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:
Light sensors

Rahland Gordon

9/24/20

TI Light Sensors: Why us?

Expertise | Supply | Quality | Innovation

Expertise

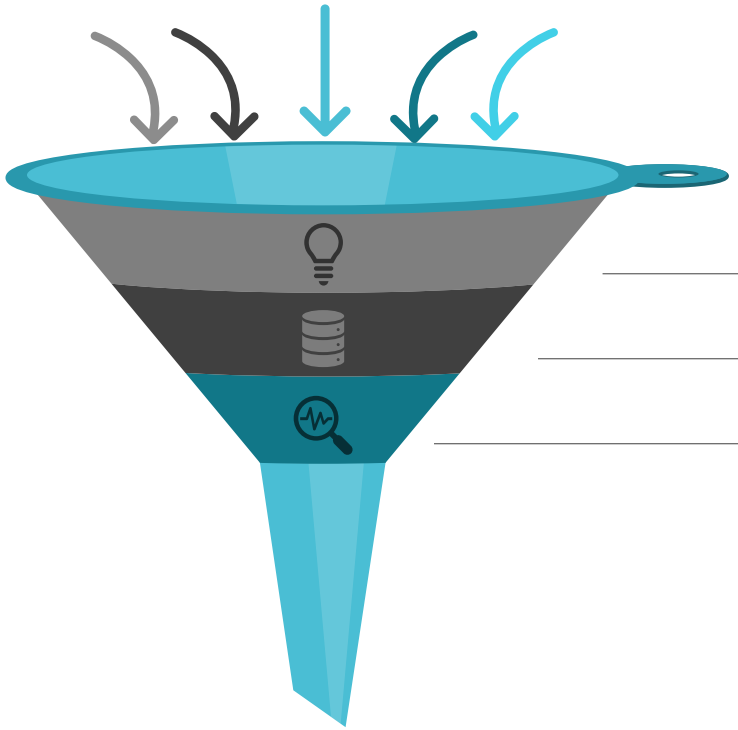
Over 25 years of light sensor expertise producing numerous technical documents, videos, and webinars sharing our knowledge while implementing it in our designs.

Supply

Over 70 Million units shipped and growing. We establish capacity ahead of customers' needs; sustaining and average growth rate of 30% year-on-year.

Quality

TI builds reliable products that work the way they're intended to work, for the lifetime of their application.



Innovation

From an ALS with 7x lower power than the competition to the world's thinnest ALS, TI continues to push the boundaries of speed and performance for tomorrow needs.

EXPERTISE

SUPPLY

QUALITY

INNOVATION

Result

An experience unlike any other that ensures the continuity of supply of a large company with the care and forward thinking of a start up.

MI | Optical Timeline

OPT301
TI first integrated photodiode and amplifier.

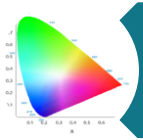
OPT3001
TI first ALS with photopic response.

OPT3006
World's thinnest ALS.

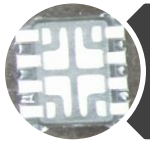
OPT3001-Q1
Automotive Grade 2 ALS. 1 of 2 on the market.

1994 | **2013** | **2016** | **2018** | **Current Investments**

OPT3008
- Blue light sensing for innovative needs in wearables market



OPT400x family
- Higher resolution and faster speed.
- Allows for multiple channels color sensors. Multiple channels means multispectral response



OPT300xDTS
- Innovative packaging
- Compatible with every device in our portfolio

