In this paper we present an amorphous silicon device that can be used in two operation modes to measure the concentration of ions in solution. While crystalline devices present a higher sensitivity, their amorphous counterpart present a much lower fabrication cost, thus enabling the production of cheap disposable sensors for use, for example, in the food industry. The devices were fabricated on glass substrates by the PECVD technique in the top gate configuration, where the metallic gate is replaced by an electrolytic solution with an immersed Ag/AgCl reference electrode. Silicon nitride is used as gate dielectric enhancing the sensitivity and passivation layer used to avoid leakage and electrochemical reactions. In this article we report on the semiconductor unit, showing that the device can be operated in a light-assisted mode, where changes in the pH produce changes on the measured ac photocurrent. In alternative the device can be operated as a conventional ion selective field effect device where changes in the pH induce changes in the transistor's threshold voltage.