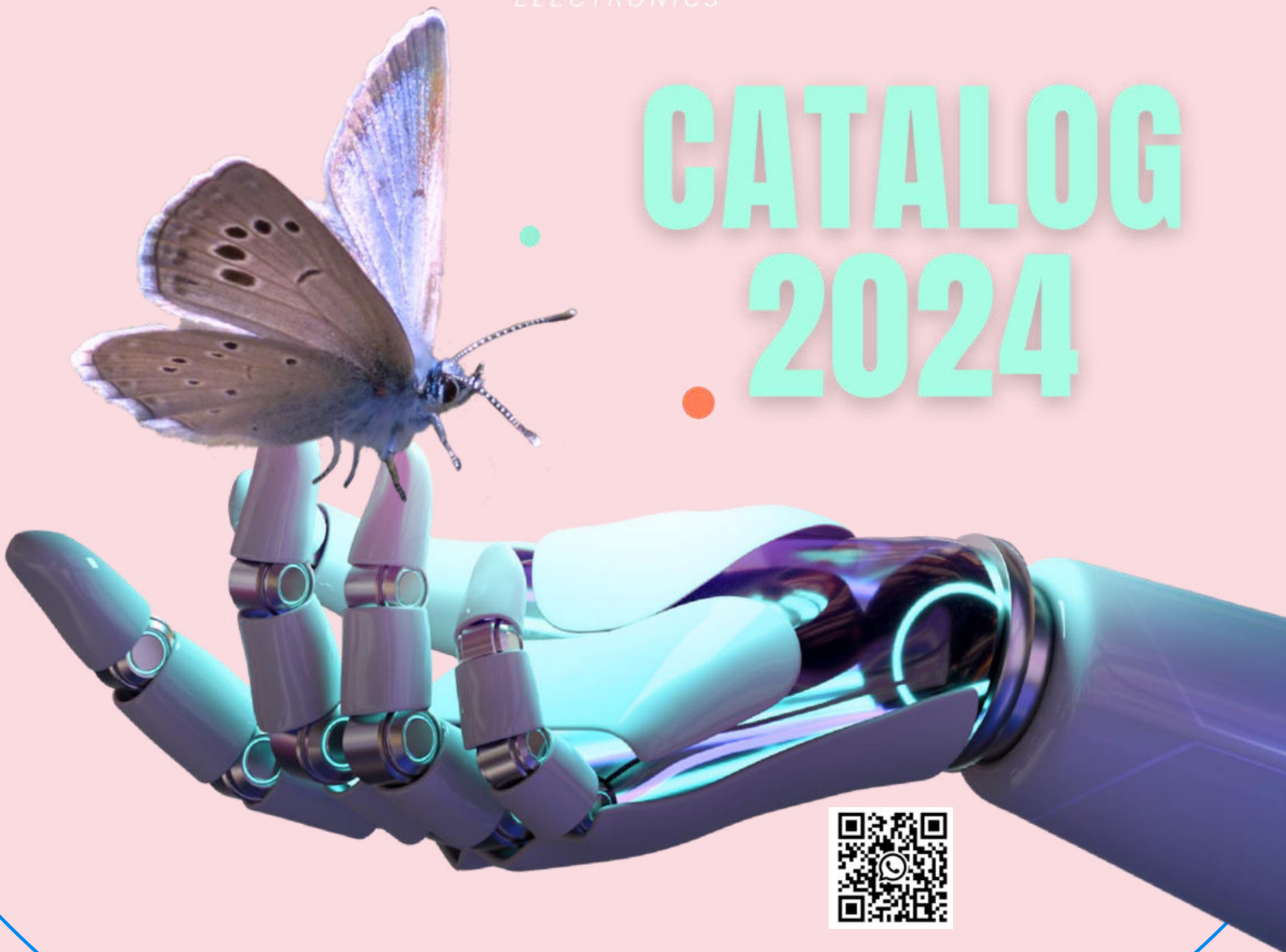# RELEC
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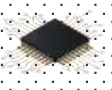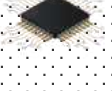
1、 PROCESSORS AND MICROCONTROLLERS

1.1 Arm Microcontrollers

Arm-based portfolio offers high levels of integration, comprehensive software(hardware) enablement and a broad range of performance.

