

NOA3302

Digital Proximity Sensor with Ambient Light Sensor and Interrupt

Description

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Table 2. ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Input power supply	VDD	4.0	V
Input voltage range	V_{in}	-0.3 to VDD + 0.2	V
Output voltage range	V_{out}	-0.3 to VDD + 0.2	V
Maximum Junction Temperature	$T_{J(max)}$	100	°C
Storage Temperature	T_{STG}		

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Table 4. ELECTRICAL CHARACTERISTICS (Unless otherwise specified, these specifications apply over 2.3 V < VDD < 3.3 V, 1.7 V < VDD_I2C < 1.9 V, -40°C < T_A < 80°C, 10 pF < C_b < 100 pF) (See Note 4)

Parameter	Symbol	Min	Typ	Max	Unit
LED pulse current	I _{LED_pulse}	5		160	mA
LED pulse current step size	I _{LED_pulse_step}		5		mA
LED pulse current accuracy	I _{LED_acc}	-20		+20	%
Interval Timer Tolerance	Tol _{f_timer}	-35		+35	%
SCL clock frequency	f _{SCL_std}	10		100	kHz
	f _{SCL_fast}	100		400	
	f _{SCL_hs}	100		3400	
Hold time for START condition. After this period, the first clock pulse is generated.	T _{HD;STA_std}	4.0		-	S
	t _{HD;STA_fast}	0.6		-	
	t _{HD;STA_hs}	0.160		-	
Low period of SCL clock	t _{LOW_std}	4.7			

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Table 4. ELECTRICAL CHARACTERISTICS (Unless otherwise specified, these specifications apply over $2.3\text{ V} < \text{VDD} < 3.3\text{ V}$, $1.7\text{ V} < \text{VDD_I2C} < 1.9\text{ V}$, $-40^{\circ}\text{C} < \text{T}_A < 80^{\circ}\text{C}$, $10\text{ pF} < \text{Cb} < 100\text{ pF}$) (See Note 4) (continued)

