

« IoT Made Easy » Webinars

Solutions From Sensors to Cloud

- 4 Sessions with end to end System approach

Session 1 (14 Sept, 2pm CET)

« Power Efficient Solutions for your IoT Applications »

Keywords : Low Power, Analog, Mixed Signals, Power Management, MCU

Session 2 (15 Sept, 2pm CET)

« Connectivity Made Easy and Scalable for your IoT Application »

Keywords : Wireless and how to comply to Regulations & Certification, Chip down or module, Wired Solutions and Ethernet, Security and Robustness

Session 3 (16 Sept, 2pm CET)

« Security Matters... and How it is now so Easy »

Keywords : EN 303-645 from ETSI, Secure Element, Keys and how to protect them, Pre-provisioning, easy on-boarding, MOQ

Session 4 (17 Sept, 2pm CET)

« Scale your Business : from Easy Prototyping to Production »

Keywords : Software Development Framework, Applications drivers, Turnkey Solutions and Reference Designs, Github



- 6 Local Experts from Microchip Europe



Johan (Connectivity) Tarek (MCU) Markus (IoT)
Miroslaw (Firmware) Tibor (Security) Thierry (Analog)

Contact details of our 6 experts will be available at the end of this presentation

IoT Made Easy – Session 2/4

Connectivity Made Easy & Scalable for your IoT Application



SMART | CONNECTED | SECURE



- Session 1 (14 Sept, 2pm CET) : « Power Efficient Solutions for your IoT Applications »
- Session 2 (15 Sept, 2pm CET)** : « Connectivity Made Easy and Scalable for your IoT Application »
- Session 3 (16 Sept, 2pm CET) : « Security matters... and How it is Now so Easy »
- Session 4 (17 Sept, 2pm CET) : « Scale your Business : from Easy Prototyping to Fast Time to Market »

The Challenge We Will Resolve Today

















Overcome Complexity of Connectivity Resulting in Smarter Devices

- Success in IoT requires sensors to be Power Efficient (Session 1), Robust & Secure (Session 3), and Easy to design ensuring good Time to Market (Session 4)
- IoT nodes also need to be smart and agile to **quickly adapt** to new technical requirements, security threats or new business models
- **Go after the data** which is the real value of IoT !
- The Enabler is here - Smart Connectivity
- But how do you implement so your application is cost effective, power efficient, secure and robust ?
- How to overcome complexity of constantly evolving standards? Certifications and regulations ?
- Don't worry, we've got you covered with this session!



1. Comprehensive Portfolio for Sensors

Wireless and Wired Solutions

Wireless	Bluetooth® Classic BLE	Wi-Fi®	802.15.4 (SubGHz & 2.4GHz)	LoRa®	LTE-M NB-IoT (*)	Security	Development Tools Ecosystem		
									
	www.microchip.com/bluetooth	www.microchip.com/wifi	www.microchip.com/802-15-4	www.microchip.com/lora					
									
								www.microchip.com/security	www.microchip.com/mplab
Wired	USB	Ethernet	PoE	CAN	RS232 RS485 DALI DMX512				
									
	www.microchip.com/usb	www.microchip.com/ethernet	www.microchip.com/poe	www.microchip.com/can	www.microchip.com/iot				

There Is « No One Size Fits All »

What Really Matters : Your Use Case...

- **Key points to consider when looking for connectivity**
 - Ecosystem
 - Mechanical constraints (PCB size and casing could be driving factors)
 - Environment (water, metal, safety, temperature, EMC...)
 - Battery Life + coverage area + data throughput
 - Network characteristics (number of nodes, routers, latency...)
 - Cloud connectivity (through phone, gateway, infrastructure)
 - Provisioning and on-boarding
- Time to market
- BOM and System Cost ! With or without service charges
- Robustness, security and compliance to standards and regulations
- Your expertise



There Is « No One Size Fits All »

Agility is a Must. Four Real-Life Examples



Street Lighting

Demand grows but market is highly fragmented with different needs, volume and budget. Infrastructure may be limited or simply not there. Solution should be flexible to cover small but growing demand and all multiple use cases (with or without Infrastructure)



Predictive Maintenance

Complex casing with metal (or other). Module works and preferred considering volume but radio performance and multiple antenna options matter



Position Sensors

Tiny sensors are needed to track production flow, if machine gets refilled, where are the products. Multiple technologies but here size is driven factor. Chip Down as a must here



