

ANT Symposium 2018

Your partner to make  **ANT**™ powered devices

RUTRONIK Electronics Worldwide

Your contact people here on site



Coleman Smith
Product Manager
Semiconductor & Wireless
North America



Sarah Brucker
Product Manager
Wireless
Global



Bernd Hantsche
Marketing Director
Embedded & Wireless
Global

- Broadline distributor for electronic components
- 28 billion parts permanent available
- Since 1973 private ownership
- Headquarters based in Germany
- >1 billion USD company turnover
- Approx. 1,700 employees
- 33 subsidiaries and 70 offices worldwide
- World wide identical support and service
- Logistics centers in Asia, Europe, USA



- Completely independent
- # 3 in European distribution market
- # 10 in global distribution market
- Successful for 45 years
- More than 35,000 customers worldwide
- Shipping more than 80 billion pieces / a
- Line card with leading suppliers
- Entire portfolio with alternative product sources

A handwritten signature in black ink, appearing to read 'H. Rudel'.

Helmut Rudel
President

A handwritten signature in black ink, appearing to read 'T. Rudel'.

Thomas Rudel
CEO



Logistic Centers

- Europe / Germany
- Asia / Hong Kong
- America / Texas

Europe



Asia



North America



South America

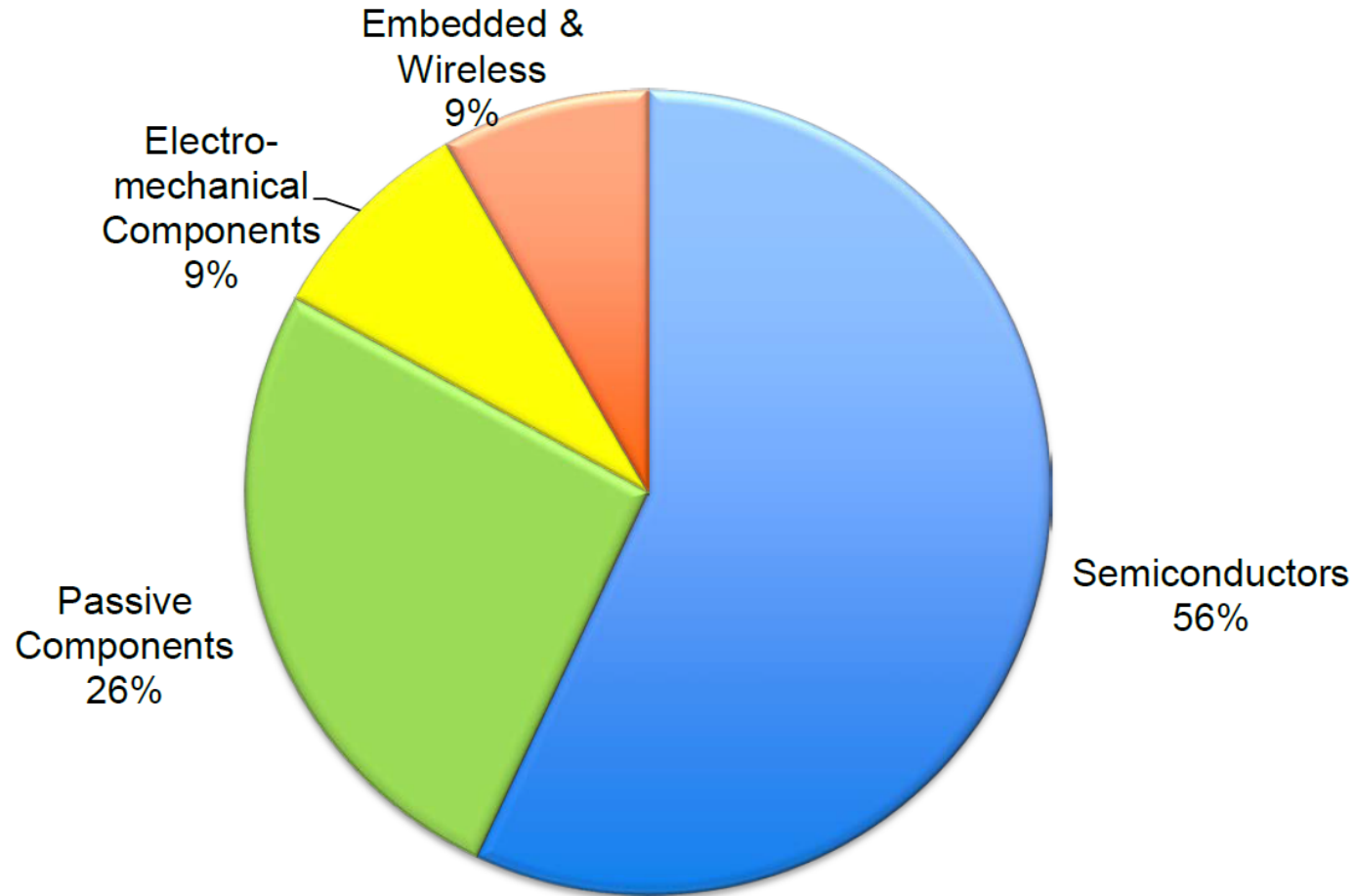


■ Headquarters

■ Offices

■ Warehouses

■ Home Offices





Wireless Competence Center was founded in 2005.