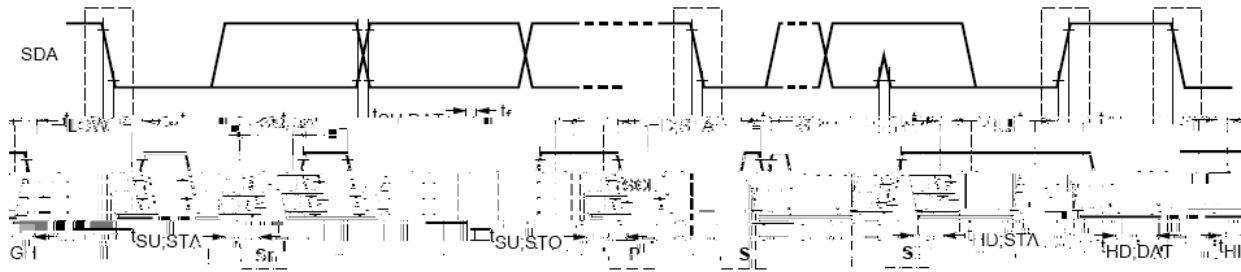


Figure 2. AC Characteristics, Standard and Fast Modes

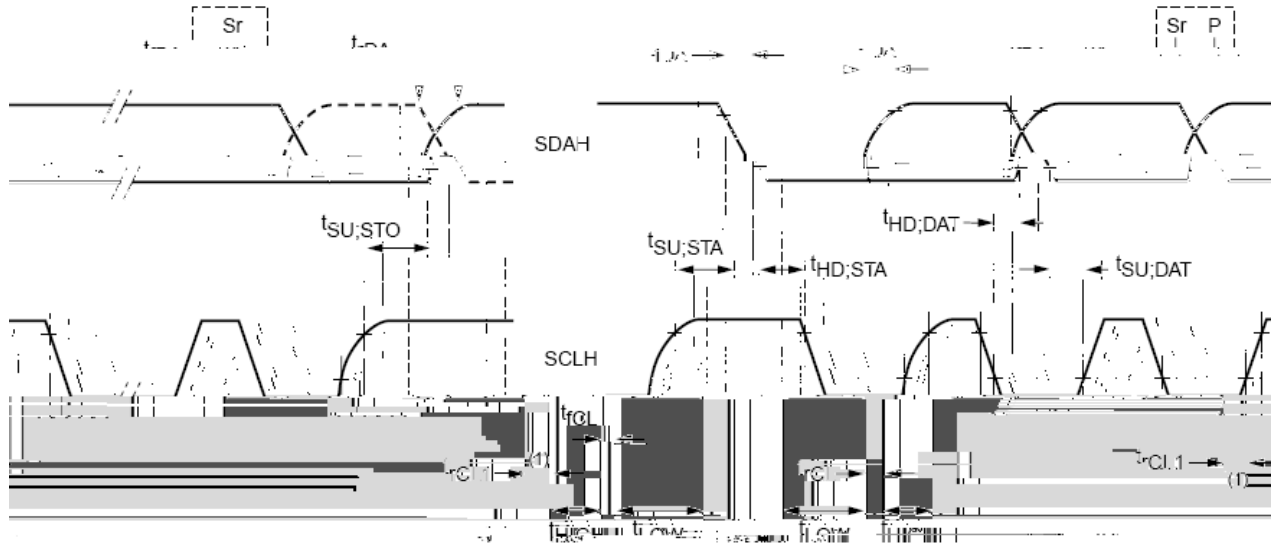


Figure 3. AC Characteristics, High Speed Mode

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TYPICAL CHARACTERISTICS

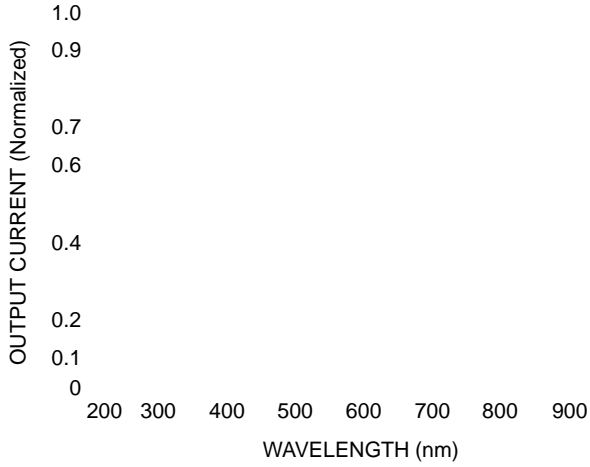


Figure 4. ALS Spectral Response (Normalized)

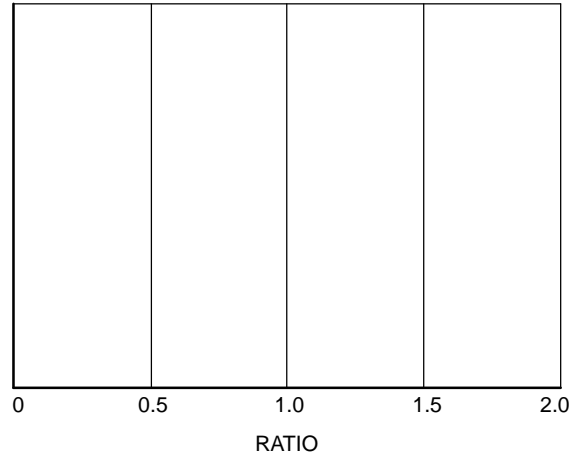


Figure 5. ALS Light Source Dependency (Normalized to Fluorescent Light)