General-Purpose MCUs:

- Offering a broad range of scalable, highly integrated and flashed-based microcontrollers. NXP Cortex-M based MCUs are supported by the MCUXpresso Developer Experience.

i.MX RT Crossover MCUs

- The i.MX RT series of crossover MCUs are designed to support next-generation IoT applications with a high level of integration and security balanced with MCU-level usability at an affordable price.

S32K General-Purpose MCUs

- A 32-bit MCU scalable family for automotive body, zone control and electrification applications.

S32M Integrated Solutions for Motor Control

- The S32M family offers scalability, high-performance for streamlined control of BLDC and PMSM motors used for in-vehicle applications such as pumps, fans, sunroofs, seat positioning, seat belt pretensioners, trunk openers and more.

Kinetis EA MCUs

- Entry level MCU family for high-quality general purpose automotive and industrial applications.

MAC57D5xx MCUs

- Targeting midrange instrument cluster, human-machine interfaces and industrial applications.

Bluetooth® Low Energy (BLE)

- Our Bluetooth Low Energy (BLE) solutions provide complete SoCs, a host BLE stack and many GATT profiles and services.

Sub-GHz ISM Bands

- These high-performance, bidirectional sub-GHz radios are capable of operating over a wide frequency range including 315, 433, 470, 868, 915, 928 and 960 MHz in the license-free industrial, scientific and medical (ISM) frequency bands.

Thread

- Thread is a simplified IPv6-based mesh networking protocol developed by technology companies for connecting products around the home to each other, to the Internet and to the cloud.

Zigbee

- Zigbee is a networking protocol defined by the Zigbee Alliance for low-cost, low-power, wireless control and monitoring solutions

1.2 Arm®-Based Processors

S32 Automotive Processors

- Automotive S32 processors for vehicle networking and connectivity applications with high-performance and real-time capabilities due to its ideal combination of Arm® Cortex®-A, Cortex-M and Cortex-R cores with ISO 26262 safety, hardware security and networking functionality. S32 processors are supported by our product longevity program for a minimum of 15 years, as well as being supported by a comprehensive, third-party software and tools ecosystem.

i.MX Applications Processors

- Multicore solutions for multimedia and display applications with high-performance and low-power capabilities that are scalable, safe and secure. i.MX applications processors are part of the EdgeVerse™ edge computing platform built on a foundation of scalability, energy efficiency, security, machine learning and connectivity.

Layerscape Processors

The Layerscape processors portfolio, part of EdgeVerse™ edge computing platform, offers wide depth and breadth. Layerscape series processors, built on Arm® core technology, extend performance to the smallest form factor—from power-constrained networking and industrial applications to new virtualized networks and embedded systems requiring an advanced data path and network peripheral interfaces.

1.3 S32 Automotive Platform

S32 microcontrollers and processors for automotive and industrial applications provide an architecture that balances performance and power efficiency. They're designed to address current and future connectivity, security and safety challenges. As part of a complete solution, we provide a complimentary S32 Design Studio, which includes a full automotive-grade SDK with low-level drivers and ecosystem support.

S32G Vehicle Network Processors:

Safe and secure multi-core Arm® Cortex®-A53 application processors with optional cluster lockstep support and plus dual-core lockstep Cortex-M7 real-time microcontrollers combining ISO 26262 ASIL D safety, hardware security, high-performance real-time and application processing and network acceleration. S32G processors are supported by a minimum of 15 years of product longevity and comprehensive third-party software and tools ecosystem. Our S32G processors are part of the NXP S32 platform.

S32K Auto General-Purpose MCUs

NXP S32K microcontrollers, based on the Arm® Cortex®-M series core, offer scalability, high-performance and low-power consumption tailored for applications in body, zone control and electrification. S32K MCUs provide functional safety and embedded security compliant to ASIL B/D levels, adaptable to both AUTOSAR® and non-AUTOSAR applications.

