Optical Mouse Sensors

Avago Technologies is the Undisputed Leader in Optical Position Sensors for Mouse Technology

Avago Technologies - the Inventor of optical mice sensor technology, introduced the world's first surface-independent, optical position-sensors for mouse technology in 1999. To date, Avago has shipped more than 600 million optical mouse sensors to all the world's optical mouse manufacturers.

PC users are demanding smoother, faster and more precise mouse control over a wider variety of surfaces. In answer to this need, traditional ball-based tracking has been replaced by a solid-state, optical tracking system that increases mouse surface coverage, prevents cursor skipping, enhances navigation accuracy, enables greater durability, and reduces maintenance due to fewer mechanical parts. A new laser-based navigation technology from Avago now takes these capabilities one step further to provide the smoothest and most accurate motion ever from an optical mouse.

Avago Technologies is a world leader in opto-electronic technologies, including CMOS imaging, infrared technology, motion control, light-emitting-diodes (LEDs), and fiber-optic transceivers. Avago Technologies first leveraged this expertise to pioneer LED-based navigation technology and, more recently, when it developed laser-based navigation technology for optical mice. Avago offers a diverse line of optical mice sensors, providing optimal navigation solutions for both corded and cordless PC mice. Today, Avago has innovated the worlds smallest sensor package in both LED-based and laser sensor to enable miniaturized/travel mice design, which is key to expanding possibilities and non-mouse new business applications.

Applications

Avago Technologies' optical mouse sensors provide improved navigation accuracy on virtually all surfaces making it the preferred solution for both corded and cordless applications. Avago sensors provide the smoothest and highest precision navigation controls, making them ideal for workstations, PCs, notebook computers or other input devices.
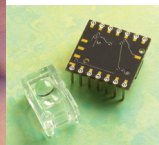
Avago Technologies' sensor teams with an LED, lens, and clip to offer a complete navigation solution

Optical mice offer smoother, more precise tracking than traditional ball mice.

Miniaturized Navigation Sensor

2

How It Works

LED-Based Optical Technology

Operation of the optical mouse sensor begins when the user moves his mouse. The optical mouse illuminates the work surface with an LED to reveal a microscopic pattern of highlights and shadows. These patterns are reflected onto Avagos' navigation sensor in the mouse, which takes thousands of pictures per second. The same images are processed by the digital signal processor (DSP) to determine the direction and distance of motion. The DSP generates values for the relative change in position. The motion information is accessed by a microcontroller inside the mouse and then sent to the computer, directing the precise position of the computer's onscreen cursor.
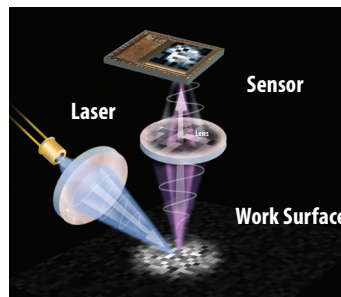
LaserStream™ Navigation Technology

Laser-based optical mice work in much the same way as LED-based mice. When the user moves the mouse, the work surface is illuminated to reveal microscopic patterns. By harnessing the coherent nature of laser light, laser illumination uncovers trackable surface structures that the incoherent LED light source cannot reveal. With this improvement, laser-based mice are able to track on smooth surfaces where LED-based optical mice fail.

Sensor

Lens

LED
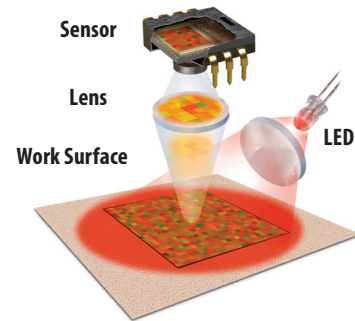
Work Surface

LED Technology

Optical mice illuminate an area of the work surface with an LED, to reveal a microscopic pattern of highlights and shadows. These patterns are reflected onto the navigation sensor, which takes thousands of pictures per second.

Avago Technologies' sensor teams with an LED, lens and clip to offer a complete navigation solution.

Sensor

Laser

Lens

Work Surface

LaserStream™ Technology

Avago Technologies uses its laser technology to uncover surface detail - or contrast - not visible to LED light. This information is processed by the sensor's DSP engine. By harnessing the coherent nature of the laser light, the laser technology reveals a new level of surface detail and enables the laser to track on surfaces where LED-based sensors typically fail.

Beyond Optical Mice

Non-Mouse Applications

Avago Technologies Optical Navigation Sensors can be used in a wide range of applications besides optical mice, such as household appliances, consumer electronic appliances, and IT peripherals.

Applications

Precision tracking

How it works:

Uses the navigation algorithm to position and stitch the mobile printer enabling it to print the complete image in a freehand manner.

Example application:

Can be used in various household appliances such as printers, sewing machines etc.

Speed detection

How it works:

Apart from lateral velocity, the sensor can also be used to measure distance traveled.

Example application:

To measure speed of sports equipment, toys, etc.

Alternative input device

How it works:

Similar to an optical mouse.

Example application:

Pen mouse and track ball.

Auto stop motion detection

How it works:

The Optical Navigation Sensors will detect a moving surface underneath the sensor. When motion is detected, the microcontroller will trigger the application to power-up. When motion is undetected, the microcontroller will power down the application.

Example application:

Used in irons as a safety feature and energy saver.

Optical Navigation Sensors Summary

LED-based Optical Navigation Sensor

Part Number	Categories	Description
ADNS-2030	Cordless	Low power optical mouse sensor optimized for cordless mouse applications
ADNS-2051	Corded	Mid range optical mouse sensor for corded and cordless mouse applications
ADNS-2610	Corded SFF	Entry-level, small form factor, optical mouse sensor for general mouse applications
ADNS-2620	Corded SFF	Entry-level, small form factor, optical mouse sensor with performance features for general mouse applications
ADNS-3040	Cordless	Ultra Low Power Optical Mouse Sensor optimized for cordless mouse applications
ADNS-3060	Corded Performance	High-performance optical mouse sensor
ADNS-3080	Gaming	High-resolution optical mouse sensor for gaming applications
ADNS-5020-EN	Corded SFF	Enhanced performance of entry level, small form factor optical mouse sensor for corded mouse application
ADNS-5030	Cordless SFF	Low power, small form factor optical mouse sensor for cordless mouse applications
ADNS-3530	Miniaturization	Miniaturized low power Chip-on-Board LED integrated for cordless application
ADNS-3550	Miniaturization	Miniaturized low power Chip-on-Board LED integrated for cordless application

LaserStream Optical Navigation Sensor

Part Number	Categories	Description
ADNS-6000	Corded	High-performance laser mouse sensor
ADNS-6010	Gaming	High- resolution laser mouse sensor for gaming applications
ADNS-7050	Cordless	Low power laser mouse sensor
ADNS-6530	Miniaturization	Miniaturized, low power intergrated Chip-on-Board LaserStream sensor for cordless application

