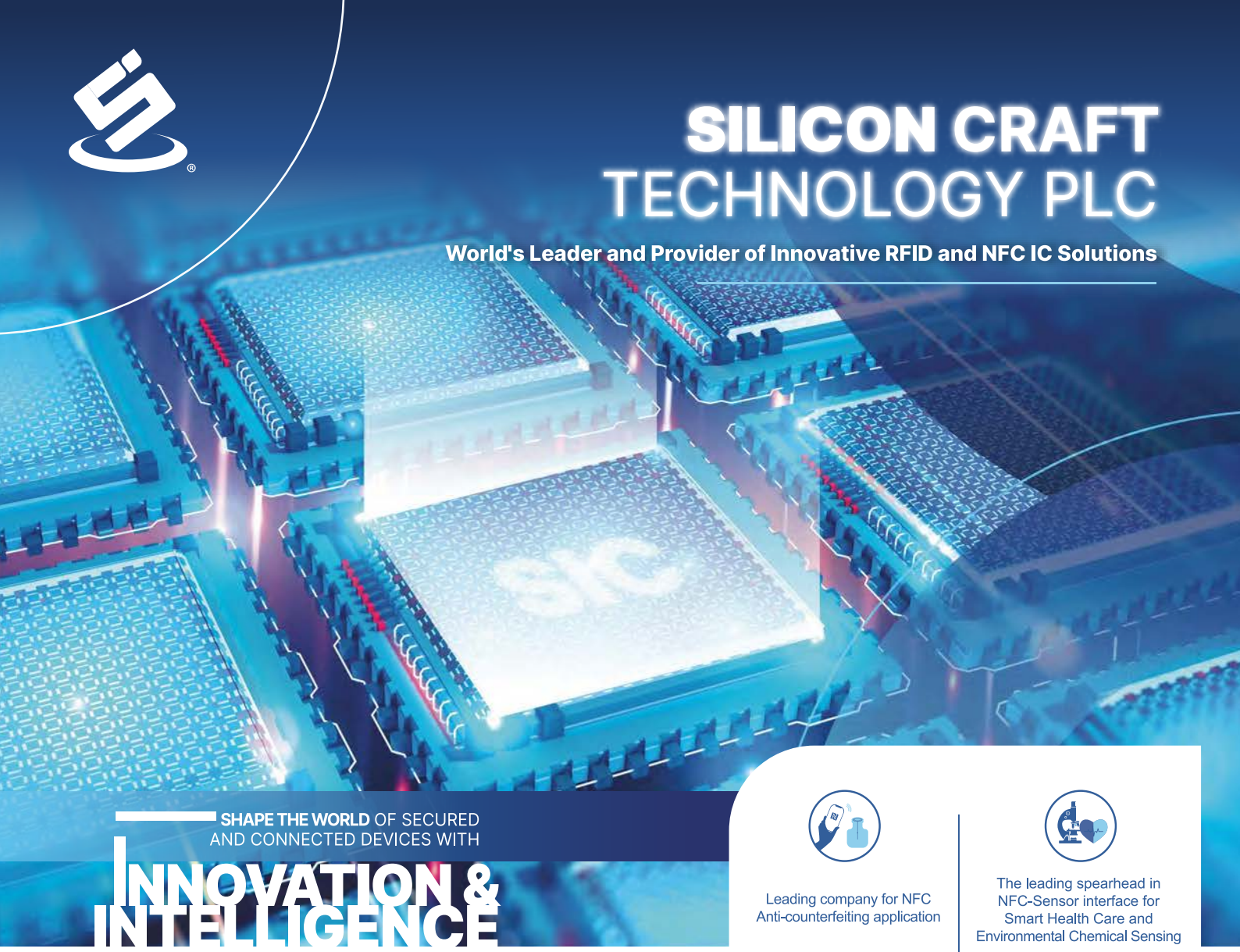
SILICON CRAFT TECHNOLOGY PLC

World's Leader and Provider of Innovative RFID and NFC IC Solutions



SHAPE THE WORLD OF SECURED AND CONNECTED DEVICES WITH

INNOVATION & INTELLIGENCE

SIC, the Thailand's first and the only one privately held Thai semiconductor design company.
We're world-class designer and provider of linear & mixed-signal integrated circuits, with experience and expertise in design & development work, with top-tier foundries & semiconductor manufacturers.

Established in 2002, SIC offers novel, custom, standard design microchips for RFID applications. Delivers products that carry high-value added features and superior overall system performance. The products quality is endorsed by years of lasting partnerships.

- Leading company for NFC Anti-counterfeiting application
- The leading spearhead in NFC-Sensor interface for Smart Health Care and Environmental Chemical Sensing
- Expert in low-power, mixed-signal ASIC design
- Proven expertise in cryptographic RF communication

PRODUCTS & SERVICES

RFID/NFC Integrated Circuit for :

- Advanced NFC
- Industrial IoT
- Immobilizer
- Animal ID

ASICs

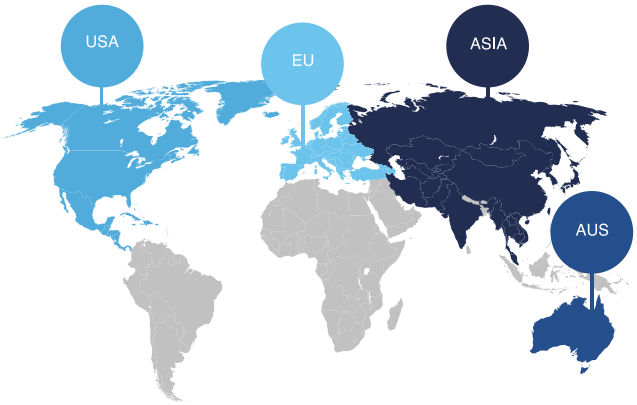
Custom design to target a wide range of applications and use cases

APPLICATIONS

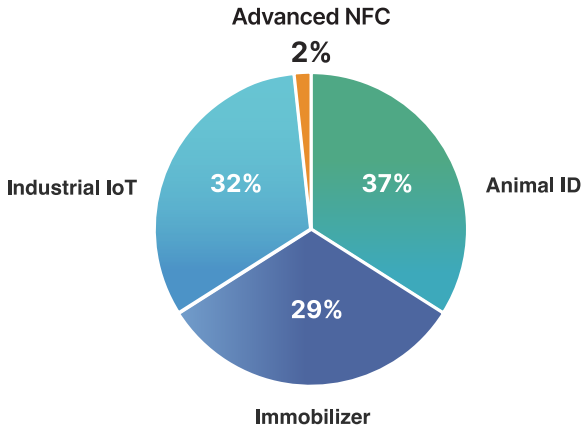
- Anti-Counterfeiting & Brand Protection
- Smart Home & Building
- Medical Devices & Healthcares
- Toy & Game
- Automotive
- Livestock

Market Coverage

Our target strategic growth countries:
EU, USA, Japan, Korea, Australia, China, India