Making Things smart requires solution thinking.
RutronikSMART combines technologies to create IoT enabled applications



Sensors



Wireless

~ 40 suppliers on our linecard to choose from



Security

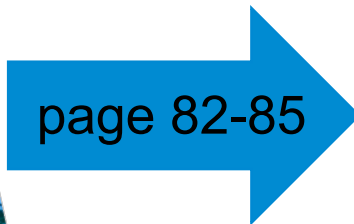
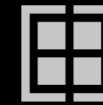
best in class hardware encryption



Cloud

IoT-Device Management Platform





page 82-85

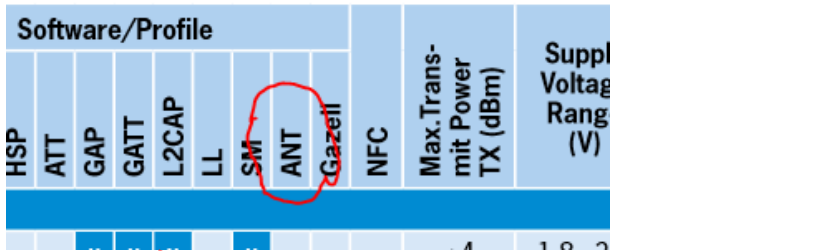
ANT CHIPS – Selection Guide

Name of Chip	Manufacturer	MCU		Memory		ANT Channel	Interface											Evaluation Kit/ Development Kit		
		Yes	No	Flash	RAM		GPIO	GPIO	UART	SPI	JTAG	PC	ADC	PWM	USB	NFC	Serial Interface			
nRF52840 new	Nordic Semiconductor	Cortex M4F		1MB	256kB		up to 48	X	X				X	X	X	X	X	X		nRF52840-DK, Power Profiler Kit
nRF52832	Nordic Semiconductor	Cortex M4F		512kB	64kB	15	up to 32	X	X				X	X	X	X	X	X		nRF52 DK, Power Profiler Kit, Nordic Thingy:52
nRF52810 new	Nordic Semiconductor	Cortex M4		192kB	24kB		up to 32	X	X				X	X	X	X	X	X		nRF52 DK, Power Profiler Kit
nRF51422	Nordic Semiconductor	Cortex M0		256kB		15/8	31	X	X				X	X						nRF51422-EK/nRF51422-DK
nRF24AP1	Nordic Semiconductor	8051			x	4		X												nRF24AP2-DK1
nRF24AP2 - 1CH	Nordic Semiconductor	8051			x	8		X												nRF24AP2-DK1
nRF24AP2 - 8CH	Nordic Semiconductor	8051			x	8		X												nRF24AP2-DK1
nRF24AP2 - USB	Nordic Semiconductor	8051			x	8		X									X	X		nRF24AP2-DK1