Dongle for Diagnosis and FW Upgrade of Secure Industrial Equipment

Wifi / Ethernet bridge and battery powered. Must be fast and simple, but robust and highly secure, and power efficient

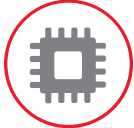
2. Product Agility

Pick the Product Flavour you Need for Your Application

Join Session 4 to find out how we make all of this super easy for you



Tarek, MCU BU Marketing and IoT Expert

 +
Any Core
8, 16, 32-bit MCU
or MPU



Wifi Controllers

(8 module flavours including BLE)
Link or Network versions - Many antenna options

- www.microchip.com/atwilc1000
- www.microchip.com/atwilc3000
- www.microchip.com/atwinc1500
- www.microchip.com/atwinc3400

 +
Security



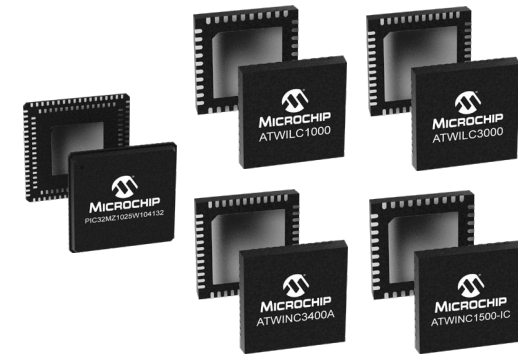
MPU SOM

MPU + Trust&Go + Ethernet PHY + Wifi + BLE
www.microchip.com/som



Standalone Wifi MCU (4 module flavours)

MCU + Trust&Go + Ethernet MAC + Wifi
www.microchip.com/wifi



Or go Chip Down and Discrete

With Reference Design and
Chip Down Package from
Microchip



SMART | CONNECTED | SECURE



PROVEN

NEW

2. Product Agility : Going The Extra Mile

Buy, Clone RF Module or Make your own IC

Reduced up-front Investment

- ✓ Save ~1-year time-to-market
- ✓ Saves 50-60 man-months effort
- ✓ Save ~\$80K expenses

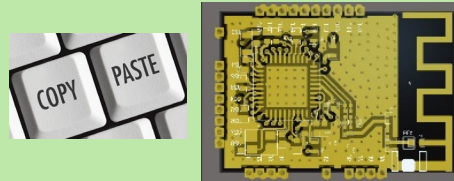
- ✓ Certified in 7 regions (typical)
- ✓ 2nd sourced critical components
- ✓ Low obsolescence risk
- ✓ REACH, RoHS compliant BoM
- ✓ Up to date on regulatory changes
- ✓ RF manufacturing test by MCHP
- ✓ Customizable with external antenna



Buy Certified RF Module

Microchip RF Module

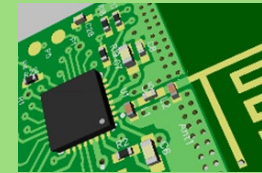
- ✓ Save ~6-7 months time-to-market
- ✓ Saves ~40 man-months effort
- ✓ Save ~\$30-\$40K expenses



Build-your-own Clone Module

Microchip RF IC with
Microchip Chip-Down Package

- ✓ Reuse module across products
- ✓ 100% leverage of MCHP BoM, PCB
- ✓ Some leverage of MCHP certification
- ✓ Tools to aid RF manufacturing test
- ✓ 3rd party CM ecosystem available



Full Custom

Microchip RF IC with
Microchip Chip-Down Package

- ✓ Tools, Collateral for all stages in product life-cycle
- ✓ Strict layout guidelines for important sections
- ✓ Support thru Wireless Check Service

Lower Unit Cost

Decreased Time to market

How Microchip Makes it Possible

Chip Down Package so the Hardware Choice is Yours !!!

