OPT3001 Ambient Light Sensor

1 Features

- Great Human Eye Matching: 99% IR Rejection
- Automatic Full-Scale Setting Feature Simplifies Software and Ensures Proper Configuration
- Measurements: 0.01 lux to 83k lux
- 23-Bit Effective Dynamic Range with Automatic Gain Ranging
- 12 Binary-Weighted Full-Scale Range Settings: < 0.3% (typ) Matching Between Ranges
- Low Operating Current: 2 µA (typ)
- Operating Temperature Range: –40°C to 85°C
- Wide Power-Supply Range: 1.6 V to 3.6 V
- 5.5-V Tolerant I/O
- Flexible Interrupt System
- Small-Form Factor: 2.0 mm × 2.0 mm × 0.65 mm

2 Applications

- Display Backlight Controls
- Lighting Control Systems
- Tablet Computers
- Notebooks

3 Description

The OPT3001 is an ideal sensing device for measuring ambient light. Measurements can be made from 0.01 lux up to 83k lux without selecting full-scale ranges by using the built-in, full-scale setting feature. This capability allows light measurement over a 23-bit effective dynamic range.

The spectral response of the ambient light sensor is tightly matched to the photopic response of the human eye and has significant infrared rejection. This tightly matched response offers accurate lux readings of different spectral sources, even under dark glass.

The digital operation is flexible for system integration. Measurements can be either continuous or single-shot. The control and interrupt system features autonomous operation, allowing the processor to sleep while the sensor searches for appropriate wake-up events.

The low power consumption and low power-supply voltage capability make this device ideal for battery-powered applications.

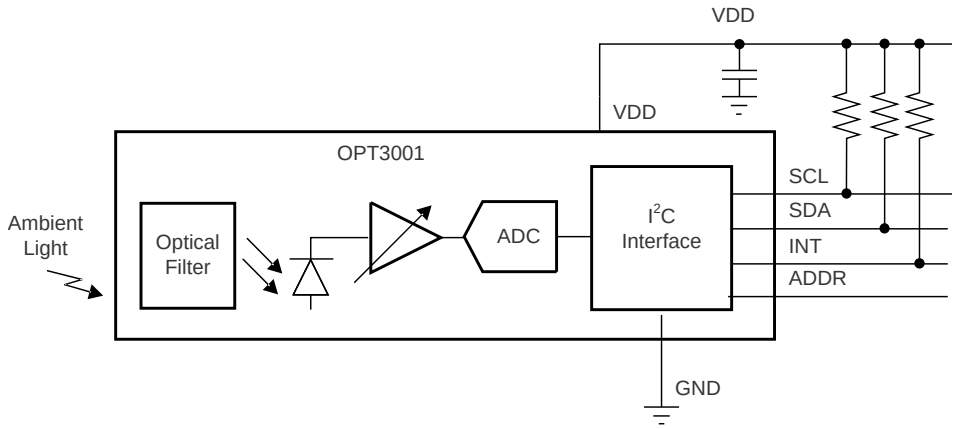
Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
OPT3001	USON (6)	2.00 mm x 2.00 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.

PRODUCT PREVIEW

Block Diagram



4 Device and Documentation Support

4.1 Trademarks

All trademarks are the property of their respective owners.

4.2 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

4.3 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical packaging and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PRODUCT PREVIEW

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
OPT3001DNPR	PREVIEW	USON	DNP	6	3000	TBD	Call TI	Call TI	-40 to 85		
OPT3001DNPT	PREVIEW	USON	DNP	6	250	TBD	Call TI	Call TI	-40 to 85		

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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