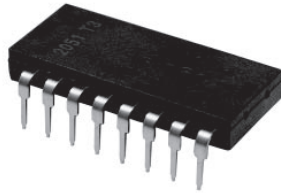
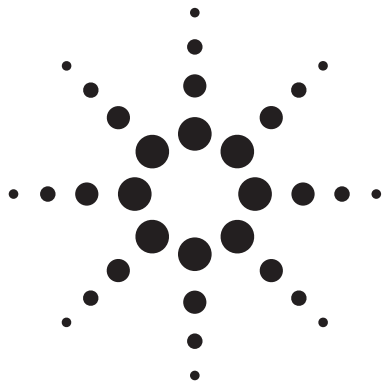


Agilent ADNS-2030 Optical Mouse Sensor Product Overview



Description

High Performance, Low Power Optical Mouse Sensor Suitable for Cordless Precision Optical Navigation

The ADNS-2030 is a low power reflective optical sensor that provides a non-mechanical tracking engine for implementing a computer-pointing device. It is based on optical navigation technology which measures changes in position by optically acquiring sequential surface images up to 2300 times per second and mathematically determining the direction and magnitude of movement at the maximum of 800 counts per inch (cpi) and at speeds up to 14 inches per second (ips). Agilent provides the complete optical mouse sample kit (Part # ADNK-2030). The CMOS based sensor is mounted in a 16-pin staggered dual in-line package (DIP) and designed for use with the HDNS-2200 (LED Assembly Clip) and HLMP-ED80-XXXXX (639 nm LED illumination source) and HDNS-2100 (lens).

With its low power feature, this optical mouse sensor enables longer battery life and more efficient power consumption. This eliminates the need for a recharger and making it an ideal choice for cordless optical mouse application.

Theory of Operation

The ADNS-2030 is based on Optical Navigation Technology. It contains an Image Acquisition System (IAS), a Digital Signal Processor (DSP), a two-channel quadrature output, and a two-wire serial port.

The IAS acquires microscopic surface images via the lens and illumination system provided by the HDNS-2100, 2200, and HLMP-ED80-XXXXX. These images are processed by the DSP to determine the direction and distance of motion. The DSP generates the (Δx) and (Δy) relative displacement values that are converted into two channel quadrature signals.

Other optical mouse sensors available from Agilent Technologies

- ADNS-2610
- ADNS-2620
- HDNS-2000
- ADNS-2051

Navigation by Two Images Comparison

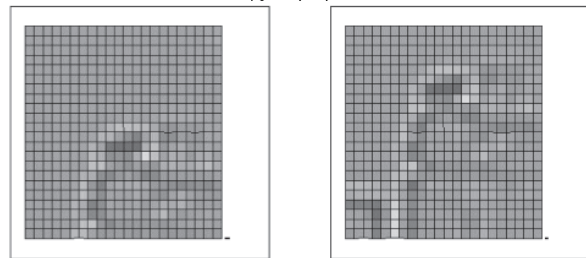


Figure 1. The Navigation Engine identifies common features in sequential images to determine the direction and amount of mouse movement. Image B was taken while the mouse was moving, a short time after image A.

Features

- Precise optical navigation technology
- No mechanical moving parts
- Complete 2D motion sensor
- Serial interface and/or quadrature interface
- Smooth surface navigation
- Programmable frame speed up to 2300 frames per sec (fps)
- Accurate motion up to 14 ips
- 800 cpi resolution
- High reliability
- High speed motion detector
- 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
 - Programming
 - Data transfer
- 16-pin staggered dual in-line package (DIP)

Applications

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

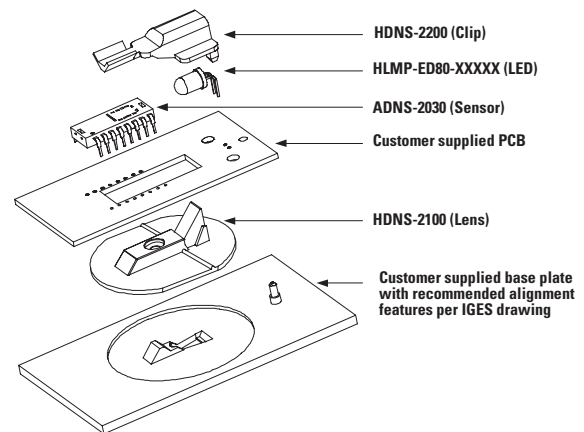


Figure 2. Exploded view drawing of optical mouse components.



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Recommended Typical Application
(Receiver side)

Recommended Typical Application
(Transmitter side)