ANT Transceiver Modules – Selection Guide

Name of Module	ANT Chip used	Manufacturer	MCU		Memory					Channel	Interface											Integr. Ant.		Evaluation Kit/ Development Kit
			Yes	No	Flash	RAM	EEPROM	SRAM	IRAM		No	GPIO	GPIO	UART	SPI	JTAG	PC	ADC	PWM	USB	NFC	Serial Interface	Yes	
ANTUSB2	nRF24LU1+	Dynastream		X	500B						8								X		X			
ANTUSBm	nRF24LU1+	Dynastream		X	500B						8								X		X			
D52QD2M4IA	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 30	X	X		X		X	X	X	X	X			D52DK2
D52QD2M4IAA	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 24	X	X		X		X	X	X	X	X			D52DK2
D52QSKM6IA	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 24	X	X		X		X	X	X	X	X			D52DK2
D52QD2M8IA	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 24	X	X		X		X	X	X	X	X			D52DK2
D52QPMMA4IA ANT BLAZE	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 30	X	X		X		X	X	X	X	X			D52DK2/EXT1
D52QPMMA4IAA ANT BLAZE	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 24	X	X		X		X	X	X	X	X			D52DK2/EXT1
D52QPMMA8IA ANT BLAZE	nRF52832	Dynastream	Cortex M4F		512kB	64 kB					15 24	X	X		X		X	X	X	X	X			D52DK2/EXT1
N550M8CC	nRF51422 v3	Dynastream	Cortex M0		256kB	16kB					15 24	X	X		X			X		X				ANTN5DK1
N550M4CC	nRF51422 v3	Dynastream	Cortex M0		256kB	16kB					15 13	X	X		X			X		X				ANTN5DK1
N5150M8CD	nRF51422 v3	Dynastream	Cortex M0		256kB	32kB					15 24	X	X		X			X		X				ANTN5DK1
N5150M8CD	nRF51422 v3	Dynastream	Cortex M0		256kB	32kB					15 13	X	X		X			X		X				ANTN5DK1
N5150M8CD	nRF51422 v3	Dynastream	Cortex M0		256kB	32kB					15 13	X	X		X			X		X				ANTN5DK1
ANTAP281M4IB	nRF24AP2	Dynastream		X							X 8									X	X			ANTAP2DK1
ANTAP281M5IB	nRF24AP2	Dynastream		X							X 8									X	X			ANTAP2DK1
ANTC782M4IB	CC2571	Dynastream		X							X 8									X	X			ANTC7EK1

Our ANT Ecosystem



ANTTM
compatible chips

Bluetooth[®] CHiPs – Selection Guide

Manufacturer	Name	Software/Profile											Supply Voltage (V)	Max. Trans- mit Power TX (dBm)	Suppl Voltag Rang (V)	MCU	Memory	Interfaces	Operating Temperature (°C)	Size (mm)	Package	Evaluation Kit / Development Kit	Status	Crystal	
		HSP	ATT	GAP	GATT	L2CAP	LL	SM	ANT	NFC	Max. Trans- mit Power TX (dBm)	Suppl Voltag Rang (V)													
Bluetooth Low Energy	BP110200AA	4.2*											4	1.8 to 3.6	91	CoreM0	2048	16384		40 to 85	5 x 5	QFN32	HR12 DK / Power Profiler Kit	v/s	QJBL90064791
Bluetooth LE 1.0	BTLE5200	4.1											4	1.8 to 3.6	91	CoreM0	2048	16384		40 to 85	5 x 5	QFN32	HR12 DK / Power Profiler Kit	v/s	QJBL90064791
Bluetooth LE 1.1	BTLE5100	4.1											4	1.8 to 3.6	91	CoreM0	2048	16384		40 to 85	5 x 5	QFN32	HR12 DK / Power Profiler Kit	v/s	QJBL90064791





ANT™ compatible modules



Bluetooth® Modules – Selection Guide

Manufacturer	Module Name	Bluetooth Specification	Stack Profile																Max. Throughput (Mbps)	Supply Voltage Range (V)	Input Sensitivity (dBm)	Used in	Interfaces										Actions	Operating Temp (°C)	Size (mm)	Package	Evaluation Kit / Development Kit				
			SP	AG	IF	HC	LE	LR	LL	LU	LL/LE	LL/LE/LL	LL/LL	LL/LL/LL	LL/LL/LL/LL	LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL					LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL	LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL						LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL/LL			
NXP	MW10720A	2.1																																							
	MW10720B	2.1																																							
	MW10720C	2.1																																							
	MW10720D	2.1																																							
	MW10720E	2.1																																							

ANT compatible antennas



Type	PF-14
Standard:	Bluetooth / Wlan
Frequency:	2.4 GHz
Gain:	0 dB
VSWR:	<2:1
Available in different connector types	



Type	2JMAS05
Standard:	Bluetooth / Wlan
Frequency:	2.4 GHz
Gain:	2.2 dB
VSWR:	<1.5:1
Available in different cable lengths and different connector types	



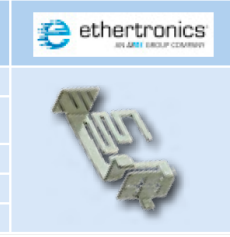
Type	ANT3216LL00R2400A
Standard:	Bluetooth/Wlan
Frequency:	2400 MHz
Gain:	5.05 dB



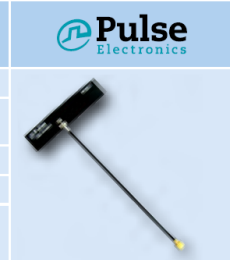
Type	1001013
Standard	Bluetooth/WLAN/ISM
Frequency	2400-2485 MHz
Antenna Type	SMD
Size	15 x 3.2 x 3.3
Peak Gain	2.6 dBi