LaserStream™ Optical Navigation Sensors

| LaserStream™ Optical Navigation Sensor				
Product Number	**ADNS-6000**	**ADNS-6010**	**ADNS-7050**	**ADNS-6530**
General Features				
Categories (Corded/Cordless/Gaming/SFF)	Corded	Gaming	Cordless	SFF Miniaturization
Operating voltage	3.3V	3.3V	2.8V	2.8V
Interface	SPI	SPI	SPI	SPI
Sensor current consumption - Running	50 mA (Max @ LOP~506µW)	53 mA (Max @ LOP~506µW)	3 mA (Typical @ LOP~506µW)	3 mA (Typical @ LOP~506µW)
Sensor+LED/Laser current consumption - Running	60 mA (Max @ LOP~506µW & VSCEL Bin3A)	63 mA (Max @ LOP~506µW & VSCEL Bin3A)	4 mA (Typical @ LOP~506µW & VSCEL Bin3A)	4 mA (Typical @ LOP~506µW & VSCEL Bin3A)
Current consumption - Power down (Typical)	5 uA	5 uA	1 uA	1 uA
IC Package	DIP-20	DIP-20	DIP-18	COB-14
X & Y & Z Dimension	22.3mm X 12.86mm X 9.6mm	22.3mm X 12.86mm X 9.6mm	17.84mm X 12.85mm X 9.6mm	15.1mm X 14.5mm X 5.7mm
Clock frequency	24 MHz	24 MHz	Internal Oscillator	Internal Oscillator
Max Speed (Subject to surface condition)	20ips	45ips	20ips	20ips
Programmable Features				
Frame rate	500-6469 fps	2000-7080 fps	SmartSpeed	SmartSpeed
Resolution	400/800 cpi	400/800/1600/2000 cpi	400/800 cpi	400/800 cpi
Sleep Mode	N/A	N/A	3 self-adjusting power-saving modes (Rest1, Rest2, Rest3)	4 self-adjusting power-saving modes (Rest1, Rest2, Rest3)
Power Management	Power down pin	Power down pin	Register access	Register access
Acceleration from sleep mode	8 G	20 G	8 G	8 G
LED Strobe/Fixed	Strobe	Strobe	Strobe	Strobe
Self Diagnostics				
Product/Revision ID	Register access	Register access	Register access	Register access
Squal Data	Register access	Register access	Register access	Register access
Pixel Dump	Register access	Register access	Register access	Register access
Average/Max Pixel	Register access	Register access	Register access	Register access
Motion Detect	Register access	Register access	Motion pin and Register access	Motion pin and Register access
LED/Laser Fault Detect	Register access	Register access	Register access	Register access
Applications	Mice for game consoles / computer Mice for desktop PC's/ Workstations and portable PC's Laser trackballs Integrated input devices	Mice for game consoles / computer Mice for desktop PC's/ Workstations and portable PC's Laser trackballs Integrated input devices	Laser mice Optical trackballs Integrated input devices Battery-powered input devices	Laser mice Optical trackballs Integrated input devices Battery-powered input devices
Part Number				
Sensor	ADNS-6000	ADNS-6010	ADNS-7050	ADNS-6530
Bundles	ADNB-6001-EV / ADNB-6002-EV	ADNB-6011-EV / ADNB-6012-EV	ADNB-7051 -EV / ADNB-7052-EV	ADNB-6532
Sample Kit	ADNK-6000	ADNK-6010	ADNK-7050	ADNK-6530
Reference Design Kit	ADNK-6003-SP01	ADNK-6003-SP01	ADNK-7053-XXXX	ADNS-6533-XXXX

LED-based Optical Navigation Sensors

LED-Based Optical Navigation Sensor					
Product Number	**ADNS-2610**	**ADNS-2620**	**ADNS-2051**	**ADNS-2030**	**ADNS-3060**
General Features					
Categories (Corded/Cordless/Gaming/SFF)	Corded	Corded	Corded	Cordless	Corded
Operating voltage	5V	5V	5V	3.3V	3.3V
Interface	SPI	SPI	SPI, Quadrature	SPI, Quadrature	SPI
Sensor current consumption - Running	15 mA (Typical)	15 mA (Typical)	15 mA (Typical)	13 mA (Typical)	60 mA (Typical)
Sensor+LED/Laser current consumption - Running	35 mA (Typical)	35 mA (Typical)	62 mA (Typical)	28 mA (Typical)	66 mA (Max)
Power consumption - Power down (Typical)	170 uA	170 uA	170 uA	4 uA	5 uA
IC Package	DIP-8	DIP-8	DIP-16	DIP-16	DIP-20
X & Y & Z Dimension	9.9mm X 9.1mm X 6.1mm	9.9mm X 9.1mm X 6.1mm	22.3mm X 9.1mm X 6.1mm	22.3mm X 9.1mm X 6.1mm	22.3mm X 12.85mm X 8mm
Clock frequency	24 MHz	24 MHz	18 MHz	18 MHz	24 MHz
Max Speed (Subject to surface condition)	12 ips (@1500fps)	12ips (@1500fps)	14ips (@1500fps)	14ips (@1500fps)	40ips (@6469fps)
Programmable Features					
Frame rate	1500 fps	500-2300 fps	500-2300 fps	500-2300 fps	500-6469 fps
Resolution	400 cpi	400 cpi	400/800 cpi	400/800 cpi	400/800 cpi
Sleep Mode	Auto, Always awake	Auto, Always awake	Auto, Always awake	Auto, Always awake	N/A
Power Management	Register access	Register access	Power down pin	Power down pin	Power down pin
Acceleration from sleep mode	0.25 G	0.25 G	0.15 G	0.15 G	15 G @6469fps
LED Strobe/Fixed	Fixed	Strobe	Strobe	Strobe	Strobe
Self Diagnostics					
Product/Revision ID	Register access	Register access	Register access	Register access	Register access
Squal Data	Register access	Register access	Register access	Register access	Register access
Pixel Dump	Register access	Register access	Register access	Register access	Register access
Average/Max Pixel	Register access	Register access	Register access	Register access	Register access
Motion Detect	N/A	N/A	Register access	Register access	Register access
LED/Laser Fault Detect	N/A	N/A	Register access	Register access	Register access
Applications	Mice for desktop PC's/Workstations and portable PC's Trackballs Integrated input devices	Mice for desktop PC's/Workstations and portable PC's Trackballs Integrated input devices	Mice for desktop PC's/Workstations and portable PC's Trackballs Integrated input devices	Cordless optical mice Mice for desktop PC's/Workstations and portable PC's Trackballs Integrated input devices	Mice for game consoles/computer Mice for desktop PC's/Workstations and portable PC's Trackballs Integrated input devices
Part Number					
Sensor	ADNS-2610	ADNS-2620	ADNS-2051	ADNS-2030	ADNS-3060
Bundles	ADNB-2611 / ADNB-2612	ADNB-2621 / ADNB-2622	ADNB-2050 / ADNB-2051	ADNB-2031 / ADNB-2032	ADNB-3061 / ADNB-3062
Sample Kit	ADNK-2610	ADNK-2620	ADNK-2052	ADNK-2030	ADNK-3060
Reference Design Kit	N/A	ADNK-2623	ADNK-2051	ADNK-2133	ADNK-3061

