

Sensor Network Module Evaluation Kit Introduction



2016/04

Perfecting the Art of Electronics

ALPS[®]



Smart Networks

ALPS.

Serving the Growing Environment & Energy Markets

Smart Networks

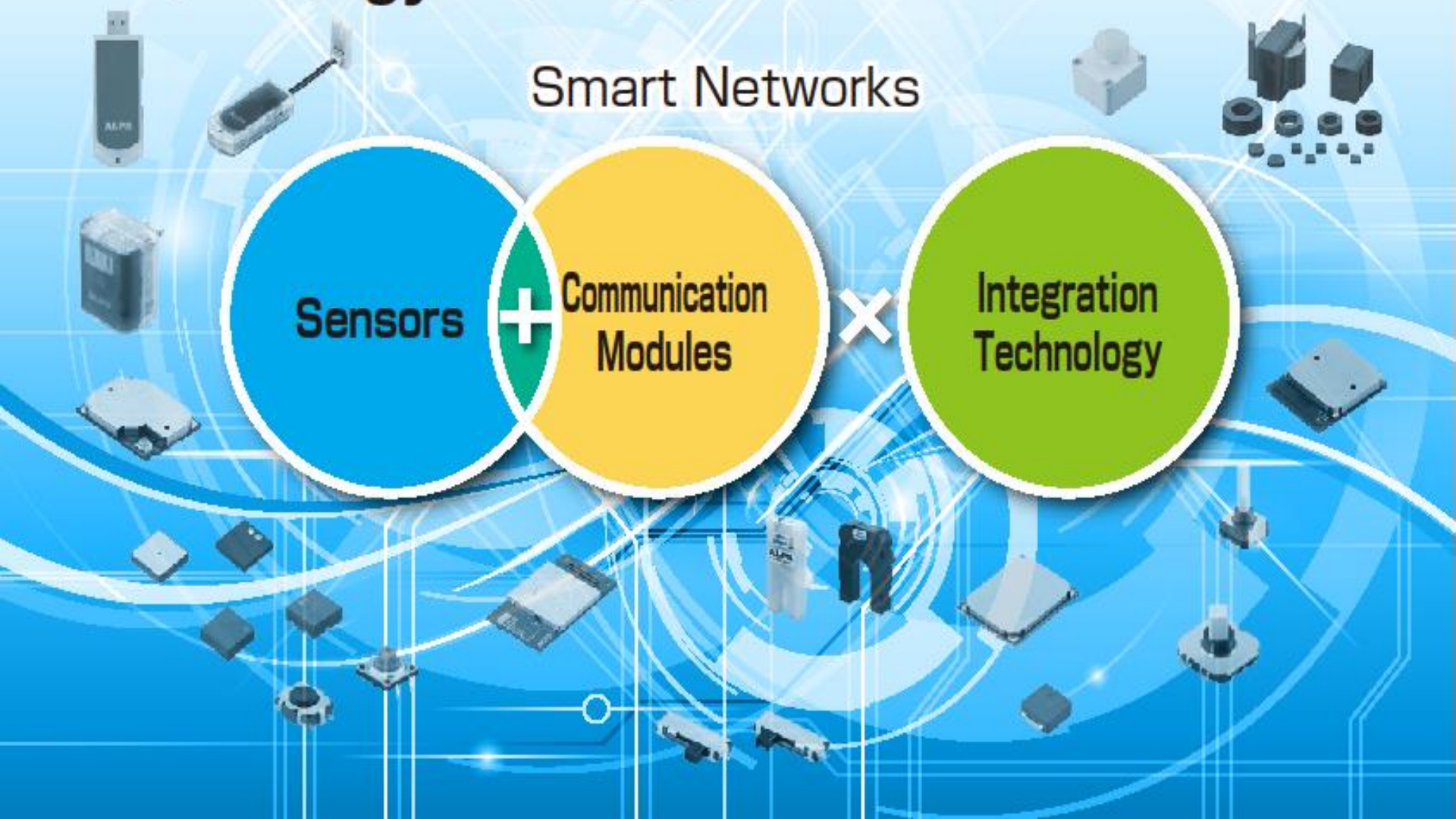
Sensors



Communication Modules



Integration Technology

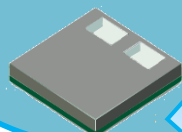


Sensor Network Module Concept

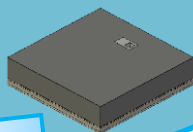
Motion and Environment Sensor and RF in a Ultra Tiny package

