

2021 KOREA MURATA WEBINAR

New Product part

Murata 만의 신규 부품 솔루션 소개 (RFID / Picoleaf / LCT)



【RFID】

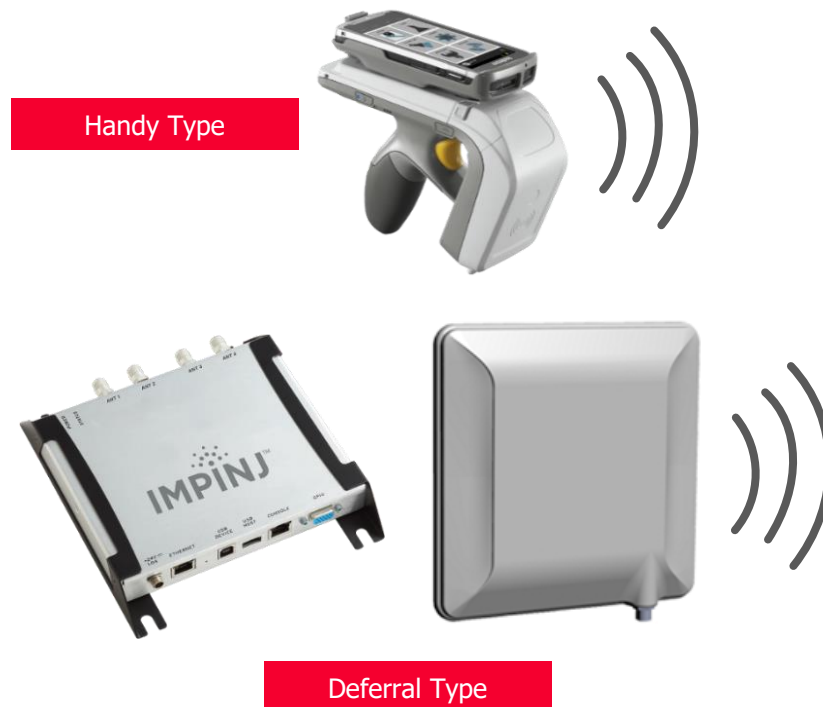
Murata RFID Tag



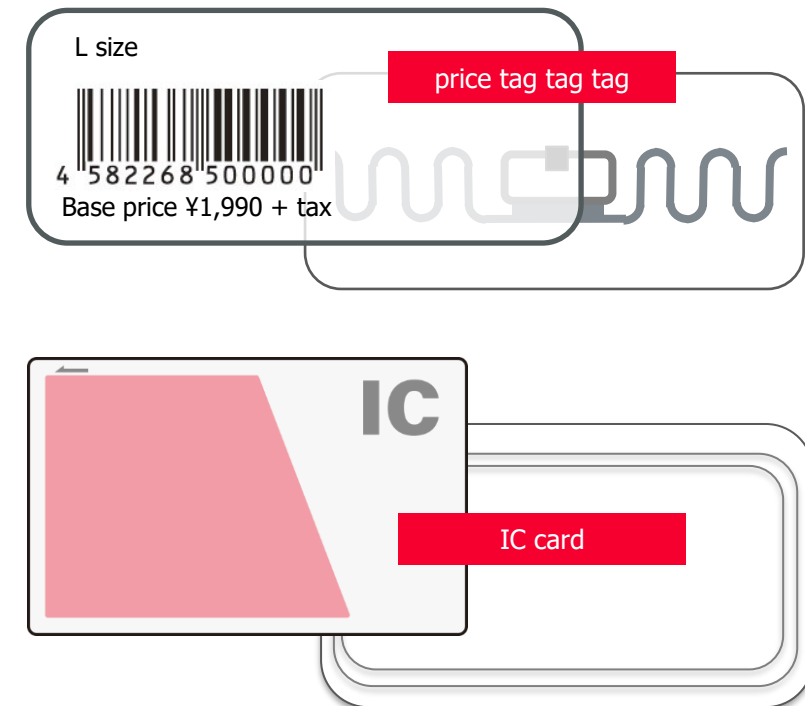
What is RFID?

RFID (radio frequency identification) is automatic recognition technology that uses wireless communication. Generally, a system or a part that uses an IC tag to identify or control various items via wireless communication is called RFID.

RFID reader/writer



RFID Tag



Characteristics of RFID technology

1. Read over long distances



It can be read from a distance of several meters by wireless communication. You can easily read tags that are far away or high and hard to reach.

2. Read multiple tags at once



RFID requires you to pick up and read each tag of a product
No, you can read all at once just by holding the scanner over. The time required for inventory can be greatly reduced.

3. Can be read from outside the box



Because it communicates by radio waves, even if you have a tag attached to the product,
You can read it from the outside of the box without opening it. Barcodes are also used
If it gets dirty, it can't be read, but RFID is dirty.
It is strong and does not cause problems reading even if the surface of the tag is dirty.

4. Long life



Passive RFID tags do not require batteries and can be used for a long time.
It also has a built-in memory so you can rewrite data.
Yes. When compared to barcodes, they allow a large amount of data to be exchanged.

Types and characteristics of RFID technology



communication zone	LF	HF/NFC	UHF	microwave
Frequency	~ 135 KHz	13.56 MHz	860 ~ 960 MHz	2.45 GHz
communication system	electromagnetic induction	electromagnetic induction	radio wave	radio wave
range of communication	~ 10 cm	~ 10 cm	~ a few meters	~ 3m
influence of metals	Medium	large	large	large
influence of water	less	less	Medium	large
application example	keyless entry	Public IC cards and security Management	apparel, retail inventory control	

Murata RFID Products Lineup



RFID passive tags

UHF band (865-928MHz)



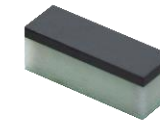
Embeddable tag

Small size and antenna built in



PCB mount tag

Small size and be able to mount on PCB



On Metal tag

Small size and be able to mount on PCB

NFC/HF band (13.56MHz)





Embeddable tag

Small size and antenna build in.
Withstands injection molding.