S32K MCUs are supported by a minimum of 15 years of product longevity and a comprehensive, third-party software and tools ecosystem.

As a part of the S32 Automotive Processing Platform, NXP S32K MCUs aim to provide an end-to-end solution, encompassing development, implementation and sustained performance through an Automotive-grade Software Development Kit (SDK).

S32M Integrated Solutions for MC

NXP S32M portfolio, based on our system-in-package (SiP) design, integrates high-voltage analog functionalities with a robust embedded MCU (S32K Arm® Cortex®-M4/M7 series core). Backed by our trusted S32 compute platform, S32M provides functional safety (embedded security compliant to ASIL B levels), fosters compatibility with proprietary and third-party software and tools ecosystem and it is supported by our automotive longevity program for

at least 15 years of production.

S32M offers scalability, high-performance for streamlined control of BLDC and PMSM motors used for in-vehicle applications such as pumps, fans, sunroofs, seat positioning, seat belt pretensioners, trunk openers and more. Enhanced with diagnostic capabilities, the portfolio simplifies edge node design, ensuring rapid deployment for OEMs and Tier 1s.

S32N Vehicle Super-Integration Processors

The scalable S32N family offers combinations of safe, real-time and applications processing for SDV central compute applications. S32N processors include an advanced hardware security engine and multiport Ethernet switch, along with options for Ethernet packet acceleration, AI/ML acceleration and cost-effective, intercompute PCI Express services.

S32R Radar Processing

The S32R family provides safe and secure radar processing, combining functional safety, hardware security, high-performance real-time processing and dedicated radar processing acceleration. The NXP radar portfolio provides scalable solutions for use cases including corner radar, front radar and 4D imaging radar.

S32Z and S32E Real-Time Processors

The S32Z and S32E real-time processors feature Arm® Cortex®-R52 split-lock processors for multitenant software integration plus lockstep Arm Cortex-M33 processors for system management, combining multi-core, real-time processing with core-to-pin hardware virtualization, DSP/ML processing, communications acceleration and Gigabit Ethernet switch with hardware security and ISO 26262 ASIL D safety.

The S32Z processors are ideal for safety processing and domain and zonal control, while the S32E processors are ideal for electric vehicle (xEV) control and smart actuation. The software-compatible S32Z and S32E processors help enable software-defined vehicles, reduce software integration complexity and enhance security and safety.

1.4 Power Architecture

A broad portfolio of processors built on Power Architecture technology, enabling networking, automotive, consumer and industrial applications.

MPC5xxx Microcontrollers

Scalable, highly-integrated Power Architecture® based microcontrollers with a focus on quality and long-term reliability for up to ASIL D powertrain, vehicle dynamics and control applications. Supported by a minimum of 15 years product longevity and a comprehensive tools ecosystem.

QorIQ Communication Processors

Whether it's for the world's new virtualized networks, mobile wireless infrastructure, smart homes, the smart grid, automated factories, intelligent hospitals or aerospace and defense—get your high-performance designs to market faster and easier with our advanced QorIQ® platforms.

Integrated Host Processors

General-purpose processors based on the e600 core, built on Power Architecture® technology, offer performance from 500 MHz to 1.8 GHz, including a dual-core option. Ideal for high-performance processing in networking, aerospace and defense, storage and pervasive computing applications, such as home media, printers, computer clusters, blade servers, thin clients and gaming systems. Our e600 core includes the AltiVec technology engine, enabling software developers to achieve dramatic acceleration in performance-driven, high-bandwidth computing and communications applications.

S32R Radar MCUs

The S32R family provides safe and secure radar processing, combining functional safety, hardware security, high-performance real-time processing and dedicated radar processing acceleration. The NXP radar portfolio provides scalable solutions for use cases including corner radar, front radar and 4D imaging radar

PowerQUICC Processors

PowerQUICC® communications processors, built on Power Architecture® technology, support the entire spectrum of embedded networking equipment, industrial and general-embedded applications.

