ams Lighting Solutions Intro

Shaping the world with sensor solutions

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ams strategy

Building global leadership in sensor solutions
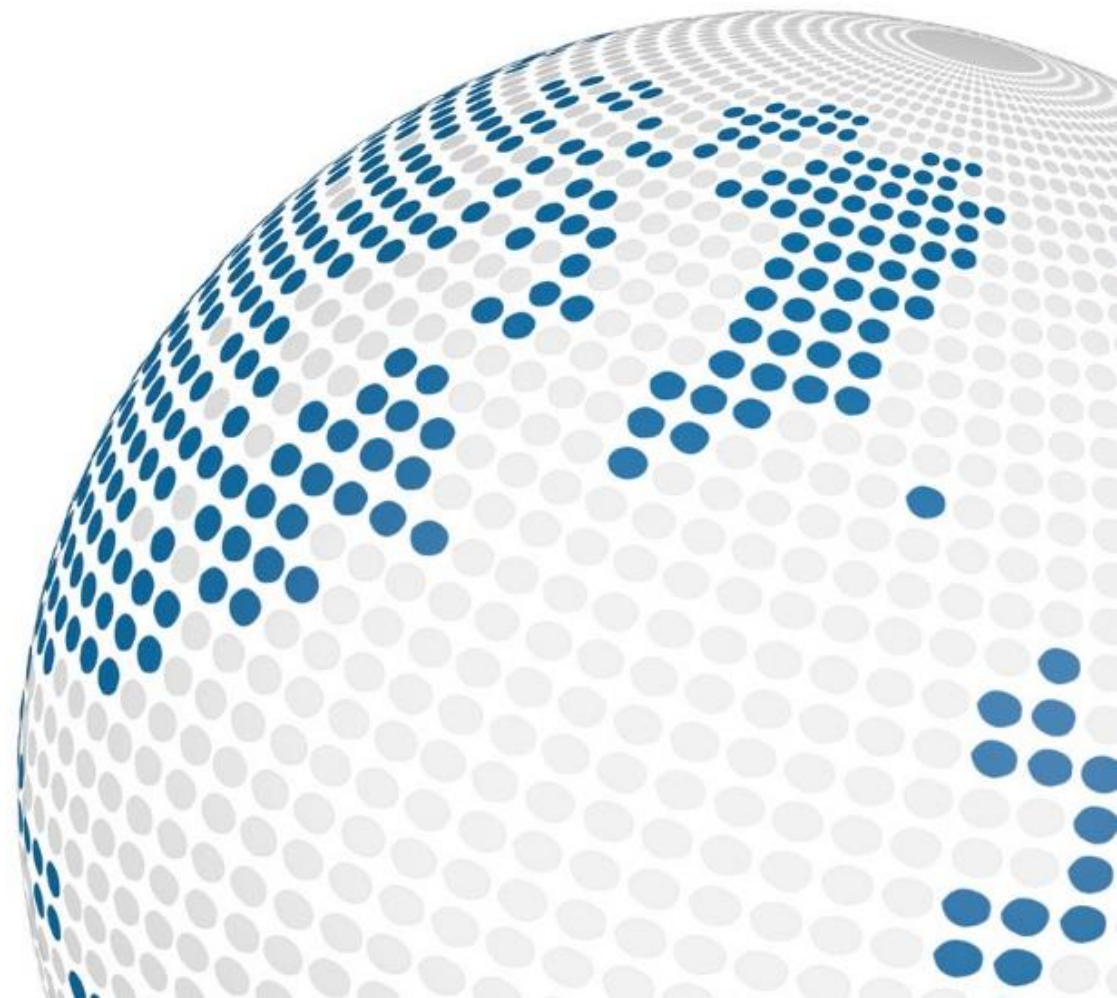
True leadership in four sensor areas

| Optical Sensors | Imaging Sensors | Environmental Sensors | Audio Sensors |

Best-in-class performance per sensor area and in multi-sensor application solutions

- Smallest, lowest cost, high volume multi-sensor modules, driving monolithic integration
- Sensor algorithms and sensor fusion software
- Application software for differentiating end-user experiences

Sensor Driven Lighting Solutions

ams IoT Smart Lighting

The ams AS722x solutions offer the simplest path to design and build high quality tunable light, and it will save your more on your BOM and manufacturing process than it costs to add the chip to your lights.