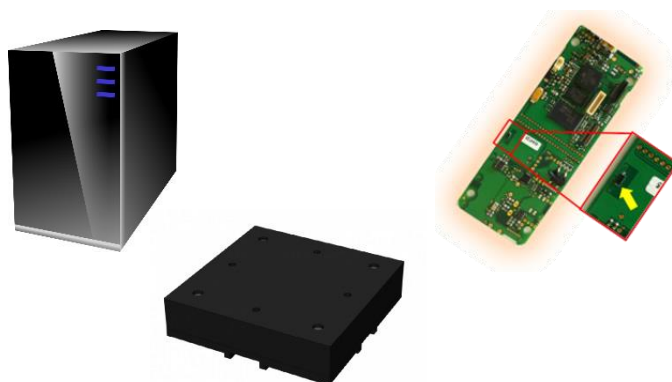
UHF RFID embeddable tag





- Passive UHF tag for small articles such as wearable item and test vials
- Small size and robust for mechanical resistance
- Easily be embedded inside item by over molding
- Withstand in the cold temperature even in liquid nitrogen

Part number	LXMS21NCMD-217	LXMSJZNCMF-210
Appearance		
RFID Standard	ISO18000-63 and EPC Global Gen2(v1.2.0)	ISO18000-63 and EPC Global Gen2v2
Frequency	865-928MHz	865-928MHz
IC	Impinj Monza 4QT	Impinj Monza R6
EPC memory	128bit	96bit
User memory	512bit	NA
Size (L x W x H)	1.2 × 1.2 × 0.55mm	1.2 × 1.2 × 0.55mm
Tag material	Ceramic, RoHS Compliant	Ceramic, RoHS Compliant
Read range(typ)	10mm(1W reader)	10mm(1W reader)
Heat resistance	Up to 85°C	Up to 85°C
Attachment	Adhesive glue or tape	Adhesive glue or tape

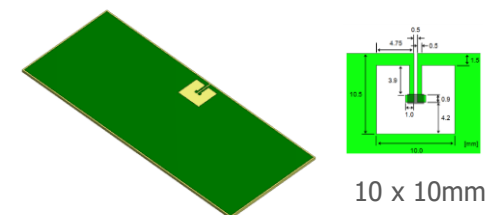
UHF RFID PCB mount tag



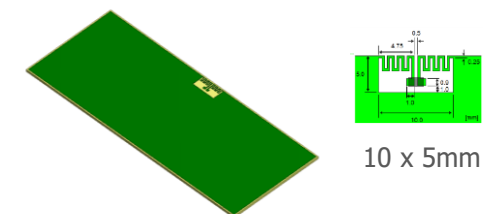
- Passive UHF tag for capturing traceability of electronic devices
- Especially for small quantity, large variety product lineup
- PCB GND is to be utilized for RF antenna
- Withstands in a reflow process with the peak 260°C
- Antenna pattern support available

Part number	LXMS21ACMF-218	LXMS21ACMD-220
Appearance		
RFID Standard	ISO18000-63 and EPC Global Gen2v2	ISO18000-63 and EPC Global Gen2(v1.2.0)
Frequency	865-928MHz	865-928MHz
IC	Impinj Monza R6	Impinj Monza 4QT
EPC memory	96bit	128bit
User memory	NA	512bit
Size (L x W x H)	2.0 x 1.2 x 0.5 mm	2.0 x 1.2 x 0.5 mm
Tag material	Ceramic, RoHS Compliant	Ceramic, RoHS Compliant
Read range(typ)	9m(4W EIRP)	7m(4W EIRP)
Heat resistance	Up to 85°C	Up to 85°C
Attachment	Solder mount on PCB	Solder mount on PCB

[Reference GND pattern\(Normal\)](#)




[Reference GND pattern\(Small\)](#)



UHF On Metal Tag



- Small and robust
- Use metal surface as external antenna (Murata patent)
- Attaching on metal surface improves read range (Tag only 20mm -> 1.5m* max)
- Murata can offer technical support attachment of the tags.

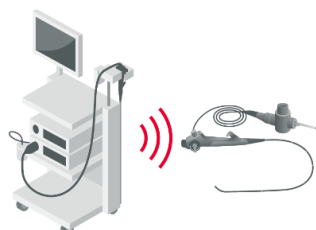
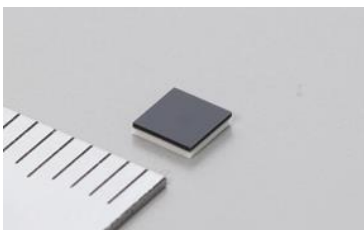
Part number	LXTBKZMCMG-010
Appearance	
RFID Standard	ISO18000-63 and EPC Global Gen2v2
Frequency	865-928MHz
IC	Impinj Monza R6P
EPC memory	128/96bit
User memory	32/64bit
Size (L x W x H)	6.0 x 2.0 x 2.3 mm (max.)
Tag material	Ceramic, RoHS Compliant
Read range(typ)	Tag only 20mm On metal 150cm(4W EIRP)*
Heat resistance	Up to 85°C
Attachment	Adhesive, heat shrink tube, etc.

*Reading distance specified here is reference.



It changes depending on the shape and size of metal.



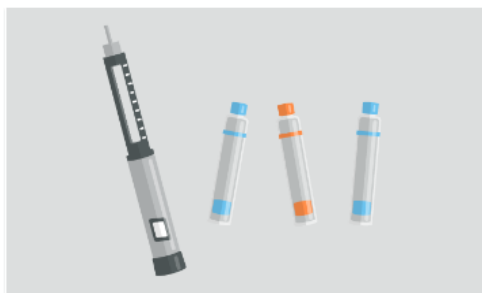
HF RFID embeddable tag



- Passive HF tag suitable for item identification
- Small size and robust for mechanical resistance
- Antenna is integrated inside package
- Easily be embedded inside plastic by injection molding
- Support available for optimizing reader antenna

