

# xshut and gpio1 purposes on the tof breakout

The **XSHUT** and **GPIO1** pins on Time-of-Flight (ToF) sensor breakout boards, such as the VL53L0X, VL53L1X, or VL53L3CX, serve distinct purposes:

## XSHUT Pin

### 1. Purpose:

- The XSHUT pin acts as a hardware shutdown control for the sensor. Setting it low (0V) completely powers down the sensor, reducing power consumption to near zero. When set high (3.3V or 5V, depending on the sensor), it powers the sensor back on, requiring reinitialization to resume operation<sup>[1]</sup> <sup>[2]</sup> <sup>[3]</sup>.

### 2. Usage:

- It can be used to reset the sensor or turn it off when not in use to save power.
- Typically connected to a microcontroller GPIO pin for control.
- A pull-down resistor is recommended for ensuring the sensor stays off when the controlling GPIO is not actively driving the pin<sup>[1]</sup>.

### 3. Key Notes:

- When toggling XSHUT, a delay (e.g., 10ms) is often required before reinitializing to ensure proper operation<sup>[3]</sup>.
- It does not replace the VIN pin; VIN still provides power to the sensor<sup>[3]</sup>.

## GPIO1 Pin

### 1. Purpose:

- GPIO1 is an interrupt pin that signals events like "data ready" or when a specific threshold (distance) is crossed during ranging operations<sup>[2]</sup> <sup>[4]</sup>.
- It can be configured for different interrupt triggers, such as lower-than-threshold, higher-than-threshold, or in/out of a defined range window<sup>[4]</sup>.

### 2. Usage:

- The polarity of GPIO1 is configurable (active high or active low). For example:
  - *Active High*: Default state is low; it goes high when an interrupt condition occurs.
  - *Active Low*: Default state is high; it goes low when an interrupt condition occurs<sup>[4]</sup>.
- This pin can be connected to a microcontroller's interrupt-capable GPIO for real-time event handling.

### 3. Key Notes:

- The configuration of GPIO1 must align with the host microcontroller's settings for proper operation<sup>[4]</sup>.
- It is optional and primarily used in advanced setups requiring interrupt-driven behavior.

### Summary Table

Pin	Purpose	Typical Use Case	Notes
<b>XSHUT</b>	Sensor shutdown/reset	Power management and reset control	Requires reinitialization after toggle.
<b>GPIO1</b>	Interrupt signaling	Event-driven applications (e.g., data ready)	Configurable polarity and trigger type.

These pins provide flexibility for managing power consumption and enabling advanced interrupt-driven features in ToF sensors.

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1. <https://community.st.com/t5/imaging-sensors/vl53l3cx-xshut-pin-problem-in-deep-sleep/td-p/139309>
2. <https://www.espbands.dev/sensors/vl53l0x/>
3. <https://community.st.com/t5/imaging-sensors/vl53l1x-xshut-pin/td-p/101168>
4. <https://community.st.com/t5/imaging-sensors/vl53l0x-gpio1-and-ranging-sequence/td-p/680165>