Target Applications

Portable Electronics

Key EE: Tablets, Wireless Speaker, Handset: Smartphone

Building Automation

Key EE: Thermostats, Lighting Control, Video Doorbell

Wearables

Key EE: Smart Watches, Smart Glasses, Health & Fitness Bands

Automotive

Key EE: Heads Up Display (HUD), Rear View Mirror, Lighting, Cluster

Key Differentiators: Lowest Power Consumption, Best Spectrum Matching

Applications

Display Backlight Control

Tablets, TV
Thermostats
EPOS/ATM
Automotive

Daylight Harvesting

Indoor Lighting
Outdoor Lighting
Wired/Wireless Controls
Lighting Sensors

Surveillance

IP Camera Network
Video Doorbell
Analog Security Camera
Video Encoder/Decoder

Wearables

Smart Watch
Wearable Glass
Fitness/Healthcare

Current Optical Sensor Portfolio

OPT3001-Q1
Grade 2 & 3 Available


Low Power: 1.8µA

Automatic Range Selection

OPT3002
Wide Spectrum Response (300nm to 1000nm)



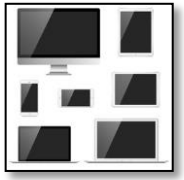
+/- 10% Accuracy

10mLux – 83kLux

OPT3001
Human Eye Response

OPT3004
Improved IR Rejection


OPT3007
World's Thinnest ALS (0.9 x 0.8 x 0.226mm)


OPT300x Value Proposition

Novel Architecture

Consistent linearity and temperature performance across entire range due to patented architecture

Range

23 bit dynamic range. 10mLux to 83kLux

Spectral Matching

Special filter for 99% human eye spectrum matching

Resolution

10mLux with excellent even performance under dark glass

Automatic Gain

Automatically adjust range setting to ensure the best resolution in any given lighting condition

Power Consumption

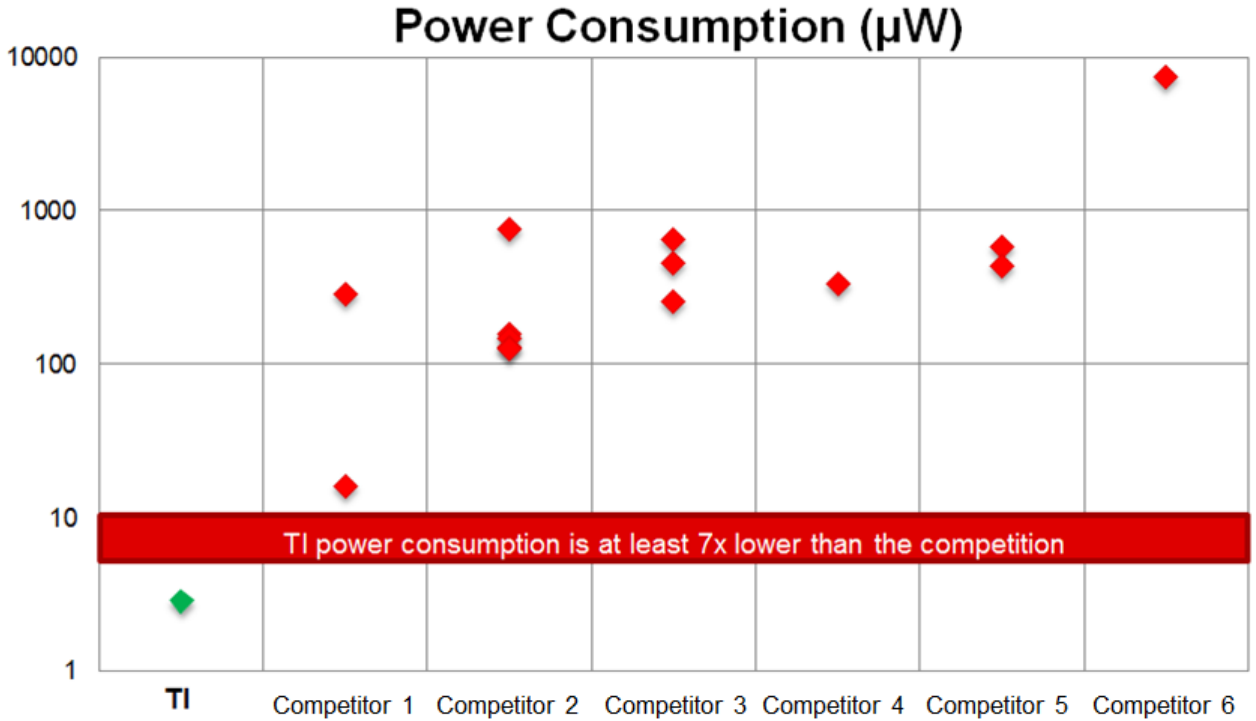
Industry's lower active power of less than 2µA