Revenue Contribution



RFID Product Line

Advanced NFC

- **NFC for Connectivity with UART interface**
  SIC4310/SIC4311
  - NFC-UART data transferring and energy harvesting
- **NFC for Authentication with on-chip encryption engine**
  SIC43S1/SIC43NT/SIC43NTG2
  - NFC Tag IC with Dynamic NDEF for Web-based authentication.
- **NFC for Sensor interface with on-chip sensor biasing and 12-bit ADC**
  SIC4340/SIC4341/SIC4343
  - Single-chip with NFC to sensor connection which can be used in batteryless application

Industrial IoT

- **ISO14443A HF Reader IC**
  RA10
  - Support transmitter supply up to 7V
- **Multi-Protocol HF Reader IC**
  RE31
  - Support ISO14443A/B and ISO15693
  - Support transmitter supply up to 7V
- **Multi-Protocol HF reader IC with JIS-X-6319-4**
  RE41
  - Fully compatible RE31 with additional support JIS-X-6319-4
- **Multi-Protocol HF reader IC with Low Power Card Detection mode**
  RA12
  - Support ISO14443A/B and ISO15693
  - Consumes only 4.7 µA in card detection mode
- **Multipage HDX Transponder for Industrial Application**
  SIC73F1
  - LF HDX transponder with EEPROM 1,360 bits in 17 pages read/write memory

Immobilizer

- **LF Automotive Transponder IC**
  SIC61 Family
  - Automotive transponder with form, function and performance compatible with majority of motor vehicle sold worldwide.

Animal ID

- **LF FDX-B Transponder IC**
  SIC278
  - Best read range performance by SIC's boost-up technique.
- **LF HDX Transponder IC**
  SIC279
  - Best-in-class reading performance HDX Tag IC in the market with tunable capacitor.

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SCAN ME

SIC43S1
SIC43NT
SIC43NTG2

NFC FORUM TYPE 2 TAG
FOR ITEM-LEVEL AUTHENTICATION

SIC43S1, SIC43NT, SIC43NTG2 are the passive NFC forum type 2 tag, which are fully compliant to ISO14443A.

The user memory of both chips supports NDEF updating with a unique value for each tap which allows App-less NFC authentication.

For higher security purpose, SIC43S1 contains an AES-128 encryption engine, which is designed for using with mutual authentication and encrypted communication schemes.

APPLICATIONS

- Item-Level NFC Label or Sticker with Authentication Function
- Smart Packaging
- Vouchers and Coupons
- Access Control Card with Authentication Function

FEATURES SUMMARY

- NFC forum type 2 tag
- Dynamic NDEF message which contains UID, and a secured authenticated code (SAC) or rolling-code for authorization
- ISO14443A,106kbps
- **50pF input capacitance**
- Secured tamper detection and verification via SAC or rolling-code
- Pin configurable to be RF field detection or tamper detection (SIC43NT / SIC43NTG2)
- Operating temperature : -40 to 85 ℃
- **Package : Sawn wafer with bump**

NFC TAG FOR
ITEM-LEVEL AUTHENTICATION

SIC43S1 — NFC Forum T2T with AES-128 encryption

SIC43NT SIC43NTG2 — NFC Forum T2T with Secured Rolling-Code

COMPARISON TABLE

FEATURES	SIC43S1	SIC43NT	SIC43NTG2
Standard	NFC Type 2 Tag		
Memory			
User Memory Size [bytes]	816	144	144
Retention	10 years		
Write cycle [times]	100k	100k	500k
Memory Protection	AES-128 Mutual Authentication	32-bit Password protection	32-bit Password protection
Dynamic NDEF			
UID	14 bytes (ASCII)		
Tamper Status	-	2 bytes (ASCII)	2 bytes (ASCII)
Timestamp	8 bytes (ASCII)		
RLC/SAC	32 bytes (ASCII)	8 bytes (ASCII)	8 bytes (ASCII)
Security			
Mutual Authentication	Yes, AES-128	No	No
Encrypted Communication	Yes, AES-128	No	No
I/O Function			
RF Detection	No	Yes	Yes
Tampering Detection	No	Yes	Yes
Others			
On-chip Capacitor	50pF		
Target Package	Sawn wafer with bump	Sawn wafer with bump, DFN	Sawn wafer with bump

DEVELOPMENT KITS

- SIC43S1 Development Kit: PS1BK00000000S1D0CB
- SIC43NT Development Kit: PNTGK100PB0S1NTD0CB

DEVELOPMENT KIT SUPPORT MATERIALS

- Demo Android APP and Source Code
- Reference PCB Design and Schematic Diagram
- Reference Antenna and Antenna Design Tool

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SIC4340
SIC4341
SIC824B
SIC4343

SENSOR INTERFACE PRODUCTS

SIC4340 GALVANOSTAT SENSOR

PRINCIPLE Chip bias current and measure voltage in response to changes in resistance or capacitance across sensor

APPLICATION Resistance, Capacitance, Temperature, Water TDS, etc.

SIC4341 POTENTIOSTAT SENSOR

PRINCIPLE Chip bias voltage to WE-RE and measure current across electrochemical sensor

APPLICATION Heavy Metal, Glucose, Ketone, Uric acid, Cortisol, Hepatitis B Virus, Chemical Substances, Biomarkers, etc.

SIC4343 VOLTAGE SENSOR

PRINCIPLE Chip bias voltage and measure voltage in response to changes in resistance across sensor (open circuit potential)

APPLICATION pH, Force, Strain, Ion Elements such as Na^{+}, K^{+},Ca^{2+},Mg^{2+}, Biomarkers, etc.

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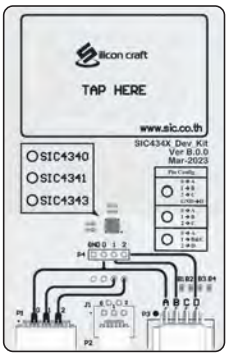
GALVANOSTAT SENSOR SIC4340

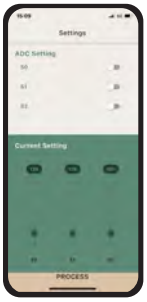
SIC4340

NFC type 2 tag IC with built-in current source and ADC for galvanostat measurement.

