

Stylus pen (Touch pen) · Digital pen

1. Overview

There are many products such as smart phones and tablets, as well as high-performance stylus pens for design, and new markets such as educational, presentation, and digital pens are expanding.

Stylus pens and digital pens are used either dry batteries or rechargeable batteries, but Dry batteries often are used AAAA size that not sold at ordinary retailers. On the other hand, the operating time of pen will be shortened due to the small volume allocated to the battery with rechargeable digital pens and stylus pens. Another problem is that it takes a long time to charge the battery after it has been used up, which makes it useless for several hours.

2. Comparison of electric storage devices

Super capacitors and lithium ion secondary batteries can be considered as the main electric storage devices that are expected to be used with rechargeable batteries. Super capacitors have the excellent characteristic that they do not easily deteriorate even after repeated rapid charging and charging / discharging, but the energy density is much lower than that of Lithium ion secondary batteries, so the digital pens and stylus pens have a short operating time and functions are limited. On the other hand, Lithium-ion secondary batteries have excellent energy density, but their drawbacks are that they require a control IC to charge and discharge and that it takes time to charge. Therefore, CT series can solve these problems.

Table.1 Comparison of electric storage devices for rechargeable stylus pens and digital pens

	Super capacitors	CT series	LiB
1) Safety	◎	○	×
2) Quick charge	◎	○	×
3) Simple charge circuit construction	◎	○	×
4) High output	○	○	△
5) Over-discharge durability	◎	○	△
6) Long lifecycles	○	○	×
7) Energy density	×	◎	◎

1) Safety

Since stylus pens and digital pens are devices that come into direct contact with the skin, safety is extremely important. By devising the composition of the electrode material, CT series do not emit smoke even if the external terminals are short-circuited, exposed to high temperature or damaged

2) Quick charge

CT series can be charged with a constant voltage, and if CT series are charged with a constant voltage of 2.7V, it is possible to charge 80% or more of the capacity in 5 minutes.

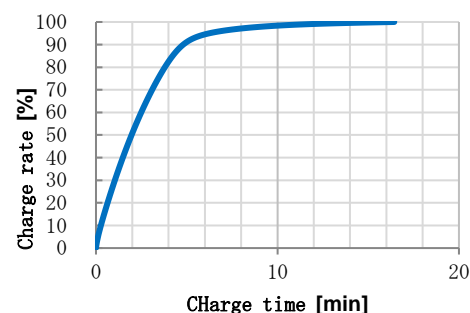


Fig.1 Constant charge characteristic of CT04120 at 25°C

3) Simple charge circuit construction

Because CT series can be charged by constant charge, Charge circuit can be only consisted of DC/DC converter or LDO for adjusting the charge voltage.

4) High output

CT series can discharge with high output despite CT's small size. CT series can output the energy required for BLE etc.

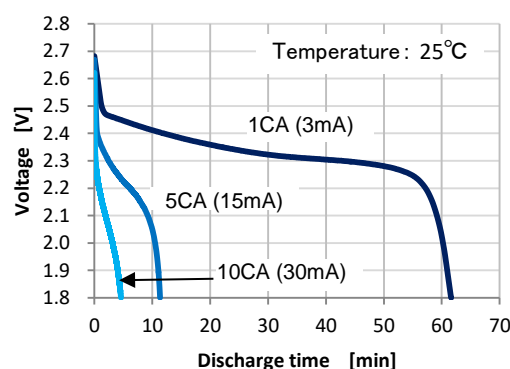


Fig.2. Discharge current characteristics

5) Over-discharge durability

The electric storage devices may be in an over-discharged state due to inventory storage or inability to generate power and be charged. However, compared to a general lithium-ion secondary battery, CT series do not easily deteriorate even in an over-discharged state. The circuit configuration can be simplified.

6) Long lifecycles

Compared to general lithium-ion secondary batteries, CT series have prone not to occur degradation due to repeated charging and discharging. The recovery capacity ratio remains 80% or more even after repeating constant voltage charging and 5CA (15mA) charging / discharging 5000 times.

7) Energy density

CT series have several dozen times the volumetric energy density compared with Super capacitors, so CT series can drive equipment for a long time and contribute to add multiple functions for Stylus pens and digital pens.

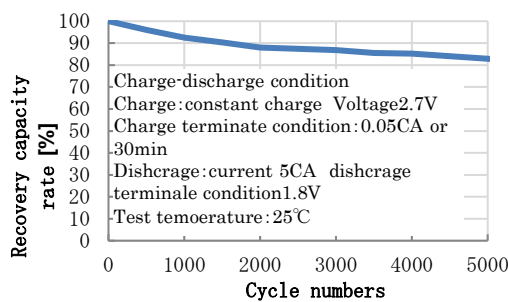


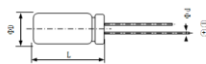
Fig.3 Cycle characteristic of CT04120 at 25°C

3. Application

Industrial, laboratory, medical (thermometer), cooking thermometer, temperature logger (transportation of luggage, inventory management)

4. Product lineup

Product name	CT04120	Dimensions	
		ΦD	4mm
Nominal Voltage	2.3V	L	12mm
Charge Voltage	2.7V	Φd	0.45mm
End of discharge Voltage	1.8V	F	1.5mm
Capacity	3mAh	Operating temp	-20~70°C



5. Support

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