2、ANALOG AND MIXED SIGNAL

NXP offers analog and mixed-signal products to advance your next industrial, communications or automotive application design. Featuring great performance, power, speed and size, our products are designed with the engineer in mind, with extensive features which when coupled with NXP's MCUs/MPUs work seamlessly together and provide the engineer with an optimized system architecture.

Analog Front-End

NXP's N-AFE analog front-end family of devices for factory automation enables the software-defined factory. With its software configurable analog inputs, where each input can be configured for voltage, current, resistance, or temperature, NXP's N-AFE enables a new level

of flexibility. In addition, with NXP's N-AFE, enhanced accuracy and precision in the manufacturing floor measurement, product quality is greatly improved. Lastly, NXP's N-AFE advanced diagnostics and anomaly detection features enable predictive maintenance, making it possible to identify issues before they occur to avoid downtime. All these features and more allow manufacturers to create a highly efficient smart factory.

NXP's N-AFE integrates all the signal chain building blocks: protections, multiplexer, amplifier, ADC and digital filtering.

Several options are available: low power or high speed, with or without voltage/current excitation, all of them with the same package and pin-to-pin compatibility.

Analog Switches

We offer a comprehensive range of analog switches that support both analog and digital I/O expansion applications—including speaker selection in cell phones or sensor selection in industrial process monitoring applications. Our SPST to SP16T solutions target a variety of automotive switching applications, including sample and hold circuits, sensor data multiplexing, video and audio switching, and GPIO expansion.

Analog Watch Motor Drivers

We offer a selection of CMOS ICs that operate as analog motor drivers for battery operated wrist watches. The quartz crystal oscillator and the frequency divider are optimized for minimum power consumption while assuring precise timing accuracy.

Bridges

Our bridge ICs (I2C/SPI to UART/IrDA/GPIO) offer compact, low-power protocol converters for creating simpler, more flexible designs while reducing software overhead and time to market. These bridge solutions help designers easily combine multiple devices, incorporate new features and seamlessly interface common communications protocols.

Comparators

Our products include a range of low-power voltage comparators, single and dual configurations with standard push-pull. Our comparators are offered in PicoGate and innovative leadless Micro-Pak® packages for PCB space savings and are fully specified from -40 °C to 85 °C.

Real-Time Clocks

Our broad assortment of tiny, full-featured real-time clocks (RTCs) delivers high accuracy and low power consumption to a variety of end applications.

NXP offers ultra-low-power RTCs that provide low power consumption enabling long battery life with regard to real-time clock functionality, as well as temperature compensated RTCs with integrated crystal CMOS optimized for very high accuracy and low power consumption for industrial applications.

AEC-Q100 Qualified RTCs are designed for highest reliability and lowest power consumption and are available with I²C or SPI bus interfaces. They have an extended operating temperature range of up to 125 °C and AEC-Q100 automotive-compliant qualification.

Voltage Level Translators

Lithium-ion (Li-ion) and lead-acid batteries require accurate charging current and output voltages to meet automotive and industrial standards. The fully automotive qualified battery cell controllers are ideally suited for vehicle battery management.

3、INTERFACES

Continuing our position in providing devices for designs using I2C, in-vehicle network, LCD drivers and USB interfaces.

I²C, SPI, I3C Interface Devices

The I2C-bus appears in virtually every application—from cellular handsets and LED blinkers to LCD displays. Our leadership position in I2C-bus devices offers you a vast portfolio to address all your design needs. In addition many of these product groups now include a higher speed I3C-bus or SPI interface.

In-Vehicle Network

New in-vehicle networking technologies enable faster, safer, and secure communication for the software defined vehicles of tomorrow. Our ever-evolving in-vehicle networking portfolio ranges from LIN, CAN and FlexRay to Ethernet switches and PHYs can be trusted to enable new vehicle architectures and extend the possibilities of existing networks to handle complex high-performance applications.