Environment Sensors

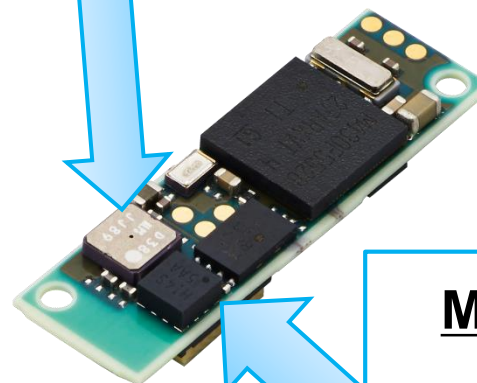
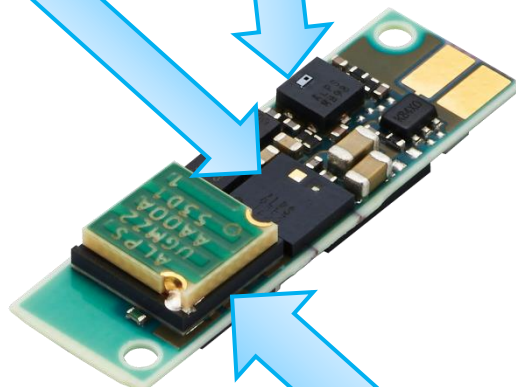
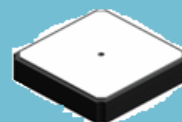
UV/Ambient
Light Sensor



Humidity/
Temp
Sensor



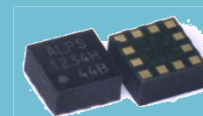
Pressure
Sensor



Dimension:
5.6mm x 18.5mm

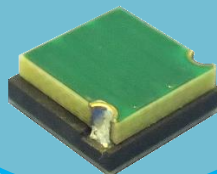
Motion Sensor

6 DOF
Geomagnetic/
Accelerometer
Sensor



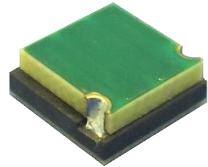
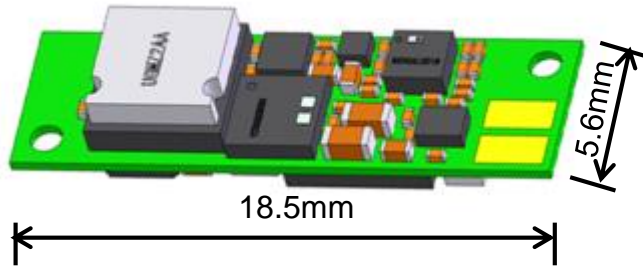
Communication

