

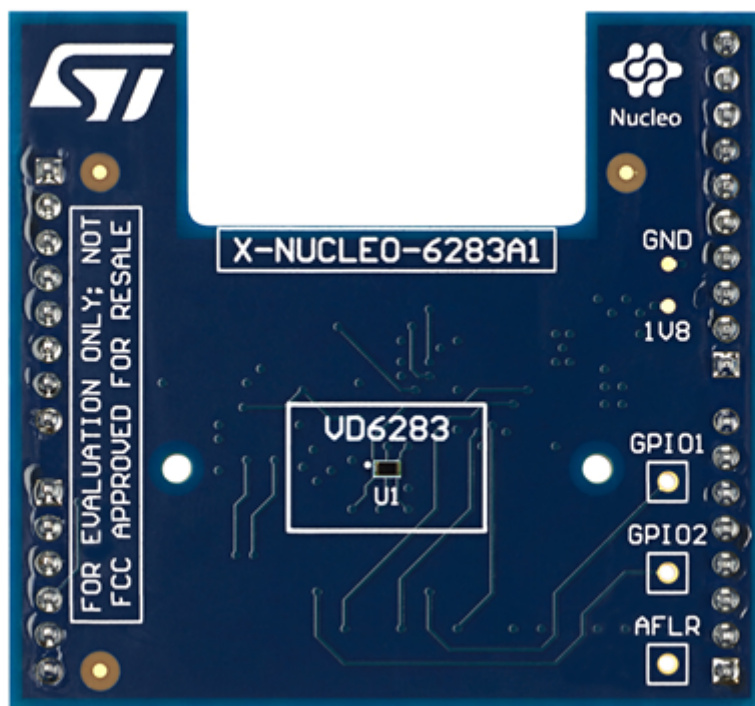
## Getting started with X-NUCLEO-6283A1 expansion board based on VD6283 6-channel ambient light sensor with flicker extraction

### Introduction

This document provides detailed hardware information on the X-NUCLEO-6283A1 expansion board. This expansion board is compatible with the STM32 Nucleo family and the Arduino® electronic boards. It is designed around the VD6283 multispectral sensor and is based on ST's ambient light sensors.

The package is composed of the X-NUCLEO-6283A1 expansion board itself.

**Figure 1. X-NUCLEO-6283A1 expansion board**



**Table 1. Ordering information**

Order code	Description
X-NUCLEO-6283A1	STM32 Nucleo expansion board

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## 1 Overview

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The X-NUCLEO-6283A1 expansion board features the VD6283 hybrid filter multispectral sensor, based on ST's ambient light sensors.

It is compatible with the STM32 Nucleo development board family, and with the Arduino UNO R3 connector layout.

Several ST expansion boards can be stacked through the Arduino connectors, which allows, for example, the development of VD6283 applications with Bluetooth or Wi-Fi interfaces.

