
VL6180X – Automatic VHV repeat rate implementation

By Colin Ramrattan

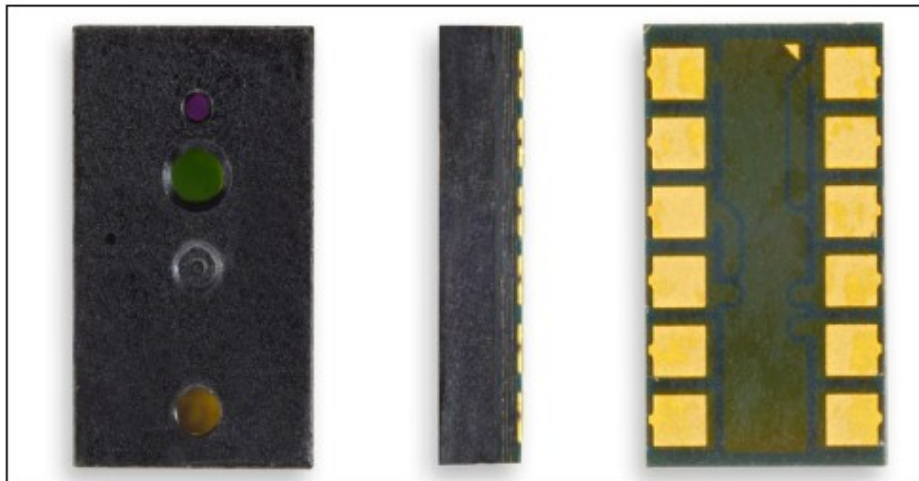
Main components	
VL6180X	Proximity and ambient light sensing (ALS) module

Purpose and benefits

The purpose of this document is to guide customers who would like to know how to configure the Automatic VHV calibration feature and in which situations each calibration is suitable.

It is assumed that customers who use this document are already familiar with coding practices, the I²C standard, and have the technical knowledge to understand the VL6180X datasheet.

Figure 1. VL6180X Device



Automatic VHV calibration details and overview

The VL6180X uses single photon avalanche diodes (SPADs) to detect a photon returning from the measured target and as the temperature changes, the SPAD sensitivity changes. As a result, the VHV calibration feature is used to recalibrate the SPAD sensitivity so the measurement accuracy can be maintained across the operating temperature.

Automatic VHV calibration is turned on by default and repeats after the set number of range measurements defined in `SYSRANGE__VHV_REPEAT_RATE` (Register 0x0031). Manual VHV calibration can be performed by setting `SYSRANGE__VHV_RECALBRATE` (Register 0x002E) to '1'. It is not recommended to use manual VHV calibration as this will require knowledge of the ambient temperature changes.

Deciding which repeat rate to use with automatic VHV calibration depends on the environment and application that the VL6180X will be used in.

Implementing automatic VHV calibration

Automatic VHV calibration is performed by default after every 255 measurements as this is the default value in the `SYSRANGE__VHV_REPEAT_RATE` register. As this calibration does increase current consumption, it is not recommended to be used after every measurement. The user should consider the ambient temperature environment that the VL6180X will be placed into. If the device is integrated into an end product, the temperature of the product will also increase the temperature of the VL6180X.

If the VL6180X is set to perform continuous or numerous range measurements that will be across the same temperature experience, then the default repetition rate is suitable. If the VL6180X is set to perform very slow sampling down to 1 sample per minute, then the repetition rate should be reduced to allow for an Auto VHV recalibration before every 5 °C change in temperature. Table 1 below summarizes which VHV repeat rate should be considered for each use case.

Table 1. VHV repeat rate setting

Approximate measurement rate (Samples/Minute)	SYSRANGE__VHV_REPEAT_RATE (0x0031) Setting with expected temperature change °C/Hr				
	10°C/Hr	20°C/Hr	30°C/Hr	40°C/Hr	50°C/Hr
1	30	15	10	7	6
10	255	150	100	70	60
>100	255	255	255	255	255

Support material

Related design support material	
MOB-EK2-180-01/1	Product/ system evaluation board
Documentation	
Datasheet: VL6180X - Proximity and ambient light sensing (ALS) module	

Revision history

Date	Version	Changes
06-Aug-2014	1	Initial release

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