Driver Support

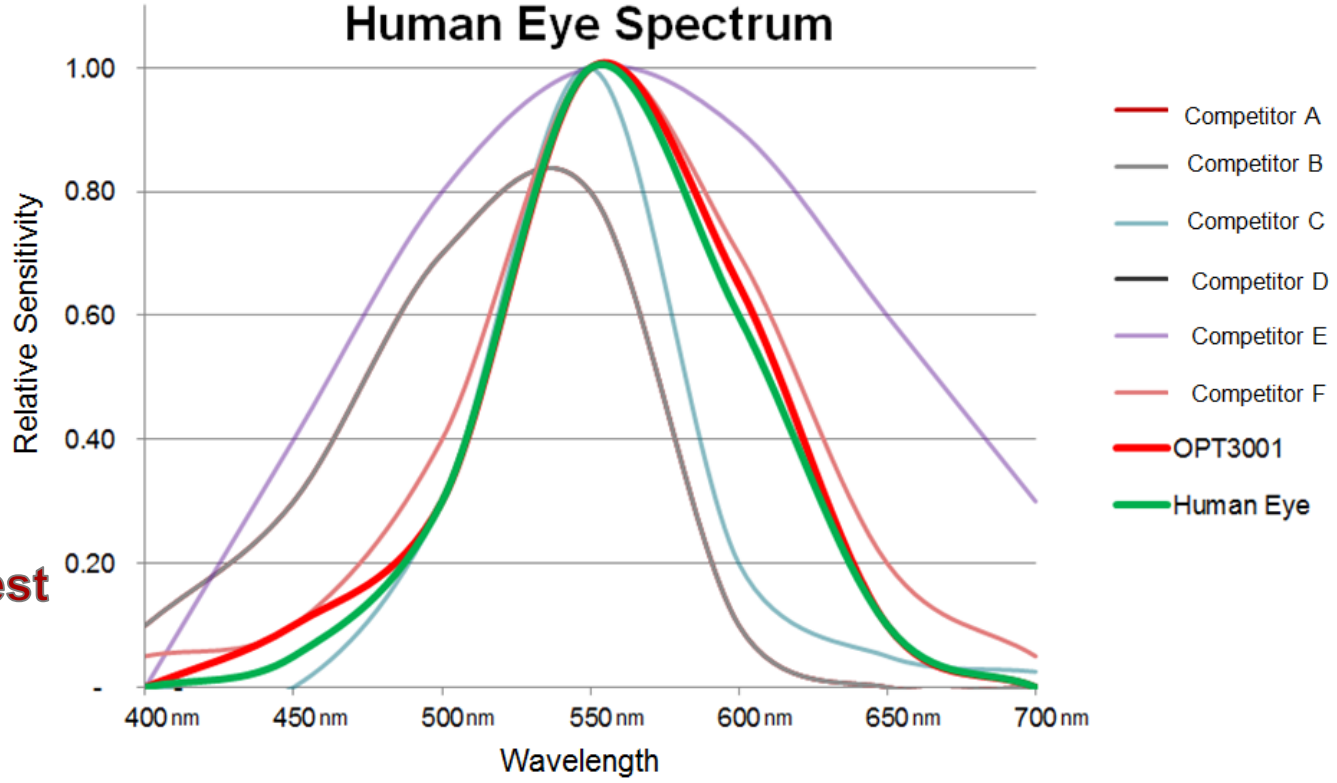
Numerous drivers to support communication through I2C bus and registers.

