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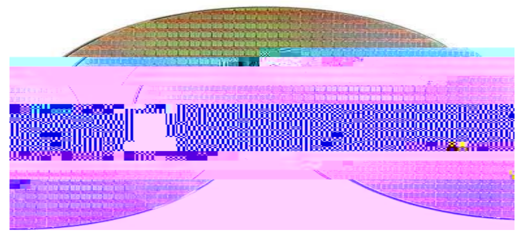


AMBIENT LIGHT PROXIMITY SENSOR

Description

The NOA3315W combines an advanced digital proximity sensor and LED driver with dual ambient light sensors (ALS) and tri−mode I^{2}C interface with interrupt capability in an integrated monolithic device. Multiple power management features and very low active sensing power consumption directly address the power requirements of battery operated mobile phones and mobile internet devices.

The proximity sensor measures reflected light intensity with a high degree of precision and excellent ambient light rejection. The NOA3315W enables a proximity sensor system with a 16:1 programmable LED drive current range and a 30 dB overall proximity detection range. The dual ambient light sensors include one with a photopic light filter and one with no filter. Both have dark current compensation and high sensitivity eliminating inaccurate light level detection and insuring proper backlight control even in the presence of dark cover glass.

The NOA3315W is ideal for improving the user experience by enhancing the screen interface with the ability to measure distance for near/far detection in real time and the ability to respond to ambient lighting conditions to control display backlight intensity.

ORDERING INFORMATION

Device	Wafer Size	Temp Range
NOA3315W	200 mm wafer	−40 C to 80 C

Features

- Proximity Sensor, LED Driver and Dual ALS in One Device
- Very Low Power Consumption
  - Stand−by current 2.8 μA (monitoring I^{2}C interface only, Vdd = 3 V)
  - ALS operational current 50 μA per sensor
  - Proximity sensing average operational current 100 μA
  - Average LED sink current 75 μA
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Proximity Sensing

- Proximity detection distance threshold I^{2}C programmable with 12−bit resolution and eight integration time ranges (16−bit effective resolution)
- Effective for Measuring Distances up to 200 mm and Beyond
- Excellent IR and Ambient Light Rejection including Sunlight (up to 50K lux) and CFL Interference
- Programmable LED Drive Current from 10 mA to 160 mA in 5 mA Steps, no External Resistor Required
- Photopic Spectral Response of ALS1 Nearly Matches Human Eye
- Broadband response of ALS2 supports compensation for spectral shifts encountered with different types of cover glass
- Dynamic Dark Current Compensation
- Linear Response over the Full Operating Range
- 3 ranges – 100 counts/lux, 10 counts/lux, 1 count/lux
- Senses Intensity of Ambient Light from 0.02 lux to 52k lux with 21−bit Effective Resolution (16−bit converter)
- Programmable Integration Times (50 ms, 100 ms, 200 ms, 400 ms)

Additional Features

- Programmable interrupt function including independent upper and lower threshold detection or threshold based hysteresis for proximity and or ALS
- Level or Edge Triggered Interrupts
- Proximity persistence feature reduces interrupts by providing hysteresis to filter fast transients such as camera flash

- Automati[redacted]fter single measurement or continuou[redacted] with programmable interval time for b[redacted] functions
- Wide Ope[redacted]Range (2.3 V to 3.6 V)
- Wide Ope[redacted]ture Range (−40 C to 80 C)
- I^2C Serial[redacted]n Port
  - Standa[redacted]kHz
  - Fast m[redacted]
  - High s[redacted]4 MHz
- No External Components Required except the IR LED and Power Supply Decoupling Caps

Applications

- Senses human presence in terms of distance and senses ambient light conditions, saving display power in applications such as:
  - Smart phones, mobile internet devices, MP3 players, GPS
  - Mobile device displays and backlit keypads