## 2 Document references

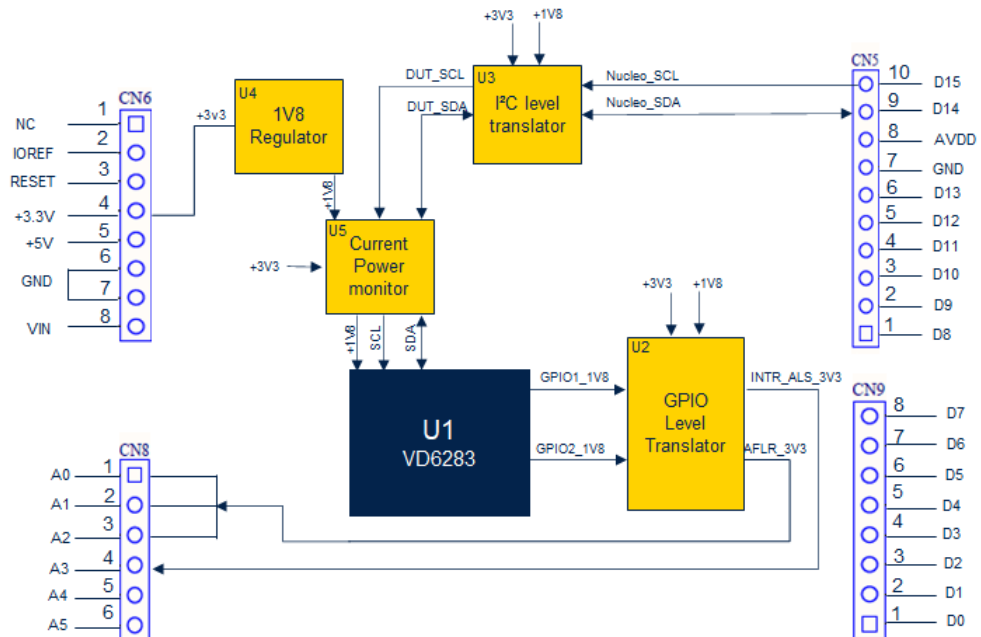
Table 2. Document references

Description	Doc ID
VD6283TX datasheet	DS13735
X-Nucleo-6283A1 data brief	DB4481
P-Nucleo-6283A1 data brief	DB4484
X-Cube-ALS data brief	DB4496

### 3 X-NUCLEO-6283A1 expansion board

This section describes the X-NUCLEO-6283A1 expansion board features and provides useful information for understanding the electrical characteristics.

**Figure 2. X-NUCLEO-6283A1 expansion board schematic diagram**



#### 3.1 Description

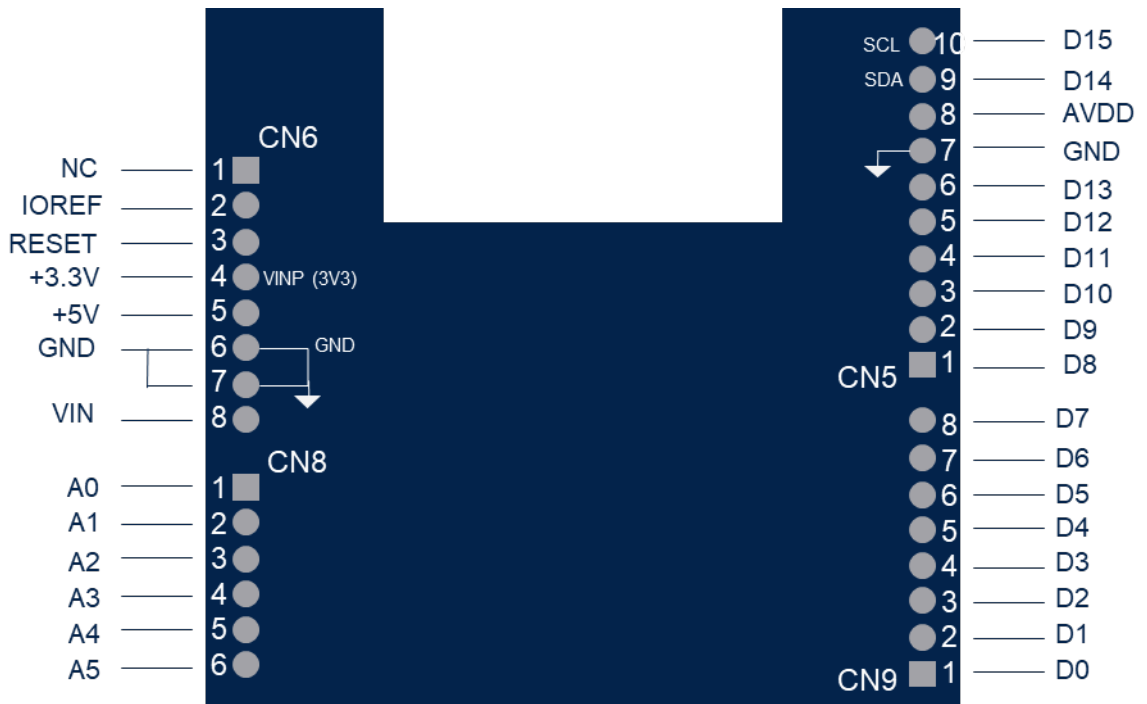
The board allows the user to test the VD6283 functionality, to program it and to understand how to develop an application using the VD6283. It integrates:

- 1.8 V regulator to supply the VD6283
- Level translator to adapt the I/O level to the main board of the microcontroller
- Arduino UNO R3 connectors
- Solderdrops to allow different configurations of the expansion board

It is fundamental to program a microcontroller to control the VD6283 through the I2C bus. The application software and an example of the C-ANSI source code are available on <https://www.st.com/en/imaging-and-photonics-solutions/vd6283tx.html>

The X-NUCLEO-6283A1 expansion board and STM32 Nucleo development board are connected through the Arduino UNO R3 connectors CN5, CN6, CN8, and CN9 as shown in the following figure and described in the tables below.

