Smart Payments

Generating a seamless experience in a digital world

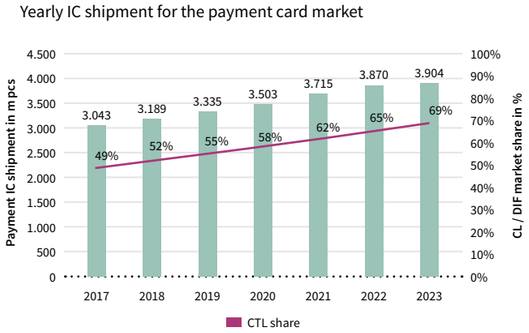
www.infineon.com/payment

Trends

Rising need for security
The trends highlighted opposite are heightening the need for security and performance, especially in a multi-application context. As popular payment methods extend beyond cash and smart cards towards contactless and mobile form factors, hardware-based security mechanisms featuring embedded Secure Elements (eSE) will become increasingly important. These Secure Elements will protect the huge data streams flowing from digital and IoT transactions, safe-guard payment transactions, and protect the identity and integrity of end users.

In this new and complex multi-channel environment, hardware-based IoT security capabilities have to be built into each application layer to ensure that users do not have to worry about fraud or theft of their identity.

Chart presenting increasing trend towards contactless payment technology for the payment IC market



ABI, Payment & Banking Card Secure IC Technologies, July 2018

Growing popularity of “system on cards” e.g. with integrated biometric authenti-cation functionality

Rise of contactless payment

IoT Payment with new form factors with a focus on wearables & payment accessories

Growth of digital payments with the need for security through encryption & tokenization for cards and additional form factors

Challenges facing the payment card and device market

Ensure the necessary contactless performance in terms of card robustness, flexibility and endurance

Deliver hardware-based security capabilities to protect payment data in complex multi-channel environments

Master the full ecosystem spanning ICs, inlays, packages, approved payment applets and personalization

Support multiple international and national standards – both proprietary and open

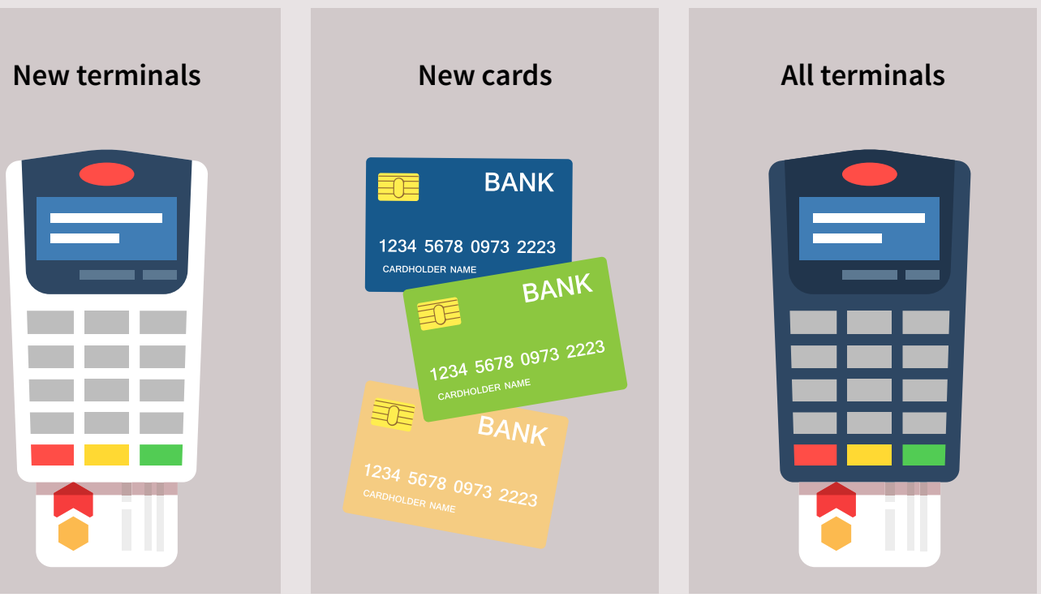
Future of payments

Payments are going digital – with today's users expecting a fast, convenient and often contactless experience with the option of using different form factors. In fact, contactless payment cards and "tap and go" transactions using cards, wearables or mobile devices are increasingly replacing cash and contact-based transactions. By 2023, ABI expects that approximately 70 percent of all payment transactions will rely on contactless technologies such as NFC (Near Field Communication).

Rise of contactless

The contactless mandates issued by VISA, MasterCard and American Express at the start of 2018 (see Contactless payment schemes mandates illustration below) reflect their commitment to expanding the infrastructure supporting contactless and dual-interface payments. This means that more and more consumers will be able to simply and securely tap and pay.