AS7221-BLGT

## Pre-calibrated CCT Smart Lighting Manager

Key Features:

- Single channel driver architecture
- Out of the box solution (Including algorithms)
- Optical calibrated sensor-driven closed loop solution
- Human eye type color accuracy interference filters
- Broad range of interfaces

Applications

- Tunable white luminaire
- Daylighting luminaire (title 24 California)
- Smart home and smart building

Associated Benefits:

- Single vs multichannel channel driver for dimmable and white tunable product → >$5 cost saving
- Time to market (saving you min ~1year engineering)
- Flexible LED supply + reduced LED inventory → 5-15% LED cost saving + characterization effort
- Stable sensor – i.e. luminaire – characteristics over lifetime and temperature
- Compatible with legacy controls and scalable to IoT future requirements
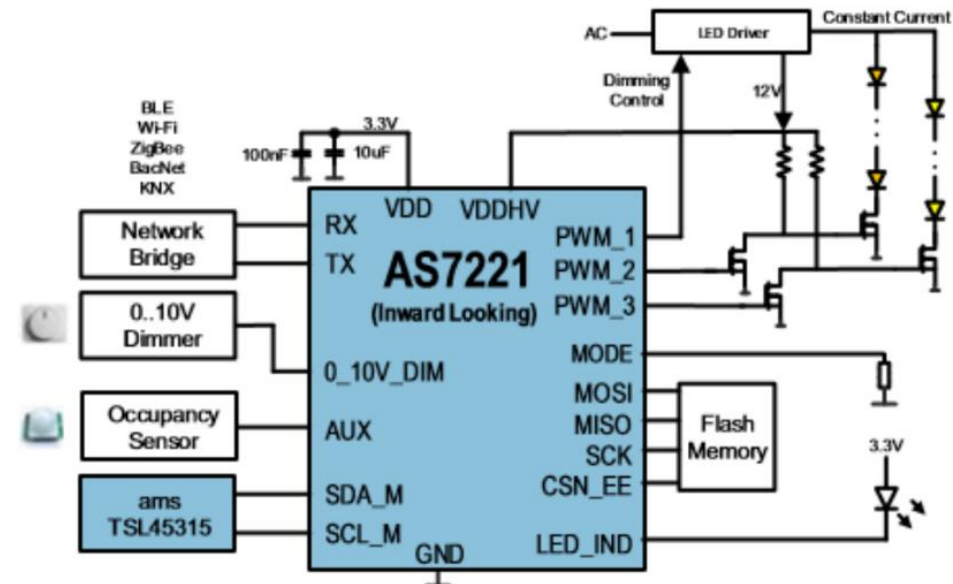
AS7221

Tunable White Smart Lighting Manager

Features

Out of the box chip-scale solution

- Integrated true color sensor + MCU running algorithms managing the feedback loop control of tunable white luminaire
- Time-to-market: luminaire prototype in a week and production in a quarter
  - Reduction of customers R&D work including: algorithms, colorimetric, calibration, controls, etc. which is > 1year

Optical calibrated sensor-driven closed loop solution

- Active driving of 'any' LEDs to meet target CCT vs. precise LED characterization-based predictive models
  - Flexible LED supply → Reduced LED inventory
    - → 5-15% LED cost saving + characterization effort

Sensing like the human eye does makes it "true color" accurate

- XYZ mimics human eye perception (CIE1931 standard)
- Interference filters reproducibility and long term stability of the sensor
- → All luminaires manufactured with the solution over time will look the same

Single channel LED driver architecture

- Reduction of equipment cost by >$5

Integrates all the key I/O… no extra processor needed

- I2C master + UART interface + AT commands
- → Backward compatibility to existing legacy controls
- → Scalability to future IoT networking requirements and sensing expansions (presence, humidity, temperature, gas, etc.)

