Welcome!
Texas Instruments New Product Update

- This webinar will be recorded and available at www.ti.com/npu
- Phone lines will be muted
- Please post questions in the chat or contact your sales person or field applications engineer

New Product Update:
HDC3x New Generation Humidity Sensor

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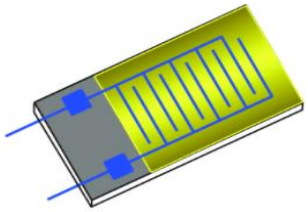
July 20th, 2021

Agenda

- RH sensor types, design challenges
- RH sensing portfolio
- Introduction to TI new HDC3020 RH sensor family
- How to optimize thermal mass
- Drift correction demonstration
- Helpful resources for designing RH sensors

Types of RH sensors, Design Challenges

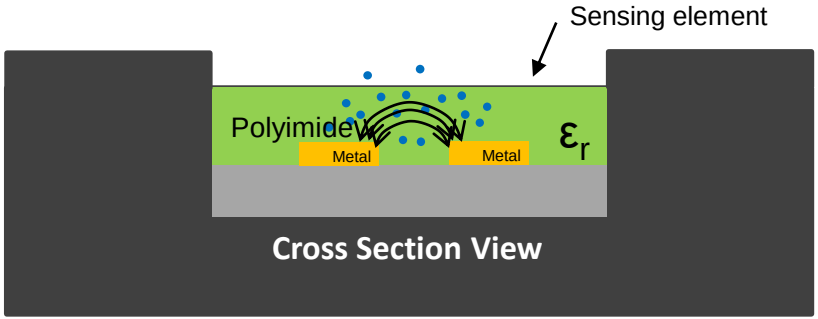
1. Resistive
2. Capacitive



Resistive

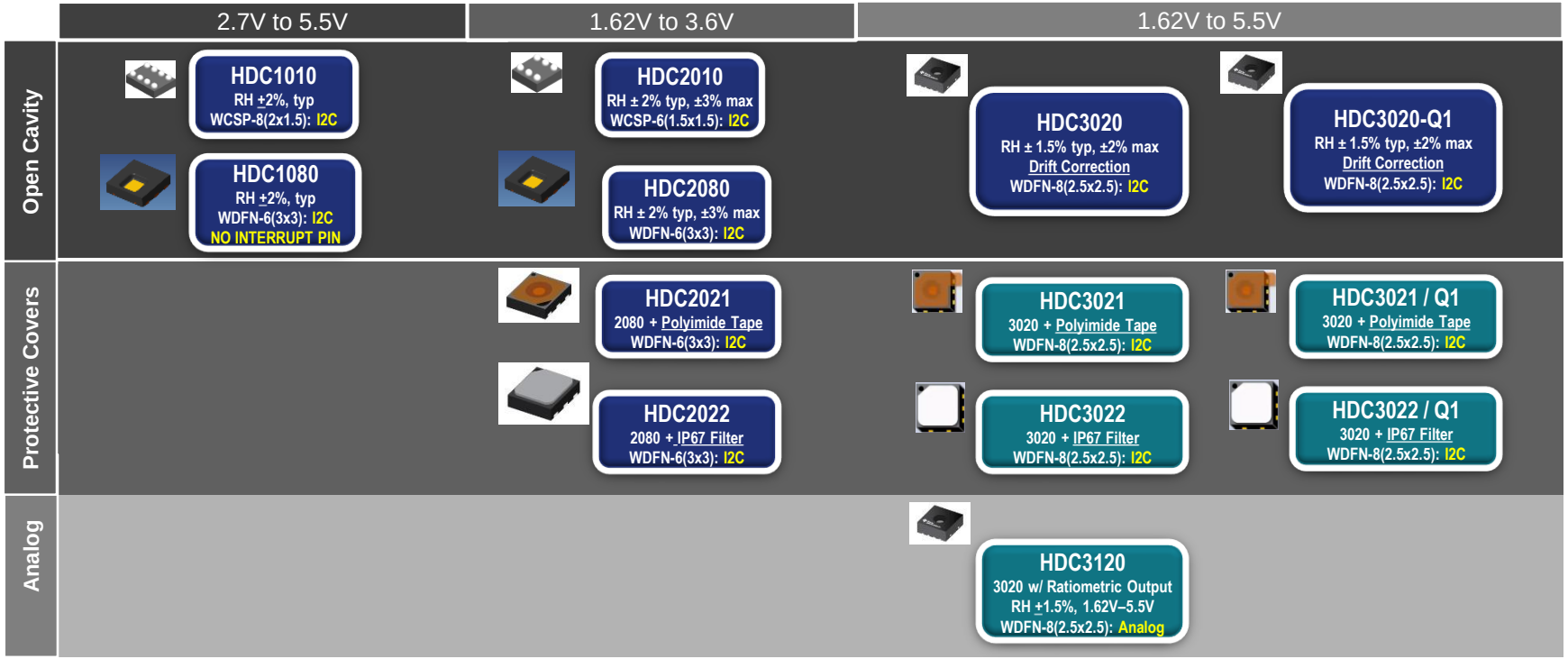
Design Challenges:

- Drift caused by natural aging moisture
- Environmental stress
- Interactions with contaminants



Capacitive

TI Humidity Sensor Portfolio



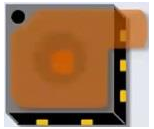
The solution: TI's new HDC3x RH sensor family

High accuracy

- RH new CMOS sensor architecture and polymer
- ±1.5% RH / ±2% RH max across a wide RH and T range
- 0.21% RH per year, long-term drift
- 85°C/85% RH
- RH drift correction technology
- RH protective tape and IP67 filter cover
- Leverages 4 decades of TI temp sensing expertise
- ±0.1°C / ±0.4°C max across wide temperature range

HDC3020/-Q1

Tape



Filter

Low power

- 0.7uA

Wide supply range

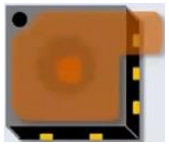
- 1.62V to 5.5V on same device

HDC3x: Package options with protective covers

Preproduction versions available now

HDC3020 / HDC3020-Q1
Open Cavity

Coming soon



HDC3021 / HDC3021-Q1
Removable tape
- Conformal Coat
- Potting
- PCB wash

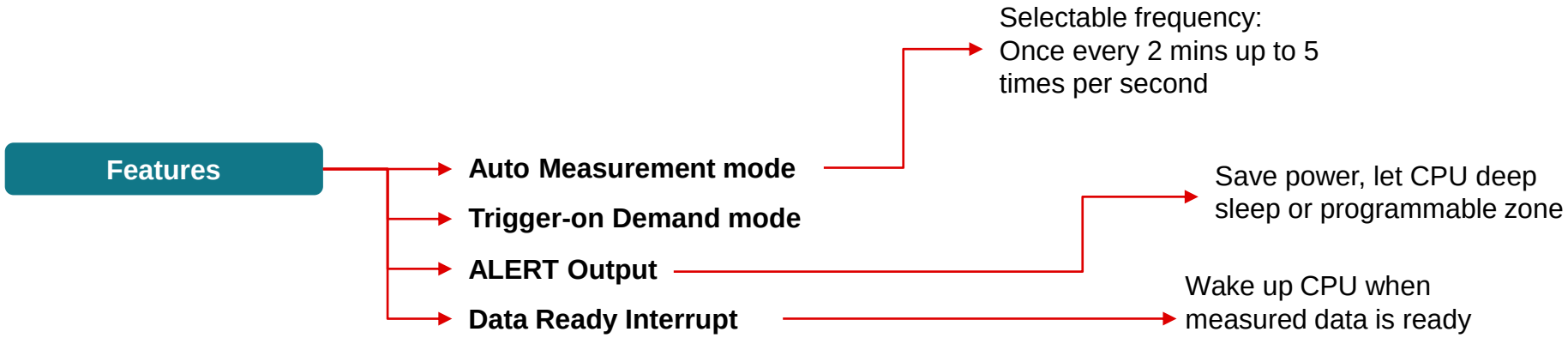
HDC3022 / HDC3022-Q1
IP67 filter cover
- Water Proof
- Dust Protection