The X-NUCLEO-6283A1 must be plugged to the STM32 Nucleo development board through the Arduino UNO R3 connectors.

**Figure 3. X-NUCLEO-62832A1 expansion board connector layout**

**Table 3. Left Arduino connector**

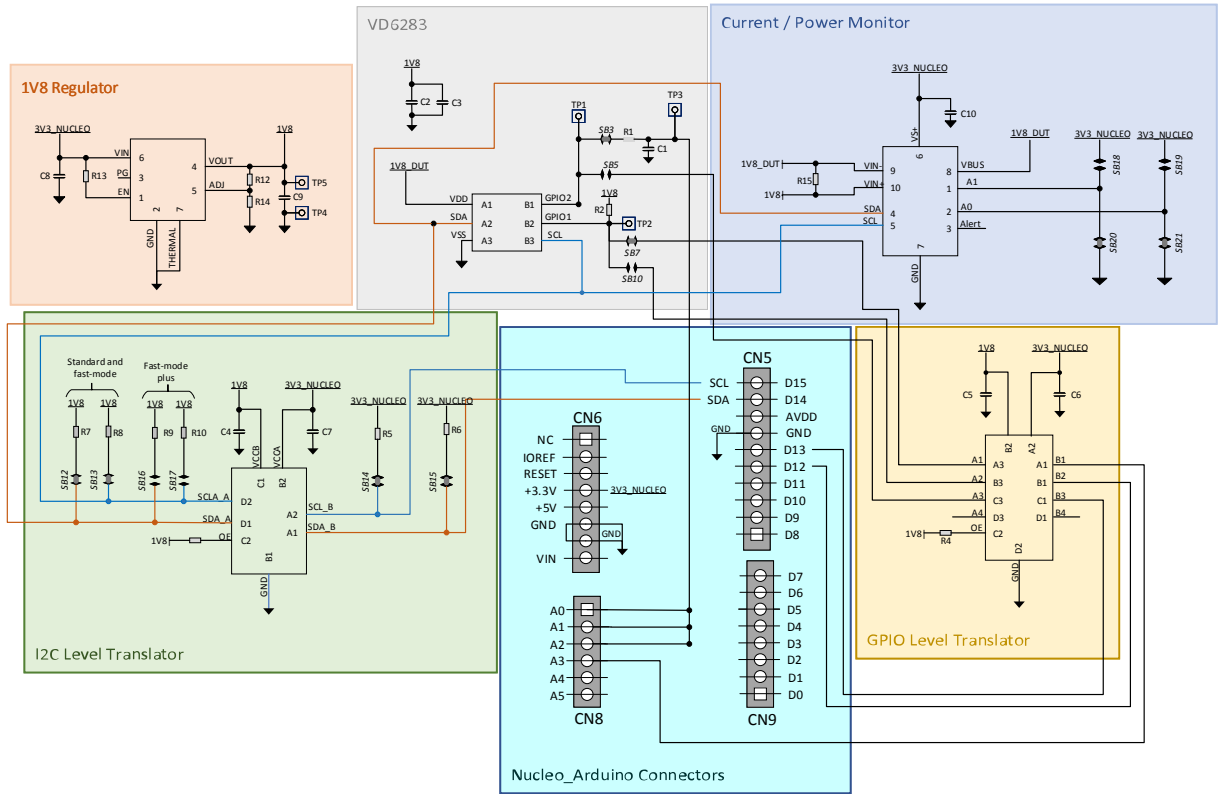
CNnumber	VD6283 board	Pin number	Pin name	MCU pin	X-NUCLEO-6283A1 expansion board function
CN6 power		1	NC	NC	Not used
		2		IOREF	
		3		RESET	
	Power	4	3V3	3V3	3.3 V supply
	GND	6	GND	5V	Not used
				GND	Ground
		7			
8		NC	VIN	Not used	
CN8 analog	AFLR_ADC	1	A0	PA0	Analog Flicker information from VD6283, to be connected to Host ADC input
		2	A1	PA1	
		3	A2	PA4	
	INTR_ALS_3V3	4	A3	PB0	Interrupt signal from VD6283 device
		5	NC	PC1	Not used
		6	NC	PC0	