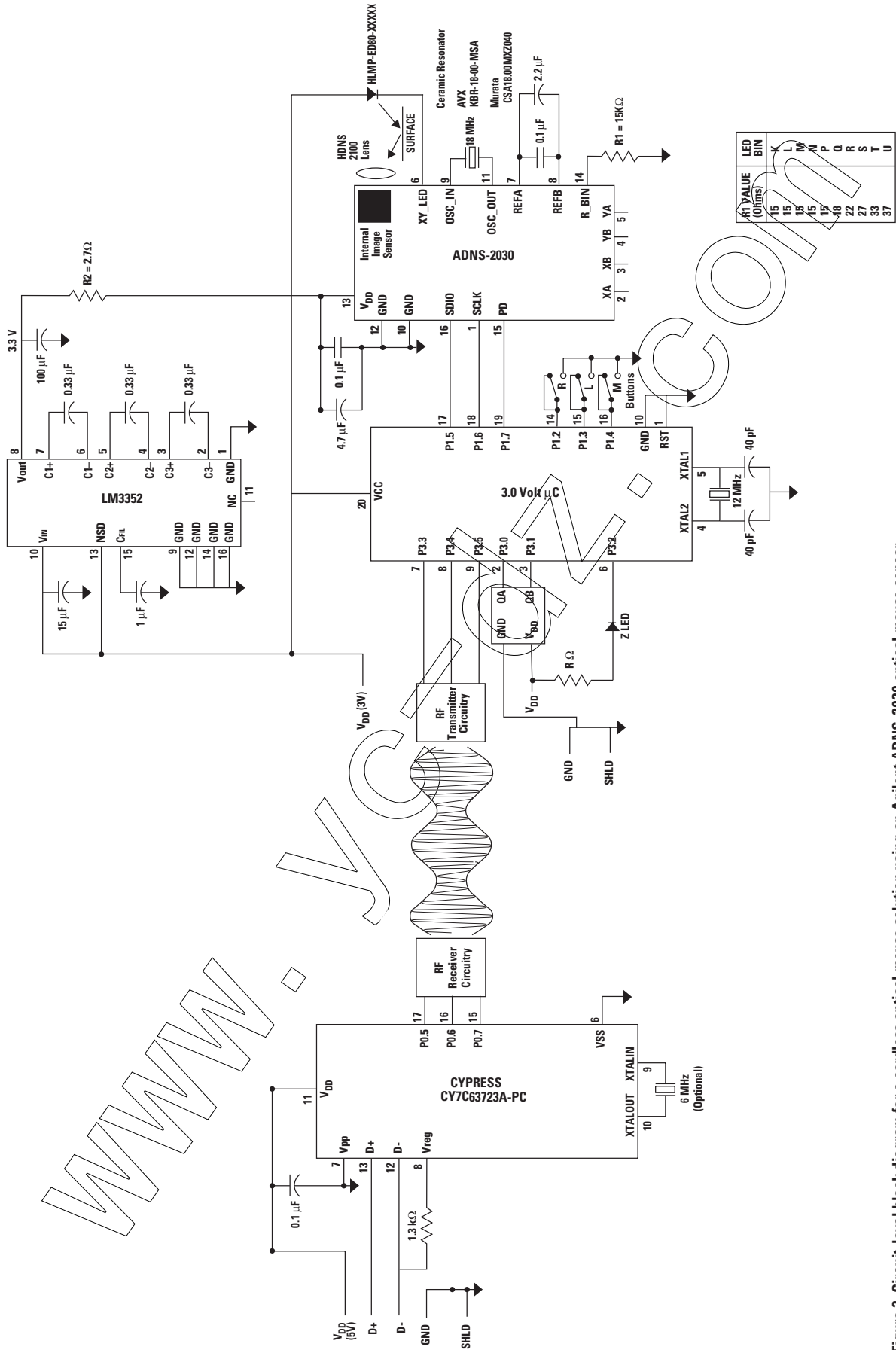


Figure 3. Circuit-level block diagram for a cordless optical mouse solution using an Agilent ADNS-2030 optical mouse sensor.

ADNS-2030 Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Operating Temperature	T_A	0		40	°C	
Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
DC Supply Current (mouse moving)	$I_{DD\text{ AVG}}$		13	23	mA	No load on XA, XB, YA, YB, SCLK, SDIO. Excluding LED current
Peak Supply Current (mouse moving)	$I_{DD\text{ PEAK}}$		18		mA	No load on XA, XB, YA, YB, SCLK, SDIO. Excluding LED current
DC Supply Current (mouse not moving)	I_{DD}		10	23	mA	No load on XA, XB, YA, YB, SCLK, SDIO. Excluding LED current
DC Supply Current (power down)	I_{DDPD}		4	30	μA	PD = V_{DD} ; SCLK, SDIO = GND or V_{DD} ; $V_{DD} = 3.0V$ to $3.6V$
Clock Frequency	f_{CLK}	17.4	18.0	18.7	MHz	Set by ceramic resonator
Resonator Impedance	X_{RES}			55	Ω	
Distance from lens reference plane to surface	Z	2.3	2.4	2.5	mm	Results in ±0.2 mm DOF
Speed	S	0		14	in/sec	@ frame rate = 1500 fps
Acceleration	A			0.15	g	@ frame rate = 1500 fps
Light level onto IC	IRR_{INC}	80 100		25,000 30,000	mW/m ²	$\lambda = 639$ nm $\lambda = 875$ nm
Resolution	RES		400	800	counts/in	
Frame Rate	FR		1500		frames/s	

Optical Mouse Design References

Datasheet ADNS-2030

Application Note AN1179

Eye Safety Calculation AN1228

Ordering Information

Specify part number as follows:

- ADNS-2030 = Sensor IC in a 16-pin staggered DIP, 20 per tube
- HDNS-2100 = Round Optical Mouse Lens
- HDNS-2100#001 = Trimmed Optical Mouse Lens
- HDNS-2200 = LED Assembly Clip (Black)
- HDNS-2200#001 = LED Assembly Clip (Clear)
- HLMP-ED80-XXXXX = LED

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

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