Type	1002295
Standard	Bluetooth/WLAN/ISM
Frequency	2400-2485 MHz
Antenna Type	Metal Stamp SMT
Size	16.1 x 15.7 x 10.55 mm
Polarization	Linear



Type	W3921B0100
Standard	Bluetooth/WLAN/ISM
Frequency	2400-2500 MHz
Gain	1 dB
VSWR	< 2.0
Connector	Available in different cable lengths with U.FL/W.FL connector



Use case example :



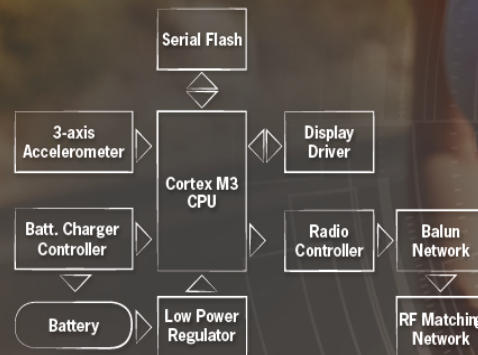
Healthcare Wearable Devices

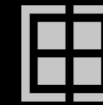
...ideas to improve actual generation

Some Highlights:

- deviceWISE IoT Platform
- Bosch BMA400
- Infineon DPS368
- Vishay VCNL4035
- Sensirion SGPC3
- Telit SE873Q5
- Raystar REX128128B
- Infineon Optiga Trust X1

BODY CARDIO & WEARABLES





Telet IoT Portal

APPLICATION DEVELOPMENT > Developer Tools/ APIs | Enterprise Integration | Cloud to Cloud | Dashboard & Mapping | Third Party Applications

ADMINISTRATION & SECURITY > Management Portal | Scalable Cloud Storage | Org/User/Role Management | Multi-Tenant | End-to-End Security

DATA MANAGEMENT > Device Drivers and APIs | Edge Agent and Logic | Data-at-Rest Data-in-Transit | Cloud Logic Engine | Location Services

DEVICE MANAGEMENT > Remote Access (RMM) | Configuration Management | OTA/FOTA | Campaigns | External Integration

CONNECTIVITY MANAGEMENT > CDP Pro | Monitoring & Alerting | Intelligence | Bridge | Automation & Switch

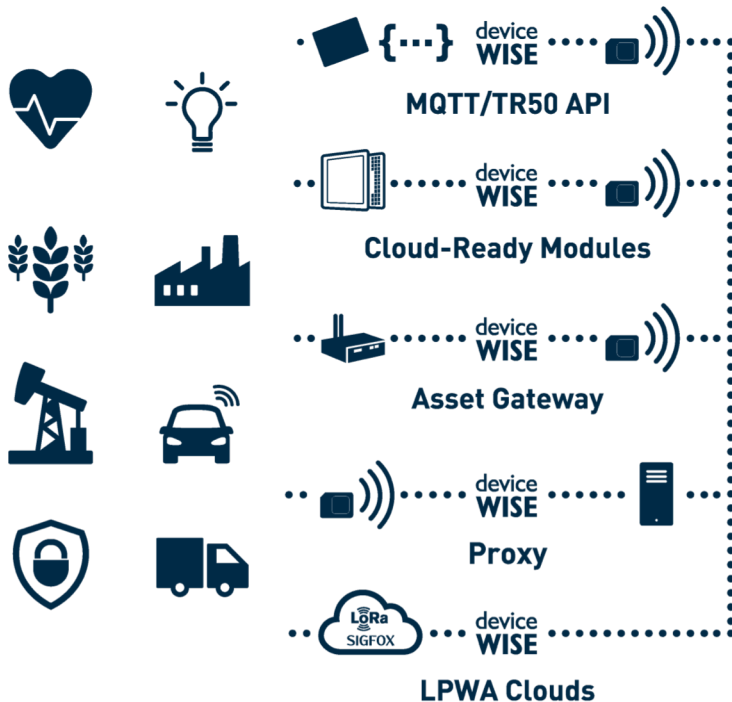
TELET IoT CONNECTIVITY > SIM Cards | Custom Data Plans | Global Roaming | 24/7 Support | Third Party Data Plans

