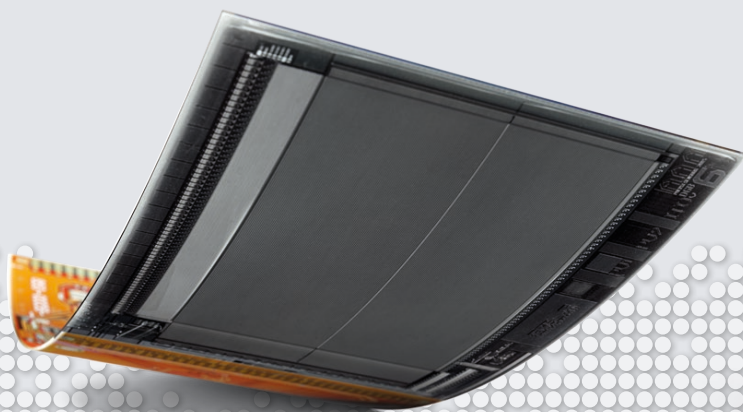




TECHNOLOGY AND PRODUCTS

One Touch.
One You.
NEXT Biometrics



> THE NEXT TECHNOLOGY ADVANTAGE

PATENTED NEXT ACTIVE THERMAL™ SENSING TECHNOLOGY

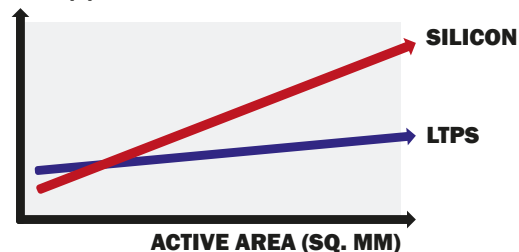
NEXT Active Thermal™ sensing technology produces high-quality fingerprint images that enable low biometric error rates. Fingerprint images are recorded consistently under varying environmental conditions, including high humidity. The NEXT Active Thermal™ sensor can even operate under water!

The NEXT Active Thermal™ sensing principle works by measuring heat conductivity. A low power heat pulse is applied to each sensor pixel over a short period of time and a response signal is measured. Heat dissipates into the finger more efficiently where the skin touches the sensor. The response is therefore different for pixels in proximity to a finger's ridge or valley – which allows generating a digital fingerprint image from the signal.

PRODUCTION PROCESS

NEXT Active Thermal™ sensors are manufactured using a low-temperature polycrystalline silicon (LTPS) process – the same technology used to make thin film transistor (TFT) screens for mobile phones and TVs. The LTPS manufacturing process is economical even for very large-area and flexible sensors - which are ideal for smart cards.

SOLUTION COST (\$)



COST ADVANTAGE OF LTPS PRODUCTION PROCESS

The use of the LTPS manufacturing process allows for great cost efficiency in building NEXT sensors.

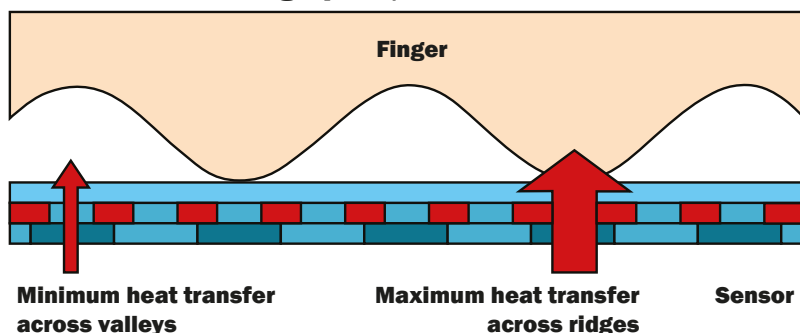
Not only is it a proven technique in other industries but large-sized glass sheets are used as a substrate material on which the polysilicon sensors are deposited. Glass display sheets are considerably less expensive than silicon wafers.

This greatly reduces the cost per area when compared to the semiconductor processes used to manufacture traditional silicon-based capacitive fingerprint sensors and allows NEXT to build extremely accurate large-area fingerprint sensors more cost effectively.