CAN Transceivers

Our broad CAN and CAN FD portfolios cover all CAN functions and power modes with high EMC performance, great quality and a multi-sourced industrial base. Disruptive innovation in this area opens the door to larger, more flexible and more secure automotive and industrial networks in the future.

Ethernet

Automobiles are rapidly evolving and incorporating unprecedented levels of comfort and safety — a revolution led by electronics. The hundreds of computers installed in current and future cars rely on the in-vehicle network to provide their services to the driver. Our portfolio of Ethernet solutions provides high data rates and design flexibility for this new era of automotive innovation.

FlexRay Transceivers

We offer FlexRay transceivers with extensive feature-sets and application support. As the leading supplier of these solutions, we have been active in FlexRay's development.
FlexRay technology provides higher bandwidth and deterministic latency to enable next-generation systems that help the automotive industry progress towards zero-emission and zero-accident driving. FlexRay also helps counteract the increase in cables as more and more systems are connected to the car—reducing vehicle weight and conserving raw materials.

Automotive LIN Solutions

NXP LIN solutions offer a complete and versatile range of LIN automotive products including single, dual, quad LIN transceivers and LIN mini system basis chips.
NXP's single and multi channel LIN transceiver portfolio offers robust, pin and footprint compatible solutions each with a different feature set offering a compact and optimum application fit. All transceivers are AEC-Q100 qualified and compliant with LIN2.x/ISO 17987-4:2016 (12 V) and SAE J2602. Almost all transceivers are available in an SO8 and small leadless HVSON8 package.

LCD Drivers

Our complete LCD driver portfolio includes segment, character and graphics display drivers. They offer ideal solutions for driving vertical alignment (VA) LCDs with high-contrast and a wide viewing angle. They also support touch-sensitive LCDs in combination with a capacitive touch controller to implement touch buttons on the display enhancing the human machine interface (HMI). These LCD display drivers work with I2C and SPI interfaces for applications such as: car instrument cluster, car control indicator, healthcare devices or elevator displays

PCI Express:

Our extensive portfolio of PCI Express devices includes multiplexer/demultiplexer switches as well as high-performance, low-power, single-lane electrical PHYsical layers (PHY) that handle low-level protocol and signaling.

UARTs

Our comprehensive UART portfolio targets the application requirements of today and tomorrow. They cover industrial and 16C UARTs as well as a growing number of specialty devices, such as our I2C bridge family.

USB Interfaces

Our portfolio includes USB Type-C as well as Micro-USB Type-B and A connector interfaces.

Signal Conditioners

Amplifies signals from sensors to make them suitable for processing. Our SMARTMOS technology improves this kind of data acquisition by monitoring high-voltage contacts and then interfacing to an MCU for status and control. Audio codecs enhance the quality of audio signals used in consumer and portable electronics.

High-Speed Multiplexer

Our high-speed muxes/switches support AC-coupled and non-AC-coupled interfaces in a range of formats (LVDS, DisplayPort, USB 3.0, SATA, SAS, PCIe). This portfolio covers bandwidth ranging from 1.5 Gbps to over 10 Gbit/s, as well as standard or custom solutions for existing and emerging architectures. Each solution builds on expertise, which comes from our active support for key standard-setting committees

High-Speed Signal Conditioners

Demand for high data rates increases the signal distortion through the communication channel. NXP high-speed signal conditioners based on CMOS and Silicon-Germanium (SiGe) technologies allow signal integrity and low noise, increasing customers' high-speed design performance.

Driver Assistance Transceivers

Check out edge transceivers from NXP for driver assistance applications like radar and vehicle-to-everything (V2X).

4、SENSORS

With more than 30 years of sensor innovation, our sensing solutions portfolio launches a new era for the industry. Our next-generation sensors feature a strong balance of intelligent integration, logic and customizable platform software to enable smarter, more differentiated applications.