TELET IoT MODULES > Cellular | Location | Short-range | Automotive | Data Cards

including **ANT**

deviceWISE IoT Platform

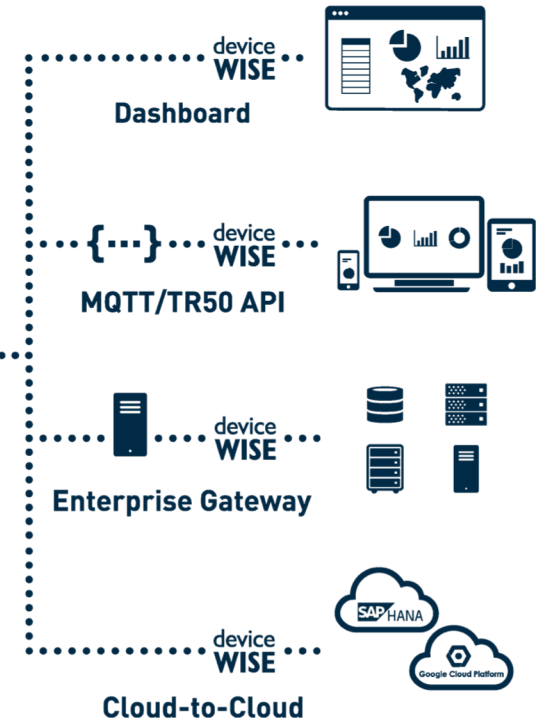
CONNECT



MANAGE



INTEGRATE



Bosch BMA400

acceleration sensor

typical use case $<4\mu\text{A}$

auto-wake-up 800nA

12-bit digital resolution

Measurement ranges $\pm 2\text{ g}$, $\pm 4\text{ g}$, $\pm 8\text{ g}$, $\pm 16\text{ g}$

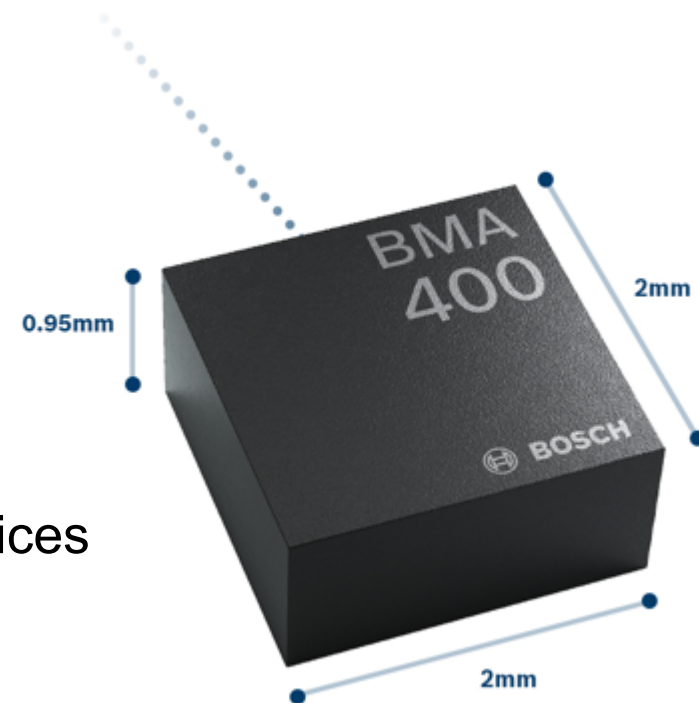
activity recognition especially suited for wearable devices

senses tilt, orientation, tap/double tap

Embedded plug'n play step counter ($< 4\ \mu\text{A}$ overall)

Embedded activity recognition (walking, running, standing still)