- Linux
- Intel
- And more…

Competitive Highlights



Competitive Highlights



TI has the best match to the Human Eye Spectrum

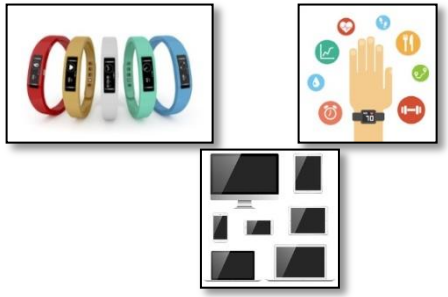
Packaging Options

OQFN

- Simple assembly
  - Sensor and pads on opposite sides
- 2 x 2 x 0.65mm
- 6-pin operation
- Useful in all market segments

WCSP

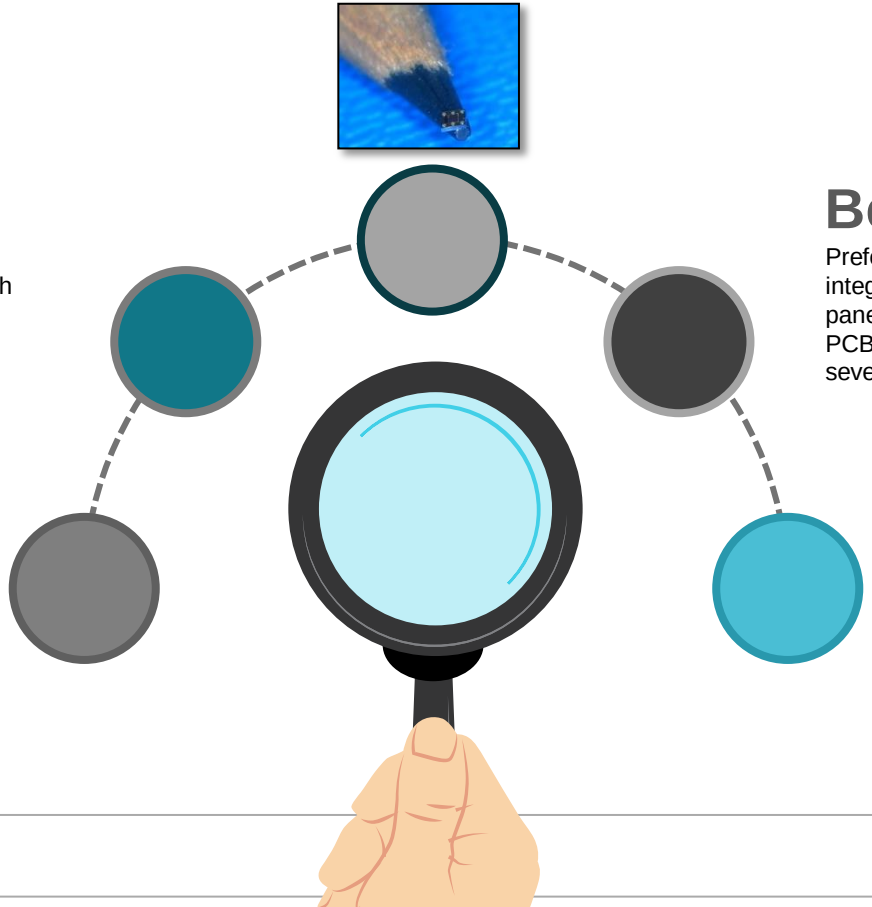
- Unique Assembly
  - Sensor and pads on the same side
- 0.85 x 0.94 x 0.22 mm
- 6-pin packaging with 4 or 6-pin operation
- Useful in size restrictive applications



SOT

- Simple assembly
  - Sensor and pads on opposite sides
- 2.1 x 1.6 x 0.6 mm
- 8-pin packaging with 6-pin operation
- Useful in all market segments

PicoStar Packaging – World's Thinnest ALS



Flex PCB

Integrated seamlessly with flex PCB with a hole over active area

Behind Display

Preferred method of ALS integration under OLED panels with several flex PCB manufacturers over several million units