SPECIFICATIONS	SIC4340
Communication Interface	NFC Type 2 Tag
Product Form Factor	QFN, Sawn Wafer with Bump
Biasing Current Range	1 - 63 µA with 1 µA / Step 8 - 504 µA with 8 µA / Step
Bias Wave Form	• DC • Square Wave with Selectable Frequency 300 Hz - 50 kHz
Voltage Measurement Range	0.2 to 1.2 V
Measurement Accuracy	± 1.2 mV
Voltage Limiter	1.28 V
Multiplexing	3 Channels
Application Example	Resistive Sensor Capacitive Sensor Temperature Sensor Water TDS (Total Dissolved Solid)

DEVELOPMENT KIT




SIC4340

SIC824B


SIC4341


SIC4343

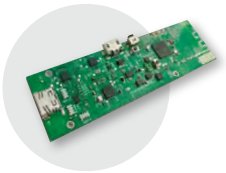
SUPPORT MATERIAL

- Demo iOS/android application
- Reference PCB design and schematic diagram
- Reference antenna and antenna design tool

SIC4341 POTENTIOSTAT SENSOR

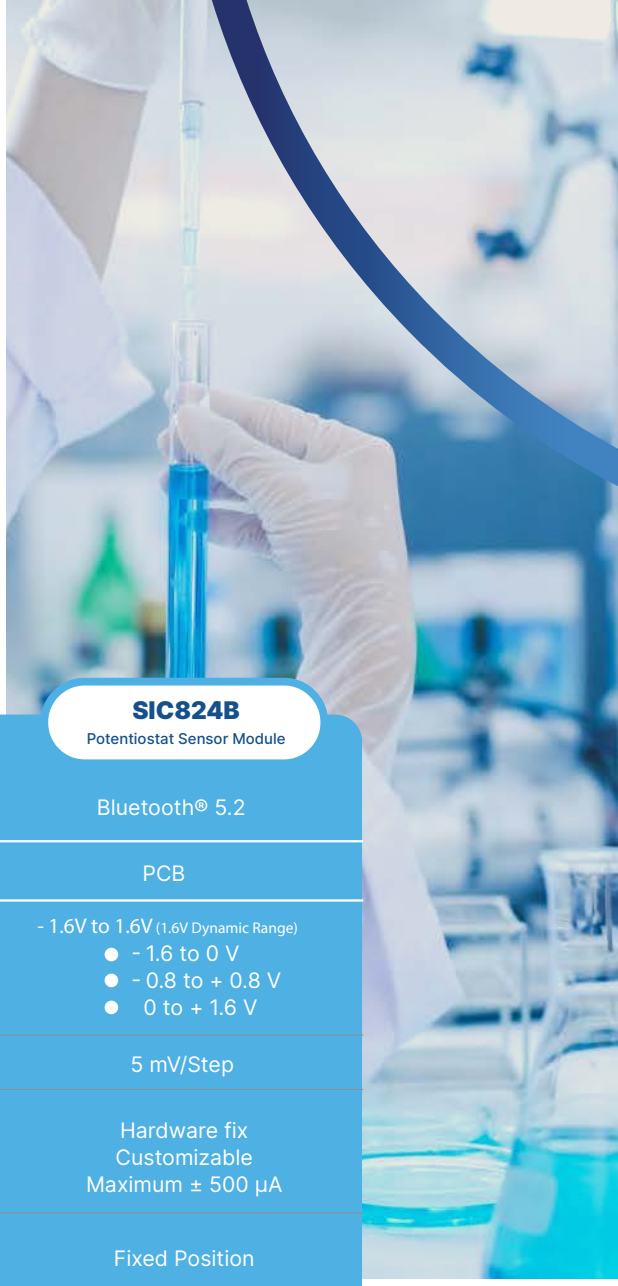
SIC4341

NFC Type 2 tag IC with built-in ADC and potentiostat sensor interface for electrochemical measurement



SIC824B

Potentiostat sensor module with bluetooth® 5.2 for electrochemical measurement



SPECIFICATIONS	SIC4341 Potentiostat Sensor Interface	SIC824B Potentiostat Sensor Module
Communication Interface	NFC Type 2 Tag	Bluetooth® 5.2
Product Form Factor	QFN, Sawn Wafer with Bump	PCB
Bias Voltage Range	-0.8 to +0.8 V	- 1.6V to 1.6V (1.6V Dynamic Range) ● - 1.6 to 0 V ● - 0.8 to + 0.8 V ● 0 to + 1.6 V
Bias Voltage Resolution	5 mV/Step	5 mV/Step
Current Measurement Range	Selectable ± 2.5 µA ± 20 µA	Hardware fix Customizable Maximum ± 500 µA
Pin Configuration	Configurable WE, RE, CE	Fixed Position
Measurement Accuracy	± 5 nA for ± 2.5 µA Range ± 20 nA for ± 20 µA Range	± 0.1% of Current Range
Compatible Analysis Technique	Amperometry Voltammetry	Amperometry Voltammetry Open Circuit Potential (OCP)
Application Example	Chemical Sensor Biochemical Sensor	Chemical Sensor Biochemical Sensor Potentiometric Sensor

Screen-Printed Electrode (SPE) on PET Substrate
3 Electrodes Including;

- Working Electrode: Graphene (Size: Diameter 3 mm)
- Counter Electrode: Graphene
- Reference Electrode: Ag/AgCl

SIC4343 VOLTAGE SENSOR

SIC4343

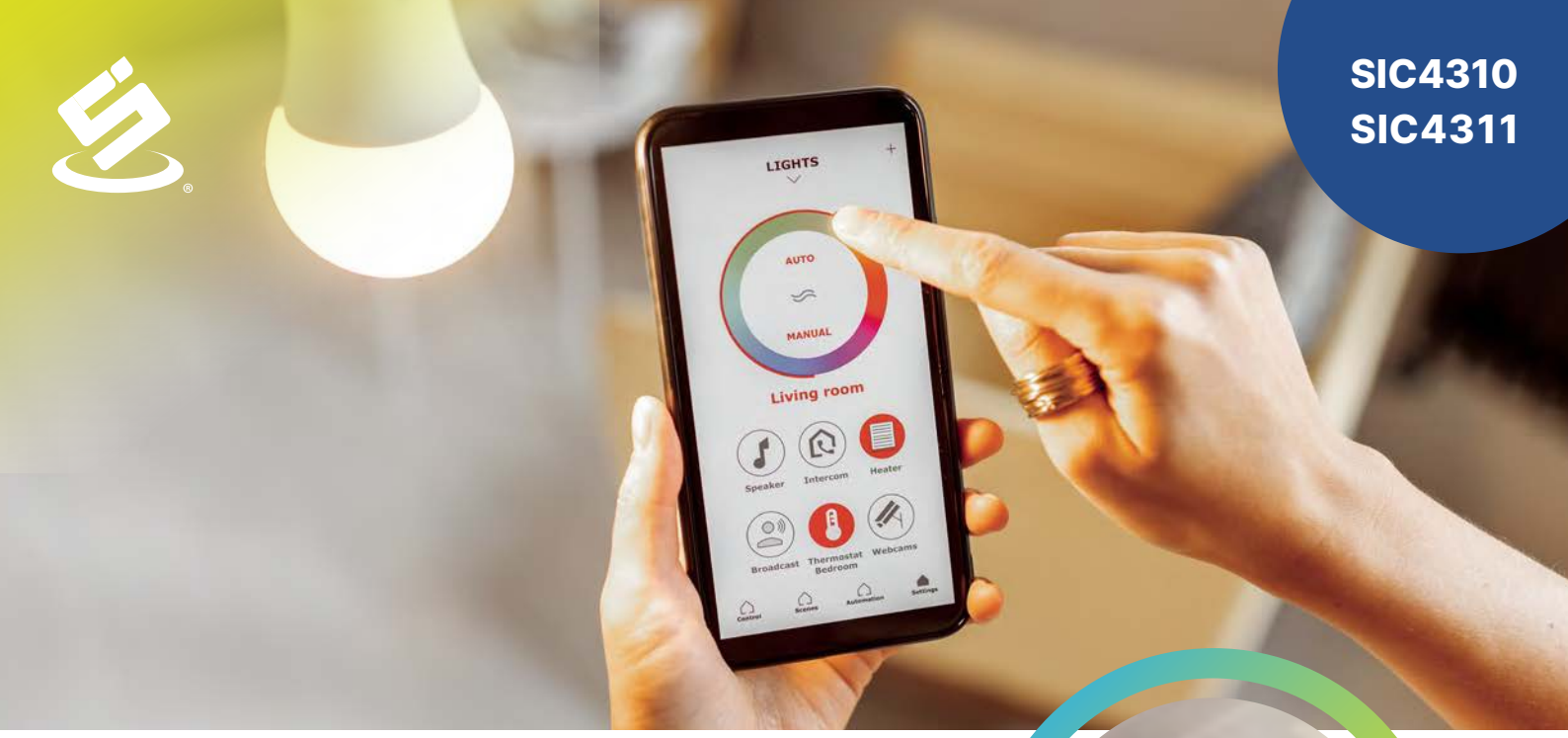
NFC type 2 tag IC with built-in DACs and ADC for voltage measurement which can be configured to single-ended or differential-ended mode.

