the load current reaches the I<sub>SC</sub> short circuit protection level, the GLF73614 is turned off and will maintain the off state to avoid any serious damage to system. The short circuit delay time avoids any false trigger which might open the switch.

The GLF73614 provides a shipping mode pin to prevent smart devices with a non-removable battery from discharging during the shipping period. When a charged battery cell is connected the GLF73614 remains in the off state and consumes an ultra-low leakage current (I<sub>SD</sub>) until the V<sub>ON</sub> voltage is applied to V<sub>OUT</sub> pin. Note that the GLF73614 is activated only by a V<sub>ON</sub> voltage from a charger output.

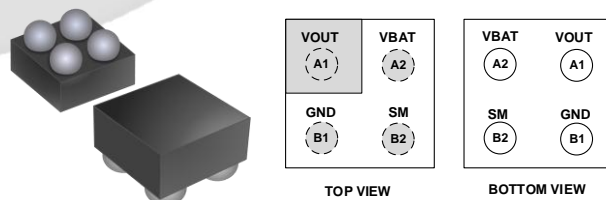
## FEATURES

- Over Charge Detection Voltage, V<sub>OC</sub>
  - Monitor V<sub>OUT</sub> to release V<sub>OC</sub>
  - V<sub>OC</sub> high accuracy: ± 75 mV (± 1.75 %)
- V<sub>OD</sub>, Over Discharge Detection: 2.80 V<sub>OUT</sub>
- I<sub>OC</sub>, Over Charge Current Detection: 330 mA
- I<sub>OD</sub>, Over Discharge Current Detection: 76 mA
- Short Circuit Protection
- Activated by Applying V<sub>ON</sub> to the V<sub>OUT</sub> Pin
- Shipping Mode Implementation
- Low R<sub>ON</sub>: 62 mΩ Typ. at 3.6 V<sub>BAT</sub>
- I<sub>Q</sub> = 1.48 μA Typ at 3.6 V<sub>BAT</sub>
- Shutdown Current
  - I<sub>SD</sub> = 6 nA Typ. at V<sub>BAT</sub> < V<sub>OD</sub>
  - I<sub>SD</sub> = 8 nA Typ. at V<sub>BAT</sub> = 3.6 V, Shipping Mode
  - I<sub>SD</sub> = 10 nA Typ. at V<sub>BAT</sub> = 4.2 V, Shipping Mode
- Latch-off at Over Discharge Detection and Short Circuit Protection. Apply V<sub>ON</sub> to V<sub>OUT</sub> pin to turn on
- 0 V Battery Minimum Voltage for Charging
- Patent Pending Circuit Architecture
- HBM: 8 kV, CDM: 2 kV
- 0.97 mm x 0.97 mm x 0.55 mm Chip Scale Package  
4 Bumps, 0.5 mm Pitch