Part number	LXMS33HCNG-134	LXMS33HCNK-171
Appearance		
RFID Standard	ISO15693 NFC Forum type5	ISO14443 TypeA NFC forum type2
Frequency	13.56MHz	13.56MHz
IC	NXP ICODE SLIX	NXP NTAG210
EPC memory	64bit	64bit
User memory	896bit	384bit
Size (L x W x H)	3.2 x 3.2 x 0.7 mm	3.2 x 3.2 x 0.75 mm
Tag material	Ceramic, RoHS compliant	Ceramic, RoHS compliant
Read range(typ)	20mm(muRata R/W) 5mm(iPhone7)	15mm(muRata R/W) 3mm(iPhone7)
Heat resistance	Up to 85°C	Up to 85°C
Attachment	Adhesive glue or tape	Adhesive glue or tape

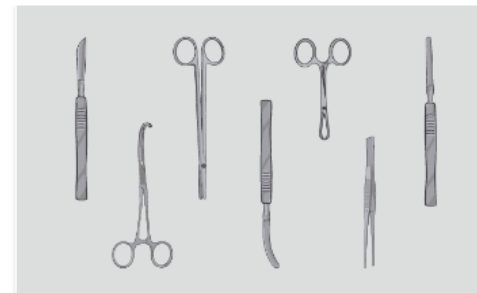
Possible Application



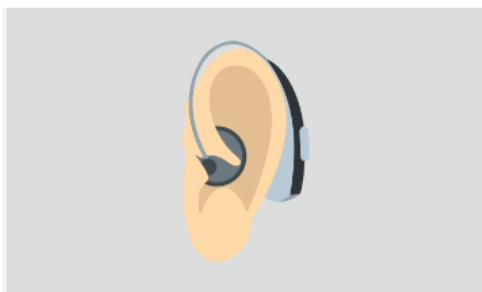
Authentication of medical cartridge with RFID



Authentication of medical device with RFID



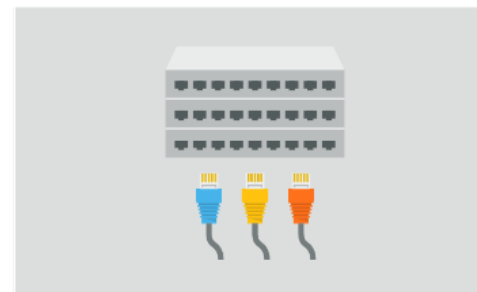
Surgical tool tracking with RFID



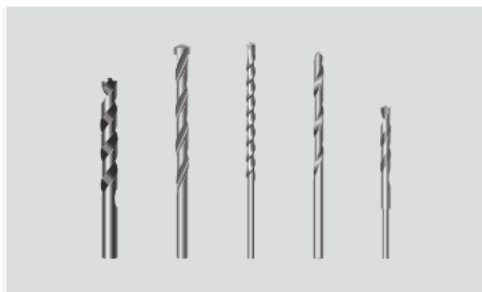
Traceability for small products with RFID



PCB management with RFID



Cable authentication with RFID



Management of machinery equipment with RFID

How to **read** a small tag?



How to read RFID tag?

Handheld Reader



Supplier: TERTIUM
P/C: Buleberry
Size: 68x42x18mm
Output: 50mW
Distance : ~10mm
Region : EU, US



Supplier: CEAN RFID
P/C: R1170I
Size: 99x54x20mm
Output: 250mW
Distance : ~10mm
Region : EU, US



Supplier: Micro Sensys
P/C: iID PENSolid UHFcc
Size: 117 x 27 x 19mm
Output: 250mW
Distance : ~5mm
Region : EU, US, JP

Fixed Reader



Supplier: Silence Net
P/C: UR-0200
Size: 95x58x18mm
Output: 200mW
Distance : ~3mm
Region : JP



Supplier: CEAN RFID
P/C: Tile R1251INF
Size: 125x125x25mm
Output: 650mA Max
Distance : **T.B.D**
Region : EU



Supplier: Impinj(R/W)
muRata(Antenna)
P/C: Speedway Revolution R420 (R/W)
LXRFZZUCCA-036(Antenna)
Size: 190x175x30mm
Output: 1W
Distance : ~15mm
Region : JP

Reading distance data is based on LXMSJZNCMF-198.

- **Manufacturing site**

Murata owned factory
that produces RFID tags and readers

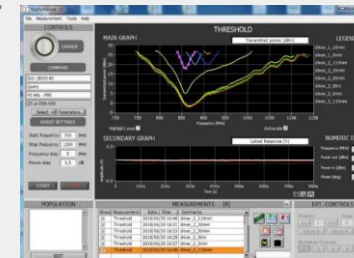


- **Frequency simulation**

Evaluate the performance of RFID tag

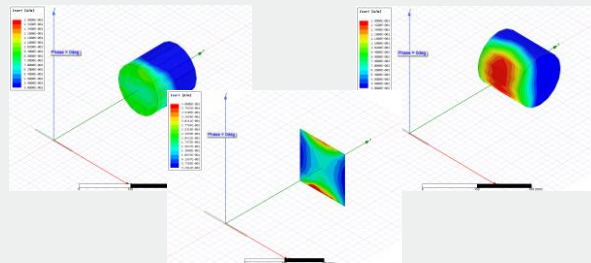


Tagformance



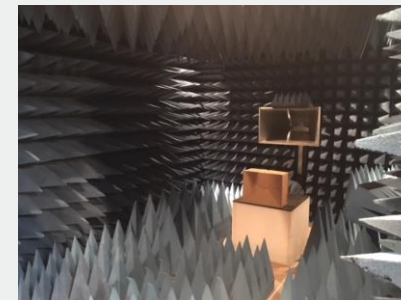
- **Antenna simulation**

3D analysis of RFID
wave with HFSS



- **Performance evaluation**

Anechoic chamber



【Picoleaf】

Sensor Solution

Haptic Solution



What is Picoleaf ??

