

SILICON CRAFT TECHNOLOGY PLC

Smart Water Sensor

9 Nov 2021



SIC4340 Chip Specification



Standard product

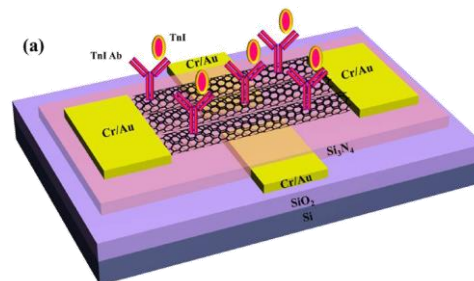
- Require battery
- Large sample quantity

SIC Smart Water Sensor

- No battery
- Small sample quantity
- Small size & light weight

Chronopotentiometric Sensor	Specification
Connectivity	NFC type 2
Memory	236-byte EEPROM (192 bytes user memory)
Maximum number of sensors	3 sensors (multiplex mode)
Current source	64 steps selectable range 0 – 63 μ A (1 μ A/step) : Accuracy \pm 0.3 μ A 0 – 504 μ A (8 μ A/step) : Accuracy \pm 1 μ A
Voltage limiter	1.27 V (5 mV/step)
Biasing frequency	DC or Square-wave pulse selectable : 300 Hz – 50 kHz
Effective ADC resolution	10 bits
Resistance range	\sim 230 Ω – 400 k Ω
Capacitive range	\sim 25 pF – 7,600 nF
Application example	<ul style="list-style-type: none"> • Water (Total Dissolved Solid) TDS • Cardiac biomarker – Troponin I, T • Prostate Specific Antigen (PSA)


A. Sharma et al. / Biosensors and Bioelectronics 82 (2016) 78–84



<http://dx.doi.org/10.1016/j.bios.2016.03.056>
<https://doi.org/10.1038/s41598-019-42506-1>
<https://doi.org/10.1016/j.bios.2017.11.035>



SIC4340 Smart Water Sensor




SMART WATER SENSOR MANUAL

Hybrid Printed Sensor
Type : Plastic Card
Process : R2R (Roll to Roll), <150°C/2min
Materials: Ag, Formulated Nano Materials & etc. on PET
Sensor of type : Water (TDS)
ASIC : Type1 NFC/EEPROM/PMS(1Ch)


Sensor Technology and Mobile Application by LG Electronics

Android iOS



1. DROP THE LIQUID ON THE SENSOR HOLE

2. TAGGING YOUR SMART PHONE ON THE SENSOR



WATER


SIC4340
NFC TAG

LIQUID METER


DROP HERE

Technology by LG Electronics LG


RECOMMENDATION



Should not use over 100 times



Should drop the water to fully cover the indicated circular area



Should make the circular area clean and not scratch the surface

Features

- Total Dissolved Solid (TDS) measurement
- Reusable 100 times
- Number of use counter

Connectivity

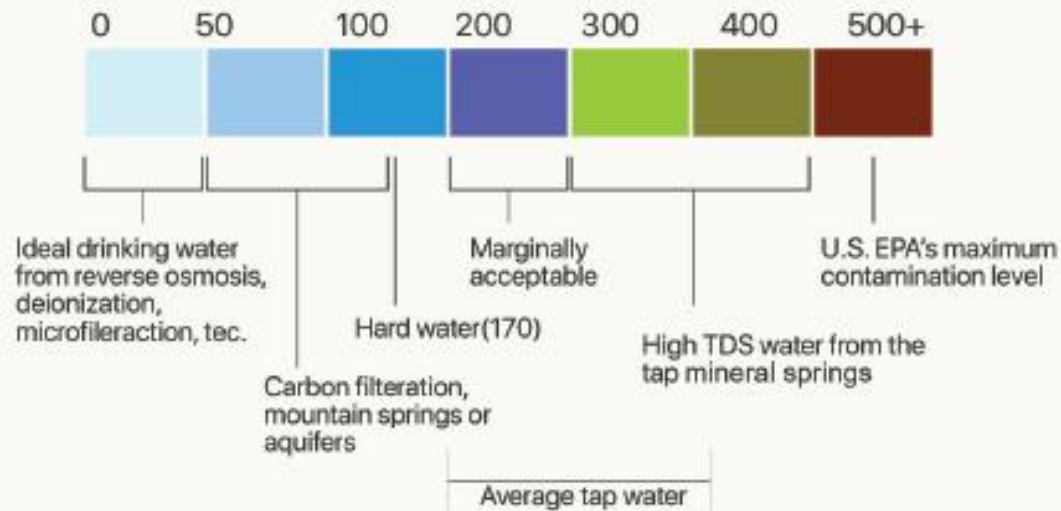
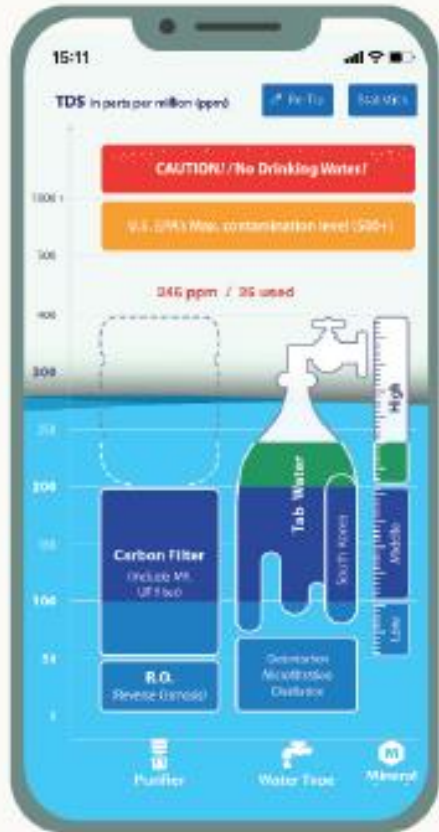
- NFC type 2
- No battery