SPECIFICATION

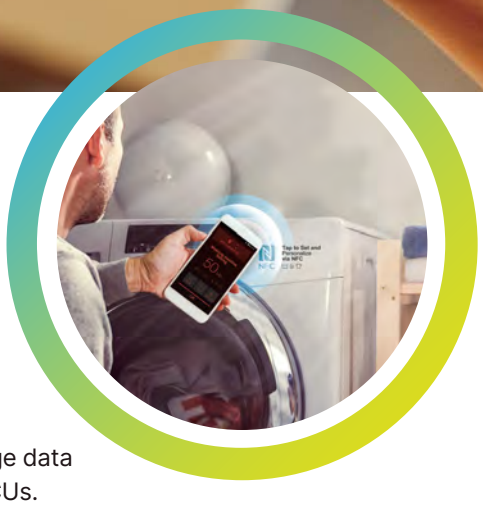
	Single Ended Voltage Sensor Interface Chip	Differential Ended Voltage Sensor Interface Chip
Communication Interface	NFC Type 2 Tag	
Product Form Factor	QFN, Sawn wafer with bump	
DAC Resolution	8-bit	
Bias Voltage	0.2 to 1.2 V	
Measurement Method	Measure voltage with respect to GND	Measure voltage between 2 pins
Voltage Measurement Range		
Input Buffer in Enable	0.2 to 1.2 V	-1 to +1 V
Input Buffer in Disable	0 to 1.2 V	-1.2 to +1.2 V
Measurement Accuracy	± 1.2 mV	
Sampling Rate	10 sps	
Application Example	Industrial Sensor Chemical Sensor Biochemical Sensor	

REFERENCE CASES

Year	Application	Author	Affiliation	Journal	Reference
2023	Hydroquinone	Charles S. Henry	Colorado State University, US	Electroanalysis	Electroanalysis.2023;35:e202200552
2023	Cortisol	Fabiana Arduini	University of Rome Tor Vergata, Italy	Sensors and Actuators B: Chemical	Sensors & Actuators: B. Chemical 379 (2023) 133258
2023	Breast cancer sensor	Warakorn Limbut	Prince Songkla University, Thailand	Microchimica Acta	Microchimica Acta (2023) 190:232
2022	Formaldehyde sensor	Warakorn Limbut	Prince Songkla University, Thailand	Talanta	Talanta 254 (2023) 124169
2022	Multi-detection, COVID & antibiotic drug	Can Dincer	University of Freiburg, Germany	Materialstoday	Materials Today (2022) 61:129-138
2022	Leptospirosis	Sudkate Chaiyo	Chulalongkorn University, Thailand	Analytical Chemistry	Anal.Chem.(2022) 94: 14583−14592
2022	Heavy metals (As(III), Cr(VI), Hg(II), Pb (II), Cd (II))	Orawon Chailapakul	Chulalongkorn University, Thailand	Microchimica Acta	Microchimica Acta (2022) 189: 191
2022	Pesticides	Chanchana Thanachayanont	National Metal & Materials Technology Center (MTEC), Thailand	IEEE	19th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON) (2022)
2021	Hepatitis-B	Orawon Chailapakul	Chulalongkorn University, Thailand	Sensors and Actuators B: Chemical	Sensors & Actuators: B. Chemical 326 (2021) 128825
2021	NFC-based sensing technologies article	Firat Güder	Imperial College London, UK	Nature Reviews Materials	Nature Reviews Materials volume 6, pages (2021) 286–288



SIC4310
SIC4311



NFC TYPE 2 TAG
WITH UART INTERFACE AND ENERGY HARVESTING FUNCTION

SIC4310 and SIC4311 are NFC type 2 tags with UART interface that bridge data transfer between NFC devices and UART-connected devices such as MCUs.

In addition, SIC4310 and SIC4311 can harvest energy for peripheral circuit up to 10mA from desktop RFID readers or up to 7mA from typical NFC phones. This energy harvesting capability enables 'batteryless' applications that instantly operate when an NFC device is tapped, even without a battery inside.

Energy Harvesting

UART & GPIO Interface

APPLICATIONS

- Shared facility (e.g. washing machine, coffee maker, or printer) personalization and controlling via NFC
- NFC energy harvesting module
- Zero-energy emergency data transfer channel for electricity, water or gas metering
- NFC bridge for medical devices
- Interactive packaging

HIGHLIGHT FEATURES

- NFC Forum type 2 tag with additional commands
- Direct data transfer from NFC to UART or vice versa
- Using NFC harvesting energy for self-operation or sourcing externally
- 3.3V on-chip regulator for energy-harvesting output
- NFC Energy harvesting: Up to 10mA capability to power external circuit (depending on the output power of the NFC device)
- 196 bytes user memory

CONNECTIVITY AND
ENERGY-HARVESTING NFC TAG IC

SIC4310

NFC Forum T2T with UART Interface and 8 GPIOs

SIC4311

NFC Forum T2T with UART Interface, 7 GPIOs, and VBAT3V3 Pin

COMPARISON TABLE

SPECIFICATIONS	SIC4310	SIC4311
Communication		
Standard	ISO14443A, NFC T2T	ISO14443A, NFC T2T
Data Rate [kbps]	106	106
Interface	UART	UART
Buffer Size [byte]	64	64
Memory		
Memory Size [byte]	196	196
Data Retention [year]	10	10
Write Cycle [times]	100,000	100,000
Operating Condition		
Operating Temperature	-40 to 85°C	-40 to 85°C
Maximum Standby Current	80µA (use XVDD pin)	0.1µA (use VBAT3V3 pin)
External Input Supply Voltage	2.7V to 3.6V (use XVDD pin)	3.0V to 10.0V (use VBAT3V3 pin)
Maximum Harvesting Current		
Harvest from Mobile Phone	7.82mA @3V	7.82mA @3V
Harvest from Desktop Reader	10.2 mA @2.87V	10.2 mA @2.87V
Pinouts and Peripherals		
GPIO pins	8	7
On-chip Capacitor [pF]	30.3	30.3
Package	QFN3×3 -16 pins	QFN3×3 -16 pins