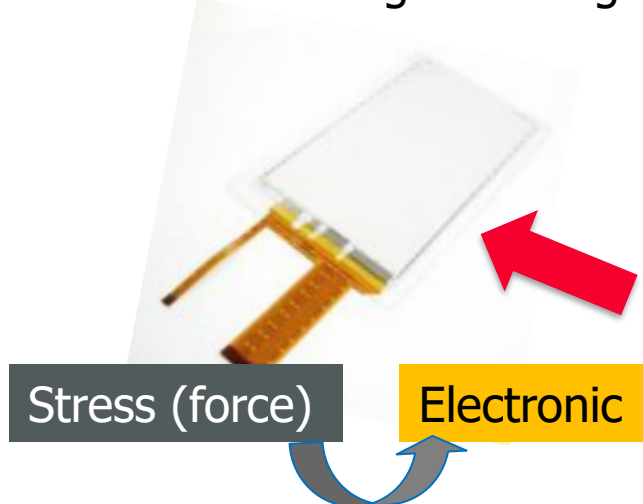
Picoleaf is solution using Thin Organic Film with piezoelectricity.

We are developing new sensors and actuators solution.

Sensor Solution

Suitable for

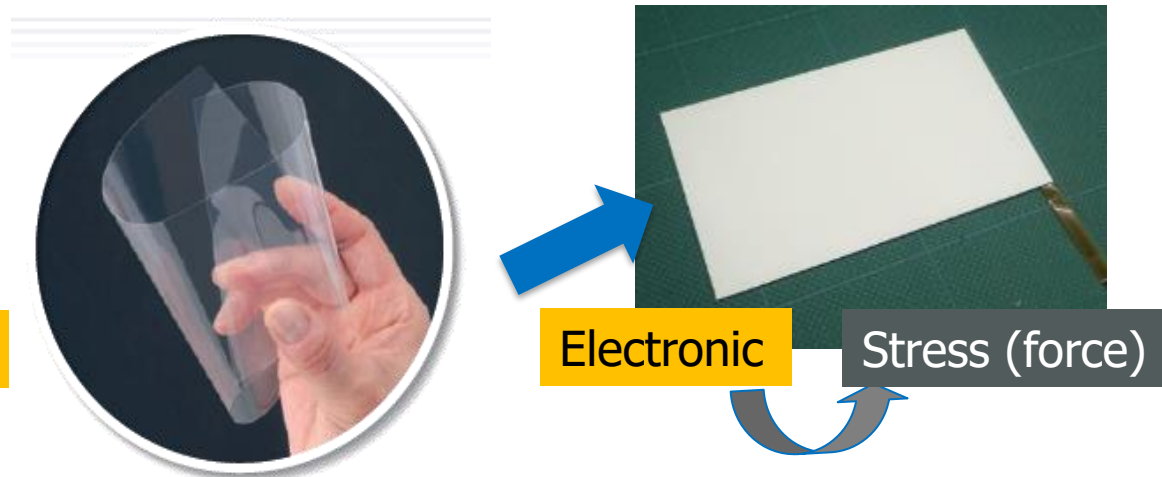
- Force sensing
- Detection angle sensing



Haptic Solution

Suitable for

- Flat thin product haptic
- Big size product haptic



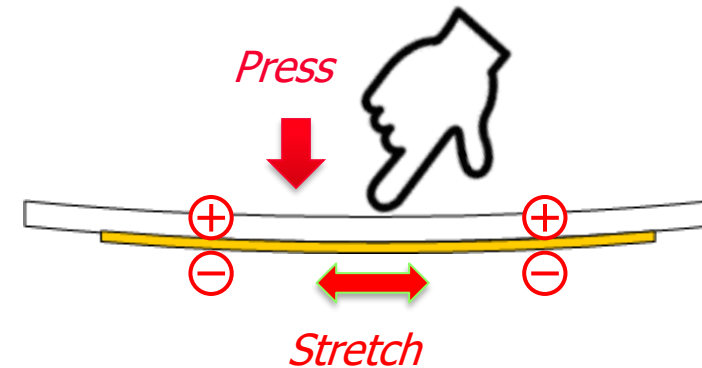
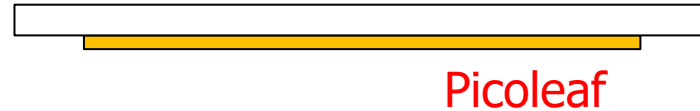
Sensor Solution



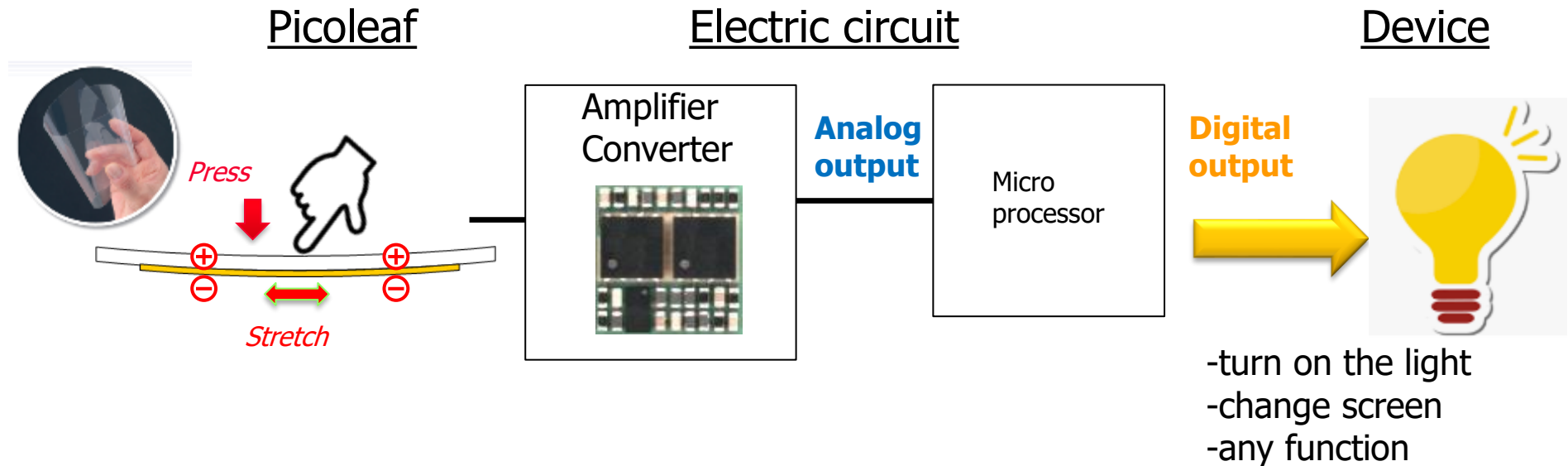
Basic principle of Picoleaf Sensor

Picoleaf generate electric discharge when it's deforming.