Figure 6. ALS Response to White Light vs. Angle

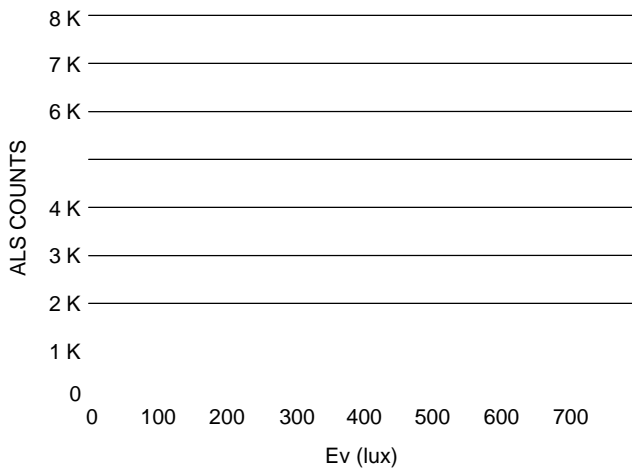


Figure 8. ALS Linearity 0-700 lux

Figure 7. ALS Response to IR vs. Angle

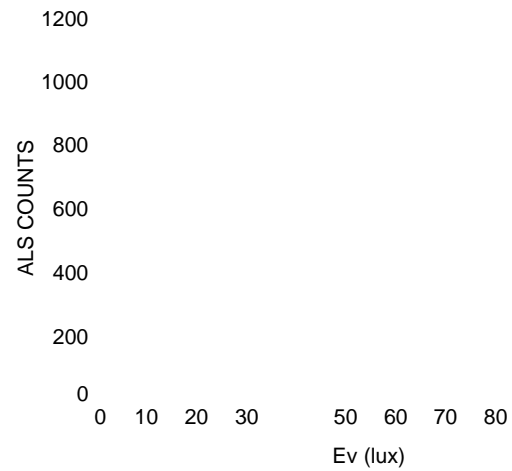


Figure 9. ALS Linearity 0-100 lux

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TYPICAL CHARACTERISTICS

120

100

60

40

20

0

0 1

3

4

6

7

8

10

Ev (lux)

Figure 10. ALS Linearity 0–10 lux

0

0

0.5

1.0

1.5

2.0

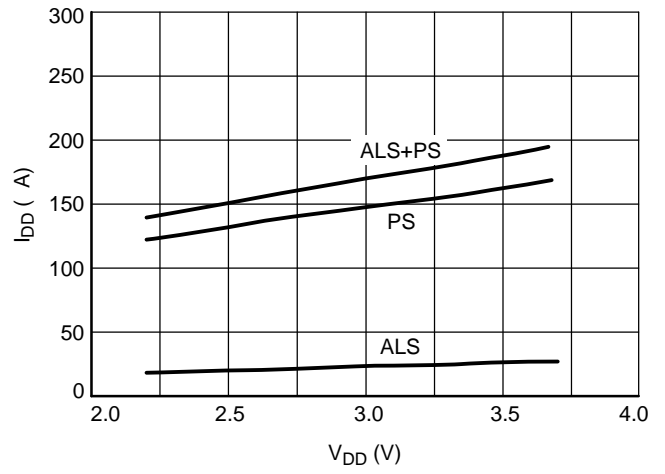
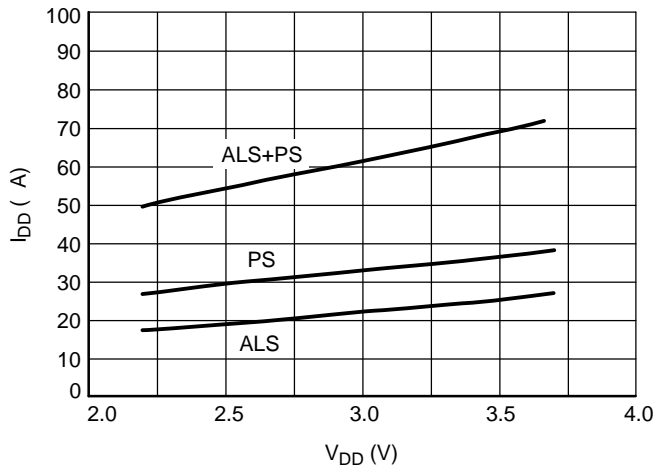
2.5