BT SMART
w/ ANT

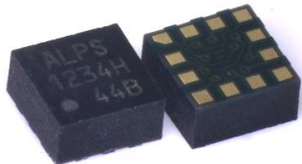


Sensor Network Module

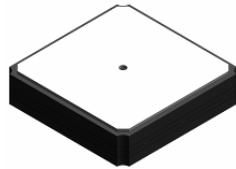
Ready to mass production



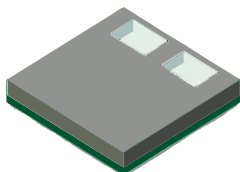
Bluetooth® SMART w/ antenna



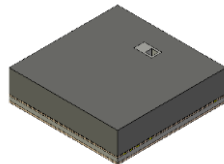
6 Axis Sensor



Pressure Sensor



Humidity/
Temperature Sensor



UV/ Light
Sensor

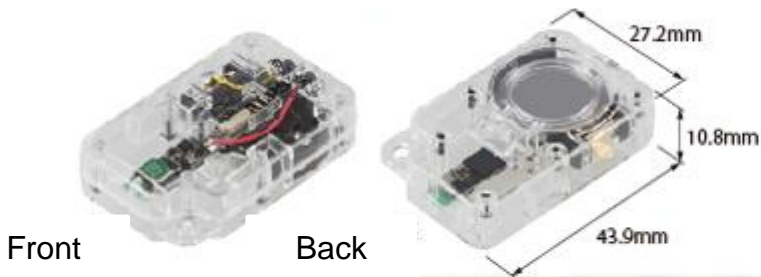
Sensor Network Module	Unit	Specifications
Supply Voltage	[V]	2.35~3.30V
Current Consumption	[mA]	7mA @Peak
Bluetooth® 4.1 LE	Unit	Specifications
Receiver Sensitivity	[dBm]	-93
Transmit Power	[dBm]	0
6 DOF Sensor	Unit	Specifications
Measurement Range	[mT] [g]	Geo-Mag. : -2.4~+2.4 Acc. : -16~+16G
Resolution	[uT/LSB] [mg/LSB]	Geo-Mag. : 0.15 Acc. : 0.98
Pressure Sensor	Unit	Specifications
Measurement Range	[hPa]	300~1100
Resolution	[hPa/LSB]	0.013
Humidity/Temp Sensor	Unit	Specifications
Measurement Range	[%RH] [°C]	Hum. : 0~100 Temp. : -20~+85
Resolution	[%RH/LSB] [°C/LSB]	Hum. : 0.016 Temp. : 0.02
UV-A/Ambient Sensor	Unit	Specifications
Measurement Range	[mW/cm2] [Lx]	UV-A : 0~20.48 Ambient : 0~81900
Resolution	[(mW/cm2)/LSB] [Lx/LSB]	UV-A : 0.005 Ambient : 20

New Evaluation Kit for Ease of Testing

Enabling Ease of design for IOT Product: Sensor Network Module

On Sale in Europe

Using Bluetooth™ Smart
Long Battery life



Various Sensor Used
Temperature/ Humidity, UV/ Ambient Light, Pressure, 6 Axis (Accelerometer/ Geomagnetic) sensors

On-Board Microcontroller
Enabling ease of Sensor control and management, including lower power consumption



Ultra Compact Module
18.5mm x 5.6mm x 3.4mm for wide range of use cases, including wearables

Easy to Use



Sensor Network Module Evaluation Kit

ALPS

Confidential

- (1) Sensor Network Module H/W
44mm x 27mm x 11mm(typ.)



Descriptions of Sensor

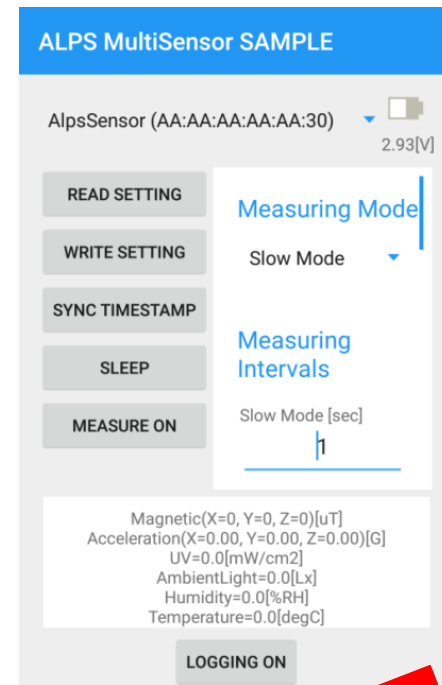
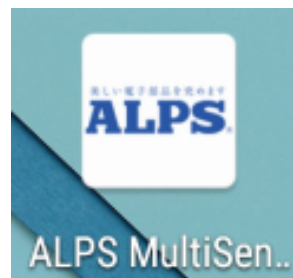
➤ Environment Sensors

- Temp. / Humidity Sensor
- UV/ Ambient Light Sensor
- Pressure Sensor

➤ Motion Sensors

- 6 Axis Sensors (Accel. + Geo-mag)

- (2) Sample App (Currently Android only)



App Functions

- Each Sensor ON/OFF
- Sleep Mode Settings
- Display data in Graph form
- Sensor Interval Settings
- Normal and Beacon Mode Settings