Design

Validation

Certification

Production

- Click Through License
- Design Files of Module
- Design Files of Eval Board
- Hardware Design Guidelines
- Wireless Design Guidelines
- Wireless Check Service

- Validation Tool
- Reference Gain tables (If needed)
- Antenna Pattern for PCB and Report

- Certification Tool
- Certification Guidelines

- Production Test Support Tool
- Production Guidelines
- Calibration Procedures

- ▼ Altium
- > with test point
- ▼ without test point
- BOM
- gerber
- > PCB
- schematic

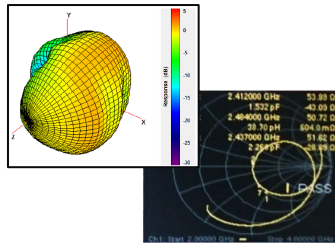


Figure 20. Example of PCB Antenna



Figure 20. Example of Multilayer Chip Antenna



Certification Test Setup

This chapter describes the certification test setup for ATWINC/ATWILC series. The following figure illustrates the block diagram for test setup. For SAMB11-ZR/ETLC1000-ZR please check MCHPRT Application note

Figure 3-1. Test Setup Block Diagram

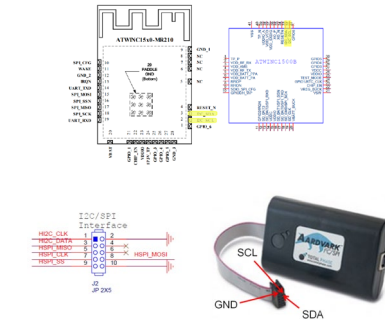
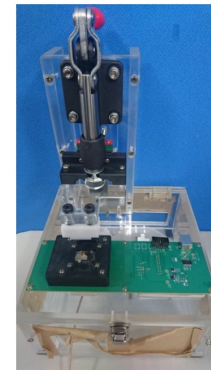
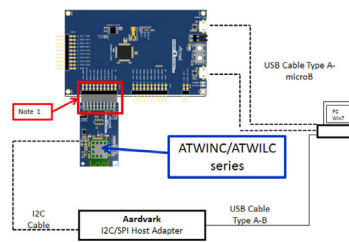
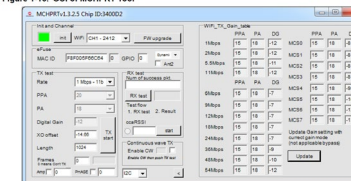


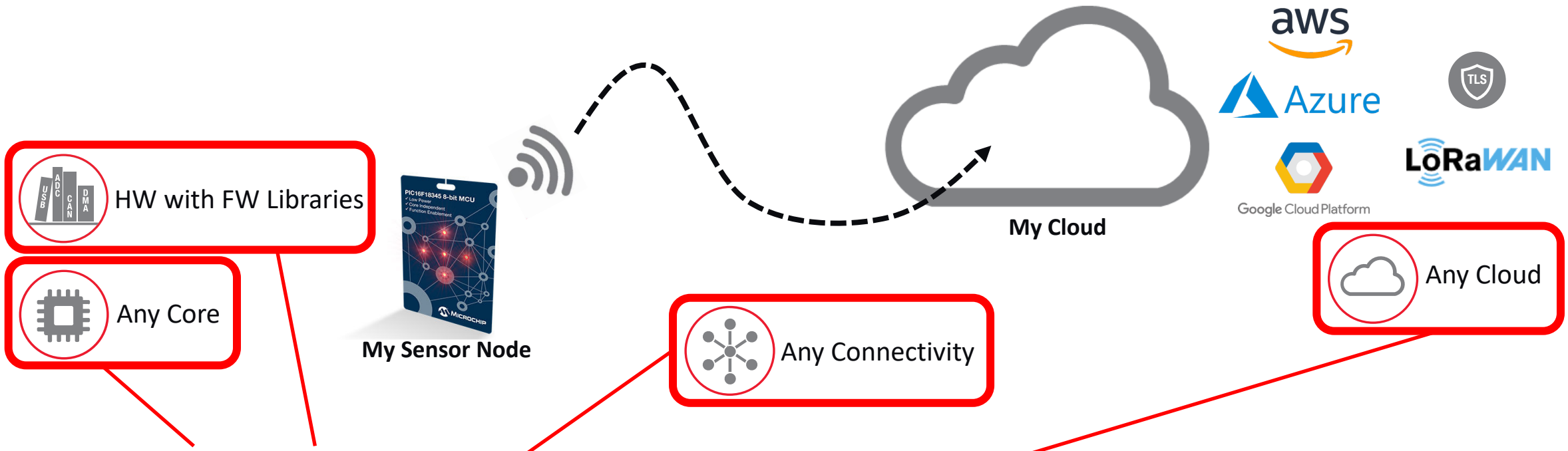
Figure 1-16. GUI of MCHPRT Tool



Channel	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain	Gain
ATWINC1

3. System Agility

Connecting the dots, from Hardware to the Cloud



Join Session 3 tomorrow, to find out more about Cloud connectivity and our Secure Solutions