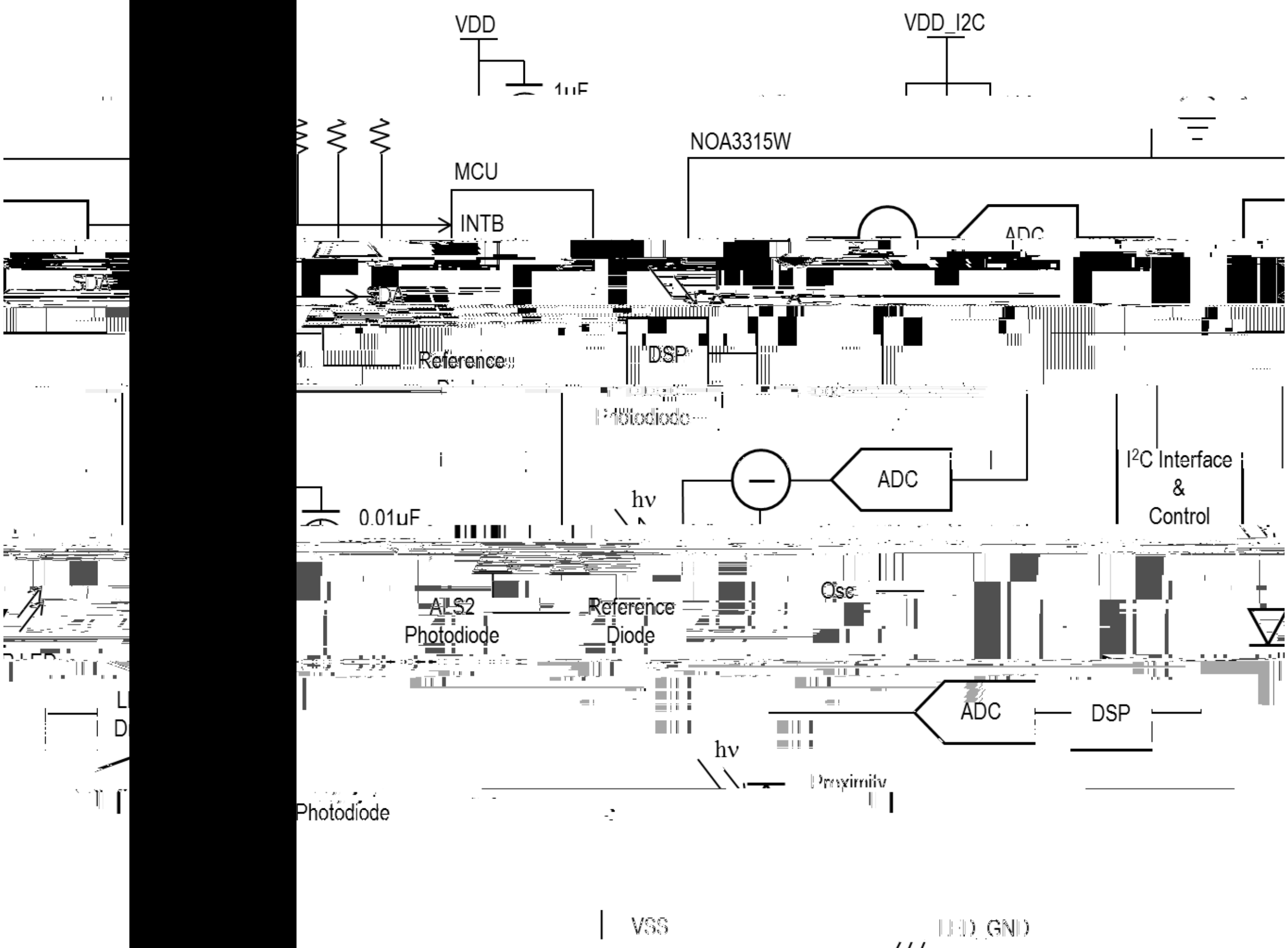


Figure 1. NOA3315W Application Block Diagram

Table 1. PA[redacted]DESCRIPTION

Pad	[redacted]	Description
1	VDD	Power pad
2	VSS	Ground pad
3	LED_GND	Ground pad for IR LED driver
4	LED	IR LED output pad
5	INT	Interrupt output pad, open−drainoutput pad

Table 4. ELECTRICAL CHARACTERISTICS (Unless otherwise specified, these specifications apply over 2.3 V < VDD < 3.6 V, 1.7 V < VDD_I2C < 1.9 V, −40 C < T_A < 80 C, 10 pF < Cb < 100 pF) (See Note 4)

Parameter	Symbol	Min	Typ	Max	Unit

Table 4. ELECTRICAL CHARACTERISTICS (Unless otherwise specified, these specifications apply over 2.3 V < VDD < 3.6 V, 1.7 V < VDD_I2C < 1.9 V, −40 C < T_A < 80 C, 10 pF < Cb < 100 pF) (See Note 4)

Parameter	Symbol	Min	Typ	Max	Unit
Capacitive load for each bus line (including all parasitic capacitance) (Note 6)	C_b	10		100	pF
Noise margin at the low level (for each connected device − including hysteresis)	V_{nL}	0.1 VDD		−	V
Noise margin at the high level (for each connected device − including hysteresis)	V_{nH}	0.2 VDD		−	V

4. Refer to Figure 2 and Figure 3 for more information on AC characteristics.
5. The rise time and fall time are dependent on both the bus capacitance (Cb) and the bus pull−up resistor $R_{p.}$ Max and min pull−up resistor values are determined as follows: $R_{p(max)} = t_{r\ (max)}/(0.8473 \times Cb)$ and $R_{p(min)} = (Vdd\_I2C – V_{ol(max)})/I_{ol}$.
6. Cb = capacitance of one bus line, maximum value of which including all parasitic capacitances should be less than 100 pF. Bus capacitance up to 400 pF is supported, but at relaxed timing.

Table 5. OPTICAL CHARACTERISTICS (Unless otherwise specified, these specifications are for VDD = 3.0 V, T_A = 25 C)

Parameter	Symbol	Min	Typ	Max	Unit
AMBIENT LIGHT SENSOR 1					
Spectral response, peak (Note 7)	λ_p		560		nm
Spectral response, low −3 dB	λ_{c_low}		510		nm
Spectral response, high −3 dB	λ_{c_high}		610		nm
Dynamic range	DR_{ALS}	0.02		52k	lux
Maximum Illumination (ALS operational but saturated)	E_{v_MAX}			120k	lux
Resolution, Counts per lux, Tint = 400 ms, Range = 0 (100 counts/lux)	CR_{400}		800		counts
Resolution, Counts per lux, Tint = 100 ms, Range = 0 (100 counts/lux)	CR_{100}		200		counts
Resolution, Counts per lux, Tint = 50 ms, Range = 0 (100 counts/lux)	CR_{50}		100		counts
Illuminance responsivity, green 560 nm LED, Ev = 10 lux, Tint = 50 ms, Range = 0 (100 counts/lux)	R_{v_g10}		1000		counts
Illuminance responsivity, green 560 nm LED, Ev = 100 lux, Tint = 50 ms, Range = 0 (100 counts/lux)	R_{v_g100}		10000		counts
Dark current, Ev = 0 lux, Tint = 100 ms	R_{vd}	0	0	3	counts
PROXIMITY SENSOR (Note 8)					
Detection range, Tint = 4800 μs, I_{LED} = 160 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), LED Modulation Frequency = 308 kHz, Sample Delay = 250 ns, SNR = 7:1	$D_{PS\_4800\_WHITE\_MOD}$		200		mm
Detection range, Tint = 4800 μs, I_{LED} = 160 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_4800\_WHITE\_160}$		148		mm
Detection range, Tint = 4800 μs, I_{LED} = 25 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_4800\_WHITE\_25}$		66		mm
Detection range, Tint = 2400 μs, I_{LED} = 50 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_2400\_WHITE\_25}$		80		mm
Detection range, Tint = 1800 μs, I_{LED} = 75 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_1800\_WHITE\_75}$		88		mm
Detection range, Tint = 1200 μs, I_{LED} = 100 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_1200\_WHITE\_100}$		90		mm
Detection range, Tint = 600 μs, I_{LED} = 125 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_600\_WHITE\_125}$		88		mm
Detection range, Tint = 600 μs, I_{LED} = 100 mA, 860 nm IR LED (OSRAM SFH4650), White Reflector (RGB = 220, 224, 223), SNR = 8:1	$D_{PS\_600\_WHITE\_100}$		76		mm

7. Refer to Figure 4 for more information on spectral response.
8. Measurements performed with default modulation frequency and sample delay unless noted.