|	ADNS-3080	ADNS-3040	ADNS-5020-EN	ADNS-5030	ADNS-3530	ADNS-3550
	Gaming	Cordless	Corded	Cordless	SFF Miniaturization	SFF Miniaturization
	3.3V	2.85V	5V	3.3V	2.85V	2.85V
	SPI	SPI	SPI	SPI	SPI	SPI
	52 mA (Typical)	1.9 mA (Typical)	6 mA (Typical)	3.2 mA (Typical)	1.9 mA (Typical)	1.9 mA (Typical)
	58 mA (Max)	2.9 mA (Typical)	26 mA (Typical)	15.2 mA (Typical)	3.6 mA (Typical)	3.6 mA (Typical)
	5 uA	1 uA	2 mA (Idle state)	28 uA	1 uA	1 uA
	DIP-20	DIP-20	DIP-8	DIP-8	COB-14	COB-14
	22.3mm X 12.85mm X 8mm	22.3mm X 12.85mm X 8mm	9.9mm X 12.85mm X 6.1mm	9.9mm x 12.85mm x 6.1mm	9.6mm X 12.9mm X 1.69mm	12.5mm X 12.9mm X 1.69mm
	24 MHz	Internal Oscillator	Internal Oscillator	Internal Oscillator	Internal Oscillator	Internal Oscillator
	40ips (@6469fps)	20ips	20ips	14ips	20ips	20ips
	2000-6469 fps	SmartSpeed	SmartSpeed	SmartSpeed	SmartSpeed	SmartSpeed
	400/1600 cpi	400/800 cpi	500/1000 cpi	500/1000 cpi	400/800 cpi	400/800 cpi
	N/A	3 self-adjusting power-saving modes (Rest1, Rest2, Rest3)	N/A	3 self-adjusting power-saving modes (Rest1, Rest2, Rest3)	3 self-adjusting power-saving modes (Rest1, Rest2, Rest3)	3 self-adjusting power-saving modes (Rest1, Rest2, Rest3)
	Power down pin	Shutdown pin	N/A	N/A	Shutdown pin	Shutdown pin
	15 G @6469fps	8 G	2 G	2 G	8 G	8 G
	Strobe	Strobe	Strobe	Strobe	Strobe	Strobe
	Register access	Register access	Register access	Register access	Register access	Register access
	Register access	Register access	Register access	Register access	Register access	Register access
	Register access	Register access	Register access	Register access	Register access	Register access
	Register access	Register access	Register access	Register access	Register access	Register access
	Register access	Motion Pin and Register access	Register access	Register access	Motion Pin and Register access	Motion Pin and Register access
	Register access	N/A	N/A	N/A	N/A	N/A
	Mice for game consoles / computer	Optical mice	Optical mice	Optical mice	Optical mice	Optical mice
	Mice for desktop PC's/ Workstations and portable PC's	Optical trackballs	Optical trakballs	Optical trackballs	Optical trackballs	Optical trackballs
	Trackballs	Integrated input devices	Integrated input devices	Integrated input devices	Integrated input devices	Integrated input devices
	Integrated input devices	Battery-powered input devices		Battery-powered input devices	Battery-powered input devices	Battery-powered input devices
	ADNS-3080	ADNS-3040	ADNS-5020-EN	ADNS-5030	ADNS-3530	ADNS-3550
	ADNB-3081 / ADNB-3082	ADNB-3042	ADNB-5021-EN / ADNB-5022-EN	ADNB-5031 / ADNB-5032	ADNB-3532	ADNB-3552
	ADNK-3080	ADNK-3040	ADNK-5020-EN	ADNK-5030	ADNK-3530	ADNK-3550
	ADNK-3083	ADNK-3043-XXXX	ADNK-5023-XXX2	ADNK-5033-XXXX	ADNK-3533-XXXX	ADNK-3553-XXXX

LaserStream™ Mouse Solutions

ADNS-6530
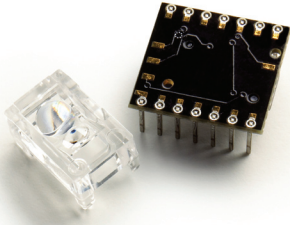
Description

Avago Technologies ADNS-6530 integrated COB LaserStream sensor comprises of a sensor and VCSEL in a single package. The advanced class of VCSEL was engineered by Avago to provide a laser diode with a single longitudinal and a single transverse mode. In contrast to most oxide-based single-mode VCSEL, this class of Avago VCSEL remains within single mode operation over a wide range of output power. It has significantly lower power consumption than an LED. It is an excellent choice for optical navigation applications.
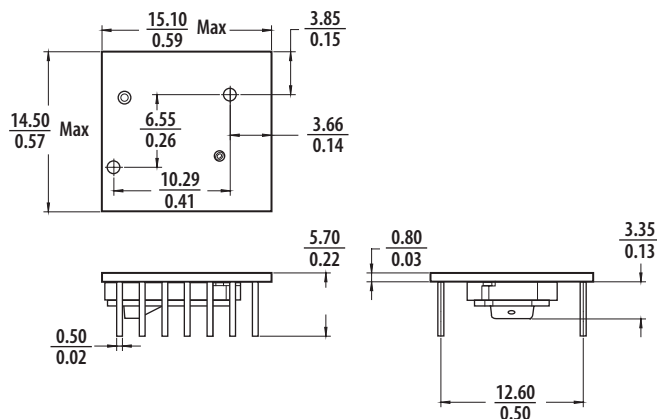
Applications

• Laser mice
• Optical trackballs
• Integrated input devices
• Battery-powered input devices

Features

• Small form factor, integrated chip-on-board package
• Low power architecture
• New LaserStream technology
• Self-adjusting power-saving modes for longest battery life
• High speed motion detection up to 20 ips and 8G
• Enhanced SmartSpeed self-adjusting frame rate for optimum performance
• Motion detect pin output
• Internal oscillator - no clock input needed
• Selectable 400 and 800 cpi resolution
• Four wire serial port
• Minimal number of passive components
• Laser fault detect circuitry on-chip for Eye Safety Compliance
• Wide operating voltage: 2.7V - 3.6V nominal
• Advanced Technology VCSEL chip
• Single Mode Lasing operation
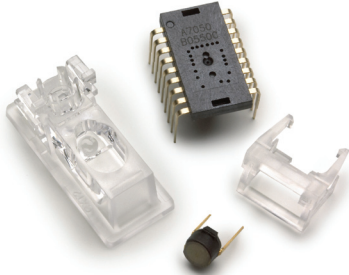• 832 - 865 nm wavelength

Package Drawing

Ordering Information

Part Number	
ADNB-6352	Sensor: ADNS-6530
	SFF Lens: ADNS-6150
ADNK-6530	ADNS-6530 Sample kit, includes sensor and small form factor lens
ADNK-6533-XXXX	ADNS-6530 Reference Design Kit. Includes an evaluation mouse with ADNS-6530 sensor, plus components in a sample kit.

LaserStream™ Mouse Solutions

ADNS-7050

Description

Avago Technologies ADNS-7050 optical mouse sensor is based on the world's first laser-illuminated system enabled for cordless application. Powered by the LaserStream navigation technology, the mouse can operate on many surfaces that are difficult for traditional LED-based optical navigation. Its high-performance, low-power architecture is capable of sensing high-speed mouse motion while prolonging battery life; two performance area essential in demanding cordless applications.

Package Drawing

Applications

- Cordless and corded mice
- Battery-powered input devices
- Industrial products
- Integrated input devices

Features

- Low power architecuture
- LaserStream technology
- Self-adjusting power-saving modes for longest battery life
- High speed motion detection up to 20 ips and 8G
- Enhanced SmartSpeed self-ajusting frame rate for optimum performance
- Motion detect pin output
- Internal oscillator - no clock input needed
- Selectable 400 and 800 cpi resolution
- Wide operating voltage: 2.7V-3.6V nominal
- Four wire serial port
- Minimal number of passive components
- Laser fault detect circuitry on-chip for Eye Safety Compliance

Ordering Information

Part Number	
ADNB-7051-EV	Sensor: ADNS-7050
	Lens: ADNS-6120
	Clip: ADNS-6230-001
	Vcsel: ADNV-6340
ADNB-7052-EV	Sensor: ADNS-7050
	Lens: ADNS-6130-001
	Clip: ADNS-6230-001
	Vcsel: ADNV-6340
ADNK-7050	ADNS-7050 Samplekit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-7053-XXXX	ADNS-7050 Reference Design Kit. Includes an evaluation mouse with ADNS-7050 sensor, plus components in a sample kit.

