

Absolute Maximum Ratings (unless otherwise specified, $T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Max.	Unit
Supply voltage	V_{DD}		4.0	V
LED supply voltage	V_{LED}		4.6	V
LED pulse current ^[1]	I_{LED}		2	A
I ² C-bus pin, Int pin voltage	V_{BUS}	-0.3	$V_{DD} + 0.3$	V
I ² C-bus pin, Int pin current	I_{BUS}		10	mA

Recommended Operating Conditions (unless otherwise specified, $T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating temperature	T_A	-20		+70	$^\circ\text{C}$
Operating supply voltage	V_{DD}	2.8		3.6	V
LED supply voltage	V_{LED}	3.0		4.2	V
Peak LED pulse current ^[1]	I_{LED}		720	860	mA
I ² C-bus pin, INT pin voltage	V_{BUS}	1.8		3.3	V
I ² C-bus pin, INT pin current	I_{BUS}			5	mA

Note:

1. Pulse width < 500 μs , duty cycle < 5%

Operating Characteristics (unless otherwise specified, $T_a = 25^\circ\text{C}$, $V_{DD} = 2.8\text{V}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Suspend current	I_{DD_SUS}		15		μA	See Figure 13
Standby state 1 current	I_{DD_ST1}		0.57		mA	See Figure 11
Standby state 2 current	I_{DD_ST2}		0.37		mA	See Figure 12
Current consumption for proximity detection			0.2		mA	1. Register R_AE_Exposure_UB, 0x48 = 0x10 2. Register R_AE_Exposure_UB, 0x49 = 0x00 3. Register R_IDLE_TIME, 0x65 = 0xCE 4. Register R_IDLE_TIME, 0x66 = 0x0B
Current consumption for gesture detection			1		mA	1. Register R_AE_Exposure_UB, 0x48 = 0x48 2. Register R_AE_Exposure_UB, 0x49 = 0x00 3. Register R_IDLE_TIME, 0x65 = 0x96 4. Register R_IDLE_TIME, 0x66 = 0x00
I ² C-bus input high voltage	V_{IH}	$0.7 \times V_{BUS}$		$V_{BUS} + 0.3$	V	
I ² C-bus input low voltage	V_{IL}	-0.3		$0.3 \times V_{BUS}$	V	
INT, I ² C_SDA output low voltage	V_{OL}			$0.1 \times V_{BUS}$	V	

Proximity Characteristics (unless otherwise specified, $T_a = 25^\circ\text{C}$, $V_{DD} = 2.8\text{V}$)

Parameter	Min.	Typ.	Max.	Unit	Test Conditions
PS ADC Count Value (No Object)	0	5		counts	1. Dedicated duo power supply, $V_{DD} = 2.8\text{V}$ and $V_{LED} = 3\text{V}$ 2. R_LensShadingComp_EnH Register, $0x25 = 0x14$ 3. R_LED1_DAC_UB Register, $0x32 = 0x14$ 4. R_AE_Exposure_UB Register, $0x48 = 0x10$ 5. R_AE_Exposure_UB Register, $0x49 = 0x00$ 6. Open view (no glass) and no reflective object above the module.
PS ADC Count Value (100 mm Distance Object)	47	56	65	counts	1. Dedicated duo power supply, $V_{DD} = 2.8\text{V}$ and $V_{LED} = 3\text{V}$ 2. Reflecting object – 73 mm × 83 mm Kodak 90% grey card, 100 mm distance 3. R_LensShadingComp_EnH Register, $0x25 = 0x14$ 4. R_LED1_DAC_UB Register, $0x32 = 0x14$ 5. R_AE_Exposure_UB Register, $0x48 = 0x10$ 6. R_AE_Exposure_UB Register, $0x49 = 0x00$ 7. Open view (no glass) above the module.

AC Electrical Characteristics, $V_{DD} = 3\text{V}$, $T_A = 25^\circ\text{C}$ (unless otherwise noted) *

Parameter	Symbol	Min.	Max.	Unit
Clock frequency (I ² C-bus only)	f_{SCL}	10	400	kHz
Bus free time between a STOP and START condition	t_{BUF}	1.3	–	μs
Hold time (repeated) START condition. After this period, the first clock pulse is generated	t_{HDSTA}	0.6	–	μs
Set-up time for a repeated START condition	$t_{SU;STA}$	0.6	–	μs
Set-up time for STOP condition	$t_{SU;STO}$	0.6	–	μs
Data hold time	$t_{HD;DAT}$	0	–	ns
Data set-up time	$t_{SU;DAT}$	100	–	ns
LOW period of the SCL clock	t_{LOW}	1.3	–	μs
HIGH period of the SCL clock	t_{HIGH}	0.6	–	μs
Clock/data fall time	t_f	–	300	ns
Clock/data rise time	t_r	–	300	ns
Input pin capacitance	C_i	–	10	pF

* Specified by design and characterization; not production tested.

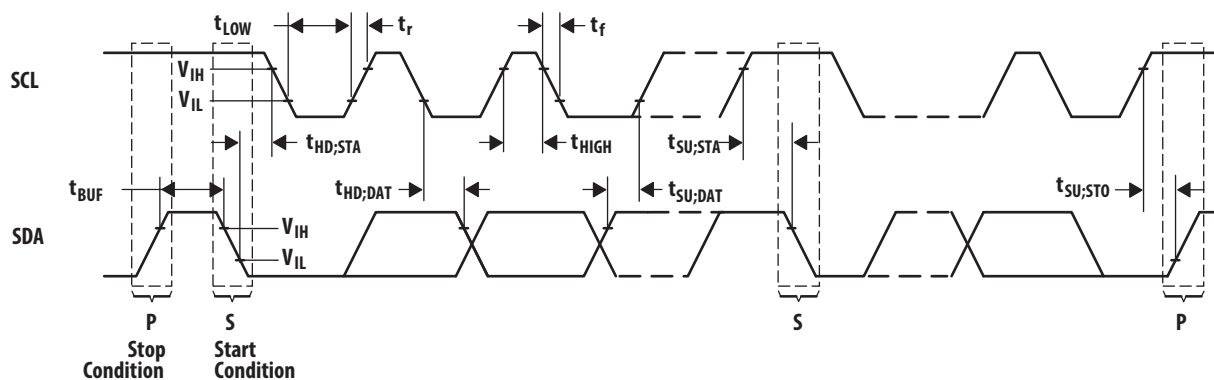


Figure 1. Timing Diagrams