Base material : everything ok
(Metal, Plastic, Silicon Rubber..)



Block Diagram



1. High Sensitivity

→ It can detect Tremor vibration

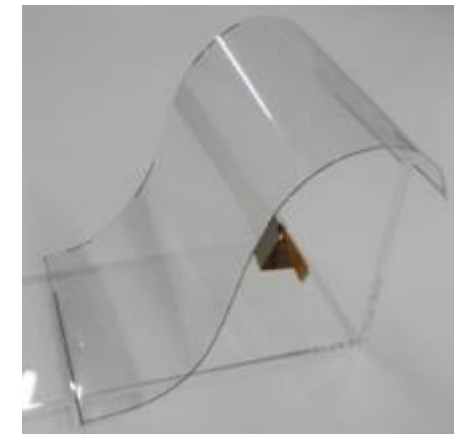
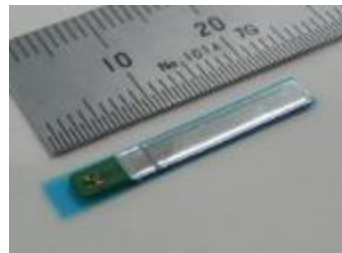
2. Non-pyroelectric

.....→ Picoleaf original

→ Good for HMI because of No drift by temperature

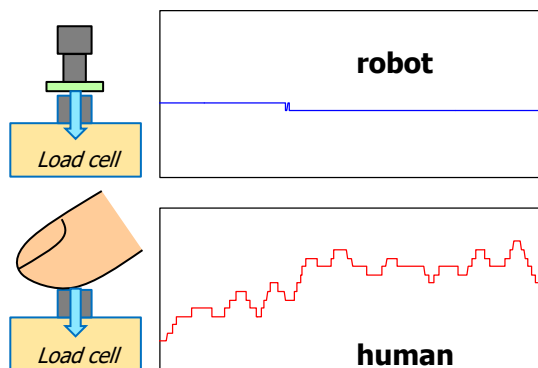
3. Low Power consumption

→ Good for mobile product $I_d < 10\mu A$

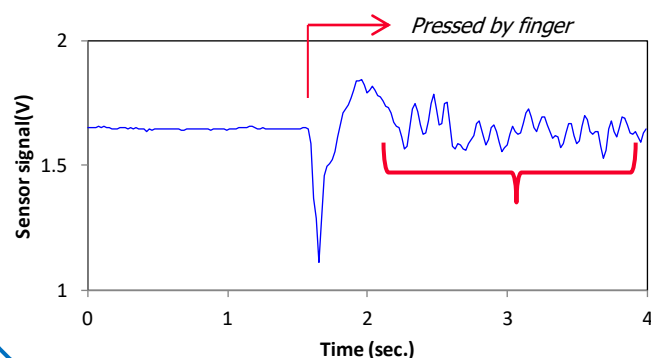


Picoleaf sensor features

High Sensitivity

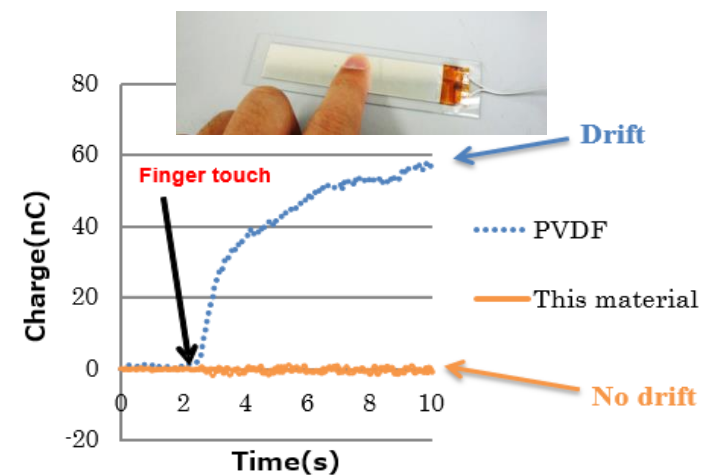
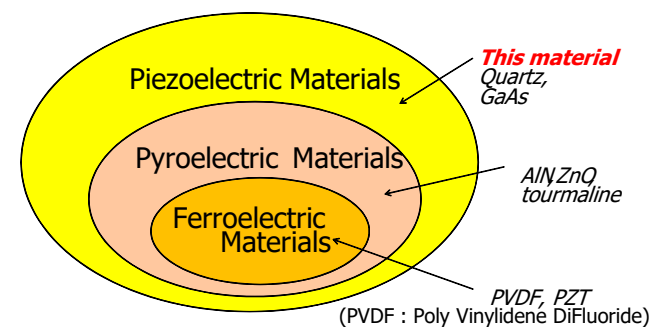


*Even if a human try to keep same force
the muscle move at all times.*



Picoleaf can detect vital signs.

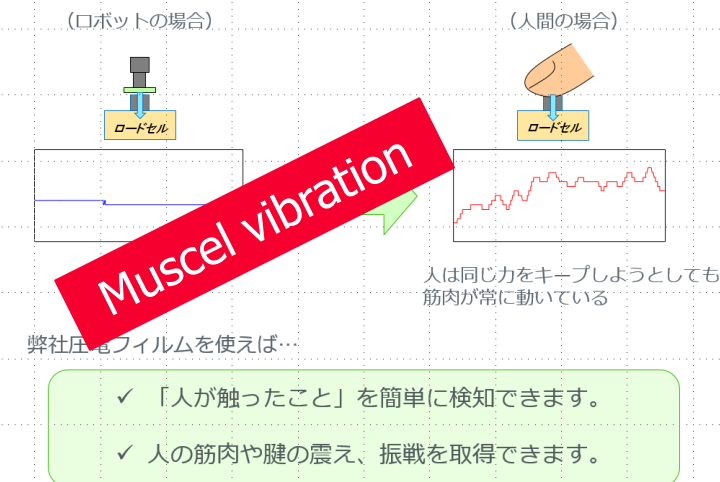
Non-pyroelectric



There is no output from temperature.