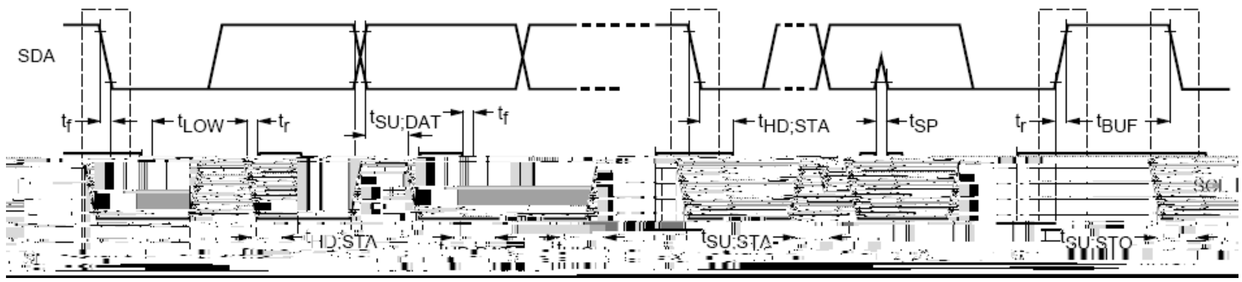


Figure 2. AC Characteristics, Standard and Fast Modes

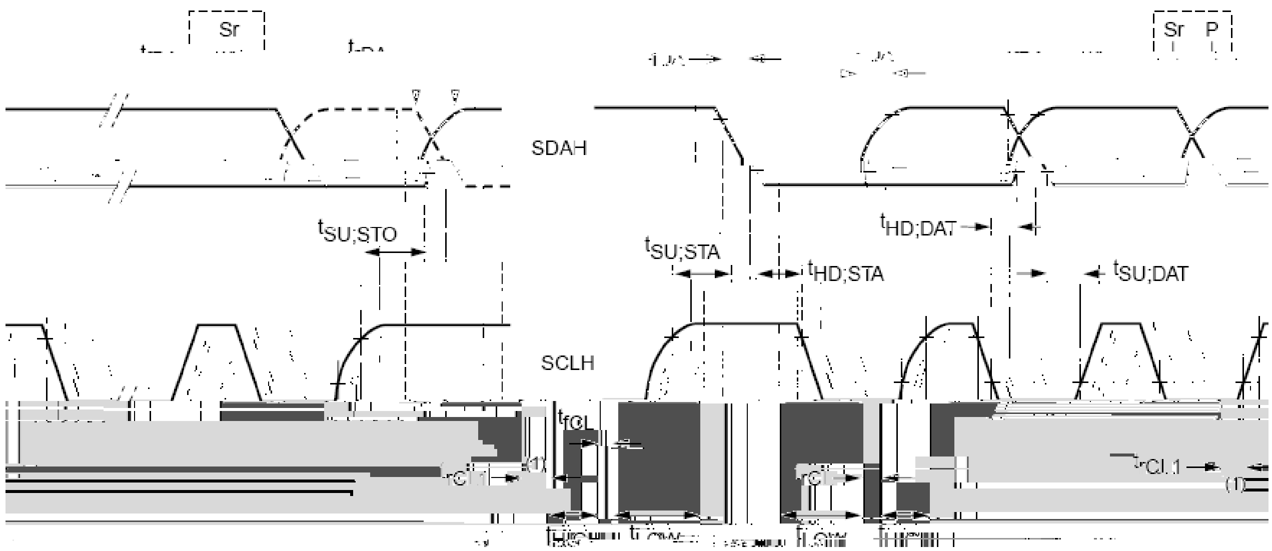


Figure 3. AC Characteristics, High Speed Mode

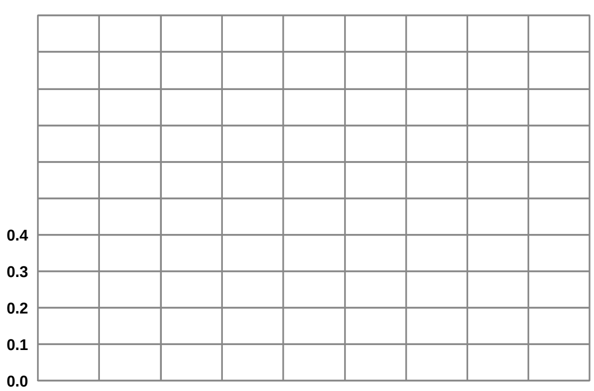


Figure 4. ALS Spectral Response (Normalized)

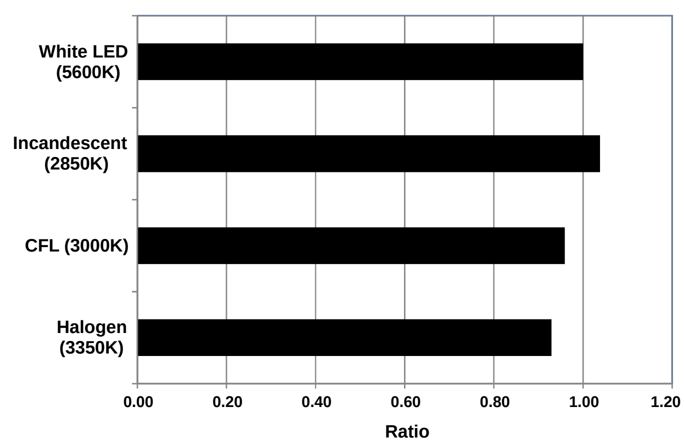


Figure 5. ALS1 Light Source Dependency (Normalized to White LED Light)