# LaserStream™ Mouse Solutions

ADNS-6010
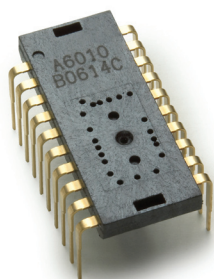
Description

Avago Technologies ADNS-6010 optical mouse sensor is the world's first laser-illuminated systems enabled for high performance navigation. Driven by LaserStream technology, the mouse can operate on many surfaces that prove difficult for traditional LED-based optical navigation. This sensor is powered for the extremely high sensitive user, especially in PC games.
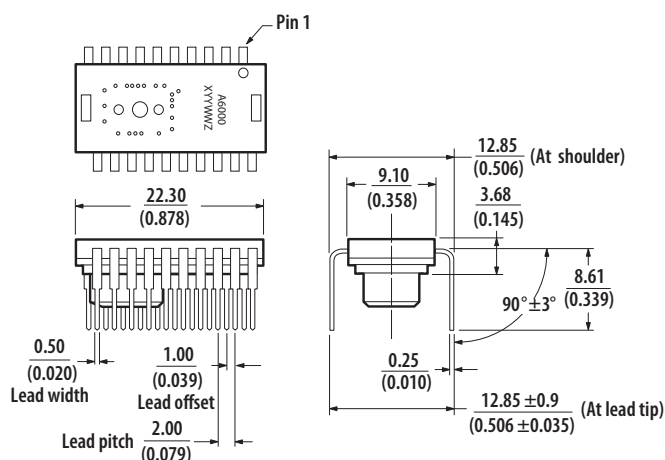
Applications

- Mice for game consoles and computer games
- Mice for desktop PCs, workstation, and portable PCs
- Industrial products
- Integrated input devices

Features

- High speed motion detection up to 45 ips and 20G
- LaserStream architecture for greatly improved optical navigation technology
- Programmable frame rate over 7080 frames per second
- SmartSpeed self-adjusting frame rate for optimum performance
- Serial port burst mode for fast data transfer
- 400, 800, 1600, and 2000 cpi selectable resolution
- Single 3.3 volt power supply
- Four-wire serial port along with Power Down, and Reset pins
- Laser fault detect circuitry on-chip for Eye Safety Compliance

Package Drawing

Ordering Information

| Part Number	
ADNB-6011-EV	Sensor: ADNS-6010
	Lens: ADNS-6120
	Clip: ADNS-6230-001
	Vcsel: ADNV-6340
ADNB-6012-EV	Sensor: ADNS-6100
	Lens: ADNS-6130-001
	Clip: ADNS-6230-001
	Vcsel: ADNV-6340
ADNK-6010	ADNS-6010 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-6013-SP01	ADNS-6010 Reference Design Kit. Includes an evaluation mouse with ADNS-6010 sensor, plus components in a sample kit.

LaserStream™ Mouse Solutions

ADNS-6000
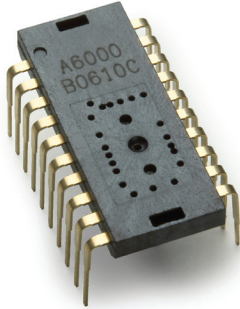
Description

Avago Technologies ADNS-6000 sensor is the world's first laser-illuminated navigation systems for corded applications. Driven by LaserStream technology, the mouse can operate on many surfaces that prove difficult for traditional LED-based optical navigation.

Package Drawing
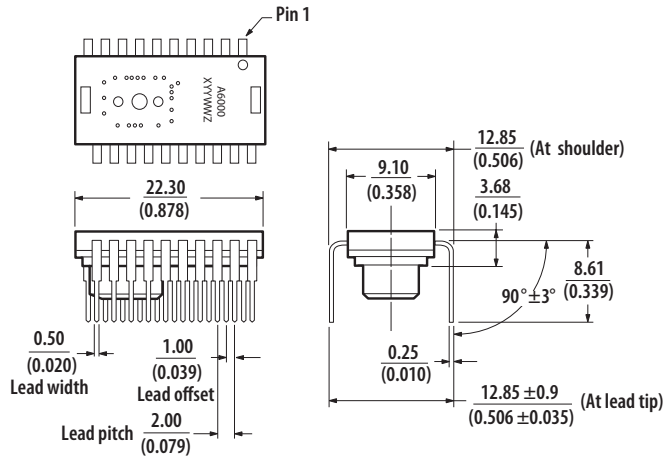
Applications

• Mice for game consoles and computer games
• Mice for desktop PCs, workstation, and portable PCs
• Industrial products
• Integrated input devices

Features

• High speed motion detection up to 20 ips and 8G
• LaserStream architecture for greatly improved optical navigation technology
• Programmable frame rate over 6400 frames per second
• SmartSpeed self-adjusting frame rate for optimum performance
• Serial port burst mode for fast data transfer
• 400 or 800 cpi selectable resolution
• Single 3.3 volt power supply
• Four-wire serial port along with Power Down, and Reset pins
• Laser fault detect circuitry on-chip for Eye Safety Compliance

Ordering Information

Part Number	
ADNB-6001-EV	Sensor: ADNS-6000
	Lens: ADNS-6120
	Clip: ADNS-6230-001
	Vcsel: ADNV-6340
ADNB-6002-EV	Sensor: ADNS-6000
	Lens: ADNS-6130-001
	Clip: ADNS-6230-001
	Vcsel: ADNV-6340
ADNK-6000	ADNS-6000 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-6003-SP01	ADNS-6000 Reference Design Kit. Includes an evaluation mouse with ADNS-6000 sensor, plus components in a sample kit.

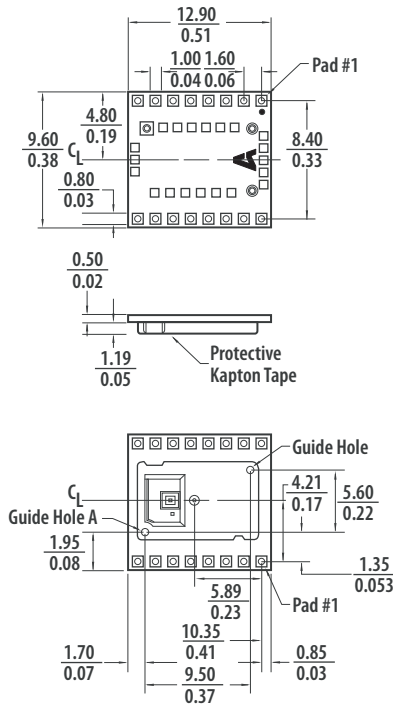# LED-Based Optical Navigation Sensors

ADNS-3530
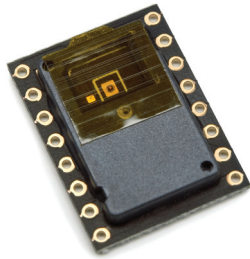
Description

Avago Technologies ADNS-3530 is a low-power optical navigation sensor. It has a new, low-power architecture and automatic power management mode, making it ideal for battery and power-sensitive applications such as cordless input devices.

ADNS-3530 is capable of high-speed motion detection - up to 20ips and 8G. In addition, it has an on-chip oscillator and integrated LED to minimize external components.

Applications

• Optical mice for desktop/laptop
• Optical trackballs
• Integrated input devices
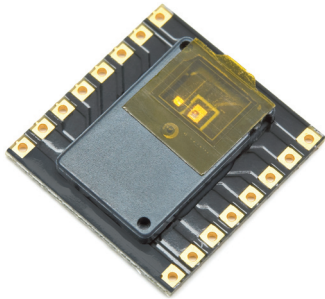• Battery-powered input devices

Features

• Low power architecture
• Small form factor
• Surface mount technology (SMT) device
• Self-adjusting power-saving modes for longest battery life
• High speed motion detection up to 20ips and 8G
• Self-adjusting frame rate for optimum performance
• Motion detect pin output
• Internal oscillator - no clock input needed
• Selectable 400 and 800 cpi resolution
• Wide operating voltage: 2.7V-3.6V nominal
• Four wire serial port
• Minimal number of passive components
• Integrated chip-on-board LED

Package Drawing

Ordering Information

Part Number	
ADNB-3532	Sensor : ADNS-3530
	SFF Lens : ADNS-3150-001
ADNK-3530	ADNS-3530 Sample kit, includes sensor and SFF Lens
ADNK-3533-XXXX	ADNS-3530 Reference Design Kit. Includes an evaluation mouse with ADNS-3530 sensor and SFF Lens in a sample kit.