Form factor

- ISO-7810 ID-1 Card
- 85.60 x 53.98 x 0.76 mm

SIC4340 Smart Water Sensor

TDS IN PARTS PER MILLION (PPM)



*The chart values represent national U.S. average. Actual TDS levels for various regions within the U.S. and in other countries may vary. Please check for the U.S. EPA's list of National Secondary Drinking Water Regulation. <http://www.epa.gov/>

Sample

- Tap water
- Drinking water

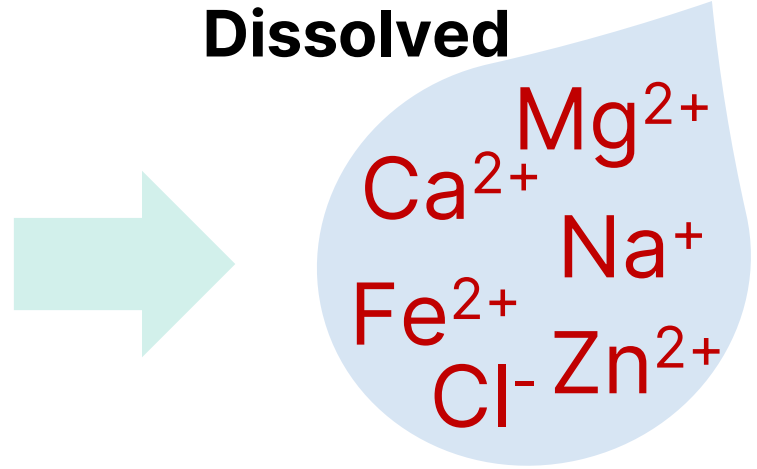
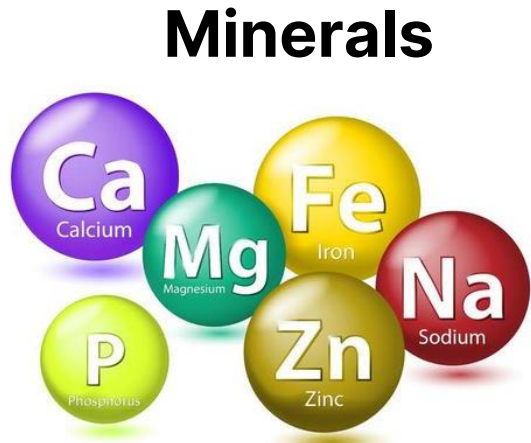
Measurement Range

- 0 – 500 ppm

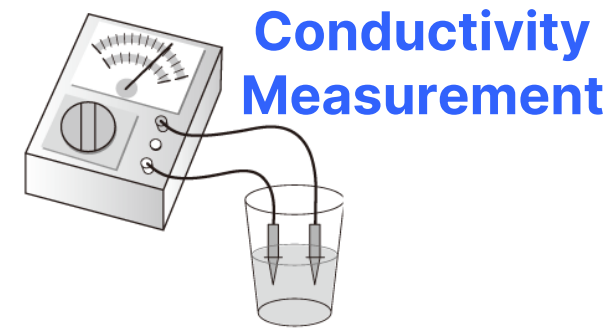
Accuracy

- ± 30 ppm (0 ~ 300 ppm)
- ± 50 ppm (300 ~ 500 ppm)

Measurement Mechanism



STD. method
Gravimetric Method



Water	TDS
Fresh water	less than 1,000 ppm
Brackish water	1,000 to 10,000 ppm
Saline water	10,000 to 35,000 ppm
Hypersaline	greater than 35,000 ppm

$TDS = k_e EC$

TDS = mg/L, ppm
 EC = electrical conductivity
 k_e = correlation factor, varies between 0.55 and 0.8.



DEMO VDO – Smart Water Sensor

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