Small Size

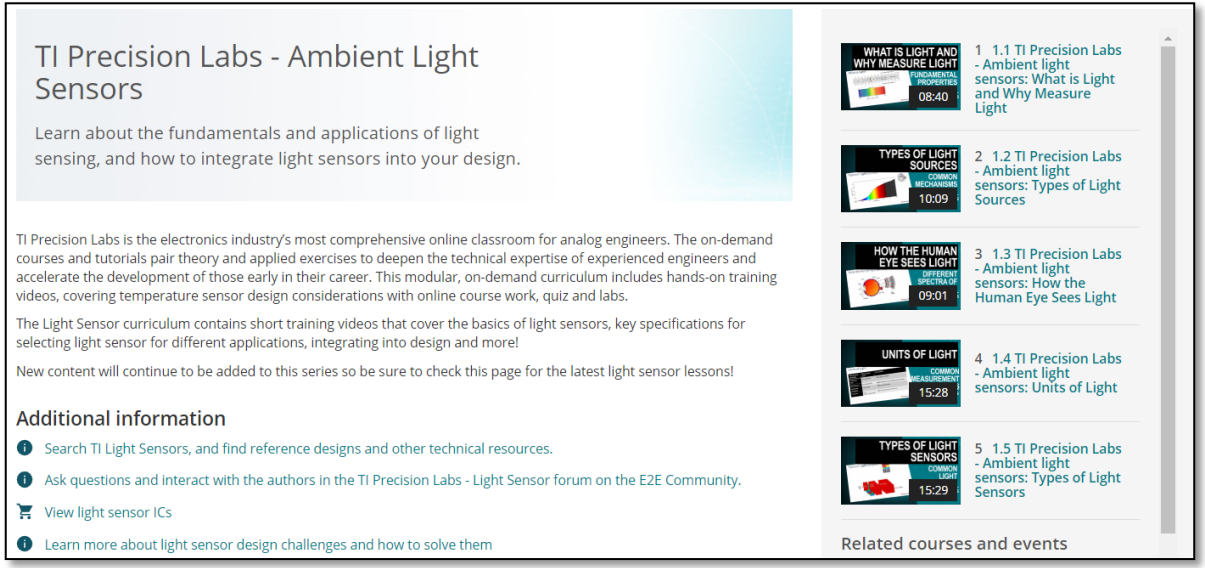
Extremely small size that fits into the thinnest of bezels

Pin Position

Optimal device pin positions for easy hole alignment and integration

Precision Labs: Light Sensor Video Series

	Chapter 1: Fundamentals of Light Sensing	**Chapter 2: How to choose a Light Sensor for Your Application**	**Chapter 3: Applications of Light Sensors**	**Chapter 4: How to Integrate Light Sensors Into Your Design**	



TI Precision Labs - Ambient Light Sensors

Learn about the fundamentals and applications of light sensing, and how to integrate light sensors into your design.

TI Precision Labs is the electronics industry's most comprehensive online classroom for analog engineers. The on-demand courses and tutorials pair theory and applied exercises to deepen the technical expertise of experienced engineers and accelerate the development of those early in their career. This modular, on-demand curriculum includes hands-on training videos, covering temperature sensor design considerations with online course work, quiz and labs.

The Light Sensor curriculum contains short training videos that cover the basics of light sensors, key specifications for selecting light sensor for different applications, integrating into design and more!

New content will continue to be added to this series so be sure to check this page for the latest light sensor lessons!