Accelerometers

NXP offers a diverse product portfolio of differentiated microelectromechanical systems (MEMS)-based accelerometers to meet expanding automotive, healthcare and industrial needs. Our accelerometers are at the forefront of emerging applications in metering and conservation, quantified wellness, security and surveillance, wearables and home convenience.

Pressure Sensors

Our very large pressure sensor portfolio contains a wide variety of pressure ranges, diverse packaging and porting options. These MEMS-based pressure sensors provide robust solutions for the appliance, medical, consumer, industrial and automotive markets.

New applications for pressure sensors emerge every day as engineers and designers realize that they can convert their expensive mechanical pressure sensors to our lower-cost, semiconductor-based devices. High sensitivity and long-term repeatability make our products suitable for demanding, high-performance applications.

Magnetic Sensors

We provide a broad portfolio of magnetoresistive sensors for applications ranging from speed sensing and angle sensing for automotive applications to magnetic anomaly detection and E-compass navigation applications for IoT, consumer, medical and industrial applications. Precision, reliability, high-resolution performance and efficiency make these solutions suitable for applications that demand high accuracy and low power.

I3C/I²C Digital Temp. Sensors

Our I3C/I2C-bus temperature sensors offer the precision to fit any thermal management need. These I3C/I2C temperature sensors combine everything you need to quickly and easily determine the heat produced by other components on the board while controlling fans and other cooling mechanisms to optimize system performance. These temperature sensors work in applications such as: servers, tablets, laptops, handheld devices, industrial controller, automotive solution and many more.

5、WIRELESS CONNECTIVITY

NXP's broad and scalable portfolio of wireless products include Matter, Wi-Fi, Thread, Zigbee, Bluetooth®, NFC and UWB with support for standalone architectures — a single chip for the application and connectivity — and hosted architectures where the wireless device seamlessly pairs with an MCU or MPU. With this broad portfolio, NXP's wireless technologies address the varying needs of automotive, industrial, medical and smart home applications, and make the connected future a reality

Bluetooth LE Audio

Our 2.4 GHz Audio Streaming devices are highly integrated, ultra-low-power wireless transceivers with an embedded MCU, targeted for low latency audio applications such as communication headsets, gaming headphones, hearing aids, wireless headphones and earbuds, soundbars and TV transmitters, home Hi-Fi and speakerphones.

To simplify development and reduce time to market, our Audio Streaming Starter Kit includes a hardware development board, the MCUXpresso firmware development environment and a complete SDK for prototyping a wireless application.

Bluetooth Low Energy:

Our 2.4 GHz Audio Streaming devices are highly integrated, ultra-low-power wireless transceivers with an embedded MCU, targeted for low latency audio applications such as communication headsets, gaming headphones, hearing aids, wireless headphones and earbuds, soundbars and TV transmitters, home Hi-Fi and speakerphones.

To simplify development and reduce time to market, our Audio Streaming Starter Kit includes a hardware development board, the MCUXpresso firmware development environment and a complete SDK for prototyping a wireless application.

DSRC Safety Modem:

V2X technology allows vehicles to communicate with other cars, infrastructure and vulnerable road users to increase driver safety and smooth out the autonomous driving experience. The DSRC/802.11p version of V2X delivers minimum latency for real-time communication and an operating range that exceeds 1 mile, even in areas where cellular network connections are not available. DSRC also provides dedicated secure safety channel operation to enable the secure communication of safety messages and other data in real time, forming an essential part of the suite of autonomous driving sensors for today's connected cars and trucks. V2X based on DSRC is also instrumental in truck platooning, a forerunner of future eco-friendly driving scenarios.

The NXP V2X system platform operates in the 5.9 GHz and 760 MHz bands and is compatible with global software protocols from all leading vendors, enabling a true global V2X solution. The platform meets and exceeds the current guidelines of the US DOT's Notice of Proposed Rulemaking, as well as emerging standards in Europe, Japan and Korea.