**Table 4. Right Arduino connector**

CNnumber	VD6283 board	Pin number	Pin name	MCU pin	X-NUCLEO-6283A1 expansion board function
CN5 digital	SCL	10	D15	PB8	I2C1_SCL
	SDA	9	D14	PB9	I2C1_SDA
		8	NC	AVDD	Not used
	GND	7	GND	GND	Ground
		6	NC	PA5	Not used
		5	NC	PA6	
		4	NC	PA7	
		3	NC	PB6	
		2	NC	PC7	
		1	NC	PA9	
CN9 digital		8	NC	PA8	Not used
		7	NC	PB10	
		6	NC	PB4	
		5	NC	PB5	
		4	NC	PB3	
		3	NC	PA10	
		2	NC	PA2	
		1	NC	PA3	

### 3.2 Electrical schematic

Figure 4. X-NUCLEO-6283A1 expansion board schematic



### 3.3 List of materials

**Table 5. List of materials**

Components	Value	Reference	Supplier	Comments
<b>VD6283 application</b>				
C2	1 uF			Supply voltage decoupling
C3	100 nF			
C1	1 nF			
R1	20 k			AFLR ADC
R2	20 k			Interrupts pullup
U1		VD6283	ST	VD6283 ALS Module
<b>GPIO level translator</b>				
R4	0 R			
C5	100 nF			Supply decoupling capacitor
C6	100 nF			Supply decoupling capacitor
U2		TXS0104EYZT	TI	Voltage level translator 4 BIT
<b>I2C level translator</b>				
R7	2.2 uF			Standard and fast mode SDA and SCL line pull up at 1.8 V
R8				
R9	1 k			Fast mode plus SDA and SCL line pull up at 1.8 V
R10				
R3	0R			
C4	100 nF			Supply decoupling capacitor
C7				
R5	2.2k			SDA and SCL line pull up at 3.3 V
R6				
U3		TCA9406YZPR	TI	Voltage level translator 2 BIT
<b>1.8V regulator application</b>				
C8	2.2 uF			Output voltage decoupling
C9				
R12	15 k			
R13	0 R			
R14	12 k			
U4		LD39050PUR	ST	Current regulator
<b>Current/Power monitor</b>				
R15	56 R			
C10	100 nF			Supply decoupling capacitor
U5		INA226	TI	Current monitor regulator high/low-side