LED-Based Optical Navigation Sensors
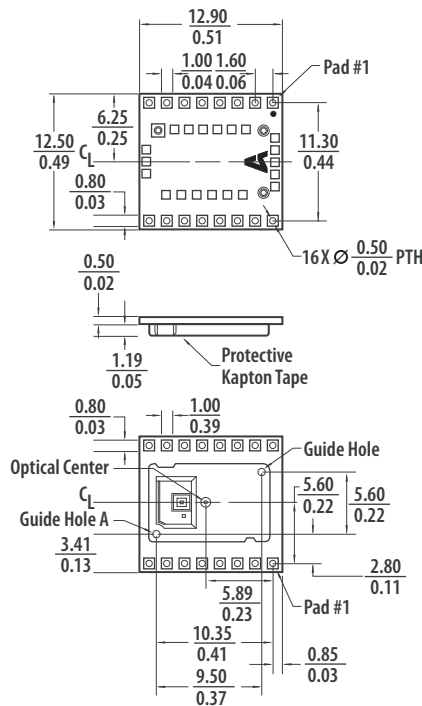
ADNS-3550

Description

Avago Technologies ADNS-3550 is a low-power optical navigation sensor. It has a new, low-power architecture and automatic power management mode, making it ideal for battery and power-sensitive applications such as cordless input devices.

ADNS-3550 is capable of high-speed motion detection - up to 20ips and 8G. In addition, it has an on-chip oscillator and integrated LED to minimize external components.

Applications

• Optical mice for desktop/laptop
• Optical trackballs
• Integrated input devices
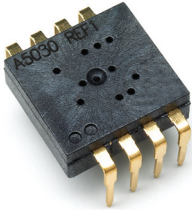• Battery-powered input devices

Features

• Low power architecture
• Small form factor
• Surface mount technology (SMT) device
• Self-adjusting power-saving modes for longest battery life
• High speed motion detection up to 20ips and 8G
• Self-adjusting frame rate for optimum performance
• Motion detect pin output
• Internal oscillator - no clock input needed
• Selectable 400 and 800 cpi resolution
• Wide operating voltage: 2.7V-3.6V nominal
• Four wire serial port
• Minimal number of passive components
• Integrated chip-on-board LED

Package Drawing

Ordering Information

Part Number	
ADNB-3552	Sensor : ADNS-3550
	SFF Lens : ADNS-3150-001
ADNK-3550	ADNS-3550 Sample kit, includes sensor and SFF Lens
ADNK-3553-XXXX	ADNS-3550 Reference Design Kit. Includes an evaluation mouse with ADNS-3550 sensor and SFF Lens in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-5030

Description

Avago Technologies ADNS-5030 is the new generation of small form factor, low power optical mouse sensors. With many built-in features, such as an on-chip oscillator and LED driver, this minimizes the need for external components. It also has a new low-power architecture and automatic power management modes, making it ideal for power sensitive applications - particularly cordless input devices in both home and office environments.

Applications

• Optical mice for desktop/laptop
• Optical trackballs
• Integrated input devices
• Battery-powered input devices

Features

• Low power architecture
• Small form factor, 8-pin package
• Self-adjusting power-saving modes, prolonging battery life
• High speed motion detection up to 14 ips and 2G
• SmartSpeed self-adjusting frame rate for optimum performance
• Internal oscillator - no clock input needed
• Selectable 500 and 1000 cpi resolution
• Operating voltage: 3.3V nominal
• Four wire serial port
• Minimal number of passive components

Package Drawing
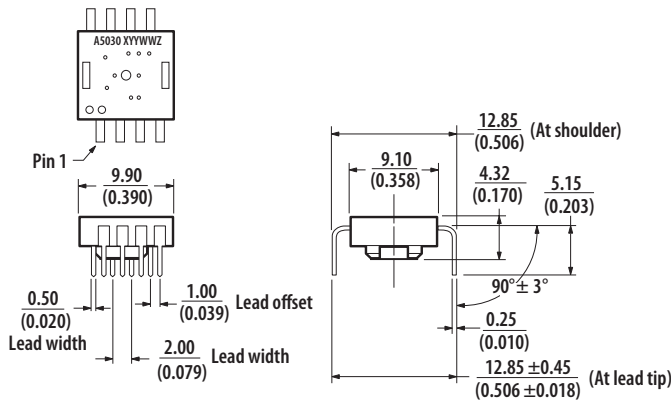
Ordering Information

| Part Number	
ADNS-5030	LED-based sensor
ADNS-5100	Small Form Factor round lens
ADNS-5100-001	Small Form Factor trim lens
ADNS-5200	Small Form Factor clip
ADNB-5031	Sensor: ADNS-5030
	Lens: ADNS-5100
ADNB-5032	Sensor: ADNS-5030
	Lens: ADNS-5100-001
ADNK-5030	ADNS-5030 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-5033-XXXX	ADNS-5030 Reference Design Kit. Includes an evaluation mouse with ADNS-5030 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-5020-EN
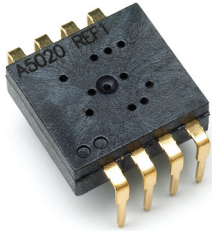
Description

Avago Technologies ADNS-5020-EN is an entry-level, small form factor optical mouse sensor. With many built-in features including on-chip oscillator and LED driver, this minimizes requirements for external components. Also, this sensor is optimized for LED-based corded applications for home and office environments.

Package Drawing
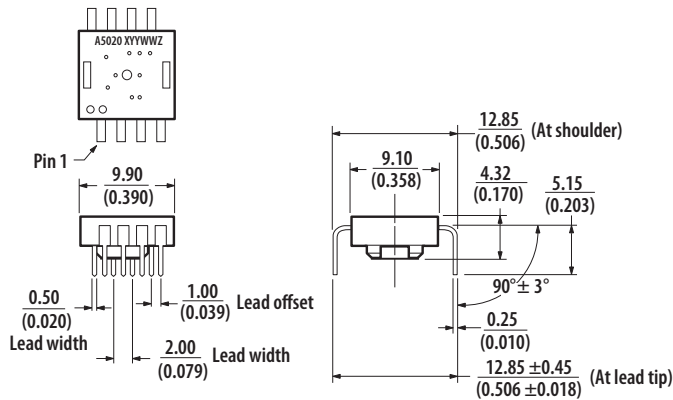
Applications

- Optical mice for desktop/laptop
- Optical trackballs
- Integrated input devices

Features

- Small form factor, 8-pin package
- Built-in LED driver for simpler circuitry
- High speed motion detection up to 20 ips and 2G
- SmartSpeed self-adjusting frame rate for optimum performance
- Internal oscillator - no clock input needed
- Selectable 500 and 1000 cpi resolution
- Operating voltage: 5V nominal
- Three-wire serial port
- Minimal number of passive components

Ordering Information

Part Number	
ADNS-5020-EN	LED-based sensor
ADNS-5100	Small Form Factor round lens
ADNS-5100-001	Small Form Factor trim lens
ADNS-5200	Small Form Factor clip
ADNB-5021-EN	Sensor: ADNS-5020-EN
	LCM round lens: ADNS-5100
ADNB-5022-EN	Sensor: ADNS-5020-EN
	LCM trim lens: ADNS-5100-001
ADNK-5020-EN	ADNS-5020-EN Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-5023-XXXX	ADNS-5020 -EN Reference Design Kit. Includes an evaluation mouse with ADNS-5020 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-3040
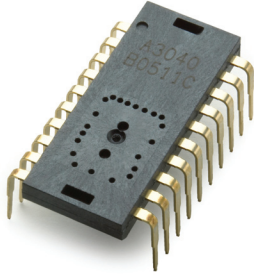
Description

Avago Technologies ADNS-3040 is an ultra low-power optical navigation sensor. It has a low power architecture and automatic power management mode, making it ideal for battery and power-sensitive applications such as cordless input devices.