Easy Sensor Settings

Sensor Network Module Evaluation Kit

ALPS

Confidential

ALPS Sensor GRAPH

CONTROL | GRAPH

SNM00 (BB:00:00:00:00:22) 3.15[V]

READ SETTING

WRITE SETTING

SYNC TIMESTAMP

SLEEP

MEASURE ON

Measuring Mode

Slow Mode

Measuring Intervals

Slow Mode [sec]

1

Magnetic(X=0, Y=0, Z=0)[uT]
Acceleration(X=0.00, Y=0.00, Z=0.00)[G]
UV=0.0[mW/cm2]
AmbientLight=0.0[Lx]
Humidity=0.0[%RH]
Temperature=0.0[degC]

LOGGING ON

Sampling Sensors

Magnetic

Acceleration

UV

Ambient Light

Humidity

Temperature

Pressure

ALPS Sensor GRAPH

CONTROL | GRAPH

Acceleration and Magnetic

SNM00 (AA:AA:AA:AA:AA:11)

6 4 2 0 -2 -4 -6

200 100 0 -100 -200

18:19:41 18:19:46 18:19:51

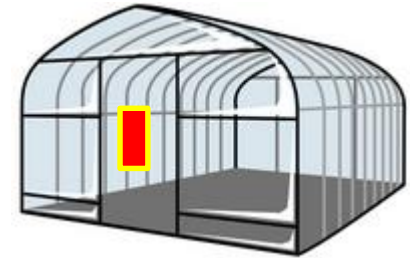
• X • Y • Z

• X • Y • Z

Pressure

1. Use Case

Agriculture ICT for weather monitoring, Infrastructure equipment for detecting irregularities etc.