HDC3120
Analog Output
- RH
- T

Pin-to-pin & software compatible

	RH	Temperature
Accuracy	±1.5% (typ) / ± 2% RH max from 10% to 90% Long-term drift 0.21% RH per year Low drift post 85°C + 85% RH	±0.1°C (typ) / ±0.3°C max from -20°C to 60°C ±0.2°C (typ) / ±0.4°C max from -40°C to 125°C
Supply Range	**1.62V to 5.5V**, wide VCC range without accuracy tradeoff	

HDC3x: Low power without sacrificing features



0.7 uA current consumption without accuracy tradeoff

HDC3x: Small footprint, new features

Small footprint, 2.5-mm x 2.5-mm (6.25 mm^2)

New Features

- **Drift correction** → Correct errors due to normal sensor aging, interaction with containments, stress
- **Programmable T and RH offsets in <u>non-volatile memory</u>** → Store any known variation to fine tune accuracies
- **NIST Traceability on T and RH sensor** → IEC17025 48-bit ID NIST letter @ TI.com
- **4 programmable I^2C addresses (0x44, 0x45, 0x46, 0x47)** → Easy inventory management by reducing stocking multiple orderable
- **CRC checksum for command and data protection**

Simple design rules – how to optimize thermal mass

Thermal isolation layout examples

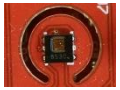
No thermal isolation

0.062” FR4

Some thermal isolation

0.031” FR4

Thermal isolation by cutout



0.062” & 0.031” FR4

Excellent thermal isolation

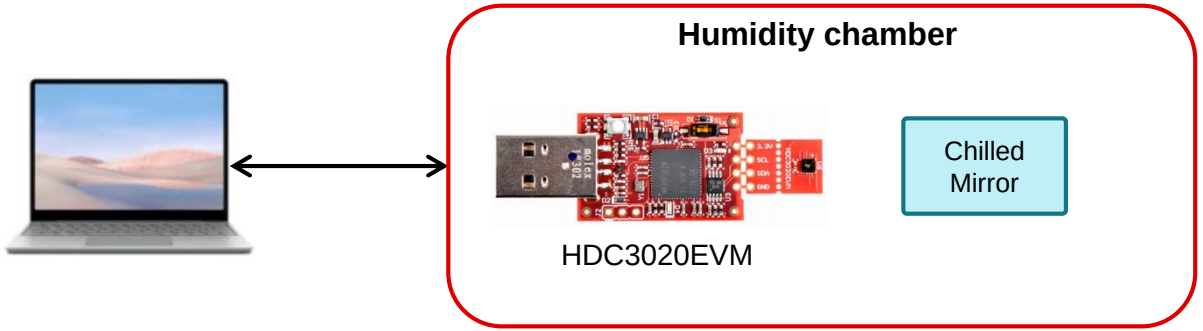
0.062” FR4

- Thermal isolation, with & without PCB cutout, no copper pour around device
- PCB layer, thickness, cutout, copper pour impact thermal mass

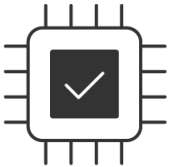
Drift correction demo using HDC3020EVM

1. Artificially cause the HDC3020 to cause out of spec
   – Measure the HDC3020 RH accuracy against chilled mirror

2. Correct HDC3020 sensor drift with drift correction
   – Re-measure the HDC3020 RH accuracy against chilled mirror



Additional resources

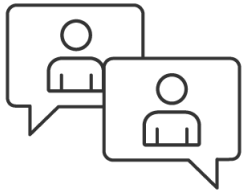


TI's humidity products, tools and resources

TI.com/humidity

RH sensor specific resources

- Silicon user guide, storage and handling guidelines, and software information to get started: ti.com/lit/snau265
- Drift application note: ti.com/lit/snaa353
- Current consumption app note: ti.com/lit/snaa352
- 85°C/85%RH white paper: ti.com/lit/slyy210
- Protective cover application note: ti.com/lit/snaa346



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