Package Drawing

Applications

- Optical mice for desktop/laptop
- Optical trackballs
- Integrated input devices
- Battery-powered input devices

Features

- Low power architecture
- Self-adjusting power-saving modes for longest battery life
- High speed motion detection up to 20 ips and 8G
- SmartSpeed self-adjusting frame rate for optimum performance
- Motion detect pin output
- Internal oscillator - no clock input needed
- Selectable 400 and 800 cpi resolution
- Wide operating voltage: 2.5V-3.6V nominal
- Four wire serial port
- Minimal number of passive components
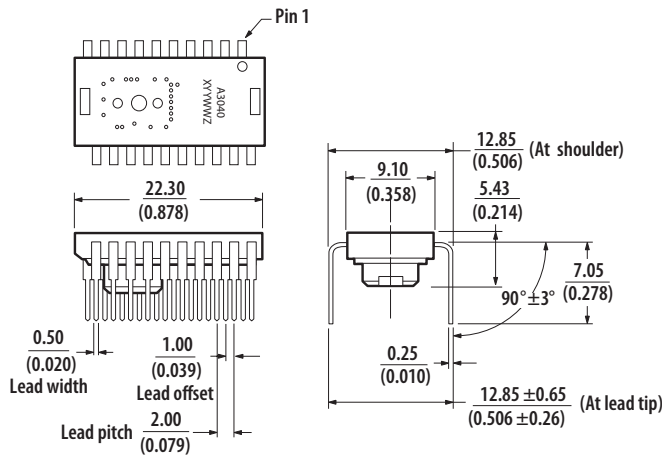
Ordering Information

Part Number	
ADNS-3040	LED-based sensor
ADNS-3120-001	Optical mouse trim lens
ADNS-2220-001	Optical mouse LED assembly clip
ADNB-3042	Sensor: ADNS-3040
	Lens: ADNS-3120-001
ADNK-3040	ADNS-3040 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-3040-XXXX	ADNS-3040 Reference Design Kit. Includes an evaluation mouse with ADNS-3040 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-3080
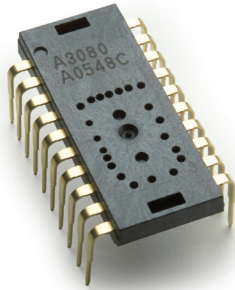
Description

Avago Technologies ADNS-3080 is a high performance optical mouse sensor for optimum precision navigation in mice applications. This sensor provides a non-mechanical tracking engine for implementing a computer-pointing device. With its high performance features, this optical mouse sensor caters to mice applications in both gaming and office environments. It can also navigate on virtually all surfaces.

Applications

- Mice for game consoles and computer games
- Mice for desktop PCs, workstations, and portable PCs
- Integrated input devices

Features

- High speed motion detection up to 40 ips and 15 G
- New architecture for greatly improved optical navigation technology
- Programmable frame rate over 6400 frames per second
- SmartSpeed self-adjusting frame rate for optimum performance
- Serial port burst mode for fast data transfer
- 400 or 1600 cpi programmable resolution
- Single 3.3 volt power supply
- Four-wire serial port dedicated for efficient communications
- Features for increased speed with Chip Select, Power Down, and Reset pins

Package Drawing
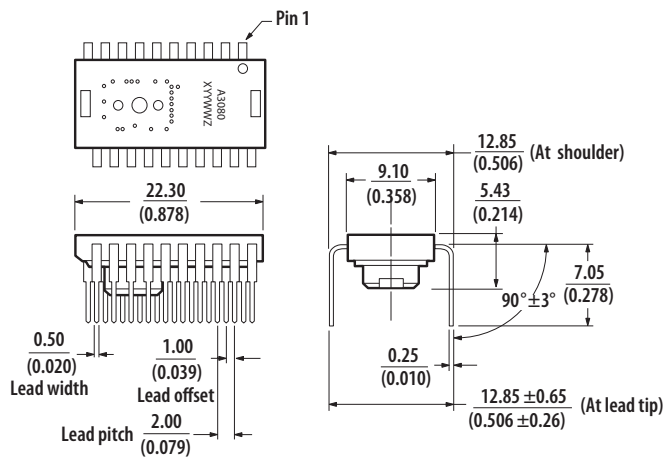
Ordering Information

| Part Number	
ADNS-3080	LED-based sensor
ADNS-2120	Optical navigation LED round lens
ADNS-2120-001	Optical navigation LED trim lens
ADNS-2220	Optical navigation black clip
ADNS-2220-001	Optical navigation LED clear clip
ADNB-3081	Sensor: ADNS-3080
	Lens: ADNS-2120
ADNB-3082	Sensor: ADNS-3080
	Lens: ADNS-2120-001
ADNK-3080	ADNS-3080 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-3083	ADNS-3080 Reference Design Kit. Includes an evaluation mouse with ADNS-3080 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-3060
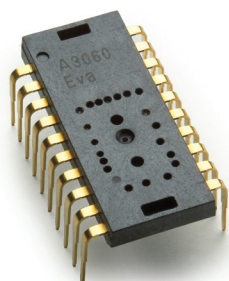
Description

Avago Technologies ADNS-3060 is high performance optical mouse sensor for optimum precision navigation in mice applications. This sensor provides a non-mechanical tracking engine for implementing a computer-pointing device.

Package Drawing
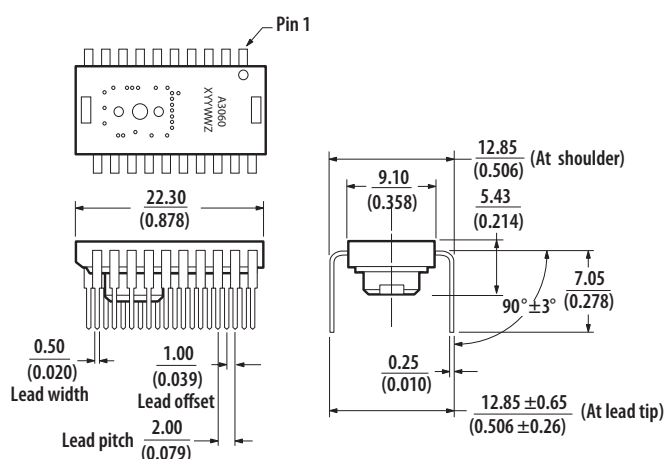
Applications

- Mice for game consoles and computer games
- Mice for desktop PCs, workstations, and portable PCs
- Integrated input devices

Features

- High speed motion detection up to 40 ips and 15 G
- New architecture for greatly improved optical navigation technology
- Programmable frame rate over 6400 frames per second
- SmartSpeed self-adjusting frame rate for optimum performance
- Serial port burst mode for fast data transfer
- 400 or 800 cpi programmable resolution
- Single 3.3 volt power supply
- Four-wire serial port dedicated for efficient communications
- Features for increased speed with Chip Select, Power Down, and Reset pins

Ordering Information

| Part Number	
ADNS-3060	LED-based sensor
ADNS-2120	Optical navigation LED round lens
ADNS-2120-001	Optical navigation LED trim lens
ADNS-2220	Optical navigation black clip
ADNS-2220-001	Optical Navigation LED clear clip
ADNB-3061	Sensor: ADNS-3060
	Lens: ADNS-2120
ADNB-3062	Sensor: ADNS-3060
	Lens: ADNS-2120-001
ADNK-3060	ADNS-3060 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-3061	ADNS-3060 Reference Design Kit. Includes an evaluation mouse with ADNS-3060 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-2030
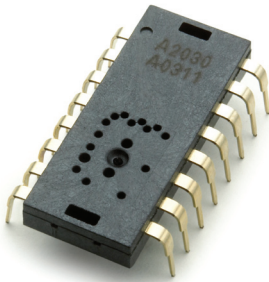
Description

Avago Technologies ADNS-2030 is a power efficient optical mouse sensor optimized for long battery life, offering computer users months of operation from AA batteries. Featuring advance precision navigation control, ADNS-2030 is ideal for cordless optical mice applications including workstations, PCs, and notebook computers. This sensor is mounted in a 16-pin staggered dual in-line package.
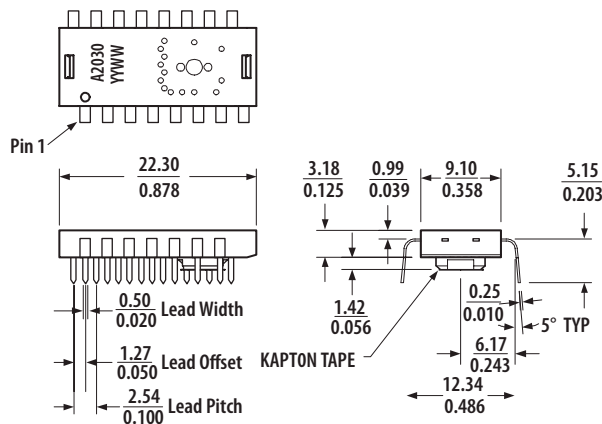
Applications