CCT tuning + Dimming

Typical constant current "cost saver" implementation
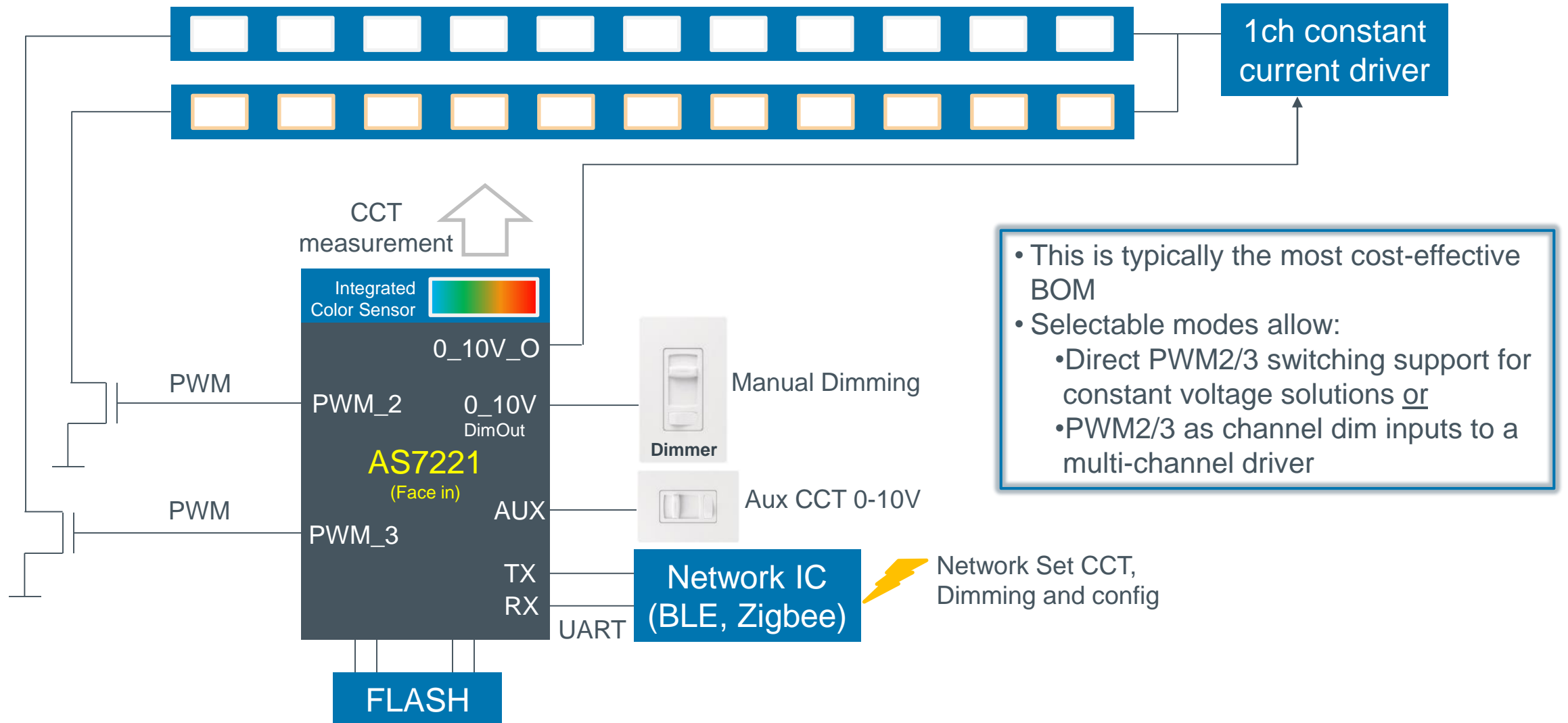
- This is typically the most cost-effective BOM
- Selectable modes allow:
  - Direct PWM2/3 switching support for constant voltage solutions <u>or</u>
  - PWM2/3 as channel dim inputs to a multi-channel driver

AS7220 CCT/Lumen Maintenance Manager

Standalone Color Point and Lumen Maintenance   P/N 191960050

am
Sensing is life.