Contactless payment scheme mandates



	New terminals	New cards	All terminals
VISA	Oct 13, 2018	Oct 13, 2018	April 01, 2023*
MC	Oct 13, 2018	April 30, 2019	April 01, 2023
AE*	Oct 12, 2018	April 12, 2019	April 14, 2023

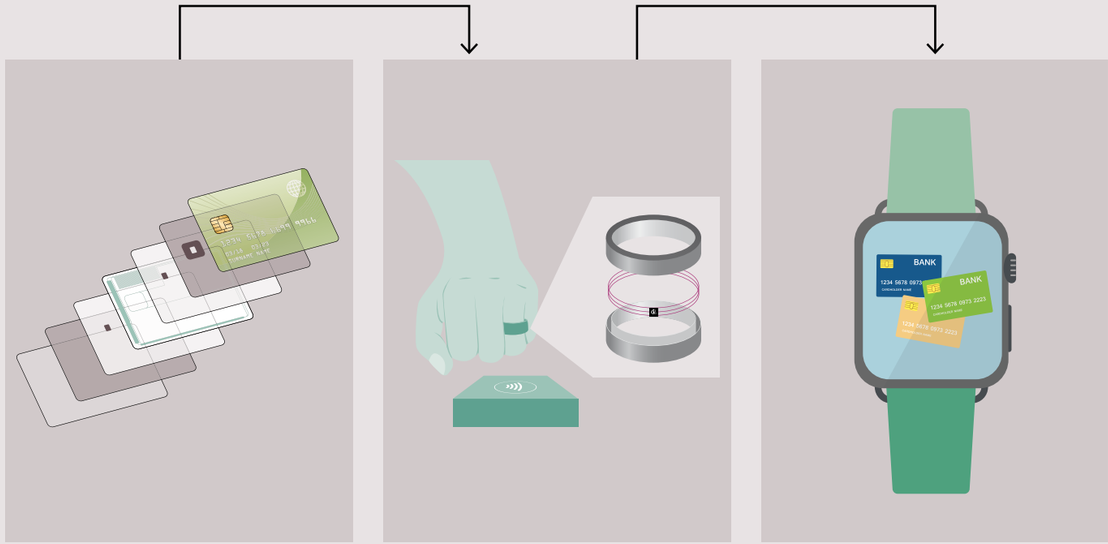
*AE = American Express

*all mPos by Apr 25

Wearables in focus

At the same time, the overwhelming success of contactless cards is driving demand for wearable payments. Gartner forecasts that wearable form factors are set to rise dramatically in popularity, with global sales projected to grow from around 310 million devices in 2017 to over 500 million by 2021. Many experts have earmarked payment as the "killer app" for wearables. According to a MasterCard press release, over 175 million Europeans are interested in paying with wearable devices. This press release states that almost one quarter of all Europeans expect to start using "tap and go" contactless wearables such as smart watches, bracelets and key rings for everyday expenses.

Transition from contactless card payment to smart wearables



Dual Interface Security Controller (With ISO 14443 Passive Contactless)

Advanced Contactless Security Controller (ISO 14443 Small Antenna)

Active Contactless with Battery-driven (Micro Antenna) and Internet Connectivity

Meeting today’s payment challenges

As the leader in digital and payment security, we offer the market’s broadest portfolio of payment solutions. Our end-to-end offering extends from optimized online-only and DDA (Dynamic Data Authentication) contact devices to high-speed contactless controllers based on SOLID FLASH™ for very fast time-to-market, flexible memory scalability and superior contactless performance. Customers increasingly rely on our pre-certified SECORA™ Pay EMV solutions incorporating the latest payment applets for fast time-to-market thanks to pre-certified solutions requiring only paper approvals for card or device manufacturers.

Hardware innovation leader

- Innovation leader for 65 nm and 40 nm hardware development
- SOLID FLASH™ production for fast time-to-market and flexible memory scalability
- Hardware enabling card innovations such as dCVV2 and biometric card verification
- Broadest payment portfolio
- Leader in digital security
- Best-in-class contactless performance

According to industry experts, Infineon was the first IC supplier with a comprehensive payment portfolio based on 65 nm technology.

Contactless innovation leader

- Migration from 90 to 65 nm technology accelerates contactless transaction speeds by 25 – 65 percent
- Easy and seamless contactless integration with hundreds of reader systems from different manufacturers across all regions through our Contactless Competence Center
- Up to 100 MHz internal clock frequency for new contactless derivatives (SLC32PD and SLJ32PD)
- Coil on Module (CoM) packages with wire-embedded antenna supporting VISA and MasterCard paper approval processes for dual-interface cards with a multitude of advantages
- Support for additional interfaces like USB and I2C enables system-on-card designs incorporating biometric sensors on cards.
- With the superior IC design, additional card displays in line with dCVV2.0 will be supported, safeguarding CNP transactions for SCA in compliance with PSD2 (Payment Services Directive)
- Moreover, leading suppliers of high-end metal cards also rely on our contactless ICs for instant design-in success thanks to their benchmark contactless performance and our contactless system expertise

According to ABI and our own sources, we are positioned as market leader with an overall share of 53 percent.

NFC payment solutions for connected smart devices & payment wearables

- Boosted NFC Secure Elements with 80 percent smaller footprint than predecessor models
- Adapted to an ultra-small NFC antenna
- Ideal for smart wearables thanks to integrated antenna package
- Easy integration of pre-approved, tiny active NFC components in wearables or other IoT devices without having to worry about power consumption

Our boosted NFC component for connected wearables in a tiny package (4x4 mm) with an integrated antenna is 80 percent smaller than a comparable NFC solution offered by our competitors incorporating Secure Element, MCU, host interface and NFC modem.