• Cordless optical mice
• Mice for desktop PCs, workstations, and portable PCs
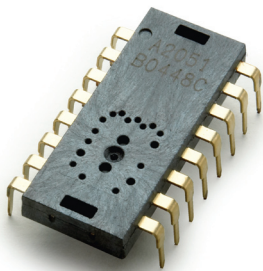• Trackballs
• Integrated input devices

Features

• Optical navigation technology
• No mechanical moving parts
• High reliability
• Complete 2-D motion sensor
• High speed motion detector
• No precision optical alignment
• Wave solderable
• Single 3.3 volt power supply
• Shutdown pin for USB suspend mode operation
• Power conservation mode during times of no movement
• On chip LED drive with regulated current
• Serial port registers

Package Drawing

Ordering Information

Part Number	
ADNS-2030	LED-based sensor
HDNS-2100	Optical navigation LED round lens
HDNS-2100-001	Optical navigation LED trim lens
HDNS-2200	Optical navigation black clip
HDNS-2200#001	Optical navigation LED clear clip
ADNB-2031	Sensor: ADNS-2030
	Lens: HDNS-2100
ADNB-2032	Sensor: ADNS-2030
	Lens: HDNS-2100-001
ADNK-2030	ADNS-2030 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-2133	ADNS-2030 Reference Design Kit. Includes an evaluation mouse with ADNS-2030 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-2051

Description

Avago Technologies ADNS-2051 optical mouse sensor provides advanced precision navigation control over a wide variety of surfaces. This sensor is mounted in a 16-pin staggered dual in-line package. It is designed for 5-V operation, which is ideal for corded optical mouse applications.
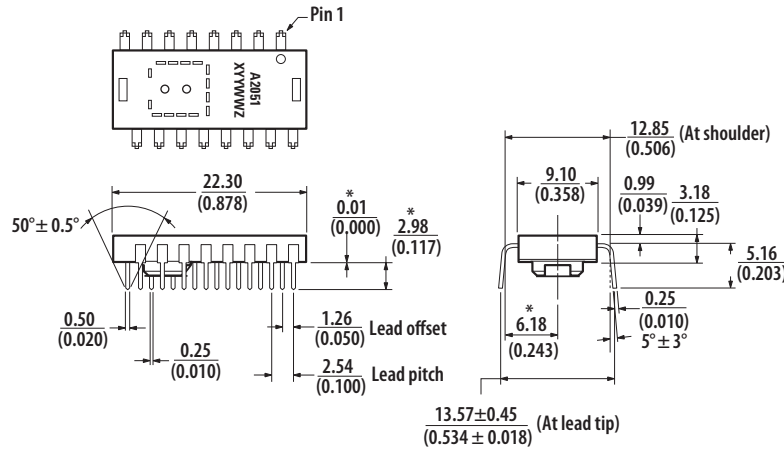
Package Drawing

Applications

• Mice for desktop PCs, workstations, and portable PCs
• Trackballs
• Integrated input devices

Features

• Optical navigation technology
• No mechanical moving parts
• High reliability
• Complete 2-D motion sensor
• No precision optical alignment
• Wave solderable
• Single 5.0 volt power supply
• Shutdown pin for USB suspend mode operation
• Power conservation mode during times of no movement
• On chip LED drive with regulated current
• Serial port registers

Ordering Information

Part Number	
ADNS-2051	LED-based sensor
HDNS-2100	Optical navigation LED round lens
HDNS-2100-001	Optical navigation LED trim lens
HDNS-2200	Optical navigation black clip
HDNS-2200#001	Optical navigation LED clear clip
ADNB-2050	Sensor: ADNS-2051
	Lens: HDNS-2100
ADNB-2051	Sensor: ADNS-2051
	Lens: HDNS-2100-001
ADNK-2052	ADNS-2051 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-2051	ADNS-2051 Reference Design Kit. Includes an evaluation mouse with ADNS-2051 sensor, plus components in a sample kit.

LED-Based Optical Navigation Sensors

ADNS-2610
ADNS-2620
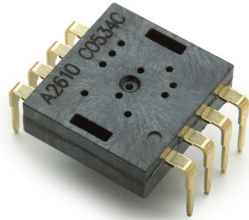
Description

Avago Technologies ADNS-2610 and ADNS-2620 are new entry level, small form factor optical mice sensors, which are used to implement a non-mechanical tracking engine in computer mice. These sensors allow for more compact and affordable optical mice designs.
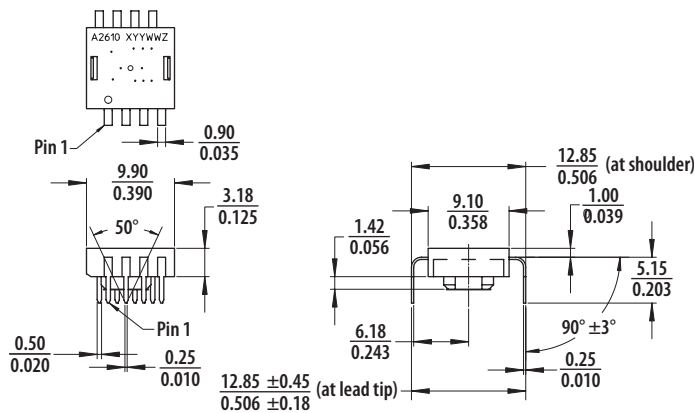
Applications

- Mice for desktop PCs, workstations, and portable PCs
- Trackballs
- Integrated input devices

Features

- Precise optical navigation technology
- Small form factor (10mm x 12.5mm footprint)
- No mechanical moving parts
- Complete 2D motion sensor
- Common interface for general purpose controller
- Smooth surface navigation
- Accurate motion up to 12 ips
- 400 cpi resolution
- High reliability
- High speed motion detector
- Wave solderable
- Single 5.0 volt power supply
- Conforms to USB suspend mode specifications
- Power conservation mode during times of no movement
- Serial port registers
- 8-pin staggered dual inline package (DIP)
- 1500 frames per second (fps) for ADNS-2610
- Programmable frame speed up to 2300 frames per sec (fps) for ADNS-2620

Package Drawing

Ordering Information

| Part Number	
ADNS-2610	LED-based sensor
ADNS-2620	LED-based sensor
HDNS-2100	Optical navigation LED round lens
HDNS-2100-001	Optical navigation LED trim lens
HDNS-2200	Optical navigation black clip
HDNS-2200#001	Optical navigation LED clear clip
ADNB-2611 ADNB-2621	Sensor: ADNS-2610/ADNS-2620
	Lens: HDNS-2100
ADNB-2612 ADNB-2622	Sensor: ADNS-2610/ADNS-2620
	Lens: HDNS-2100-001
ADNK-2610 ADNK-2620	ADNS-2610/ADNK-2620 Sample kit, includes sensor, round and trim lens option, clips and LEDs.
ADNK-2623	ADNS-2620 Reference Design Kit. Includes an evaluation mouse with ADNS-2620 sensor, plus components in a sample kit.