## APPLICATIONS

- BLE Wireless Earphone
- Hearing Aid
- Wearables and Smart IoT Devices

## PACKAGE



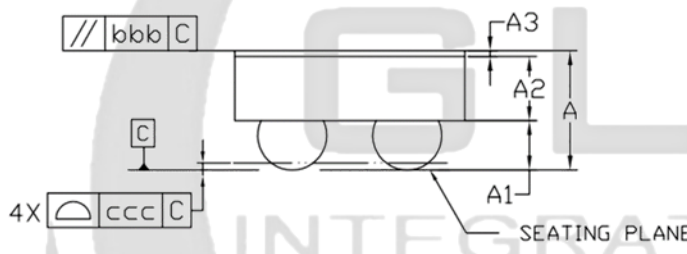
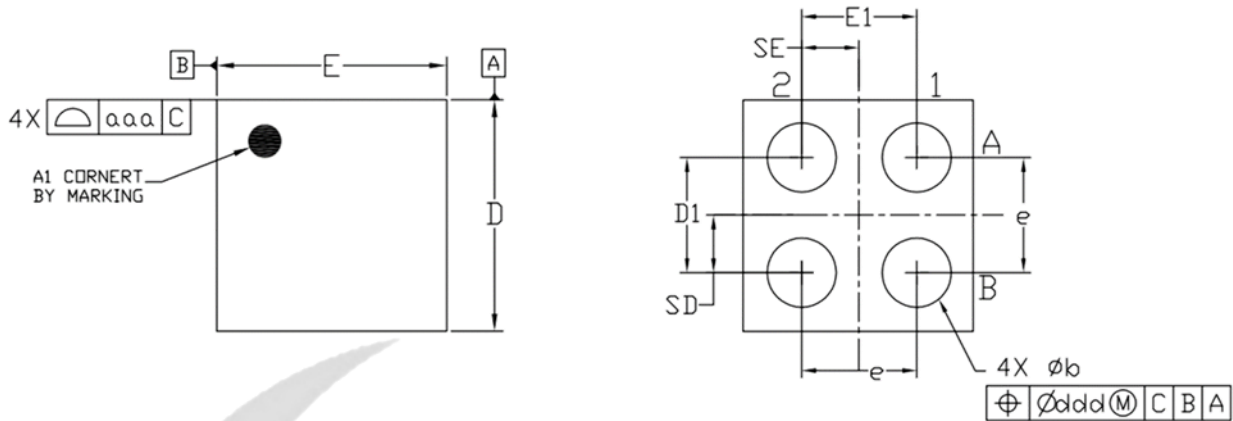
**0.97 mm x 0.97 mm x 0.55 mm WLCSP**

**DEVICE INFORMATION**

Part Number	Top Mark	R <sub>ON</sub> (Typ.) V <sub>BAT</sub> = 3.6 V	Over Charge Detection V <sub>OC</sub>	Over Discharge Detection V <sub>OD</sub>	Over Charge Current I <sub>OC</sub>	Over Discharge Current I <sub>OD</sub>	Short Circuit Current, I <sub>SC</sub>
GLF73614-DE23C	FX	62 mΩ	4.275 V	2.80 V	330 mA	76 mA	250 mA
GLF73614-CE23C	EX		4.450 V				

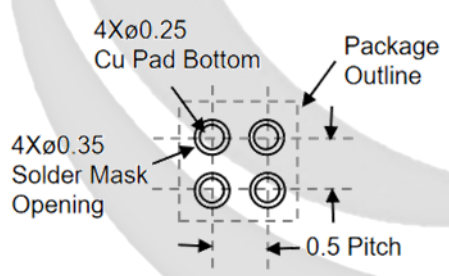


**PACKAGE OUTLINE**



Dimensional Ref.			
REF.	Min.	Nom.	Max.
A	0.500	0.550	0.600
A1	0.225	0.250	0.275
A2	0.255	0.275	0.300
A3	0.020	0.025	0.030
D	0.960	0.970	0.985
E	0.960	0.970	0.985
D1	0.450	0.500	0.550
E1	0.450	0.500	0.550
b	0.260	0.310	0.360
e	0.500 BSC		
SD	0.250 BSC		
SE	0.250 BSC		
Tol. of Form & Position			
aaa	0.10		
bbb	0.10		
ccc	0.05		
ddd	0.05		

**Recommended Footprint**



**Notes**

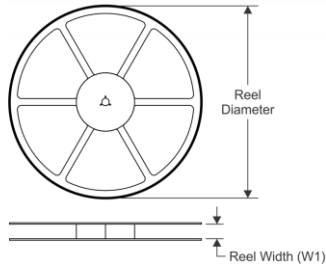
1. ALL DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES)
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
3. A3: BACKSIDE LAMINATION