Leading technologies to keep our customers ahead

Our leadership position in the payment market is built on three technology pillars: SOLID FLASH™, which revolutionized payment chip technology, CoM, enabling an easy transition toward dual-interface production lines, and SECORA™ Pay, a benchmark EMV solution based on Global Platform and the latest payment applets.

SOLID FLASH™

Fastest time-to-market

This future-proof memory concept meets the growing demand for increasingly differentiated application schemes. The smart design supports post-issuance of new applications and accelerates time-to-market by over 50%.

Coil on Module

Easy transition

Coil on Module (CoM) technology simplifies the transition from contact-based to dual-interface schemes that enable contactless processing. Existing manufacturing lines can simply be used without any new capital investments.

System solutions supported by SECORA™ Pay

High performance for contact & dual-interface payment cards, for mobile & connected devices. With benchmark efficiency, smallest footprints and fast integration paths.

SOLID FLASH™

Coil on Module

Broad portfolio – proven performance

Card vendors, personalizers and issuers around the world rely on our SECORA™ Pay family of tailored, cost-effective Java Card-based solutions for fast and agile implementation of their payment projects. This solid chip platform comes with the latest EMV applets offering the longest approval lifetimes.

SECORA™ Pay is available in three different flavors to support seamless and efficient card production across different application needs:

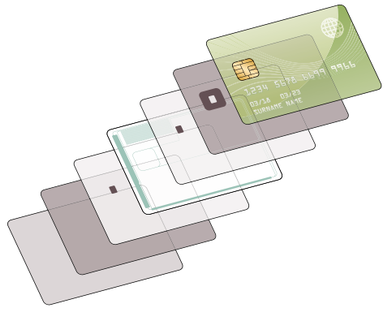
Payment cards

SECORA™ Pay S

› Ready-to-go, off-the-shelf, optimized EMV solutions with major global payment scheme reference approvals from VISA & MasterCard (American Express & Discover targeted for 2019) and personalization scripting support

SECORA™ Pay X

› Flexible enablement platform to support multi-application payment cards, supporting domestic payment schemes and project-specific requirements with the possibility to integrate transit applications based on the CIPURSE™ open standard



Payment accessories

SECORA™ Pay W

› Turnkey EMV solutions based on innovative packaging technologies to support non-connected, passive wearables or pay ment accessories

Connected wearables

SECORA™ Connect

› Solutions for connected wearables based on an NFC boosted Secure Element design for connected wearables in ultra-small integrated packages with lowest power consumption

Card manufacturers

Device OEMs

Packages

› We also offer a range of high-performance security controllers supporting various payment applications. Our dedicated SLC 32 and SLC 37 platforms use 65 nm and 40 nm process technologies to deliver state-of-the-art security and product features. Available in both contact and contactless derivatives, these families come in a multitude of approved packages.

Trusted partner with proven global track record in payment projects

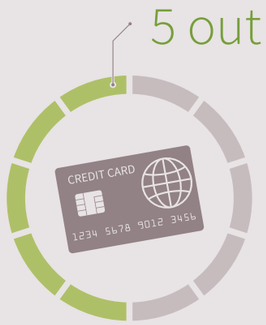
As the market-leading provider of security technologies for over 30 years, we have already delivered 15 billion chips worldwide. In 2017 alone, every second payment card issued contained an Infineon security chip.

We are a strong supporter of open standards such as EMV and CIPURSE™ to drive the move towards flexible, interoperable multi-application schemes.

Moreover, we are firmly committed to the payment IoT market, delivering a multitude of new active NFC platforms enabling low power consumption, connectivity, interoperability and security. We meet the needs of the highly fragmented IoT & ODM market by teaming up with our industry partners to customize and distribute bespoke solutions through our traditional distribution channels. We also work with major IoT and payment industry players to develop innovative onboarding, tokenization and personalization solutions to address growing demand for convenient, quick and secure contactless payment and other IoT use cases.

Over the coming years, “tap and go” payments – everywhere and on every device – will become the standard in an increasingly digital economy.

Facts & figures



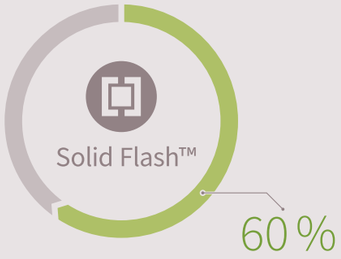
5 out of 10 new payment cards in 2017
were equipped with an Infineon chip

1 position in the payment market

(Source: ABI, Payment & Banking Card Secure IC Technologies, July 31, 2018)

51 percent of all VISA dual-interface approvals have been achieved with Infineon components

(Source: www.technologypartner.VISA.com/Testing/TestMaterials.aspx#714)



Approx. 60 percent of all US payment cards have an Infineon SOLID FLASH™ chip inside

(Source: Infineon)

More than 30 years' experience providing security solutions to the payment market

(Source: Strategy Analytics, April 2015)

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