ABILITY TO MANUFACTURE FLEXIBLE SENSORS

Another core advantage of the LTPS process is the ability to produce sensors on flexible substrates like those used for flexible displays.

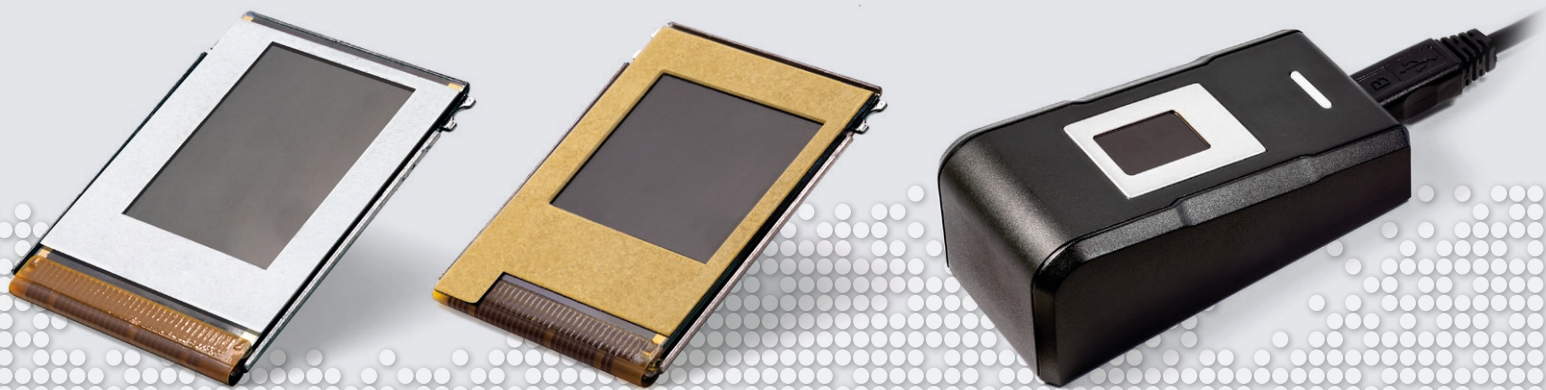
CROSS-SECTION OF FINGERPRINT / SENSOR INTERFACE



NEXT FOCUS

At NEXT, we are focused on developing sensors with a large active area. The large-area sensors and solutions from NEXT deliver outstanding performance, work for a very high percentage of a given user population and are accurate in a wide range of environmental conditions.

NEXT has created a fully flexible sensor based on the company's unique NEXT Active Thermal™ technology. It is designed to enable Biometric System-on-Card solutions compliant with ISO/IEC 17839-2:2015.



> LARGE-SIZE FINGERPRINT SENSORS



BIOMETRIC ERROR RATES DECLINE AS SENSOR SIZE INCREASES

FUNDAMENTALS

A fingerprint system captures prints and locates a number of unique features (minutiae points or other characteristic patterns). From the locations of these points or patterns and their interrelations, the system assesses the probability that a finger presented to the sensor actually belongs to the rightful user of the system.

REAL LIFE CHALLENGES OF FINGERPRINT RECOGNITION

Fingerprinting in the lab differs from real life. In real life, a variety of challenges are present. These include non-uniform finger placements and varying environmental conditions (e.g. fingers that become wet, dry, cut, dirty or worn). Sensors need to be large enough to compensate for these variations in finger condition; a fault tolerant system must include enough buffer capability to operate in a reliable fashion.

NEXT SENSOR RANKED AS TOP PERFORMER IN STUDIES BY THE UNIVERSITY OF MADRID

Fingerprint system accuracy is directly related to the size of sensors used, with larger area sensors delivering better biometric results. The University Carlos III of Madrid performed two multi-sensor, multi-algorithm comparative evaluations of fingerprint technologies, in 2015 and in 2018. Both studies were conducted under ISO best practices methodology.

The 2015 study showed a direct correlation between sensor size and biometric performance, with larger sensors performing better. The 2018 round included more than 50,000 fingerprint scans taken on each of the 5 sensor models evaluated in the study, and resulted in over 150 million comparisons per sensor and biometric algorithm. Both studies confirmed that reducing sensor size has a dramatic negative impact on biometric performance.