Tibor, Embedded Solutions Engineer and Expert in Security

3. System Agility

Coming on October 13th – New 32-bit MCU Wi-Fi

- **High performance 32-bit MCU Wi-Fi with comprehensive Peripherals set**
 - 200MHz CPU with FPU/DSP/DMA (CoreMark score of 710)
 - Wi-Fi® 802.11 b/g/n
 - 10/100 Ethernet, UART/SPI/I2C/SQI/I2S, CAN, USB FS - Touch and Analog
- **Embedded advanced security with Trust&Go**
- **Superior robustness by design, hardware and firmware**
- **Chip Down and Certified Modules : the choice is yours !**
- **Large ecosystem of firmware, hardware and solutions with videos to get started in no time**

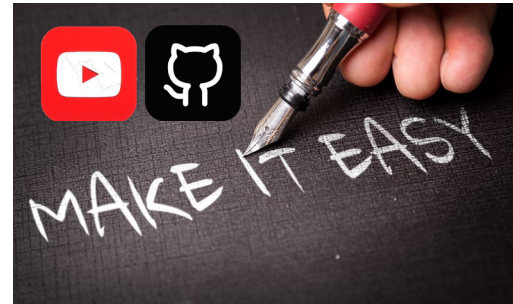


Chip Down

FCC/CE/IC Module



Chip Down Package



Contact us to discover and get started NOW with this new solution !



Johan Pauvert (France)
johan.pauvert@microchip.com

3. System Agility

Made Easy with Harmony !

EASY
ROBUST
PROVEN



Example Applications

AWS Connection

HTTP Provisioning

Ethernet and Wi-Fi dual interface example

Getting started applications to use:
UART R/W, SPI R/W, I2C, NVM, Ethernet, ADC reading, PWM

- 40+ Application examples including AWS voice Control, Over-The-Air Update...
- Convenient sample codes to evaluate all peripherals
- Thorough “Out of the Box”
- Tutorial on Github NOW



Wi-Fi and Stack SDK WLAN v1.0

AP/STA

WPA3

WPA2 Personal

OTA with External Flash

TCP/IP

MQTT + TLS v1.3

Cloud Connection

- Latest Wi-Fi security standard : WPA3
- Rich Wi-Fi libraries to establish a Robust and secure Wi-Fi connection
- MQTT + TLS example for **Secure Cloud** connection



Peripheral Drivers in MPLAB® Harmony v3

WDT

Timer

PPS

DMA

USB

CAN

UART

OSC

Ethernet

Reset

I2C

Touch

SPI

PWM

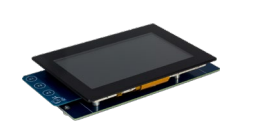
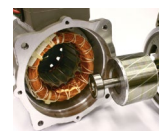
Interrupt

Wi-Fi

ADC

I/O

- Rich peripherals set and firmware examples to drive many external devices including...



3. System Agility

System Approach : Power Efficient Ethernet Connectivity



Microchip's PoE Solutions

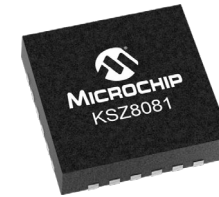
- Powered Device ICs (PD)
- Power Source Equipment ICs (PSE)
- PoE Systems (PoE Midspan)

www.microchip.com/poe

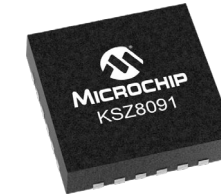
Microchip's Ethernet Solutions

- Single Pair Ethernet (10BASE-T1S)
- Ethernet PHYs (10/100/1000)**
- Ethernet Switches**
- Ethernet Controllers
- Ethernet Bridges