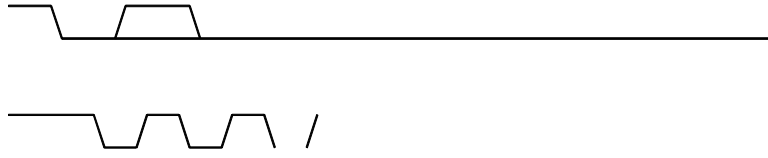
Ev (lux)

Figure 11. ALS Linearity 0–2 lux

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TYPICAL CHARACTERISTICS





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NOA3302 Data Registers

Table 6. NOA3302 DATA REGISTERS

Address	Type	Name	Description
0x00	R	PART_ID	NOA3302 part number and revision IDs
0x01	RW	RESET	Software reset control
0x02	RW	INT_C:5 refBT8dG0.84 612.36 .85.36 ref59.76 6112.36 .84 2 .833997 refBT8 0 0 8 266.04 617.76 Tm.0172 Tc(R00TjETI)	

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RESET Register (0x01)

Table 8. 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)

Table 9. INT_CONFIG REGISTER (0x02)

Bit	7	6	5	4	3	2	1
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Table 11. PS_TH_UP REGISTERS (0x10 – 0x11)

Bit	7	6	5	4	3	2	1	0
Field	PS_TH_UP_MSB(0x10), PS_TH_UP_LSB(0x11)							

Field	Bit	Default	Description
PS_TH_UP_MSB			

PS_INTERVAL Register (0x16)

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Table 18. 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_CONFIG Register (0x25)

Table 19. ALS_CONFIG REGISTER (0x25)

Bit	7	6	5	4	3	2	1	0
Field	NA		hyst_enable	hyst_trigger	reserved	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				
reserved	3	0	Must be set to 0					
integration_time	2:0	100	000	6.25 ms integration time				
			001	12.5 ms integration time				
			010	25 ms integration time				
			011	50 ms integration time				
			100	100 ms integration time				
			101	200 ms integration time				
			110	400 ms integration time				
			111	800 ms integration time				

ALS_INTERVAL Register (0x26)

Table 20. ALS_INTERVAL REGISTER (0x26)

Bit	7	6	5	4	3	2	1	0
Field	NA		interval					
Field	Bit	Default	Description					
interval	5:0	0x0A	Interval time between ALS measurement cycles					

ALS_CONTROL Register (0x27)

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ALS_DATA Registers (0x43 – 0x44)

Table 24. ALS_DATA REGISTERS (0x43 – 0x44)

Bit	7	6	5	4	3	2	1	0
Field	ALS_DATA_MSB(0x43), ALS_DATA_LSB(0x44)							

Field	Bit	Default	Description
ALS_DATA_MSB	7:0	0x00	ALS measurement data, MSB
ALS_DATA_LSB	7:0	0x00	ALS measurement data, LSB

Proximity Sensor Operation

Ambient Light Sensor Operation

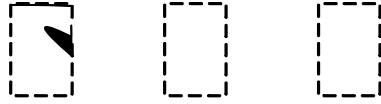
Example Programming Sequence

```

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] = 0x01; // PS_CONFIG 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] = 0x04; // ALS_CONFIG 100ms 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
    }
  }
}

```

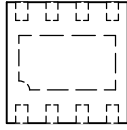
Physical Location of Photodiode Sensors



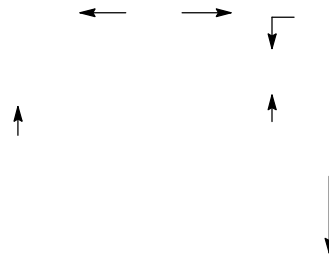
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PACKAGE DIMENSIONS

CWDFN8, 2x2, 0.5P
CASE 505AJ
ISSUE O



MOUNTING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For