**PACKAGING INFORMATION**

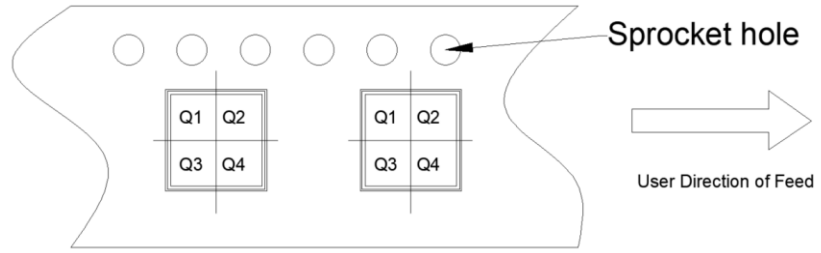
Part Number	Package	Pins	Pitch	Top Mark	Moisture Sensitivity Level	Environmental Information
GLF73614-DE23C	0.97 mm x 0.97 mm x 0.55 mm WLCSP	4	0.5mm	FX	MSL1	ROHS+HF
GLF73614-CE23C				EX		

**TAPE AND REEL INFORMATION**

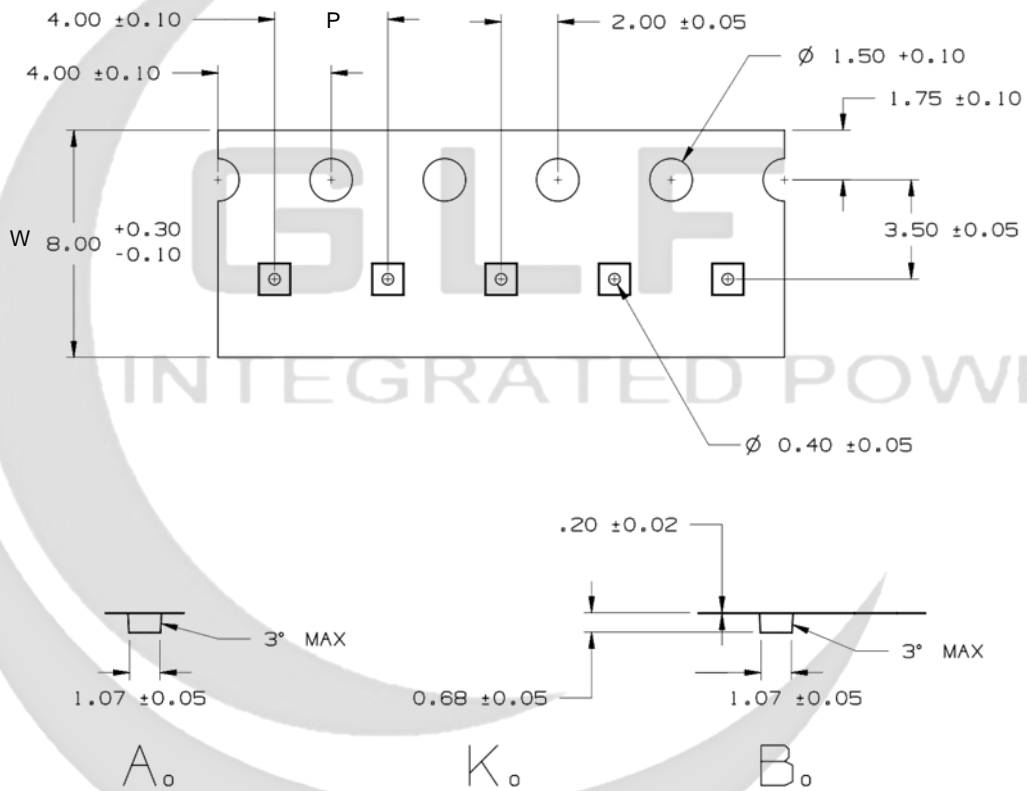
**REEL DIMENSIONS**



**QUADRANT ASSIGNMENTS PIN 1 ORIENTATION TAPE**



**TAPE DIMENSIONS**



Device	Package	Pins	SPQ	Reel Diameter (mm)	Reel Width W1	A0	B0	K0	P	W	Pin1
GLF73614	WLCSP	4	3000	180	9	1.07	1.07	0.68	4	8	Q1

**Remark:**

- A0: Dimension designed to accommodate the component width
- B0: Dimension designed to accommodate the component length
- K0: Dimension designed to accommodate the component thickness
- W: Overall width of the carrier tape
- P: Pitch between successive cavity centers