TYPICAL CHARACTERISTICS

TYPICAL CHARACTERISTICS

Figure 12. PS Horizontal Response to IR LED Light vs Angle (Source swept from LED pin (+90°) to VDD pin (−90°))

Figure 13. PS Vertical Response to IR LED Light vs Angle (Source swept from LED pin (+90°) to INT pin (−90°))

PS COUNT
16K
14K
12K
8K
6K
4K
2K
0
0 50 100 150 200 250
DISTANCE (mm)

Figure 14. PS Response vs. Distance and LED Current (1200 μs Integration Time, White Reflector (RGB = 220, 224, 223))

PS COUNT
9K
8K
6K
5K
4K
2K
1K
0
0 50 100 150 200
DISTANCE (mm)

Figure 15. PS Response vs. Distance and LED Current (1200 μs Integration Time, Grey Reflector (RGB = 162, 162, 160))

PS COUNT
1200
1000
800
600
400
200
0
0 50 100 150 200
DISTANCE (mm)

Figure 16. PS Response vs. Distance and LED Current (1200 μs Integration Time, Black Reflector (RGB = 16, 16, 15))

PS COUNT
45K
40K
30K
25K
20K
15K
5K
0
0 50 100 150 200 250
DISTANCE (mm)

Figure 17. PS Response vs. Distance and Integration Time (80 mA LED Current, White Reflector (RGB = 220, 224, 223))

TYPICAL CHARACTERISTICS

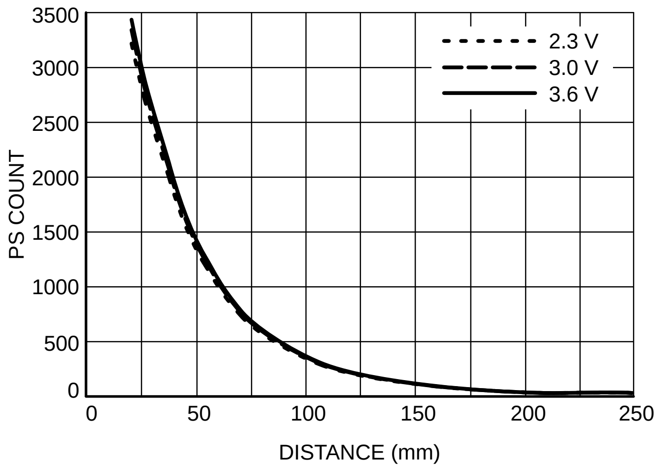


Figure 18. PS Response vs. Distance and Supply Voltage (1200 μs Integration Time, 40 mA LED Current, White Reflector (RGB = 220, 224, 223))

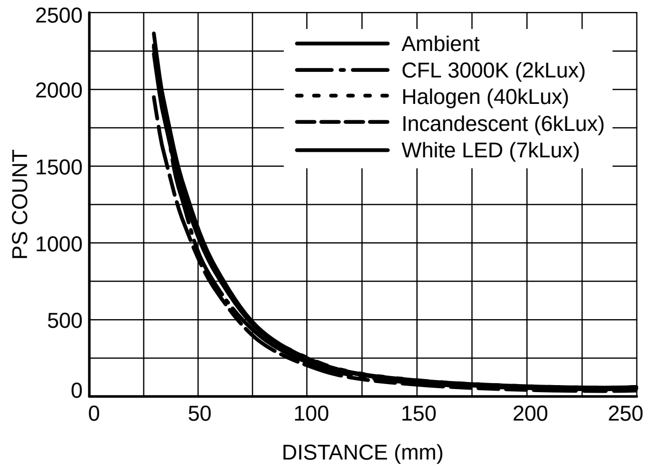


Figure 19. PS Ambient Rejection (1200 μs Integration Time, 100 mA LED Current, White Reflector (RGB = 220, 224, 223))

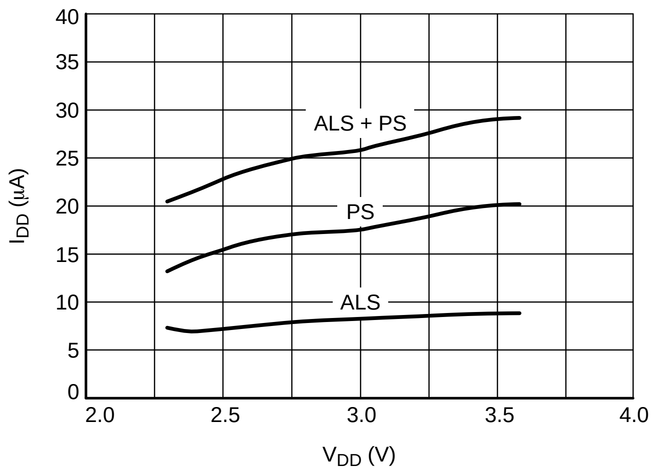


Figure 20. Supply Current vs. Supply Voltage ALS1 or ALS2 TINT = 100 ms, TR = 500 ms PS TINT = 300 μs, TR = 100 ms