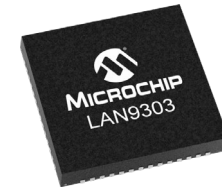
www.microchip.com/ethernet



www.microchip.com/ksz8081



www.microchip.com/ksz8091

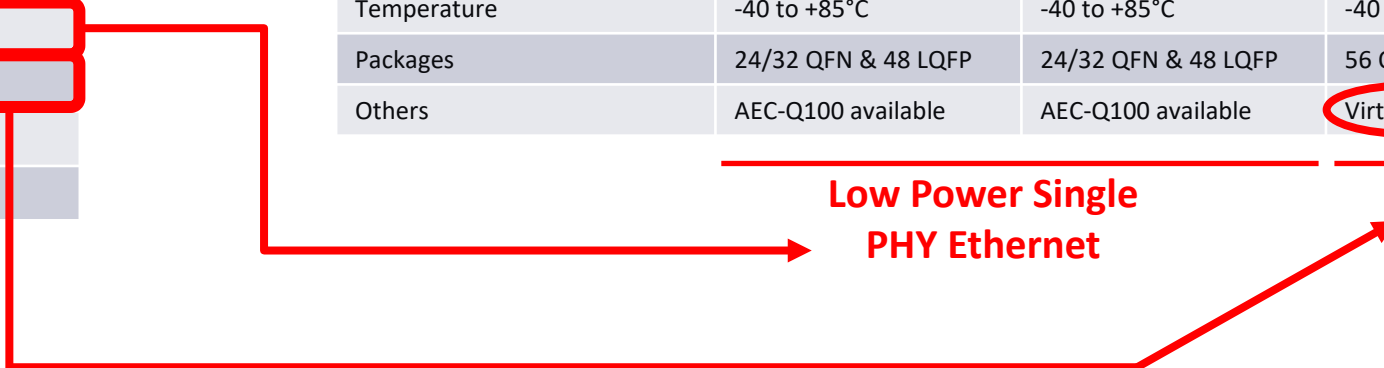


www.microchip.com/lan9303

	KSZ8081	KSZ8091	LAN9303
Key Features	1 Port	1 Port	3 Port Switch
Bandwidth	10Base-T/100Base-TX	10Base-T/100Base-TX	10Base-T/100Base-TX
Interface	MII/RMII	MII/RMII	MII/RMII/Turbo MII
Power	155mW typ	155mW typ	627mW typ
Wake-on-LAN	Yes	Yes	No
Energy Efficient Ethernet (EEE)	No	Yes	No
Cable diagnostics	Yes	Yes	No
Temperature	-40 to +85°C	-40 to +85°C	-40 to +85°C
Packages	24/32 QFN & 48 LQFP	24/32 QFN & 48 LQFP	56 QFN
Others	AEC-Q100 available	AEC-Q100 available	Virtual PHY