DEVELOPMENT KIT

- SIC4310-HV Development Kit : P10CK081PB0S110D0CBA

- SIC4310-FU Development Kit : P10CSECR000SN10D1CB

DEVELOPMENT KIT
SUPPORT MATERIAL

- Firmware Source Code (SIC4310-FU)
- Demo Android/iOS App and Source Code
- Reference PCB Design and Schematic Diagram
- Reference Antenna and Antenna Design Tool

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SIC56NL

NFC FORUM TYPE 5 TAG

WITH ANTI-COLLISION AND REPROGRAMMABLE DIGITAL SIGNATURE

SIC56NL is a vicinity tag IC compatible with ISO/IEC 15693 and NFC forum type 5 tag, with reprogrammable digital signature.

This chip brings an easy-to-discover NFC experience for consumers, and supports multiple tags reading based on anti-collision standard from ISO/IEC 15693 and includes Electronic Article Surveillance (EAS) feature to deter shoplifting.

SIC56NL supports de facto standard for the read signature command, with 32-byte digital signature allowing item-level verification for consumer without internet access.

APPLICATIONS

- Asset and document tracking
- Library management
- Laundry tag
- Pharmaceutical supply chain management
- Toys
- Smart packaging
- Product authentication

HIGHLIGHT FEATURES

- NFC forum type 5 tag compatible
- RF interface based on ISO/IEC 15693
- 320 bytes of user memory with 50 years data retention
- Multiple tag reading with fast inventory read
- On-chip capacitance 23.5 pF
- Electronic article surveillance (EAS)
- Reprogrammable 32-byte digital signature

NFC FORUM TYPE 5 TAG
FOR ASSET TRACKING

SPECIFICATION	SIC56NL
Standard	NFC Type 5 Tag ISO/IEC 15693 with AFI and DSFID Support ISO/IEC 18000-3 Mode 1
Memory	
User Memory Size [bytes]	320
Data Retention [years]	50
Write Cycle [times]	100,000
Access Protection	32-bit or 64-bit Password Protection
Security	
Signature	Reprogrammable
Signature Size [bytes]	32
Signature Technology	Elliptic Curve Digital Signature Algorithm (ECDSA)
Others	
On-Chip Capacitor [pF]	23.5
Target Package	Sawn Wafer with Bump

DEVELOPMENT KITS
SUPPORT MATERIALS

- Demo iOS, Android and Windows Application
- Reference Antenna Design and Antenna Design Tools

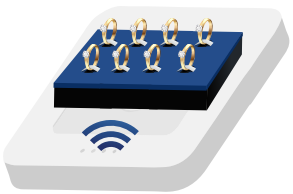
SIC56NL
CONCEPT

Asset & Document Tracking

Long Read Range

Library

Multi-Tag Reading



Fast Anti-Collision

Jewelry Shop

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RA10
RA12
RE31
RE41

13.56 MHZ
RFID/NFC READER IC

Silicon Craft's 13.56 MHz RFID/NFC reader/writer IC is a single-chip ASIC for 13.56MHz RFID and contactless card reading/writing. It supports major global standards including ISO14443A, ISO14443B, ISO15693, and JIS-X-6319-4

The communication speed can be up to 848 kbps. SIC's RFID/NFC reader/writer IC provides the best performance while consuming very low power to 0.6μA* in power-down mode.

*RA12 only

APPLICATION

- Secured Access Control
- Digital Door Lock
- Handheld or desktop RFID reader
- Smart Toys
- Electricity / Gas Metering

FEATURE SUMMARY

- Support standard HF RFID protocols
  - ISO14443A
  - ISO14443B
  - ISO15693
  - JIS-x-6319-4
- Support NFC type 1,2,3,4,5 tags
- SPI interface
- 64-byte send and receive FIFO buffer
- Consumes 1.0uA in power down mode (RA10,RE31,RE41)
- Consume 0.6μA in power down mode and 4.7μA in Low Power Card Detection mode (RA12)

READER IC FAMILY

RA10
ISO14443A

RA12
ISO14443A
ISO14443B
ISO15693
with Low Power Card Detection

RE31
ISO14443A
ISO14443B
ISO15693
Support 7V TVDD

RE41
ISO14443A
ISO14443B
ISO15693
JIS-X-6319-4
Support 7V TVDD

COMPARISON TABLE/ORDERING INFORMATION

FEATURES	RA10 PI3AVQO7P20UT1001E1	RA12 PI6BVQL5P60UT1201T1	RE31 PI5AVQO7P20UT3101E1	RE41 PI5AVQO7P20UT3201E1
Ordering Part Number Protocol				
ISO14443A, up to 848 kbps (NFC tag type 1,2,4A)	●	●	●	●
ISO14443B , up to 848 kbps (NFC tag type 4B)	–	●	●	●
ISO15693, 1 and 2 subcarrier (NFC tag type 5)	–	●	●	●
JIS-X-6319-4 (NFC tag type 3)	–	"Unsecured Memory Only (Need MCU to decoder)"		"Unsecured Memory Only (On-chip HW decoder)"
Operating condition				
Receiver voltage	2.7 - 3.3 V	2.7 - 3.6 V	2.7 - 3.3 V	2.7 - 3.3 V
Transmitter voltage	2.7 - 7 V	2.7 - 5.5 V	2.7 - 7 V	2.7 - 7 V
Operating Temperature	-40 - 85°C	-40 - 85°C	-40 - 85°C	-40 - 85°C
Maximum driving current	200 mA @5V TVDD	250 mA @5V TVDD	300 mA @5V TVDD	300 mA @5V TVDD
Other features				
Interface	SPI	SPI	SPI	SPI
EEPROM (Byte)	–	–	256	256
IRQ pin	●	●	●	●
Low Power Card Detection Function	–	●	–	–
Low Power consumption on Power Down mode	1μA	0.6μA	1μA	1μA
Package	QFN32(5×5)	QFN24(4×4)	QFN32(5×5)	QFN32(5×5)

DEVELOPMENT KIT

- RA12 Development Kit : PI6BK200M10S112B1CB
- RE41 Development Kit : PI5AK200M10S132B1CB

DEVKIT
SUPPORT MATERIAL

- Firmware Source Code with Command-Line Instruction via UART
- Demo PC Software (Windows based)
- Reference PCB Design and Schematic Diagram
- Reference Antenna and Antenna Design Tool