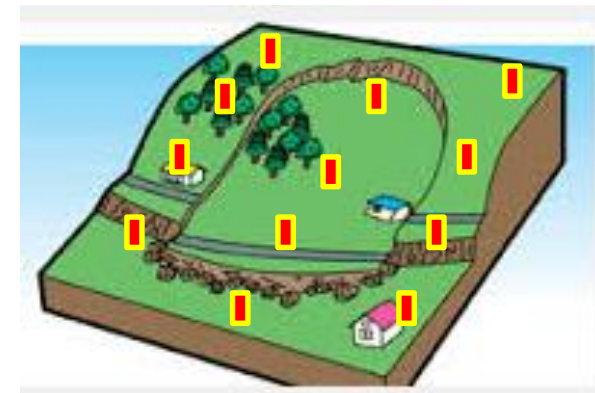


2. Sensor Data Used

**6 Axis Sensor for vibration detection
Humidity/ Temperature, UV/ Ambient light
and Pressure sensors for weather data**

3. System Construction

**Sensor ⇒ Gateway ⇒ Cloud
⇒ Operator**



1. Use Case

Irregularity detection for prevention maintenance

2. Sensor Data Used

Humidity/ Temperature for overheat detection

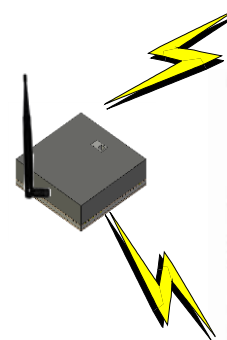
6 Axis Sensors for vibration detection

Pressure Sensor for air pressure monitoring in Clean Room



3. System Construction

Sensor \Rightarrow Gateway \Rightarrow Cloud
 \Rightarrow Supervisor



Application Example: Personnel Environment Monitoring

1. Use Case

Helmet Condition Care

2. Sensor Data Used

6 Axis Sensor for faint/ fall check

転

Humidity/ Temperature and

UV/ Ambient light Sensor
for heat exhaustion check

3. System Construction

Sensor \Rightarrow Smartphone \Rightarrow Cloud

\Rightarrow Back Office



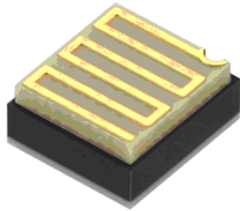
Components of the Module

Bluetooth Smart w/ Antenna

Bluetooth®
SMART

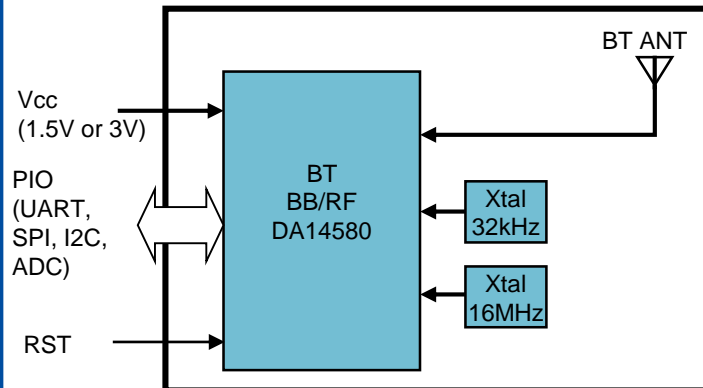


UGMZ2AA



Mold Array Package

4.7 x 4.7 mm, t = 2.0 mm (LGA)



Features

Very Small and Thin Package
Low Power Consumption
UART / SPI / I2C Interface



Specifications

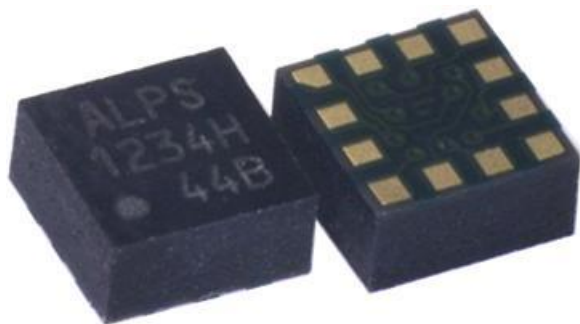
Spec:	Bluetooth SMART
Freq:	2402-2480MHz
Chip Set:	DA14580
I/F:	UART / SPI / I2C
Power supply:	Supports coin (typ 3.0V) and alkaline (typ 1.5V) battery cells.
Others:	16 MHz crystal, 32 KHz crystal is embedded.
Current Cons. :	Rx / Tx peak 5 mA Sleep 0.6µA

Application
DSC, Printer, Cellular, PDA, POS, etc

Ready to mass production

6-axis (Mag.+Acc.) sensor

HSCDHD005A



Applications

- E-Compass
- Motion Sensing
- Game Controller



Standard Product

Features

□ **6DOF (Mag. + Acc.) with Low Current Consumption**

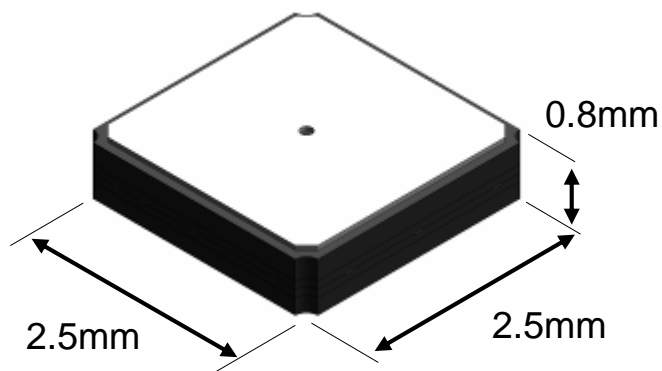
- Principal:
 - Magnetometer: GMR
 - Accelerator: Capacitive
- Package Size: 2.0 x 2.0 x t0.95mm
- I/F: I2C
- Current Consumption: 150uA@Active
- Wide Dynamic Range:
 - Magnetometer: +/- 2.4mT
 - Accelerator: +/-2,4,8,12,16G

	ALPS	Comp.C	Comp.D
Principle	Mag GMR Acc Capacitive	FG&Hall Capacitive	TMR Capacitive
Size [mm]	2.0x2.0xt0.95 12LGA	2.2x2.2xt0.95 12LGA	2.0x2.0xt1.0 12LGA
Current Consumption (10Hz ,2.5V)	150uA@Active 5uA@Sleep	500uA@Act 1uA@Sleep	320uA@Act 6uA@Sleep
Dynamic Range	Mag +/- 2.4mT Acc +/- 2,4,8,12,16G	XY±1.3 mT, Z±2.5mT +/-2,4,8,16G	±1.6mT +/-2,4,8G
Resolution (8G)	Mag 0.15uT Acc 1mg/LSB	0.30uT 4mg/LSB	0.58uT 0.24mg/LSB
Voltage	1.7~3.6V	1.6~3.6V	1.9~3.6V

Pressure Sensor (digital)

The lowest noise level in industry in a compact package.