Embedded activity change recognition



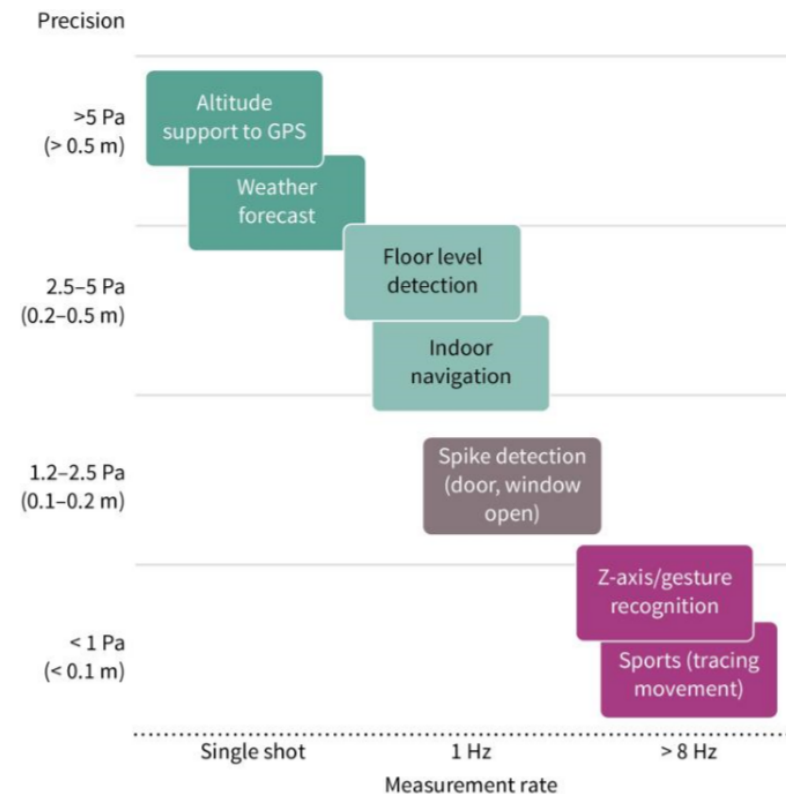


Infineon DPS368

Barometric pressure sensor
protected against water, dust, humidity
avg. current consumption 1,7uA

Key product features	DPS310/DPS368 ¹⁾	DPS422 ²⁾
Operating pressure range	300 ... 1200 hPa	
Operating temperature range	-40 ... 85°C	
Pressure level precision	± 0.005 hPa (or ±0.05 m)	
Relative accuracy/Absolute accuracy	± 0.06 hPa (or ±0.5 m)/± 1 hPa (or ±8 m)	
Temperature accuracy	0.5°C	< 0.4°C
Pressure temperature sensitivity	0.5 Pa/K	
Measurement time	3.6 ms (low precision); 27.6 ms (standard mode)	
Average current consumption @ 1 Hz sampling rate	1.7 µA for pressure measurement/1.5 µA for temperature measurement (0.5 µA standby)	1.7 µA for pressure measurement/2.0 µA for temperature measurement (1.0 µA standby)
Supply voltage	V _{DDIO} : 1.2–3.6 V; V _{DD} : 1.7–3.6 V	
Operating modes	Command (manual), background (automatic), standby	
Interface	I ² C and SPI, both with optional interrupt	
Package	8 pins LGA: 2.0 x 2.5 x 1.0 mm (DPS310) 8 pins LGA: 2.0 x 2.5 x 1.1 mm (DPS368)	8 pins LGA: 2.0 x 2.5 x 0.73 mm

1) Available Q1 2019 2) Available Q3 2018



Vishay VCNL4035

proximity & ambient light sensor
designed for 2D and 3D gesture recognition
16bit resolution
Excellent background light cancellation
Upper and lower thresholds and interrupt functions
Driver for up to three emitters
Temperature compensation
AEC-Q101, operating temperature 105°C
Low profile: 4.0 x 2.36 x 0.75 mm



Sensirion SGPC3

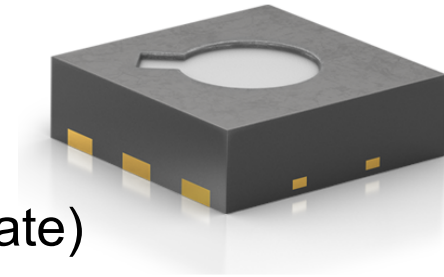
low power air quality sensor – output: total VOC in ppb

Low power mode: 1mA average current (2s sampling rate)

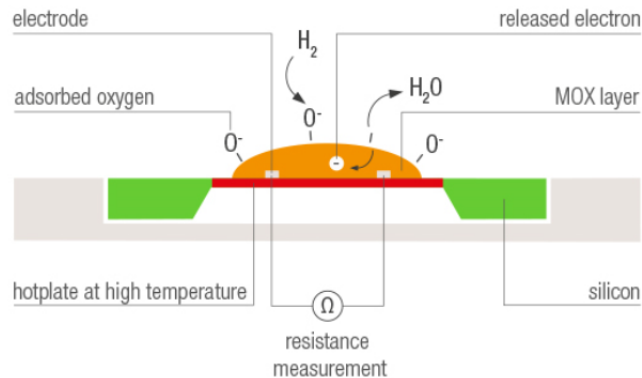
Ultra low power mode: 0.065 mA average current (30s sampling rate)

