

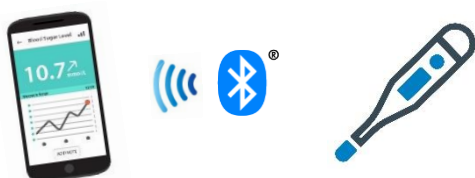
Rechargeable wireless thermometer



1. Overview

In recent years, various devices have communication functions, and data communication with smartphones and personal computers has greatly improved work efficiency and convenience. One of them is that thermometers have a wide range of uses and are highly effective devices by wireless.

Conventional thermometers are often small and battery-operated, and primary batteries are used. However, if a communication function and other function are added, power consumption will increase, and battery replacement frequency and battery disposal will increase, so rechargeable batteries are often considered. The storage devices used in a rechargeable thermometer are required to be able to output the energy required for communication even if it is small, and depending on the application, a wide operating temperature range is required. Also, the designing the charging circuit and charging at the time of use increases by rechargeable batteries, so it is important how to do these without stress



2. Comparison of electronic storage devices

Compared with general Lithium ion secondary batteries, CT series are inferior to energy density. However as shown in Table 1, CT series have the optimum performance for a rechargeable wireless thermometer. And another major feature is the wide operating temperature range from -20 °C to 70 °C.

Table.1 Comparison of electric storage devices for rechargeable wireless thermometer

	CT series	LiB
1) Safety	○	×
2) Quick charge	○	×
3) simple charge circuit construction	○	×
4) High output	○	△
5) Over-discharge durability	○	△
6) Long lifecycles	○	×

1) Safety

Safety is extremely important for devices that directly touch the skin, such as thermometers. 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.

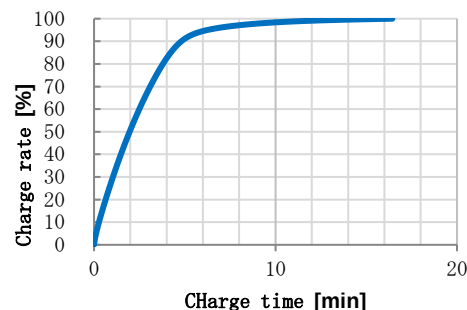


Fig.1 Constant charge characteristic of CT04120 at 25°C

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. The energy required for BLE, LoRa, Sigfox, etc. can be output.

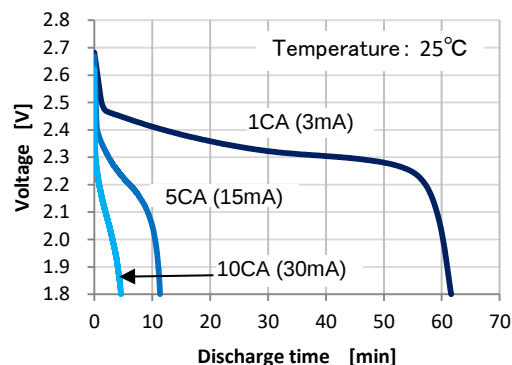


Fig.2. Discharge current characteristics

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.

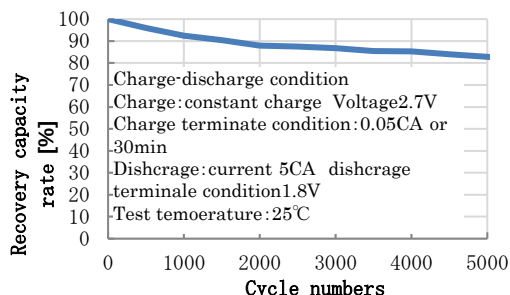


Fig.3 Cycle characteristic of CT04120 at 25°C

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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