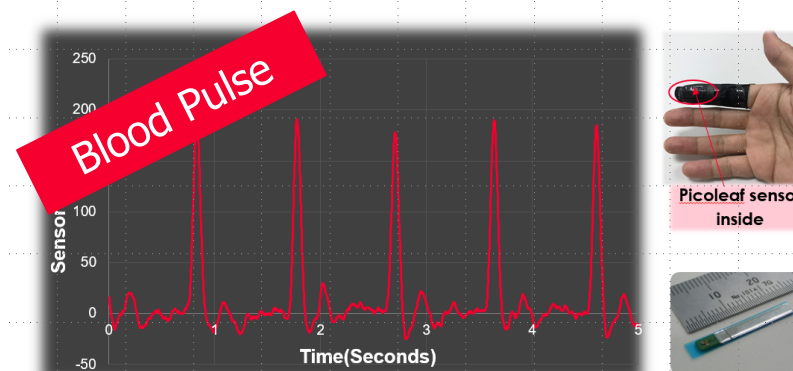
Ex. Vital signs detection

【特長①】筋肉振動（生体振戦）の検知



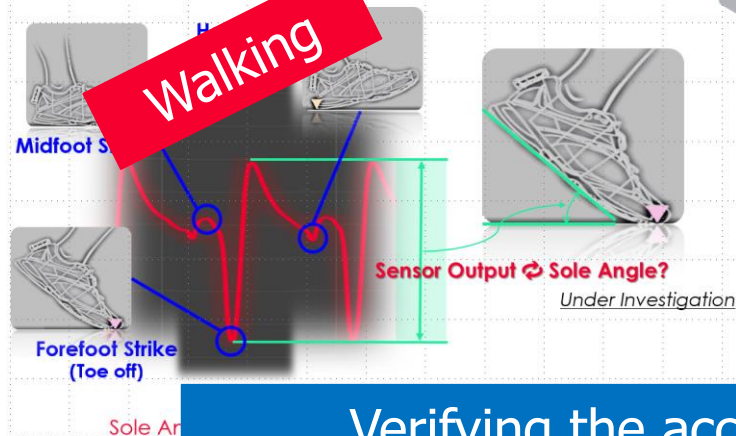
Detect Blood Beat(Pulse)

- Blood Beat

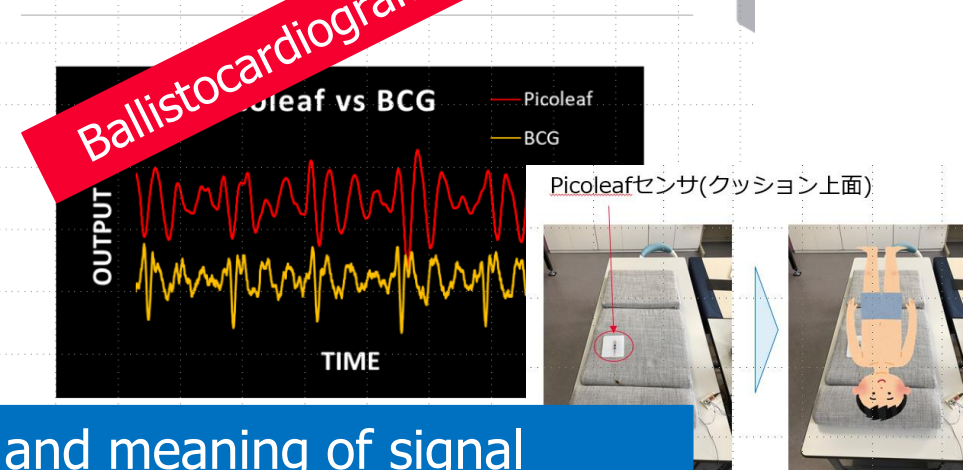


Detect minute vibration like blood beat of fingertip
-> Detect the pulse at another part of the body

What can be measured?(2)

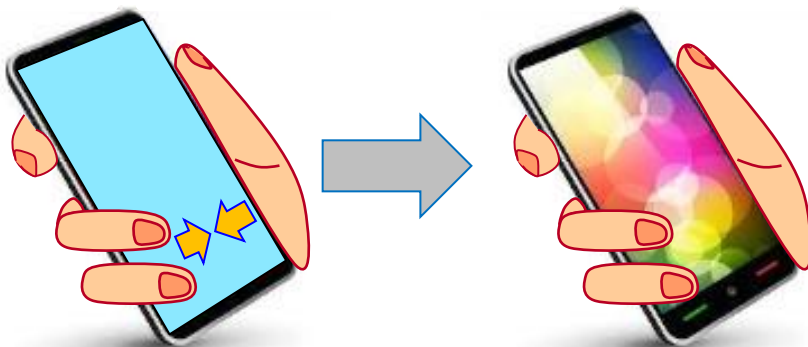


PicoleafとBCGのデータ比較

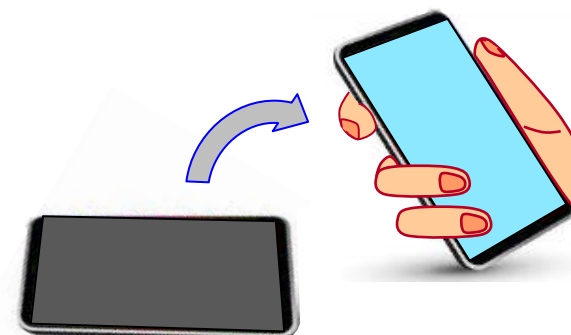


Verifying the accuracy and meaning of signal

No device limitation



Grip Sensor



Wake Up Sensor



Force touch sensor

pinch



Twist



Picoleaf can detect human several motion

New UI

Haptic Solution



Picoleaf Actuator Features

1. Thin structure (<1.3mm)

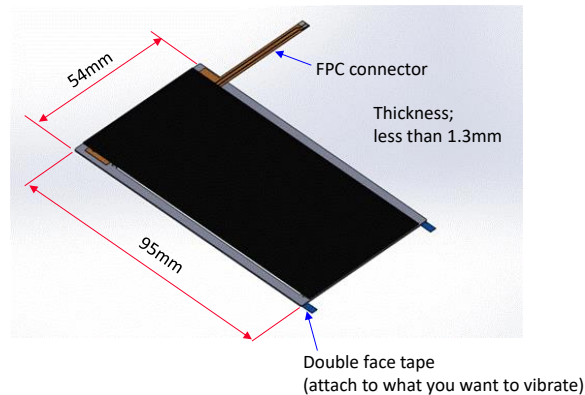
→ Design flexibility, suitable for slim design