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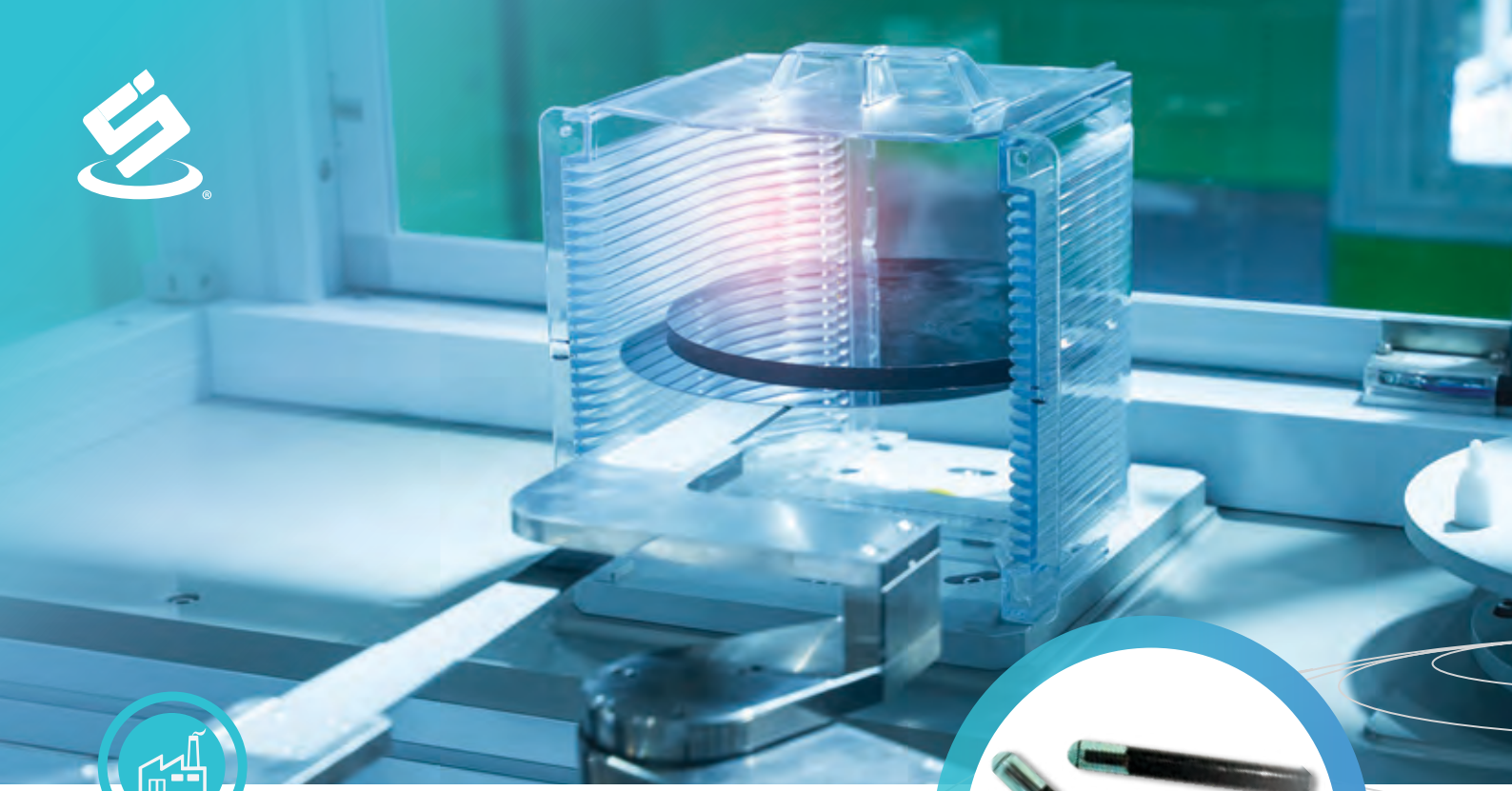

SIC73F1
LF INDUSTRIAL TAG

SIC73F1 is a 32mm RFID glass transponder with 1,360-bit multipage read/write memory operating through 134.2 kHz half-duplex protocol. The transponder is robust and well-suited for various industrial tracking applications.

HIGHLIGHT FEATURES

- Half-Duplex Contactless Read/Write Data Transmission
- Multipage Transponder (MPT)
- Drop-in Replacement of RFID Tag for Wafer Carrier
- Robust and High Quality Built

INTERFACE

- Compliant with ISO 11784/11785 HDX Animal Tag ID data
- Support to SEMI E144-0312
- Uplink Modulation: FSK (Frequency Shift Keying)

MEMORY

- 1,360 bits EEPROM
- 17 Pages Read/Write Memory
- 100,000 Erase/Write Cycles
- 10 Years Non-Volatile Data Retention

APPLICATIONS

- Wafer Carrier Tracking
- Industrial
- Access Control

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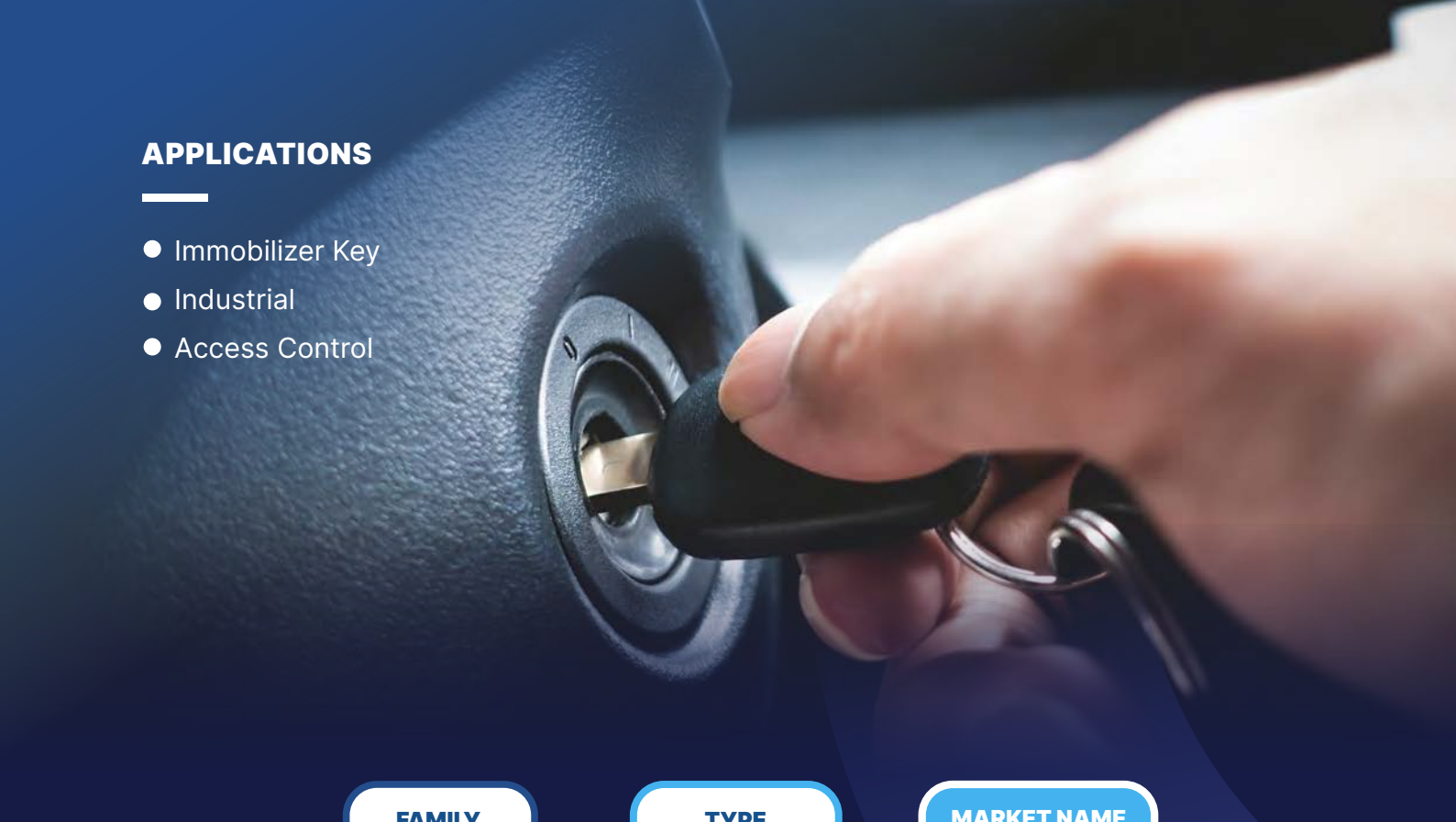
SIC61AU
UNIVERSAL IMMOBILIZER KEY