Long term stability: typ 1.3% accuracy drift per year

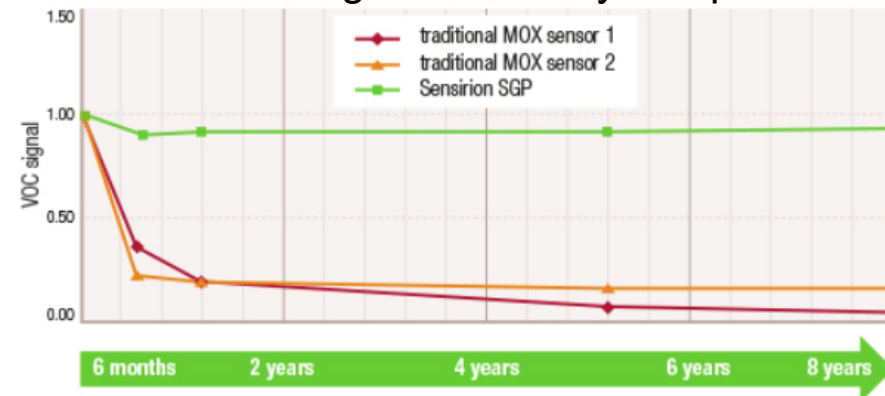
2.45 × 2.45 × 0.9 mm³ DFN package



MOXSens® Technology:



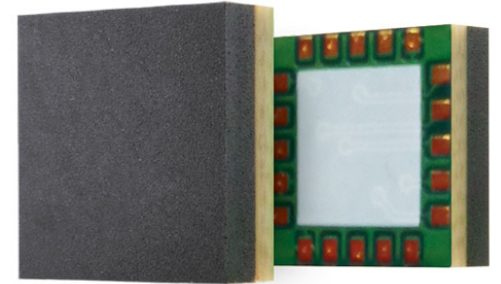
Long term stability comparison:





Telit SE873Q5

- 7 x 7 x 1.85 mm
- MEMS port for accelerometer
- GPS, BeiDou, Glonass, Galileo
- autonomous and server based A-GNSS
- advanced power modes: smartGNSS, duty cycle, push-to-fix
- TCXO, LNA, RTC and flash for upgrades, data logging and customisation
- switching power supply
- -25% reduction in power consumption compared to linear SE873 version
- -167dBm tracking sensitivity
- 77mW in navigation mode
- 1,8V GPIO's



Raystar REX128128B

Circular Graphic OLED Φ 1.18"

Resolution 128x128 dots

Dot Size 0.210 × 0.210 mm

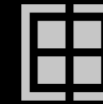
Dot Pitch 0.235 × 0.235 mm

Emitting Color: Sky Blue / White / Yellow

View Area 32.00 × 32.00 mm

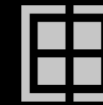
Active Area 30.00 × 30.00 mm





✓ Done by IFX ✓ Customer Implementation, support by IFX	OPTIGA™ Trust	OPTIGA™ Trust E	OPTIGA™ Trust X	OPTIGA™ Trust P
Turnkey	✓	✓	✓	-
Secure Data Store	-	3k	10k	✓
ECC authentication	✓	✓	✓	✓
Life-cycle management	✓	✓	✓	✓
PKI support	-	✓	✓	✓
Sign/Verify for secure updates	-	-	✓	✓
Data encryption, FW update Mutual authentication, Encrypted communication	-	-	✓	✓
System integrity monitor	-	-	✓	-
Interface	SWI	I2C	I2C	UART ISO 7816
NVM size (Code / Bytes)	448	-	-	150k(*)
System integration	✓	✓	✓	✓





Premium Security

- > Based on CC EAL 6+ (high) certified security controller
- > DTLS Support
- > X.509 certificate supported
- > TRNG AIS-31 certified
- > USB Type C Authentication supported

Easy to Integrate

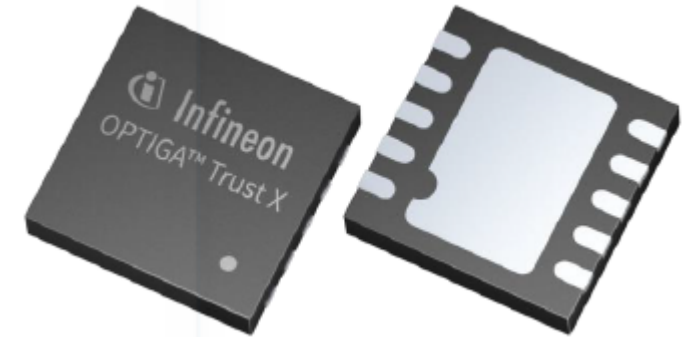
- > Full turnkey solution
- > Customer specific public key system provided
- > Host Code Provided
- > Evaluation kit

Extensive Feature Set

- > X1 Feature Set
 - Mutual Authentication
 - Secure Communication
 - Data Store Protection
 - Lifecycle Management
 - Power Management
- > X2 extended Feature Set
 - Platform Integrity Protection
 - Secure Update