HSPPAD Series



Features

- Small Package Size
- 16 bit Digital Output
- Supply voltage 1.8 to 3.6 V
- 30 to 110 kPa
- Lead free, RoHS instruction, halogen free conforming

Specifications

Pressure type	Absolute
Resolution [kPa]	0.001 (0.08m)
Size [mm]	2.5 x 2.5 x 0.8 (typ.)

Applications

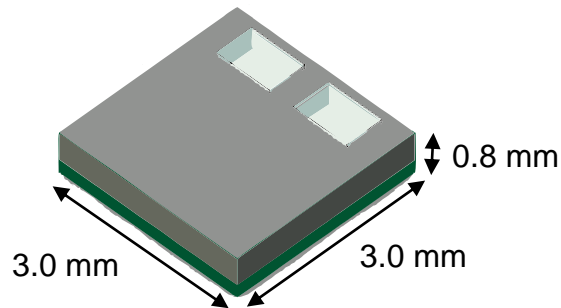
- Smart phone
- Enhancement navigation for GPS
- Weather forecast & Information
- Vertical velocity indication

Detects various types of light in a single package

HSVDDD003A(UV-A/ambient)

HSVDDD002A(UV-A/B)

HSVDDD002B(UV-B/ambient)



Features

- 3 variety
- Small Package Size UV sensor
- 12 bit Digital Output

Specifications

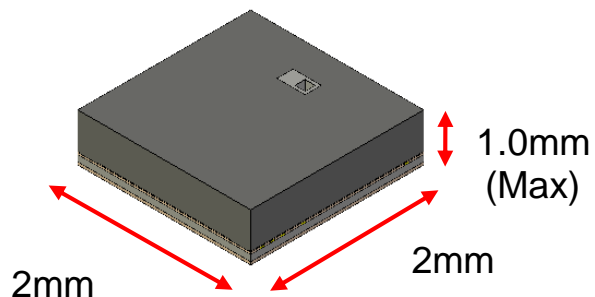
Digital interface	I2C
Supply voltage	1.8 to 3.6 V
Current consumption (active)	200 μ A
Current consumption (sleep)	5 μ A
Operating Temp.	-30 to 85 $^{\circ}$ C
Measurement range	[UV] 0 to 10 mW/cm ² [Ambient light] 0 to 100,000 lx
Sensitivity	[UV] 2.5 μ W/cm ² /LSB [Ambient light] 25 lx/LSB

Applications

- Healthcare
skincare and heat stroke prevention
- Smartphone
indoor/outdoor detection
skincare and heat stroke prevention

The world's smallest humidity sensor

HSHCAL001B



Features

- Stable Capacitive type sensor
- Temperature measurement capability
- Small foot print
- Low current consumption 140uA@10Hz

Specifications

Item	Unit	Spec
Humidity Type	[-]	Relative Humidity
Operating Voltage	[V]	1.8 (1.71~1.89)
Operating Temperature	[°C]	-20 ~ 85
Measurement Humidity Range	[%RH]	0 ~ 100
Humidity Resolution	[%RH]	0.015
Humidity Accuracy	[%RH]	+/-1.5 @ 25°C/50%RH
Measurement Temp Range	[°C]	-20 ~ 85
Temperature Resolution	[°C]	0.02
Temperature Accuracy	[°C]	+/-0.5 @ 25°C
Interface	[-]	I2C

Applications

- Smart phone / Tablet
- PC
- Environmental sensor module



Pursuit of the ultimate in fine electronic devices.
ALPS creates new values that satisfy stakeholders
and are friendly to the earth.

ALPS®