2. Uniformity vibration

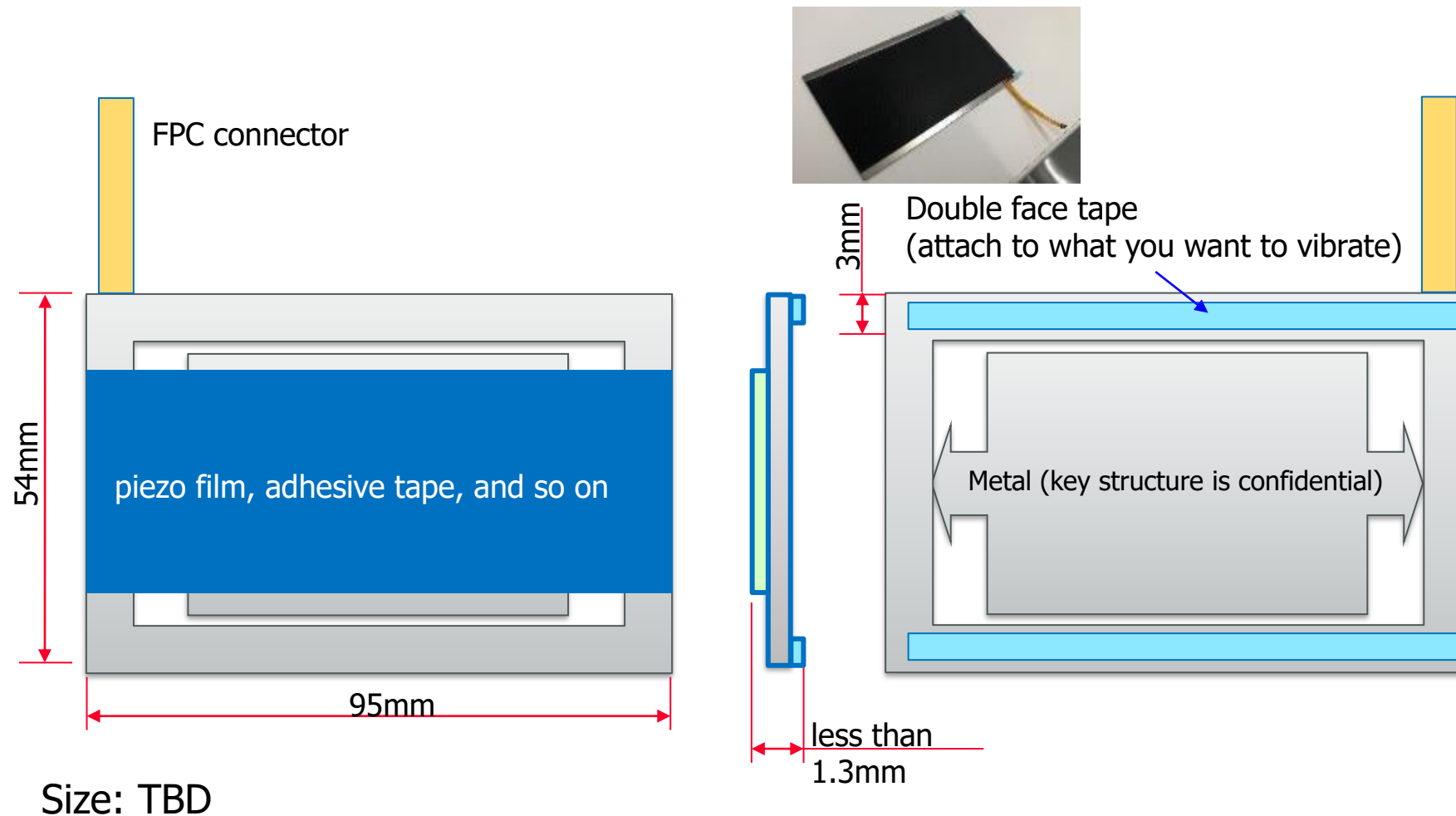
→ Suitable for large panel and product

3. Click feeling

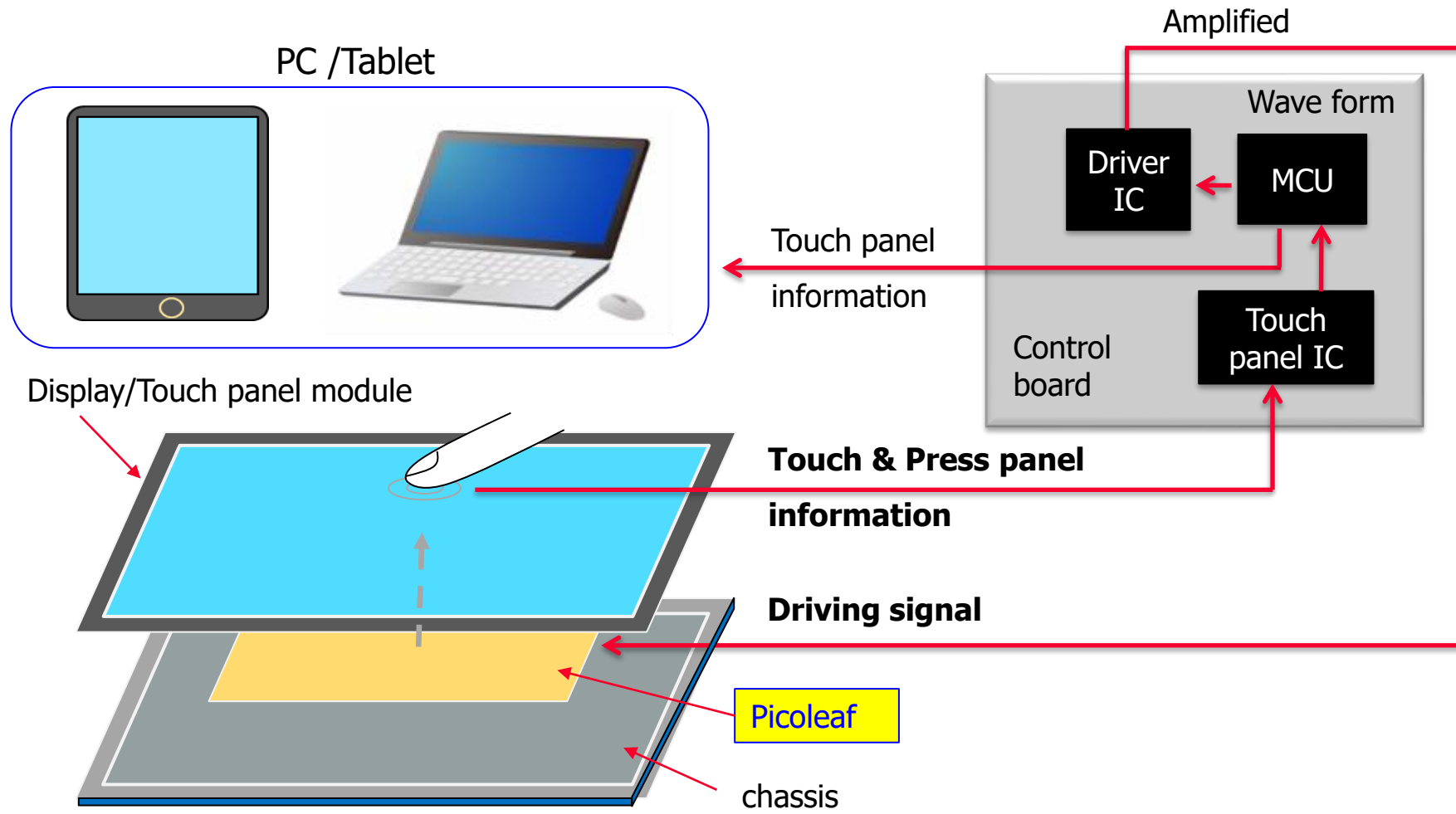
→ Realize good touch feeling



Dimension of piezo film actuator

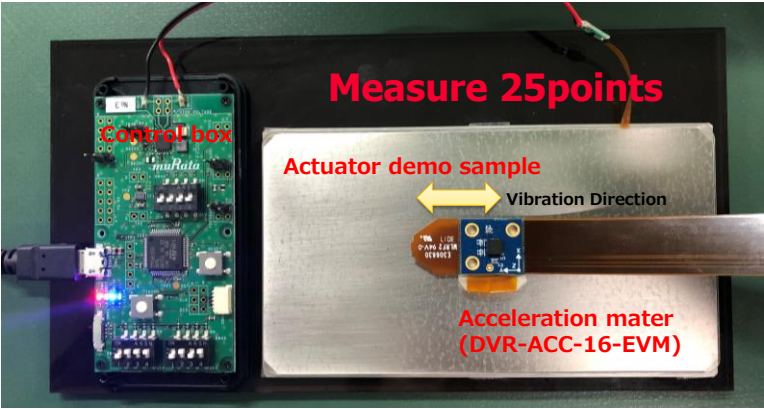


Configuration Example