Extended Operating Temperatures

- > X4 -25 to +85°C and X2 -40 to +105°C supported



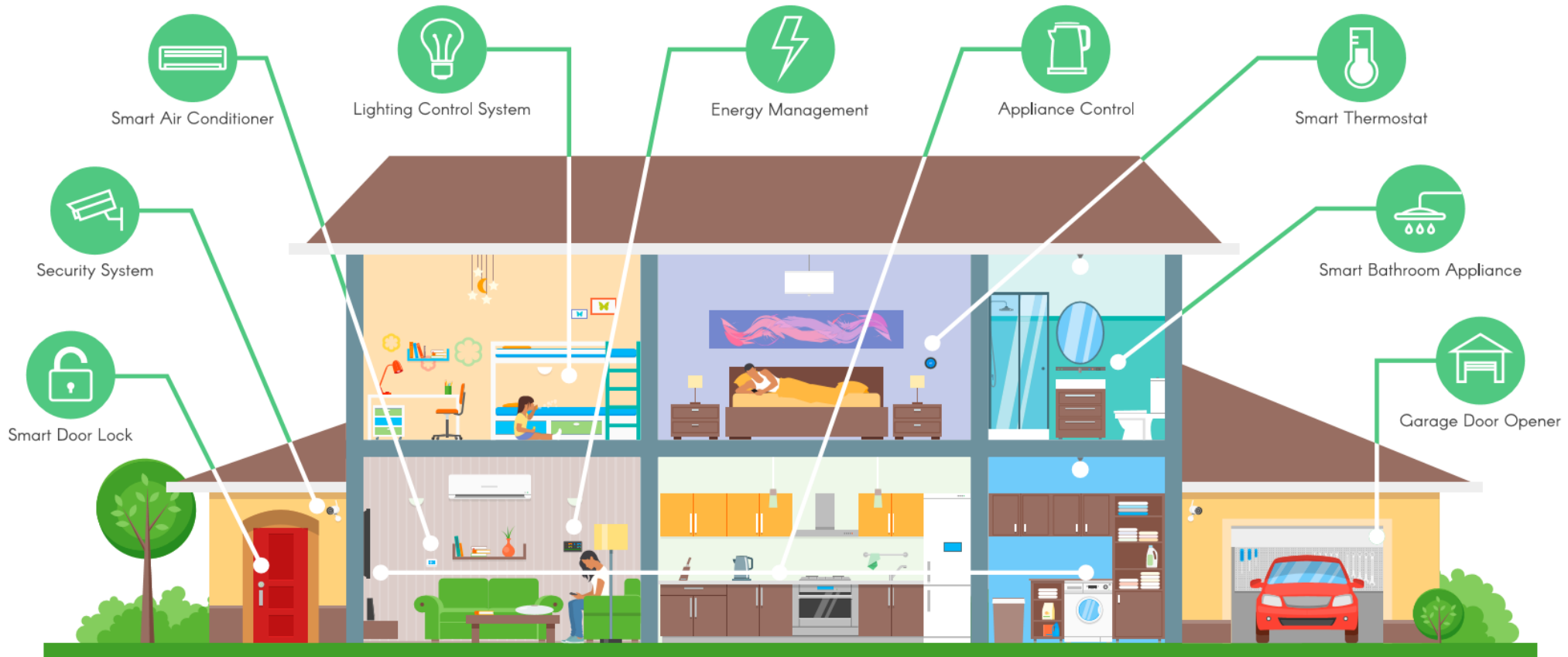
Product Details (SLS 32AIA)

Set-up	Turnkey	Interface	I2C
Data Store	10kB	Interface Speed	1 Mbit/sec
Cryptography	ECC256, AES128, SHA-256	Package	USON-10
Available	X1 → QS:05/2017	Size	3 x 3 mm

Talk with us about **YOUR** product idea



RUTRONIK
ELECTRONICS WORLDWIDE



...and if you don't want to talk, use our B2B online shop

www.rutronik24.com

3D CAD files
mass quotation
traceability
product change notifications
free of charge samples
...and much more to discover



Leading international trade fair – first time in 17 halls



components | systems | applications | solutions
World's leading trade fair and conference for electronics
Messe München | November 13–16, 2018

Whether it comes to PCBs, semiconductors, sensors, connectors or displays: electronica is the best place to find out first which components, systems and applications are made possible by the latest developments. You can see the entire world of electronics here.

MEET US IN MUNICH
13-16 NOVEMBER
electronica 2018



Hall C4
RUTRONIK 24
next generation e-commerce
R24 Booth 434

Hall C3
Main Booth 312

Please take your Smartphones and test if you are ready to make an ANT device

[>>> START QUIZ <<<](#)



Thank's for your attention and have a good time in Banff !

Bernd Hantsche

Bernd.Hantsche@rutronik.com

0049-7231-801-1506