Key Features

- Manages lighting based on daylight & CCT
  - Constant lumen/CCT target output
  - Digital deep dimming 1-100%
  - 0-10V control interface
- Automatic lumen & CCT maintenance
- EPROM or resistor configurable CCT target
- EPROM configurable "100% lumen output" reference

Applications
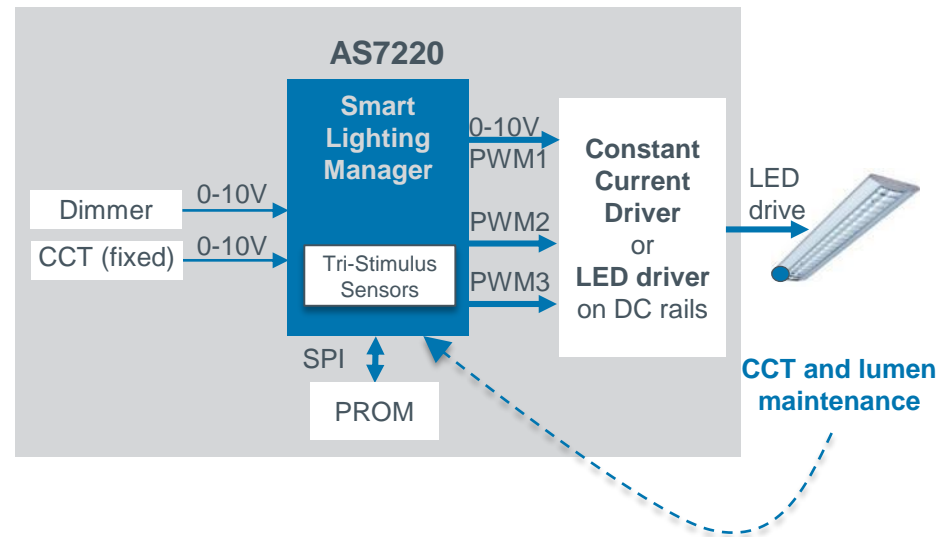
- Lumen maintenance "engine"
- Accurate color temperature lamp to lamp
- Flexible manufacturing… One BOM could support multiple CCT SKUs