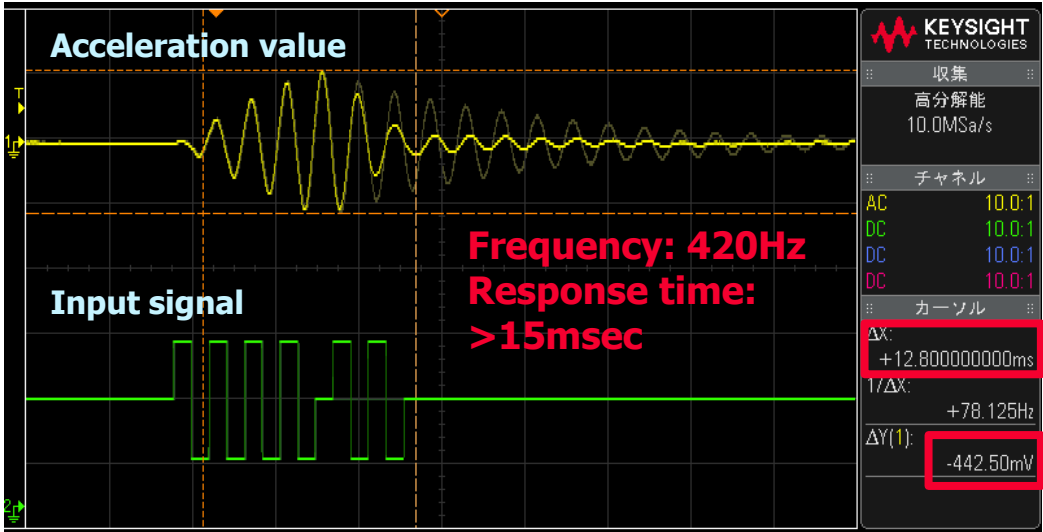


Murata can provide reference circuit information.

Measurement result on demo-kit



Acceleration value [Gpp]



	1	2	3	4	5
1	7.6	7.7	7.7	7.7	7.6
2	7.7	7.7	7.7	7.7	7.7
3	7.6	7.7	7.7	7.6	7.6
4	7.6	7.7	7.7	7.7	7.6
5	7.5	7.6	7.6	7.6	7.5

Good uniformity performance!!

Thank you

감사합니다.