SIC61AU is a universal immobilizer transponder for automotive key operating at the low-frequency (LF) range. SIC61AU supports 4 families of LF communication protocol: A, N, S and T family with 14 classical transponder types supported.

HIGHLIGHT FEATURES

- Universally support transponders in the market both HDX and FDX
- Best-in-class reading performance
- Compatible with 4 families and 13 types of conventional immobilizer transponder
- Simple step to transform transponder to each type
- High-Quality and robust transponder package
- Simplify transponders inventory management to handle fluctuating demand in car service center or locksmiths shop



APPLICATIONS

- Immobilizer Key
- Industrial
- Access Control

SUPPORT PRODUCT FAMILY

FAMILY	TYPE	MARKET NAME
N	Full Duplex 125 kHz	ID46
		ID46 +EE
		ID46 Ext.
		ID47
		ID4A
		ID49
T	Half Duplex 134.2 kHz	ID4C
		ID4E
		ID4D
		ID8A
S	Full Duplex 125 kHz	T5
		ID48
A		ID88
		ID8C

ORDERING **INFORMATION**

Part No : PAUDW503EP0SUAU30C3

Description : SIC61AU-30 Universal immobilizer LF FDX & HDX with multiple encryption wedge 134.2/125kHz,Canister, RFID Tag

Package : Wedge (6.0 mm H x 3.0 mm W x 12.0 mm L, Standard size with OEM)

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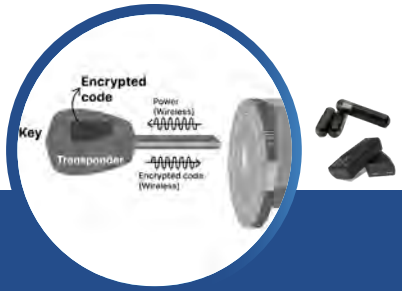
AUTOMOTIVE TRANSPONDER

Silicon Craft Technology PLC (SIC) presents a broad range of compatible automotive transponders with superior performance and reliability, extensively supporting a wide variety of automotive applications.

Experience uninterrupted use with SIC transponders, AEC-Q100 certified for reliable operations.

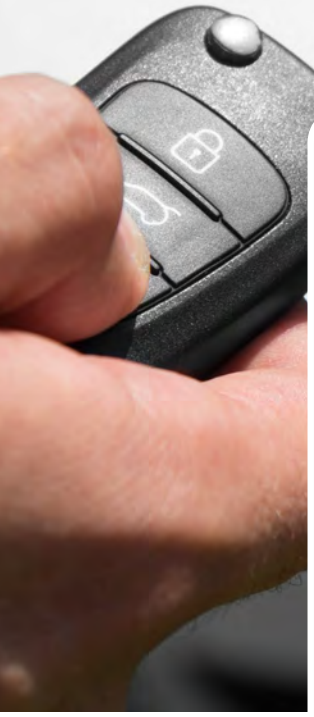
Fully compatible with OEM



Superior read-range

High-reliability circuit and packaging

AUTOMOTIVE TRANSPONDER PORTFOLIO



SIC6146-6H/BN/EN, SIC6147, SIC614A, SIC6149

SPECIFICATIONS

	SIC6146-6H	SIC6146-BN	SIC6146-EN	SIC6147	SIC614A	SIC6149
COMPATIBILITY	ID46	ID46+EE*1	ID46 Ext*1	ID49-1C, ID47	ID4A	ID49*1
SECURITY ALGORITHM	48-bit / H2 32-bit password	48-bit / H2		96-bit / H3	128-bit / H-AES	128-bit / H-Pro
TECHNOLOGY	FDX					
FREQUENCY	125 kHz					
DOWNLINK PROTOCOL	ASK					
UPLINK PROTOCOL	ASK Manchester and Bi-phase with RF/32 data rate					
EEPROM MEMORY SIZE	256-bit	4096-bit				
UNIQUE ID	32-bit					
USER MEMORY	128-bit	128-bit / Ext. 3840-bit	128-bit / Ext. 3584-bit	96-bit / Ext. 3584-bit	64-bit / Ext. 3584-bit	64-bit / Ext.3584-bit
FORM FACTOR	Wedge					
CAR BRAND*2	Honda, BMW, Nissan, Hyundai , Chevrolet, Kia, Citroen, Peugeot	Honda, BMW, Nissan, Hyundai , Chevrolet, Citroen, Kia, Peugeot	Chevrolet, Opel, GMC	Honda, Hyundai,Fiat, Mitsubishi, Suzuki, Acura, Jeep,Renault	Nissan, Honda, Infiniti, Jeep, Kia, Hyundai	BMW, Chevrolet, Mini Cooper, Ford, Toyota