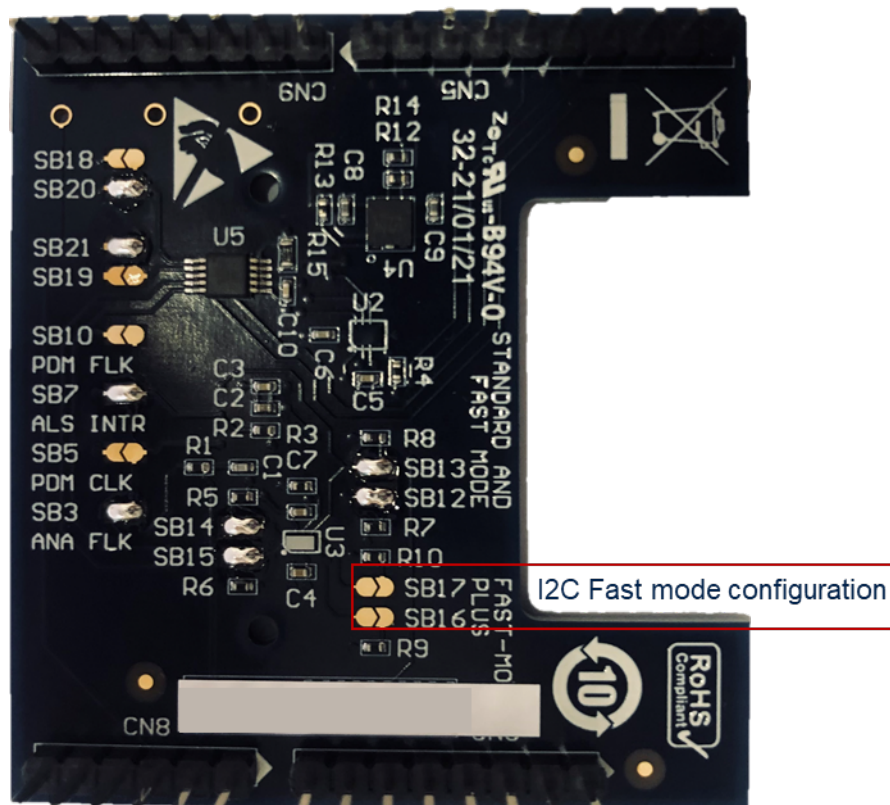


### 3.4 Solderdrop configurations

Solderdrops allow the following configurations of the X-NUCLEO-6283A1 expansion board (see the figure below):

- the VD6283 interrupt is output on the TP2/GPIO1 (SB7 fitted) of the expansion board. By default, the SB7 is fitted.
- the VD6283 analog flicker is output on the TP1/GPIO2 (SB3 fitted) of the expansion board. By default, the SB3 is fitted.
- the VD6283 I2C Fast mode can be enabled by fitting SB16 and SB17 solder drops. By default SB16 and SB17 are not fitted.

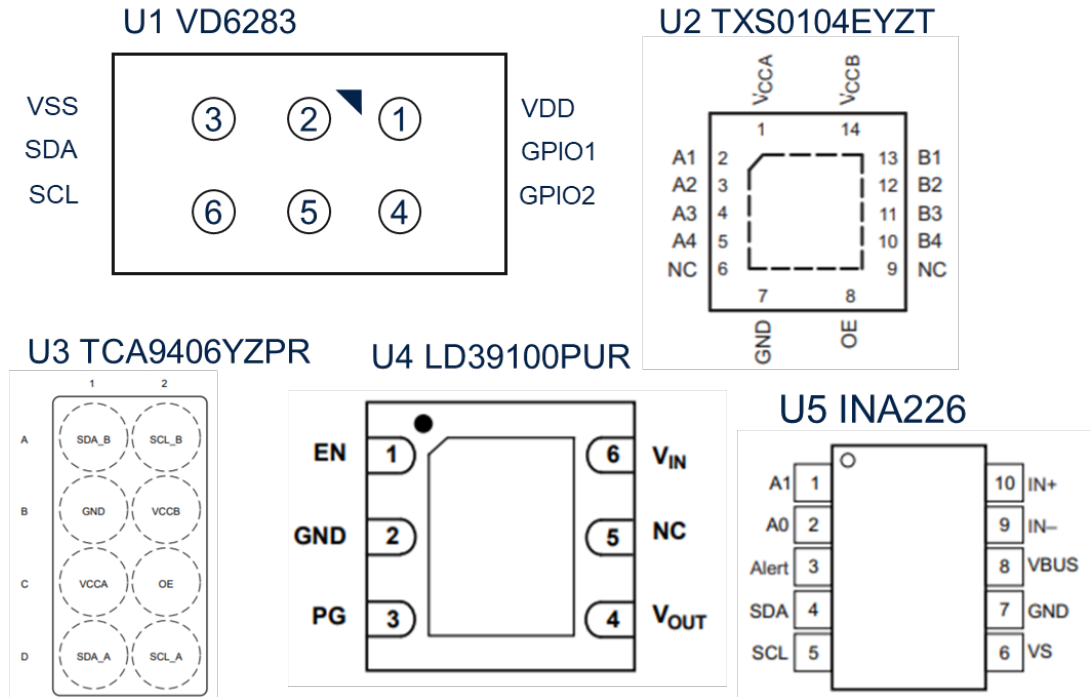
**Figure 5. Interrupt configuration**



### 3.5 Integrated device pin location

The following image illustrates the device pin location. U1 is the bottom view, while U2, U3, U4 and U5 represent the top views.

**Figure 6. Integrated device pinning**



## 4 Safety considerations

### 4.1 Electrostatic precaution

The user should exercise electrostatic precautions, including using ground straps when using the X-NUCLEO-6283A1 expansion board. Failure to prevent electrostatic discharge could damage the device.

Figure 7. Electrostatic logo



## Revision history

**Table 6. Document revision history**

Date	Version	Changes
14-May-2021	1	Initial release

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