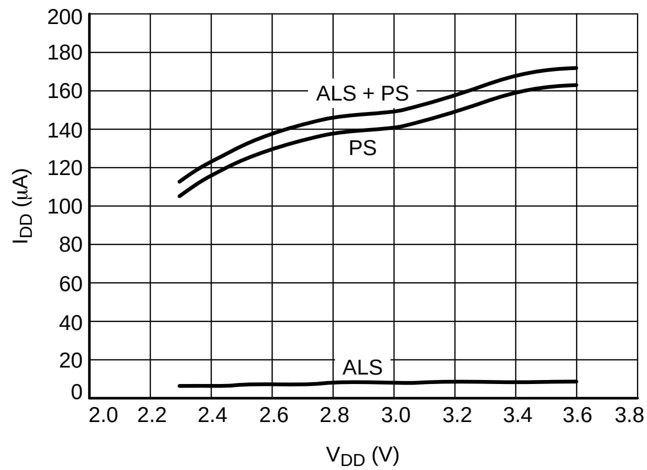


Figure 21. Supply Current vs. Supply Voltage ALS1 and ALS2 TINT = 100 ms, TR = 500 ms PS TINT = 1200 μs, TR = 50 ms

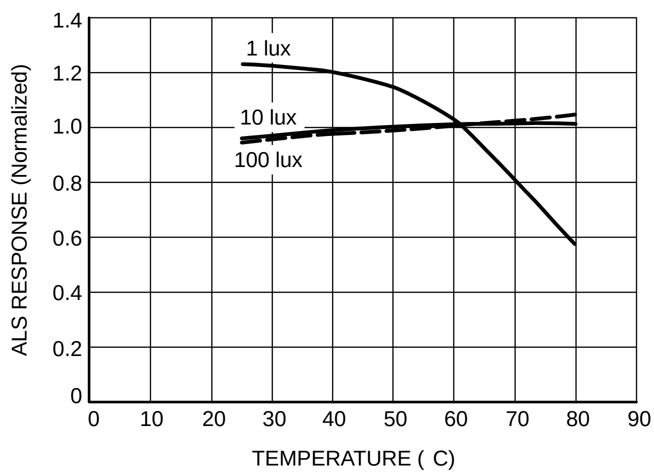


Figure 22. ALS1 Response vs. Temperature

Description of Operation

Proximity Sensor Architecture

NOA3315W combines an advanced digital proximity sensor, LED driver, dual ambient light sensors and a tri−mode I^2C interface as shown in Figure 1. The LED driver draws a modulated current through the external IR LED to illuminate the target. The LED current is programmable over a wide range. The infrared light reflected from the target is detected by the proximity sensor photo diode. The proximity sensor employs a sensitive photo diode fabricated in ON Semiconductor's standard CMOS process technology. The modulated light received by the on−chip photodiode is converted to a digital signal using a variable slope integrating ADC with a default resolution (at 300 μs) of 12−bits, unsigned. The signal is processed to remove all unwanted signals resulting in a highly selective response to the generated light signal. The final value is stored in the PS_DATA register where it can be read by the I^2C interface.

Proximity Sensor LED Frequency and Delay Settings

The LED current modulation frequency is user selectable from approximately 128 KHz to 2 MHz using the PS_LED_FREQUENCY register. An internal precision 4 MHz oscillator provides the frequency reference. The 4 MHz clock is divided by the value in register 0x0D to determine the pulse rate. The default is 0x10 (16) which results in an LED pulse frequency of 250 KHz (4 μs period). Values below 200 KHz and above 1 MHz are not recommended.

Switching high LED currents can result in noise injected into the proximity sensor receiver causing inaccurate readings. The PS receiver has a user programmable delay from the LED edge to when the receiver samples the data (PS_SAMPLE_DELAY – register 0x0E). Longer delays may reduce the effect of switching noise but also reduce the sensitivity.

Since the value of the delay is dependent on the pulse frequency, its value must be carefully computed. The value obviously cannot exceed the LED pulse width or there would be no sampling of the data when the LED is illuminated. There is also a minimum step size of 125 ns.

The delay values are programmed as follows:

0 or 1: No delay
2−31: Selects (N−1)*125 ns
N must be less than or equal to the
PS_LED_FREQUENCY Value

The default delay is 0x05 (500 ns)

Table 6 shows some common LED pulse frequencies and sample delays and the resulting register values.

Table 6. COMMON LED PULSE FREQUENCY SETTINGS

LED Pulse Frequency (KHz)	Sample Delay (ns)	PS_LED_ FREQUENCY Register (0x0D) Value	PS_SAMPLE_ DELAY Register (0x0E) Value
200	250	0x14	0x03

After the NOA3315W sends an ACK, the master sends the register address as if it were going to be written to. The NOA3315W will acknowledge this as well. Next, instead of sending data as in a write, the master will re−issue an I^2C START (repeated start) and again send the slave address and this time the read(1) command bit. The NOA3315W will then begin shifting out data from the register just addressed. If the master wishes to receive more data (next register address), it will ACK the slave at the end of the 8 bit data transmission, and the slave will respond by sending the next byte, and so on. To signal the end of the read transaction, the master will send a NACK bit at the end of a transmission followed by an I^2

PART_ID Register (0x00)

The PART_ID register provides part and revision identification. These values are hard−wired at the factory and cannot be modified.

Table 8. PART_ID Register (0x00)

Bit	7	6	5	4	3	2	1	0
Field	Part number ID				Revision ID			

Field	Bit	Default	Description
Part number ID	7:4	1011	Part number identification
Revision ID	3:0	NA	Silicon revision number

RESET Register (0x01)

Software reset is controlled by this register. Setting this register followed by an I2C_STOP sequence will immediately reset the NOA3315W to the default startup standby state. Triggering the software reset has virtually the same effect as cycling the power supply tripping the internal Power on Reset (POR) circuitry.

Table 9. RESET Register (0x01)

Bit	7	6	5	4	3	2	1	0
Field	NA							SW_reset

Field	Bit	Default	Description
NA	7:1	XXXXXXX	Don't care
SW_reset	0	0	Software reset to startup state

INT_CONFIG Register (0x02)

INT_CONFIG register controls the external interrupt pin function.