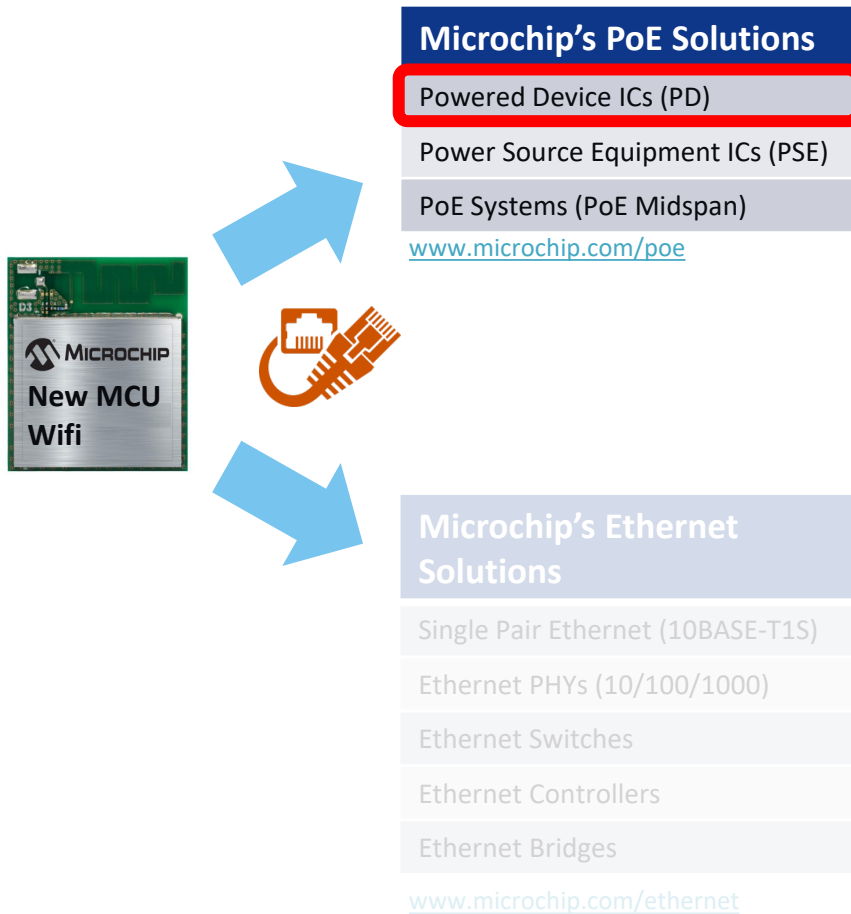
Low Power Single PHY Ethernet

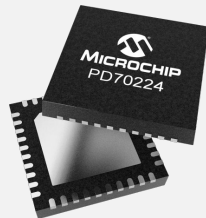
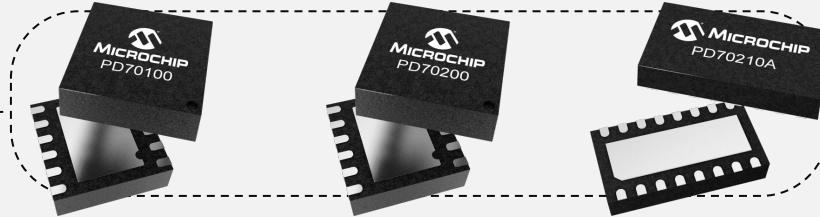
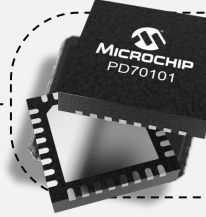
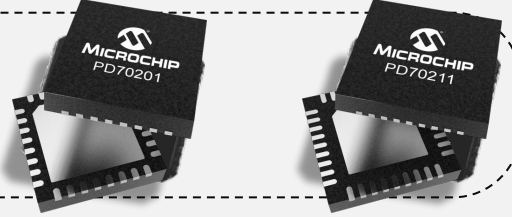
Ethernet Switch



3. System Agility

System Approach : Power Over Ethernet Connectivity




Type 1-4 IdealBridge™ 90W	Type-1 PD 13W	Type-2 PD 25.5W 0.6Ohm	PoH PD* 95W 0.3Ohm
			
	Ideal Diode Bridge Fully Integrated 4-pair FET-based Bridge offers 2W power saving		
			
	FE with Best In Class $R_{DS(on)}$		
	FE with PWM Controller		

* 60W/95W operation with UPoE/PoH PSE's;
Limited to 25.5W when operating with IEEE802.3bt PSE's which do not support UPoE/PoH/LLDP

4. Because Local Support Matters

We've Got You Covered

- **Design Check Online Design Review Services**
 - Online design review service providing a new “Value Added Service” support case
 - Customer benefits from best practices from Microchip experts
- **Your local EMEA team : contact the experts**
- **Going 1 step further with Microchip Github** 

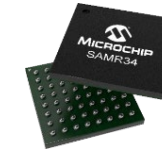


Mirosław and our Local Team from Eastern Europe here for you

SAMR34 Family

Standalone LoRa[®] MCU, In Production & Fully Available NOW !

- Ultra Low Power 32-bit MCU with LoRa Radio
- Chip Down or Certified Modules : choice is yours !
- LoraWAN[™] or P2P/Star Network : choice is yours !
- Advanced Security with Trust&Go as companion chip



Chip Down (Now)



Dual Band Module with FCC/IC/CE certification (Now)



Chip Down Package (Now)