Additional information

- Search TI Light Sensors, and find reference designs and other technical resources.
- Ask questions and interact with the authors in the TI Precision Labs - Light Sensor forum on the E2E Community.
- View light sensor ICs
- Learn more about light sensor design challenges and how to solve them

OPT3002

Light to Digital Converter

Features

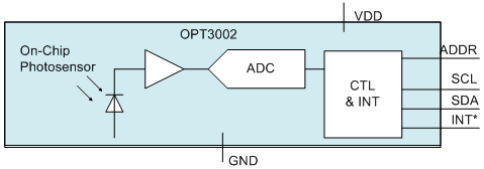
- Complete Optical-to-Digital System
  - Sensitive from UV to Near-IR
  - 23Bit Effective Dynamic Range with Automatic Range Setting Feature
- Tight Tolerance: 10%
- Flexible Interrupt System
  - Alerts System if Appropriate Event Occurs
- Wide 1.6-3.6V Power Supply Range
- Low 1.8uA (typ.) operating current
- Operating Temperature: -40 to 85 °C
- Small 2.0 x 2.0mm Package

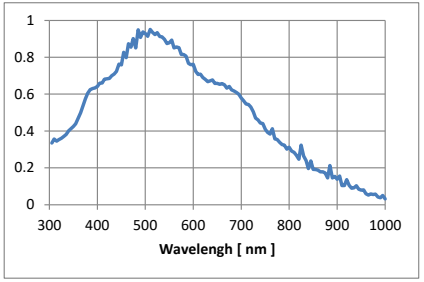
Benefits

- Complete digital optical sensor
- Broad spectral sensitivity
- Wide dynamic range, great low light detection and sensitivity
- Low operating current allows long operating life on small batteries
- Interrupt system allows system to go to sleep until a relevant optical event
- Tight accuracy can eliminate need for calibration

Applications

- Intrusion and Door-Open Detection/Outdoor Traffic and Street Lights
- System Wake-Up Circuits/Tablet and Notebook Computers
- Medical and Scientific Instrumentation
- Display Backlight Controls/Lighting Control Systems
- Thermostats and Home Automation Appliances





OPT3001

Ambient Light Sensor

Features

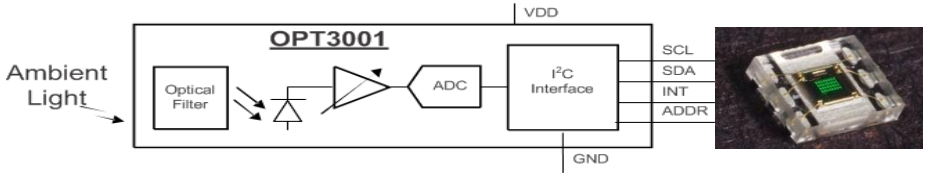
- Good Human Eye Spectral Matching
  - < 1% IR Response
- Optical Power Sensitivity
  - 0.01 Lux – 83,000 Lux
  - Automatic Range Setting
    - 23 Bit Dynamic Range
- Tight Absolute Accuracy: 10%
- Wide 1.6 – 3.6V Power Supply Range
- Low 2uA Operating Current

Benefits

- Best Representation of Human Experience
  - “OPT3001 sees what you see”
  - Low measurement variation between light sources Florescent, Sunlight, Halogen, etc.
  - Especially good under dark glass
- Simpler Software, Always in Optimal Range
- Simplifies System Calibration
- Flexible & Easy Power Supply

Applications

- Any Lit Screen exposed to Varied Lighting
- Any Lighting Control changing with Ambient
- HMI: Displays Intensity Control
- Lighting, Building/Home Automation
- Personal Electronics



OPT3004

Ambient Light Sensor with Increased Angular IR Rejection

Features

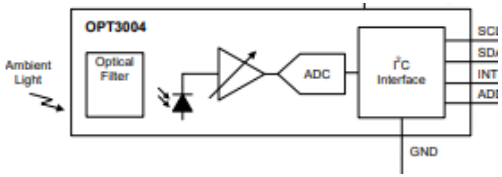
- Good Human Eye Spectral Matching
  - Rejects >99% of IR over ±85° Angle of Incidence
- Optical Power Sensitivity
  - 0.01 Lux – 83,000 Lux
  - Automatic Range Setting
    - 23 Bit Dynamic Range
- Tight Absolute Accuracy: 10%
- Wide 1.6 – 3.6V Power Supply Range
- Low 2uA Operating Current