Table 10. INT_CONFIG Register (0x02)

Bit	7	6	5	4	3	2	1	0
Field	NA					edge_triggered	auto_clear	polarity

Field	Bit	Default	Description	
NA	7:3	XXXXX	Don't care	
Edge_triggered	2	0	0	Interrupt pin stays asserted while the INTERRUPT register bit is set (level)
			1	Interrupt pin pulses at the end of each measurement while the INTERRUPT register bit is set
auto_clear	1	1	0	When an interrupt is triggered, the interrupt pin remains asserted until cleared by an I^2C read of INTERRUPT register
			1	Interrupt pin state is updated after each measurement
polarity	0	0	0	Interrupt pin active low when asserted
			1	Interrupt pin active high when asserted

PS_LED_FREQUENCY Register (0x0D)

The LED FREQUENCY register controls the frequency of the LED pulses. The LED modulation frequency is determined by dividing 4 MHz by the register value. Valid divisors are 2−31. The default value is 16 which results in an LED pulse frequency of 250 KHz (one pulse every 4 μs).

Table 17. PS_CONFIG Register (0x15)

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Field	NA		hyst_enable	hyst_trigger	als_blanking	integration_time		

Field	**Bit**	**Default**	**Description**	
NA	7:6	XX	Don’t Care	
hyst_enable	5	0	0	Disables hysteresis
			1	Enables hysteresis
hyst_trigger	4	0	0	Lower threshold with hysteresis
			1	Upper threshold with hysteresis
als_blanking	3	1	0	Disables ALS blanking
			1	Enables ALS blanking
integration_time	2:0	011	000	150 μs integration time
			001	300 μs integration time
			010	600 μs integration time
			011	1200 μs integration time
			100	1800 μs integration time
			101	2400 μs integration time
			110	3600 μs integration time
			111	4800 μs integration time

Table 19. PS_CONTROL Register (0x17)

Bit	7	6	5	4	3	2	1	0
Field	NA						PS_Repeat	PS_OneShot

Field	Bit	Default	Description
NA	7:2	XXXXXX	Don't care
PS_Repeat	1	0	Initiates new measurements at PS_Interval rates
PS_OneShot	0	0	Triggers proximity sensing measurement. In single shot mode this bit clears itself after cycle completion.

ALS_TH Registers (0x20 – 0x23)

With hysteresis not enabled (see ALS_CONFIG register), the ALS_TH registers set the upper and lower interrupt thresholds of the ambient light detection window. Interrupt functions compare these threshold values to data from the ALS_DATA1 registers. Measured ALS_DATA1 values outside this window will set an interrupt according to the INT_CONFIG register settings.

With hysteresis enabled, threshold settings take on a different meaning. If the ALS_hyst_trig is set, the ALS_TH_UP register sets the upper threshold at which an interrupt will be set, while the ALS_TH_LO register then sets the lower threshold hysteresis value where the interrupt would be cleared. Setting the ALS_hyst_trig low reverses the function such that the ALS_TH_LO register sets the lower threshold at which an interrupt will be set and the ALS_TH_UP represents the hysteresis value at which the interrupt would be subsequently cleared. Hysteresis functions only apply in "auto_clear" INT_CONFIG mode.

Table 20. ALS_TH_UP Registers (0x20 – 0x21)

Bit	7	6	5	4	3	2	1	0
Field	ALS_TH_UP_MSB(0x20), ALS_TH_UP_LSB(0x21)							

Field	Bit	Default	Description
ALS_TH_UP_MSB	7:0	0xFF	Upper threshold for ALS detection, MSB
ALS_TH_UP_LSB	7:0	0xFF	Upper threshold for ALS detection, LSB

Table 21. ALS_TH_LO Registers (0x22 – 0x23)

Bit	7	6	5	4	3	2	1	0
Field	ALS_TH_LO_MSB(0x22), ALS_TH_LO_LSB(0x23)							

Field	Bit	Default	Description
ALS_TH_LO_MSB	7:0	0x00	Lower threshold for ALS detection, MSB
ALS_TH_LO_LSB	7:0	0x00	Lower threshold for ALS detection, LSB

ALS_FILTER_CONFIG Register (0x24)

ALS_FILTER_CONFIG register provides a hardware mechanism to filter out single event occurrences or similar anomalies from causing unwanted interrupts. Two 4 bit registers (M and N) can be set with values such that M out of N measurements must exceed threshold settings in order to set an interrupt. The default setting of 1 out of 1 effectively turns the filter off and any single measurement exceeding thresholds can trigger an interrupt. N must be greater than or equal to M. A setting of 0 for either M or N is not allowed and disables the ALS Interrupt.

Table 22. ALS_FILTER_CONFIG Register (0x24)

Bit	7

ALS_CONFIG Register (0x25)

The ALS_CONFIG register controls the operation of the

ALS_CONTROL Register (0x27)

The ALS_CONTROL register is used to control the

Proximity Sensor Operation

NOA3315W

Ambient Light Sensor Operation

The NOA3315W supports dual ambient light sensors. ALS1 has a photopic filter which closely mimics the spectral response of the human eye. ALS2 has no filters. In many respects ALS1 and ALS2 are similar, but each sensor can be separately enabled or disabled and each ALS has its own data registers. ALS1 and ALS2 share control, configuration and operational details except that ALS2 is not compared to the threshold registers and cannot create an interrupt. ALS1 and ALS2 support simultaneous concurrent measurements allowing the two sensor values to be read out and used in computations as desired.

ALS configuration is accomplished by writing the desired configuration values to registers 0x02 and 0x20 through 0x27. Writing to configuration registers can be done with either individual I^2C byte−write commands or with one or more I^2C block write commands. Block write commands specify the first register address and then write multiple bytes of data in sequence. The NOA3315W automatically increments the register address as it acknowledges each byte transfer.