LaserStream™ Selection Guide

Part Numbering System - LaserStream Mouse Sensors

Part Number	Description	Laser-based Products with Base part Numbers
ADNS-XXXX	Stand alone components	1. Laser Mouse Sensor
		2. Lens (Round/Trim)
		3. Assembly Clip (Clear)
ADNB-XXXX-EV ADNB-X5XX-EV	Laser Mouse Bundles	1. Laser Mouse Bundle (ADNB-XXX1-EV) Laser Mouse sensor, VCSEL Assembly clip, VCSEL and Round Lens
		2. Laser Mouse Bundle (ADNB-XXX2-EV) Laser Mouse sensor, VCSEL Assembly clip, VCSEL and Trim Lens
		3. Laser Bundle (ADNB-X5XX) Integrated Chip-On-Board Laser Sensor with Small Form Factor Lens
ADNK-XXXX	Laser Mouse Kits	1. Laser Mouse Sample Kit (ADNK-XXX0) a. Laser Mouse Sensor (5 units) b. Round lens (5 units) c. Trim Lens (5 units) d. Clear clip (5 units) e. VCSEL (5 units) f. CD containing relevant technical literature (1 unit)
		2. Laser Mouse Sample Kit (ADNK-XXX3) a. Laser Mouse Sensor (5 units) b. Round lens (5 units) c. Trim Lens (5 units) d. Clear clip (5 units) e. VCSEL (5 units) f. Microcontroller (5 units) - optional g. CD containing Avago's technical literature and support files (1 unit) h. CD containing microcontroller's technical literature and support files (1 unit) - optional i. Complete working reference design mouse (1 unit)

Laser Mouse Bundles and Kits

Sensor	Bundle (Sensor, VCSEL, Clip with Round Lens)	Bundle (Sensor, VCSEL, Clip with Trim Lens)	Sample Kit	Ref Design Kit
ADNS-6000	ADNB-6001-EV	ANB-6002-EV	ADNK-6000	ADNK-6003-SP01
ADNS-6010	ADNB-6011-EV	ADNB-6012-EV	ADNK-6010	ADNK-6013-SP01
ADNS-7050	ADNB-7051-EV	ADNB-7052-EV	ADNK-7050	ADNK-7053-XXXX
ADNS-6530	N/A	ADNB-6532	ADNK-6530	ADNK-6533-XXXX

Bundle consists of:

	Sensor	Lens	Clip	VCSEL
ADNB-6001-EV	ADNS-6000	ADNS-6120	ADNS-6230-001	ADNV-6340
ADNB-6002-EV	ADNS-6000	ADNS-6130-001	ADNS-6230-001	ADNV-6340
ADNB-6011-EV	ADNS-6010	ADNS-6120	ADNS-6230-001	ADNV-6340
ADNB-6012-EV	ADNS-6010	ADNS-6130-001	ADNS-6230-001	ADNV-6340
ADNB-7051-EV	ADNS-7050	ADNS-6120	ADNS-6230-001	ADNV-6340
ADNB-7052-EV	ADNS-7050	ADNS-6130-001	ADNS-6230-001	ADNV-6340
ADNB-6532	ANDS-6530	ADNS-6150	N/A	N/A

LED-based Selection Guide

Part Numbering System - LED-based Mouse Sensors

Part Number	Description	LED-based Products with Base part Numbers
ADNS-XXXX	Stand alone components	1. Optical Mouse Sensor 2. Lens (Round/Trim) 3. Assembly Clip (Clear/Black)
ADNB-XXXX	Optical Mouse Bundles with Lens	1. Optical Mouse Sensor and Round Lens (ADNB-XXX1)* 2. Optical Mouse Sensor and Trim Lens (ADNB-XXX2)*

ADNK-XXXX	Optical Mouse Kits	1. Optical Mouse Sample Kit (ADNK-XXX0)**
		   a. Optical Mouse Sensor (5 units)
		   b. Round Lens (5 units)
		   c. Trim Lens (5 units)
		   d. Black Clip (5 units)
		   e. Clear Clip (5 units)
		   f. L ED (5 units)
		   g. CD containing relevant technical literature (1 unit)

		2. Optical Mouse Sample Kit (ADNK-XXX3)***
		   a. Optical Mouse Sensor (5 units)
		   b. Round Lens (5 units)
		   c. Trim Lens (5 units)
		   d. Black Clip (5 units)
		   e. Clear Clip (5 units)
		   f. LED (5 units)
		   g. Microcontroller (5 units) - optional
		   h. CD containing Avago's technical literature and support files (1 unit)
		   i. CD containing microcontroller's technical literature and support files (1 unit) - optional
		   j. Complete working reference design mouse (1 unit)

Note:
* Except for ADNB-2050 and ADNB-2051
** Except for ADNK-2052
*** Except for ADNK-2051 and ADNK-3061

Optical Mouse Bundles and Kits

Sensor	Bundle (Sensor with Round Lens)	Bundle (Sensor with Trim Lens)	Sample Kit	Reference Design Kit
ADNS-2610	ADNB-2611	ADNB-2612	ADNK-2610	N/A
ADNS-2620	ADNB-2621	ADNB-2622	ADNK-2620	ADNK-2623
ADNS-2051	ADNB-2050	ADNB-2051	ADNK-2052	ADNK-2051
ADNS-2030	ADNB-2031	ADNB-2032	ADNK-2030	ADNK-2133
ADNS-3060	ADNB-3061	ADNB-3062	ADNK-3060	ADNK-3061
ADNS-3080	ADNB-3081	ADNB-3082	ADNK-3080	ADNK-3083
ADNS-3040	N/A	ADNB-3042	ADNK-3043	ADNK-3043-XXXX
ADNS-5020-EN	ADNB-5021-EN	ADNB-5022-EN	ADNK-5020-EN	ADNK-5023-XXXX
ADNS-5030	ADNB-5031	ADNB-5032	ADNK-5030	ADNK-5033-XXXX
ADNS-3530	N/A	ADNB-3532	ADNK-3530	ADNK-3533-XXXX
ADNS-3550	N/A	ADNB-3552	ADNK-3550	ADNK-3553-XXXX

Accessories

Accessories - Optical Mouse Lenses

Lens Type	Part Number	Associated Bundles
Round	HDNS-2100	ADNB-2611
		ADNB-2621
		ADNB-2050
		ADNB-2031
	ADNS-2120	ADNB-3061
		ADNB-3081
	ADNS-5100	ADNB-5021-EN
		ADNB-5031
Trim	HDNS-2100-001	ADNB-2612
		ADNB-2622
		ADNB-2051
		ADNB-2032
	ADNS-2120-001	ADNB-3062
		ADNB-3082
	ADNS-3120-001	ADNB-3042
	ADNS-5100-001	ADNB-5022
		ADNB-5022-EN
		ADNB-5032
SFF	ADNS-3150-001	ADNB-3532
		ADNB-3552

Accessories - Recommended LED parts

Part Number	Associated Products
HLMP-ED80-XX000	ADNS-2610
	ADNS-2620
	ADNS-2051
	ADNS-2030
	ADNS-3060
	ADNS-3080
	ADNS-3040
	ADNS-5020-EN
	ADNS-5030

Accessories - Optical Mouse Clips

Type of clip	Part Number	Associated Bundles
Black	HDNS-2200	ADNB-2611/ADNB-2612
		ADNB-2621/ADNB-2622
		ADNB-2050/ADNB-2051
		ADNB-2031/ADNB-2032
	ADNS-2220	ADNB-3061/ADNB-3062
		ADNB-3081/ADNB-3062
	ADNS-5200	ADNB-5021-EN/ADNB-5022-EN
		ADNB-5031/ADNB-5032
Clear	HDNS-2200-001	ADNB-2611/ADNB-2612
		ADNB-2621/ADNB-2622
		ADNB-2050/ADNB-2051
		ADNB-2031/ADNB-2032
	ADNS-2220-001	ADNB-3061/ADNB-3062
		ADNB-3081/ADNB-3062
		ADNB-3042

About Avago Technologies

Avago Technologies is a leading supplier of analog interface components for communications, industrial and consumer applications. With a global employee presence, Avago provides an extensive range of analog, mixed-signal and optoelectronic components and subsystems to more than 40,000 customers. The company's products serve four end markets: industrial and automotive, wired infrastructure, wireless communications, and computer peripherals. It is recognized for providing high-quality products along with strong customer service. Avago's heritage of technical innovation dates back 40 years to its Agilent/Hewlett-Packard roots. Information about Avago is available on the Web at www.avagotech.com

For product information and a complete list of distributors, please go to our web site:

www.avagotech.com
www.avagotech.com/opticalnavigation

Avago
T E C H N O L O G I E S