For a network-enabled implementation, equivalent functions are available in the AS7221 IoT Tunable White Smart Lighting Manager
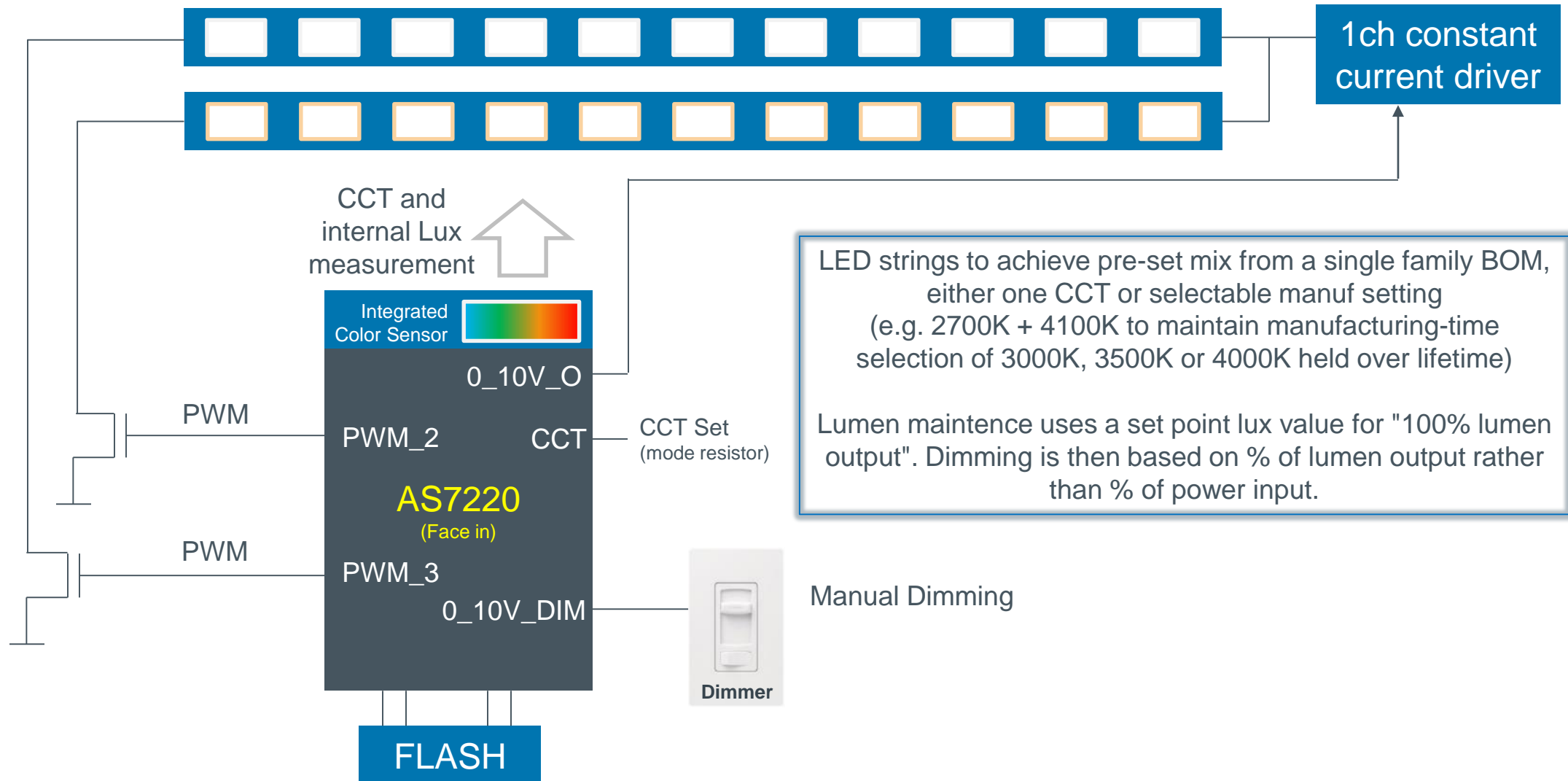
Associated Benefits

- Lifetime, temperature & lamp-lamp consistency
- Eliminates lumen/color binning penalty
- Significantly reducing cost of quality lighting

Functional Block Diagram

Color and Lumen Maintenance tuning + Dimming

Set a single CCT target into Flash, or configurable via resistor/switch

ams

Sensing **is life.**

1ch constant current driver

CCT and internal Lux measurement

Integrated Color Sensor

0_10V_O

PWM — PWM_2   CCT — CCT Set (mode resistor)

AS7220
(Face in)

PWM — PWM_3

0_10V_DIM — Manual Dimming

Dimmer

FLASH

LED strings to achieve pre-set mix from a single family BOM, either one CCT or selectable manuf setting
(e.g. 2700K + 4100K to maintain manufacturing-time selection of 3000K, 3500K or 4000K held over lifetime)

Lumen maintence uses a set point lux value for "100% lumen output". Dimming is then based on % of lumen output rather than % of power input.

Smart Lighting Manager

Award winning technology

The AS7211 Smart Daylighting Manager was recognized by both EDN and Electronic Product Magazine as a 2016 Product of the Year

The AS7221 wins May 2017 IES/IALD-judged LIGHTFAIR Innovation Award
(the IES is the international Illumination Engineering Society and the IALD is the International Association of Lighting Designers)

The IES/IALD judges said:
"(ams) *has created a product that truly represents the future of sensor technology. Combining miniaturization and performance, we finally see the path toward connected lighting where lighting can be the vehicle for Big Data and an IC chip can sense, analyze and respond to a whole host of gathered input. We believe this one small device signals the beginning of a vast future for our industry*."

The AS7221 wins Sept 2017 LEDprofessional Technical Innovation Award

The AS7225 wins Feb 2018 Strategies in Light/LEDs Magazine Sapphire Award

Thank you!

Please visit our website
www.ams.com
and
www.ams.com/Sensor-Driven-Lighting