SIC614C/D/E, SIC618A, SIC61T5, SIC6148, SIC6188, SIC618C

SPECIFICATIONS

	SIC614C	SIC614D	SIC614E	SIC618A	SIC61T5	SIC6148	SIC6188	SIC618C
COMPATIBILITY	ID4C*1	ID4D	ID4E, ID64	ID7A, ID8A	T5	ID48	ID88, MQB48*1	ID8C,TEMIC
SECURITY ALGORITHM	Fixed Code	40-bit / D40 80-bit / D80	40-bit / D40	128-bit / D-AES	Fixed Code	96-bit / M2	128-bit / M-AES 96-bit / M2	128-bit / AUT64
TECHNOLOGY	HDX				FDX			
FREQUENCY	134.2 kHz				125 kHz			
DOWNLINK PROTOCOL	ASK							
UPLINK PROTOCOL	FSK uplink at 134kHz /123kHz with RF/16 data rate				ASK Manchester and Bi-phase with RF/32, RF/40,RF/64 data rate	ASK Manchester and Bi-phase with RF/32 data rate		ASK Manchester and Bi-phase with RF/32, RF/64 data rate
EEPROM MEMORY SIZE	80-bit	552-bit	88-bit	3072-bit	160-bit	256-bit	2048-bit	320-bit
UNIQUE ID	80-bit programable ID	24-bit serial number 8-bit manufacturer code			64-bit /128-bit programable ID	32-bit	32-bit unique ID1 32-bit unique ID2	64-bit /128-bit programable ID
USER MEMORY	80-bit	336-bit	8-bit	112-bit / Ext. 1920-bit	128-bit	94-bit	94-bit / Ext.1024-bit	128-bit
FORM FACTOR	Wedge					Glass Tag	Wedge	
CAR BRAND*2	Ford, Lexus,Mitsubishi, Toyota, Hyundai	Ford, Toyota, Kia Hyundai	Chrysler	Toyota, Subaru, Scion Citroen, Peugeot	Fiat, Audi, Honda	Volkswagen, Audi	Audi, Seat, Skoda, Volkswagen	Mazda, Proton

INFORMATION

*1 Please contact our support team for further product information
*2 Silicon Craft Technology PLC does not possess the intellectual property rights or any licenses for the brands of vehicles, transponders, or commercial names mentioned in this document. The referenced brands and names are utilized solely for the purpose of product communication.

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SIC7150
SIC278
SIC279

LF TRANSPONDER ICs
FOR ANIMAL IDENTIFICATION

SIC7150, SIC278, and SIC279 are low-frequency (LF) RFID transponder ICs designed for a broad range of applications in animal identification. They operate at 134.2 kHz RFID, fully compliant with ISO 11784 and ISO 11785.

Low-frequency (LF) transponder ICs streamline animal handling, elevating the standard of livestock management while mitigating the risk of disease transmission. These transponder ICs also play a crucial role in the identification of pets and laboratory animals.

Silicon Craft's specialized chip design, integrated with proprietary intellectual properties (IPs), provides best-in-class read range performance. It also includes on-chip resonant capacitance tuning, which optimizes transponder communication capabilities and greatly enhances operational efficiency.

HIGHLIGHT FEATURES

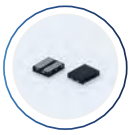
- Meets ISO 11784/11785 and ICAR Standard for Animal Identification
- Support LF Transponders Used in Industrial Applications
- On-Chip Tunable Resonant Capacitor
- Best-in-Class Communication Distance

APPLICATIONS

- Livestock Identification
- Pet Identification
- Fish Identification
- Pigeon Identification
- Laboratory Animal Identification

LF TRANSPONDER ICs
FOR ANIMAL IDENTIFICATION APPLICATION

SIC7150
Transponder IC with
Full-Duplex (FDX-B)



SIC278
Transponder IC with
Full-Duplex (FDX-A/FDX-B)

SIC279
Transponder IC with
Half-Duplex (HDX R/O)

SPECIFICATION TABLE

SPECIFICATION	SIC7150	SIC278	SIC279
Communication			
Protocol	ISO 11784/11785 (FDX-B)	ISO 11784/11785 (FDX-B), FSK FECAVA (FDX-A)	ISO 11784/11785 (HDX R/O)
Reader Talk First	Yes	Yes	N/A
Memory			
User Memory Size [bits]	320	1,184	192
Data Retention [bits]	10	10	20
Write Cycles [times]	100,000	100,000	100,000
Security	32-bit password authorization	Read and write 32-bit password authorization	32-bit password authorization
Resonant Capacitor			
Integrated Resonant Capacitor [pF]	210, 250, 330	230	330
On-Chip Tunable Resonant Capacitor	Yes*	Yes	Yes
Tunable Resonant Capacitance Range	±5%	±5%	±10%
Tunable Resonant Capacitance Data [steps]	32	32	128
Others			
Package	Sawn wafer, UDFN	Sawn wafer, WDFN	Glass tag, VDFN
Megapad for Direct Connection of Coil on Die	Yes	Yes	No

Remark [*]: Only avaliable for 330 pF

SUPPORT MATERIALS

- Silicon Craft Universal LF Reader
- PC Software for Tuning On-Chip Resonant Capacitance

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SICDI2C

Dual Interface RFID UHF and I²C
with Tamper Detection

SICDI2C is an innovative chip that supports both UHF EPC Gen2V2 and I²C communication protocols.

The chip can operate as either an I²C-master or an I²C-slave.
SICDI2C can power the I²C-slave components, enabling batteryless solution. Also equips with a tamper detection mechanism that provides tamper evidence and anti-counterfeiting capabilities.

Batteryless
Enabling Maintenance-Free Operation

No MCU
Bridging UHF RFID to Digital Sensor Directly

HIGHLIGHT FEATURES

- UHF ISO18000-6C compliant
- EPC Gen2V2 compliant
- Configurable I²C Master/Slave interface
- Bridging UHF RFID to digital sensor without MCU
- Support both Batteryless and BAP* mode
- User memory 8,192-bits
- Tamper detection status
- Programable regulator output voltage 1.4V to 1.9V

APPLICATIONS

- Passive sensor device solution
- Predictive maintenance system
- Cold chain tracking
- Intelligent fleet management
- Inventory visibility and location

DUAL INTERFACE UHF AND I²C WITH TAMPER DETECTION

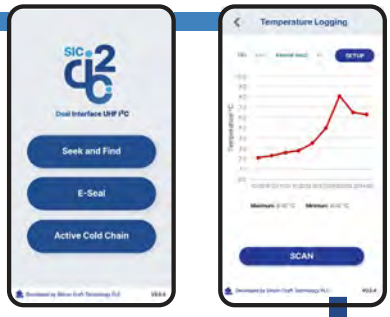
SPECIFICATION TABLE

SPECIFICATIONS	SICDI2C
UHF Interface	
Standard	• UHF ISO18000-6C Compliant • EPC Gen2V2 Compliant
Read Sensitivity	• -20 dBm, -27 dBm with BAP*
Write Sensitivity	• -15 dBm, -27 dBm with BAP*
Optional Command	• Support BlockPermalock • Support BlockWrite 64 bits
I²C Interface	
I²C Mode	Master, Slave
Memory and Security	
EPC Memory [bits]	128
TID Memory [bits]	128
User Memory [bits]	8,192
Access Password [bits]	32
Kill Password [bits]	32
EEPROM Write Cycle [times]	up to 100,000
EEPROM Memory Retention [years]	up to 10
Operating Condition	
Operating Temperature	-40°C to 85°C
External Supply Voltage [External Power Source Mode]	1.4V to 3.6V
Regulated Output Voltage [RF Energy Harvesting Mode]	1.4V to 1.9V
Others	
I/O Function	Tampering Detection
Target Package	• Sawn Wafer 8 inch with Bump • QFN8L

Remark [*]: Battery-Assisted Passive

DEMONSTRATION MATERIALS

- Demo Android Application
- PCB Design and Schematic Diagram



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