ALS measurement is initiated by writing appropriate values to the CONTROL register (0x27). Sending an I2C_STOP sequence at the end of the write signals the internal state machines to wake up and begin the next measurement cycle. Figure 27 and Figure 28 illustrate the activity of key signals during an ambient light sensor measurement cycle. The cycle begins by starting the calibrated low frequency (LF) oscillator and powering up the ambient light sensor. Next, the ambient light measurement is made for the specified integration time and the result is stored in the appropriate 16 bit ALS Data registers. If in One−shot mode, the ALS is powered down and awaits the next command. If in Repeat mode the ALS is powered down, the interval is timed out and the operation repeated. There are some special cases if the interval timer is set to less than the integration time. For continuous mode, the interval is set to either 0 or a value less than or equal to the integration time and the ALS makes continuous measurements with only a 5 μs delay between integration times and the ALS remains powered up.

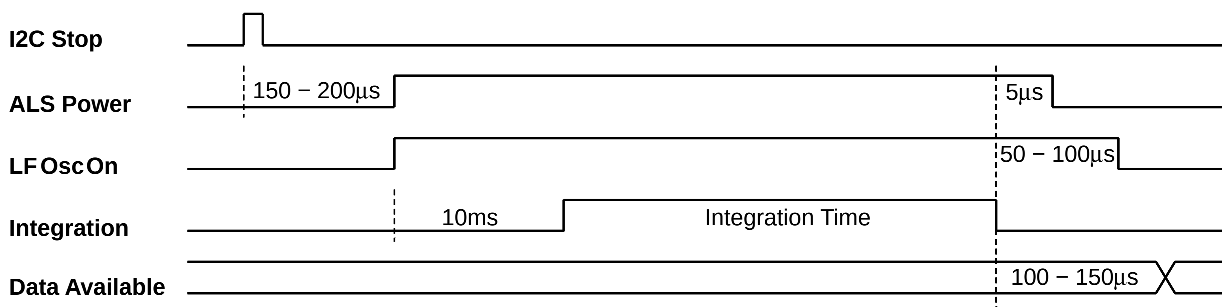
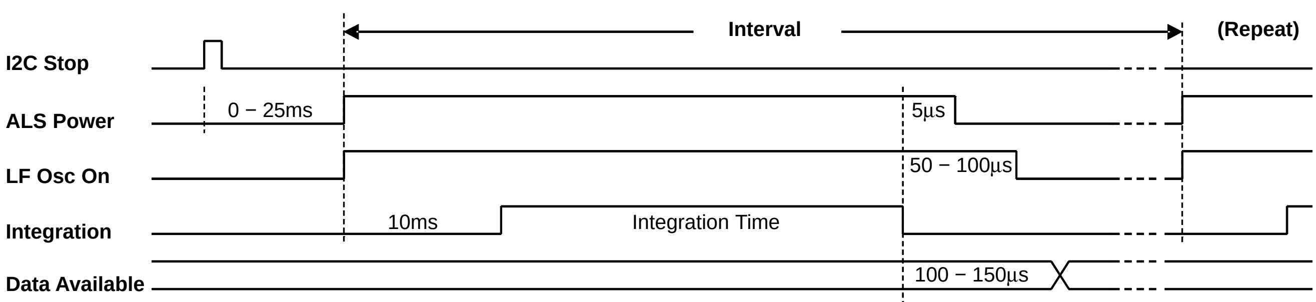


Figure 27. ALS One−Shot Timing



NOTE: If Interval is set to 0 (continuous) the time between integrations is 5 μs and power stays on.
If Interval is set to ≤ to the integration time (but not 0) the time between integrations is 10 ms and power stays on.
If Interval is set to > integration time the time between integrations is the interval and the ALS powers down.

Figure 28. ALS Repeat Timing

Example Programming Sequence

The following pseudo code configures the NOA3315W proximity sensor in repeat mode with 50 ms wait time between each measurement and then runs it in an interrupt driven mode. When the controller receives an interrupt, the interrupt determines if the interrupts was caused by the proximity sensor and if so, reads the PS_Data from the device, sets a flag and then waits for the main polling loop to respond to the proximity change.

```
external subroutine I2C_Read_Byte (I2C_Address, Data_Address);
external subroutine I2C_Read_Block (I2C_Address, Data_Start_Address, Count, Memory_Map);
external subroutine I2C_Write_Byte (I2C_Address, Data_Address, Data);
external subroutine I2C_Write_Block (I2C_Address, Data_Start_Address, Count, Memory_Map);
subroutine Initialize_PS () {
 MemBuf[0x02] = 0x02;   // INT_CONFIG assert interrupt until cleared
 MemBuf[0x0F] = 0x09;   // PS_LED_CURRENT 50mA
 MemBuf[0x10] = 0x8F;   // PS_TH_UP_MSB
 MemBuf[0x11] = 0xFF;   // PS_TH_UP_LSB
 MemBuf[0x12] = 0x70;   // PS_TH_LO_MSB
 MemBuf[0x13] = 0x00;   // PS_TH_LO_LSB
 MemBuf[0x14] = 0x11;   // PS_FILTER_CONFIG turn off filtering
 MemBuf[0x15] = 0x09;   // PS_CONFIG ALS blanking enabled, 300us integration time
 MemBuf[0x16] = 0x0A;   // PS_INTERVAL 50ms wait
 MemBuf[0x17] = 0x02;   // PS_CONTROL enable continuous PS measurements
 MemBuf[0x20] = 0xFF;   // ALS_TH_UP_MSB
 MemBuf[0x21] = 0xFF;   // ALS_TH_UP_LSB
 MemBuf[0x22] = 0x00;   // ALS_TH_LO_MSB
 MemBuf[0x23] = 0x00;   // ALS_TH_LO_LSB
 MemBuf[0x25] = 0x40;   // ALS_CONFIG ALS2 disabled, ALS1 enabled, max sensitivity, 50ms
integration time
 MemBuf[0x26] = 0x00;   // ALS_INTERVAL continuous measurement mode
 MemBuf[0x27] = 0x02;   // ALS_CONTROL enable continuous ALS measurements
 I2C_Write_Block (I2CAddr, 0x02, 37, MemBuf);
}
subroutine I2C_Interupt_Handler () {
 // Verify this is a PS interrupt
 INT = I2C_Read_Byte (I2CAddr, 0x40);
 if (INT == 0x11 || INT == 0x12) {
  // Retrieve and store the PS data
  PS_Data_MSB = I2C_Read_Byte (I2CAddr, 0x41);
  PS_Data_LSB = I2C_Read_Byte (I2CAddr, 0x42);
  NewPS = 0x01;
  }
 }
subroutine main_loop () {
 I2CAddr = 0x37;
 NewPS = 0x00;
 Initialize_PS ();
 loop {
  // Do some other polling operations
  if (NewPS == 0x01) {
   NewPS = 0x00;
   // Do some operations with PS_Data
   }
  }
 }
```