M A D R I D 2 - R E S U L T S

Fingerprint sensor	NEXT NB-3023-U2	Competitor 1	Competitor 2	Competitor 3
Technology	Active thermal / LTPS	Capacitive	Capacitive	Capacitive
Sensor size (mm)	11.9 x 16.9	12.8 x 18.0	9.6 x 9.6	7.8 x 7.8
Resolution (ppi)	385	508	508	373
False Non Match Rate*	0.000%	1.963%	4.015%	10.668%

* False Non Match rate at False Match Rate (FMR) 0.01% with Neurotechnology FingerCell biometric algorithm.



Universidad
Carlos III de Madrid

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IN THE 2018 STUDY, THE LATEST GENERATION OF NEXT ACTIVE THERMAL™ SENSOR OUTPERFORMED ALL OTHER SENSORS, INCLUDING A SIMILAR SIZED BUT SIGNIFICANTLY MORE EXPENSIVE CAPACITIVE SENSOR.

> PRODUCT OFFERING FOR A WIDE RANGE OF APPLICATIONS



One Touch Flex

SMART CARD INTEGRATION

FINGERPRINT CHIPSET - Fully flexible fingerprint chipset for smart cards:

11.9 mm x 16.9 mm flexible sensor and companion ASIC. The chipset is suitable for hot- and cold laminated smartcards. Comes with support package for easy integration into powered cards.

FINGERPRINT MODULE - Fully flexible fingerprint module for smart cards:

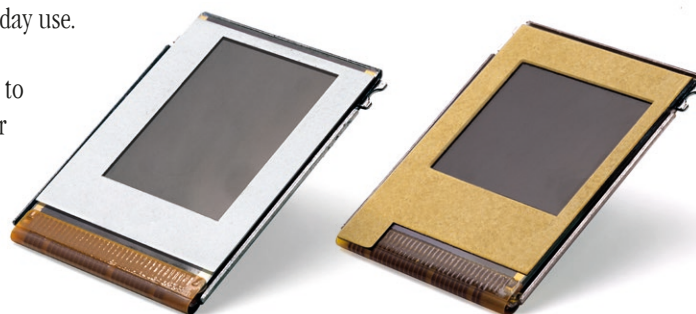
11.9 mm x 16.9 mm flexible sensor and companion electronics. The flexible module is suitable for hot- and cold laminated smart cards. It exports an ISO/IEC 19794-2 fingerprint template to the secure element for match-on-card. Secure communication between fingerprint module and secure element is supported. Optionally, enrollment and verification on module is available.

NOTEBOOKS, TABLETS, ACCESS CONTROL AND POINT OF SALE (POS) APPLICATIONS

NEXT's large-sized (11.9*16.9 mm²) and medium-sized (11.9*11.9 mm²) fingerprint modules have been built into millions of notebooks from tier-1 manufacturers. They come with USB or SPI interface and have consistently proven to be accurate and reliable in day-to-day use.

Bezel-less design and minimal sensor thickness enables full design freedom to fit the style of your product. Cosmetic bezels can be added. NEXT USB sensor modules are ready for Windows Biometric Framework (WBF), plug and play with Windows Hello, drivers available through Microsoft Windows Update service. Drivers and SDKs for Windows, Android, Linux and embedded platforms are available.

NEXT provides customers a faster time-to-market with the One Touch Power and One Touch Lite SDKs (includes algorithm technology by Neurotechnology).



One Touch Access

One Touch ID



AADHAAR

After rigorous testing and qualification, NEXT's STQC certified fingerprint modules and readers are ready to be used in the UIDAI ecosystem. At just 2.5 mm in height, the sensor module integrates into devices without compromising form factor or sleek design.

NEXT provides turnkey solution including certified Level-0 Registered Device Service and Registered Device Management Server. NEXT also provides a Biometric SDK with FRR tested and MINEX III compliant algorithm to allow continued use of existing RD Services.

Our Aadhaar modules and readers are STQC certified and ready to be used within the UIDAI ecosystem.

Visit **www.nextbiometrics.com** or contact us:

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