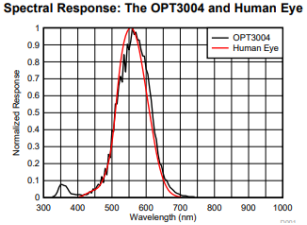
Benefits

- Best Representation of Human Experience
  - “OPT3004 sees what you see”
  - Low measurement variation between light sources Florescent, Sunlight, Halogen, etc.
  - Especially good under dark glass
- Simpler Software, Always in Optimal Range
- Simplifies System Calibration
- Flexible & Easy Power Supply

Applications

- Any Lit Screen exposed to Varied Lighting
- Any Lighting Control changing with Ambient
- HMI: Displays Intensity Control
- Lighting, Building/Home Automation
- Personal Electronics





OPT3001-Q1
Ambient Light Sensor

Features

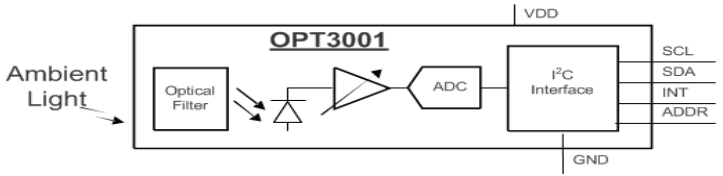
- Good Human Eye Spectral Matching
  - < 1% IR Response
- AECQ-100 Qualified Grade 2 (-40 to 105°C)
  - Grade 3 (-40 to 85°C)
- Optical Power Sensitivity
  - 0.01 Lux – 83,000 Lux
  - Automatic Range Setting
    - 23 Bit Dynamic Range
- Wide 1.6 – 3.6V Power Supply Range

Benefits

- Best Representation of Human Experience
  - “OPT3001-Q1 sees what you see”
  - Low measurement variation between light sources Florescent, Sunlight, Halogen, etc.
  - Especially good under dark glass
- Simpler Software, Always in Optimal Range
- Simplifies System Calibration
- Flexible & Easy Power Supply

Applications

- Any Lit Screen exposed to Varied Lighting
- Any Lighting Control changing with Ambient
- HMI: Displays Intensity Control
- Lighting, Building/Home Automation
- Personal Electronics



OPT3006/7

Ambient Light Sensor

Features

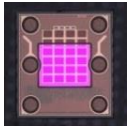
- World's Smallest & Thinnest Ambient Light Sensor: 0.94 x 0.85 x 0.226mm
- Good Human Eye Spectral Matching
  - <1% IR Response
- Optical Power Sensitivity
  - 0.01 – 83,000Lux
  - Automatic Range Setting
- Absolute Accuracy: 20%
- Wide 1.6V - 3.6V Power Supply Range
- Low 1.8uA (typ) Operating Current.
- Flexible Interrupt System

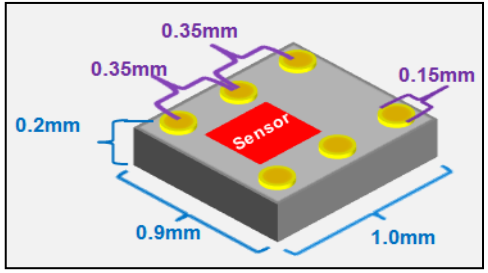
Benefits

- Can fit in places no other light sensor can fit.
- Best Representation of Human Experience
  - Low measurement variation between light sources Florescent, Sunlight, Halogen, etc.
  - Especially good under dark glass
- Tight accuracy can eliminate need for calibration
- Interrupt system allows system to go to sleep until a relevant optical event
- Simpler Software, no req. for proper range selection
- Flexible & easy Power Supply, can eliminate need for additional power supplies.
- Low operating current allows long operating life on small batteries.

Applications

- Any Lit Screen exposed to Varied Lighting
- Any Lighting Control changing with Ambient
- HMI: Displays Intensity Control
- Lighting, Building/Home Automation
- Personal Electronics





Visit www.ti.com/npu

For more information on the New Product Update series, calendar and archived recordings

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