Physical Location of Photodiode Sensors

The physical locations of the NOA3315W proximity sensor and ambient light sensor photodiodes are shown in Figure 29, referenced to the lower left hand corner of the die.

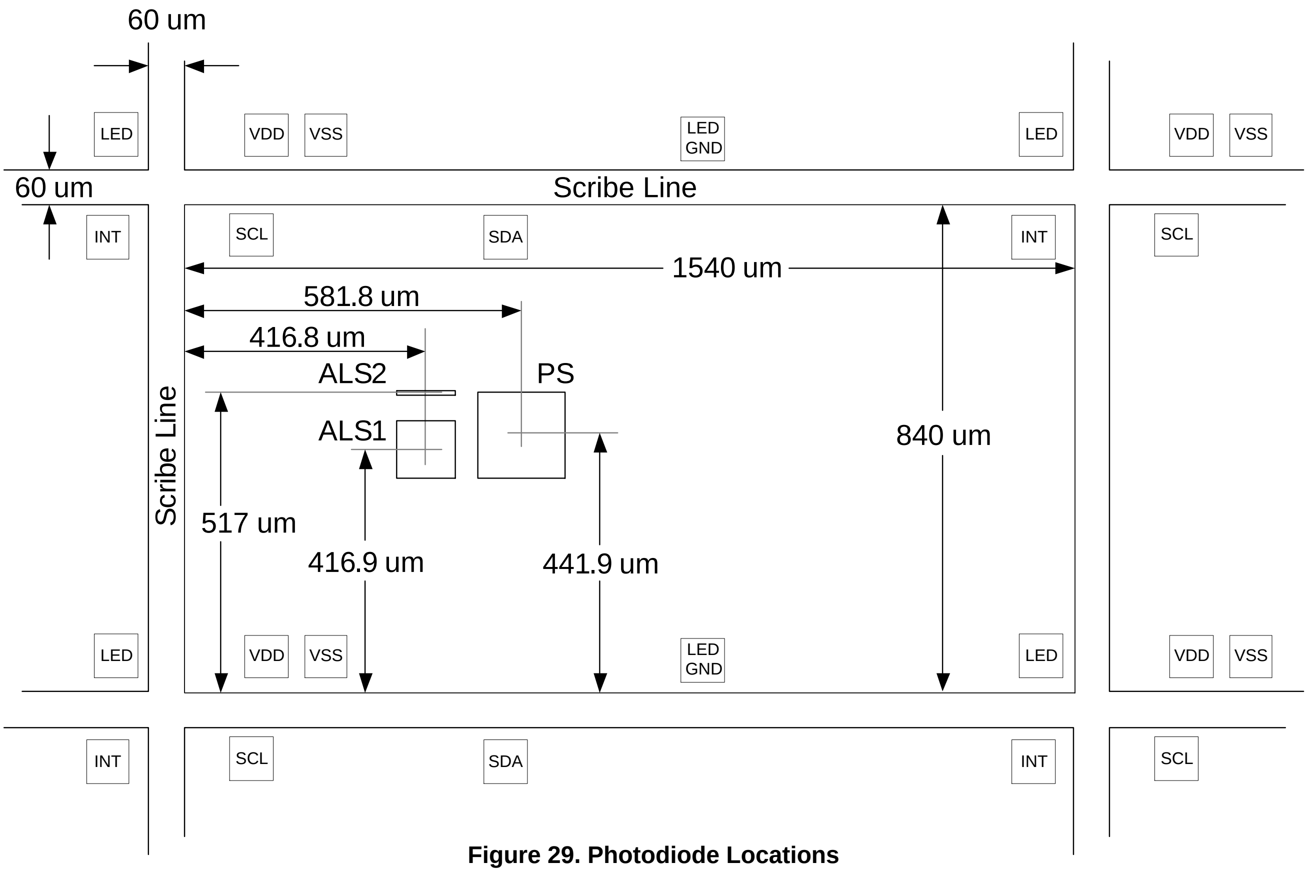


Figure 29. Photodiode Locations

Table 30. BONDING PAD LOCATIONS
(Dimensions in μm measured from the lower left corner of the die to the middle of the bond pad) (Note 9)

Pad	Description	X	Y	Pad Size
VDD	Power supply	139	58.4	75x75
VSS	Ground	248.5	58.4	75x75
LED_GND	Ground for IR LED driver	895.5	54.5	75x75
LED	IR LED output	1483.5	65.6	75x75
INT	Interrupt output	1467.3	786	75x75
SDA	I2C data signal	554.9	786	75x75
SCL	I2C clock signal	114.25	786	75x75

9. Bond pad material is AL + 0.5% Cu

Table 31. MECHANICAL DIMENSIONS

Parameter	Symbol	Min	Typ	Max	Unit
Wafer thickness		700	725	750	μm
Wafer diameter			200		mm