Matter:

Matter (previously known as Project CHIP) is a single, unified, application-layer connectivity standard designed to enable developers to connect and build reliable, secure IoT ecosystems and increase compatibility among Smart Home and Building devices. Backed by major brands and

developed through collaboration within the Connectivity Standards Alliance (previously known as the Zigbee Alliance), Matter is an open source royalty-free connectivity standard built with market-proven technologies using Internet Protocol (IP) and compatible with Thread and Wi-Fi network transports.

Building solutions and leading standards efforts, NXP provides scalable, flexible and secure platforms for the variety of use cases Matter addresses – from end nodes to gateways – so device manufacturers can focus on their product innovation. NXP's Matter solutions go beyond just the connectivity with comprehensive capabilities for the compute and security requirements for IoT devices.

MiGLO®:
This family of ultra-low-power, single-chip solutions enables wireless audio streaming and data communication using MiGLO technology with Near Field Magnetic Induction (NFMI).

Multiprotocol MCUs:
As the IoT market continues to evolve and grow, developers need more integrated options for wireless connectivity. NXP's multiprotocol wireless MCUs enable expanded connectivity from a single MCU reducing design and development costs and opening the path for IoT convergence where applications can leverage aspects of multiple connectivity standards. NXP's multiprotocol wireless MCUs combine a multiprotocol radio that supports dynamic and switched modes using Bluetooth LE, NFC, Thread and Zigbee protocols with an Arm® Cortex®-M core and a rich set of features to deliver the right balance of performance and low-power for a variety of IoT applications.

NFC (HF):
Near Field Communication (NFC) is a fast, intuitive technology that lets you interact securely with the world around you with a simple touch. NFC wireless proximity technology is available in billions of smartphones, tablets, consumer and industrial electronics—with new devices arriving almost daily.

Sub-GHz ISM Bands:
NXP offers low-power, sub GHz wireless solutions for use in a wide range of applications. These high-performance, bi-directional radios operate over a wide frequency range, including 315, 433, 470, 868, 915, 928 MHz and 960 MHz in the license-free industrial, scientific and medical (ISM) frequency bands, based on proprietary modulations as FSK/GFSK/OOKn/MSK.

Thread:
Thread is an IPv6-based mesh networking protocol developed by industry-leading technology companies, for connecting products to each other, to the Internet and to the cloud – around the home and in buildings.

Trimension® UWB:

UWB technology enables secure ranging and precision sensing, creating a new dimension of spatial context for wireless devices. Trimension represents the NXP UWB portfolio, a rich collection of UWB solutions that enable secure fine ranging across automotive, mobile and IoT devices. The fine ranging and positioning capabilities of Trimension products bring precise location and convenience to a variety of use cases, including secure access control, indoor positioning, device-to-device communication and item tracking.

Wi-Fi® + Bluetooth® + 802.15.4:

NXP wireless solutions build upon decades of Wi-Fi, Bluetooth®, multiprotocol silicon, software and system design expertise, including 802.15.4 in the latest tri-radio architectures. NXP is committed to driving large-scale deployment across multiple markets by a broad array of power- and cost-optimized Wi-Fi, Bluetooth and 802.15.4 transceivers, enabling products with advanced Wi-Fi and multiradio capabilities including Wi-Fi 4, Wi-Fi 5 and Wi-Fi 6 chips.

Zigbee:

Zigbee® is a networking standard for low-cost, low-power, wireless control and monitoring solutions. Designed on top of the IEEE® 802.15.4 radio, Zigbee is a self-healing, secure, robust, mesh protocol that can scale to hundreds of nodes across large areas. Zigbee networks can participate in the "Internet of Things" (IoT), in both residential and commercial markets, allowing network nodes such as HVAC, lighting and security devices to be remotely monitored and controlled by devices on the Internet.

Relec international (singapor) Pte. LTD.
Adress: Rm 803, Xianglu Building, No.3009 Gudai Road, Minhang District, Shanghai
Tel: +8615601762625
Wp: https://wa.me/message/33YH2I2BXYY3D1
Linkedin:
Website: https://www.allofyiwu.com/relec-intl
Fax: +8615601762625