CPN Reference : DM320111

EASY

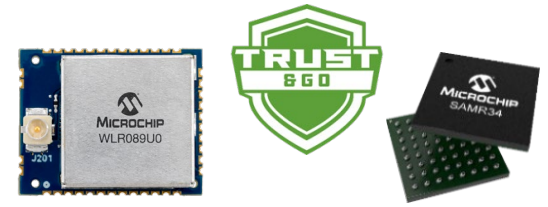
EASY



		Flash	RAM	LP RAM	GP IOs	Others
ATSAMR34J16BT-I/7JX	6x6mm 64-ball TFBGA Chip Down	64k	8k	4k	27	USB, Timers, SERCOM, ADC
ATSAMR34J17BT-I/7JX	6x6mm 64-ball TFBGA Chip Down	128k	16k	8k	27	USB, Timers, SERCOM, ADC
ATSAMR34J18BT-I/7JX	6x6mm 64-ball TFBGA Chip Down	256k	32k	8k	27	USB, Timers, SERCOM, ADC
ATSAMR35J16BT-I/7JX	6x6mm 64-ball TFBGA Chip Down	64k	8k	4k	27	Timers, SERCOM, ADC
ATSAMR35J17BT-I/7JX	6x6mm 64-ball TFBGA Chip Down	128k	16k	8k	27	Timers, SERCOM, ADC
ATSAMR35J18BT-I/7JX	6x6mm 64-ball TFBGA Chip Down	256k	32k	8k	27	Timers, SERCOM, ADC
WLR089U0	41-Pad Module with u.FL Antenna	256k	32k	8k	23	USB, Timers, SERCOM, ADC

Github : Get Started in No Time

Example : Some SAMR34 Examples



- **Wireless Made Fun**

- Workshop to learn Secure Authentication with SAMR34 and ATECC608
 - https://github.com/MicrochipTech/secure_lorawan_with_tti

Have **FUN** with us today

- This Workshop will show The Real World of developing your own LoRaWAN application
- "Secure Authentication with ATSAMR34 & ATECC608A and The Things Industries's Join Server"
 - Identify **challenges** to go from concept to a robust & secure end-product
 - Find possible **solutions**.
 - During **2 Labs** session, implement these solutions & test them out

The R&D Team - Jeroen, Johan, and me!

Gregory, Our Team Leader

Key Products and documentation that will be covered during this workshop

- ATSAMR34 LoRa MCU
- ATECC608A-TNGLORA Secure Element
- Development Board : DM320111 and AT86CKSC1TSOIC-XPRO
- Workshop on Github Now!



Secure Authentication with SAM R34 & ATECC608A and The Things Industries' Join Server

MicrochipTech

"Wireless Made Fun!"

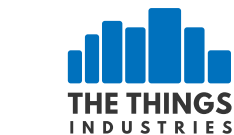
<https://github.com/MicrochipTech>

YouTube

- **Wireless Made Easy**

- Develop with the SAMR34 and Microchip LoRaWAN™ stack on TTI Join Server (SAMR34 and ATECC608)
 - https://github.com/MicrochipTech/atsamr34_ecc608a_tti
- Develop with the SAMR34 and Microchip LoRaWAN stack on Actility join server (SAMR34 and ATECC608)
 - https://github.com/MicrochipTech/atsamr34_ecc608a_actility
- P2P/Star Networks over SAMR34
 - https://github.com/MicrochipTech/atsamr34_miwi_lora_modulation
- And much more firmware examples on Microchip Github

P2P/Star



- **Microchip ASF**

- LoRaWAN Stack, Developed, Maintained and Supported by Microchip
 - www.microchip.com/mplab/avr-support/atmel-studio-7



Conclusion

Connectivity is Complex... but Microchip has the Solutions Made Easy For You

- “Massive IoT” is deploying up fast but also evolves fast !
- Success in IoT requires Agility and End to End System Approach with products fully supported
- With its comprehensive Wireless and Wired portfolio, and Embedded Software Platform, Microchip has these Solutions, Secure, Robust and available NOW !



Do You Want To Become An IoT Expert?

We've got you covered !

- **Design Check : Online Design Review Services**

- Wireless, Ethernet LAN, PoE, MPU...
- www.microchip.com/design-check-services



- **Microchip IoT Landing Page**

- www.microchip.com/iot



- **Github**

- <https://github.com/MicrochipTech>



- **Microchip YouTube Channel**

- www.youtube.com/user/MicrochipTechnology



- **Design Partner:**

- <https://get.microchipdirect.com/design-partner-ecosystem/>



- **And your friendly and Local Microchip team !**



Let's Go For Q&A

Ask Our Experts Now !



Johan Pauvert

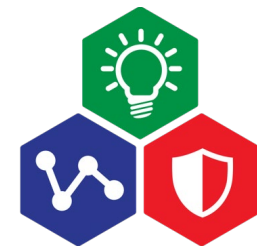
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Our Technical Experts Are Here For You



Markus Austermayer (Germany)

EMEA IoT Evangelist and your host for these 4 sessions

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www.microchip.com/mcu