VISHAY INTERTECHNOLOGY, INC.

OPTOELECTRONICS

MID-RANGE INFRARED SENSORS

With Digital or Analog Output

PRODUCT OVERVIEW

www.vishay.com

MID-RANGE INFRARED SENSORS

With Digital or Analog Output

Vishay's mid-range sensors enable a wide variety of safety mechanisms and automatic fixtures in homes, businesses, and industrial settings. Sensors with digital output have a fixed gain and are used to detect presence only. Sensors with analog output are used to detect presence and proximity by sensing the relative strength of the reflected signal.

Features and Benefits

- Interrupter sensor: light curtain and perimeter guard applications up to 30 meters
- Reflective sensor: 1 meter; 3 meters with reflector
- Fast reaction time: 300 µs

Applications

- Safety switches for garage door, elevator door, gates and industrial light curtains
- Reflective sensors for toilet, urinal, faucet, hand dryer and towel dispenser
- LCD monitor power sensor

Mid-Range Detection—Digital Output

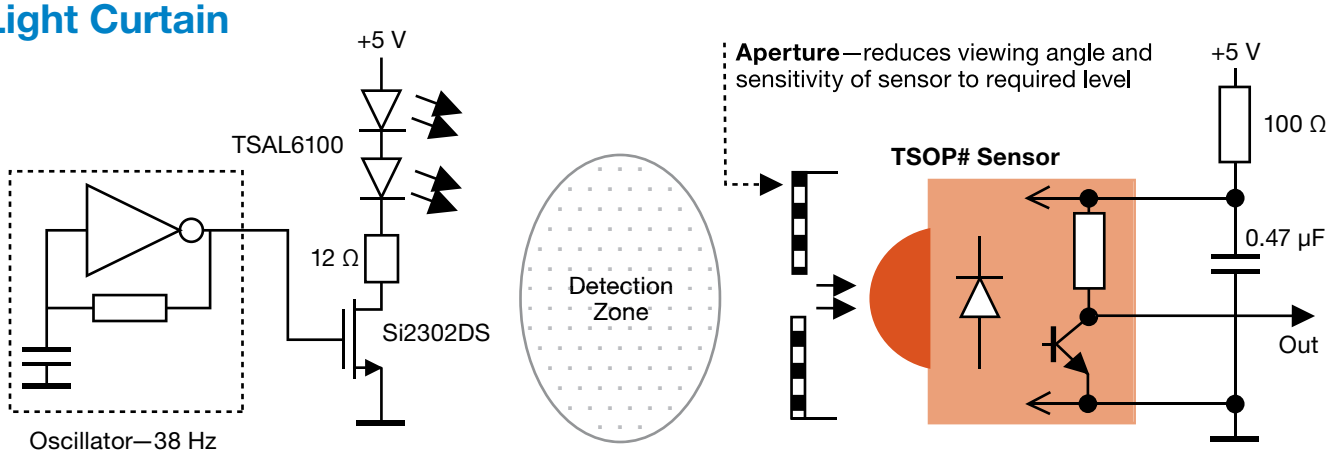
Some mid-range sensors adjust their detection threshold depending on the amount of ambient light and optical noise present in the environment. This can cause two problems:

- To avoid false detections, the gain of the amplifier may adjust itself to such a low level that sensor responsiveness is affected
- With low ambient light, the adjustable gain can make the receiver too sensitive, such that it will detect and respond to reflected or stray light

	Short Range	Mid-Range	Long Range
Reflective	< 4 cm	20 cm to 3 m	> 3 m
Interrupter	3 mm	20 cm to 45 m	> 45 m

Vishay's TSOP4038, TSOP5038, and TSOP58038 eliminate these problems by featuring a fixed gain. With a ***fixed gain*** the detection threshold and resulting detection distance is fixed. Once the design of the optical parameters such as the intensity of the emitter, the aperture in front of the receiver, and the alignment of emitter and detector are determined, the sensor will have stable, repeatable performance under all lighting conditions. ***The output is a simple digital state indicating a detection.***

Light Curtain



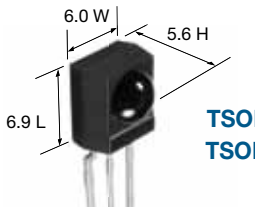
Fast Response Time

People's lives depend on light curtains and perimeter guards having fast reaction times. Unfortunately, some sensors require the infrared beam to be interrupted for up to 5 ms before detection. The **300 µs** response time of Vishay's sensors is much faster. For the fastest response time, a continuous 38 kHz signal should be used. For the longest distance, we recommend driving the TSAL6100 infrared emitter using a 38-kHz burst.

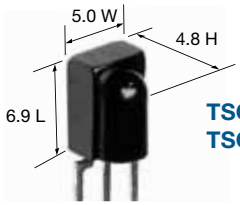
MID-RANGE INFRARED SENSORS

With Digital or Analog Output

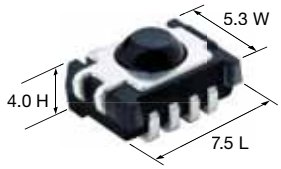
Part Numbers*		Supply Current (mA)	Supply Voltage (V)	Viewing Angle (°)	Response Time (µs)	Light curtain Range (m)	Reflective Range (m)
Presence (Digital Out)	Proximity (Analog Out)						
TSOP4038 TSOP58038 TSOP5038	TSOP4P38 TSOP58P38 TSOP5P38	0.85	2.7 to 5.5	± 45°	300	30	0.2 to 3.0



TSOP4038
TSOP4P38



TSOP58038
TSOP58P38



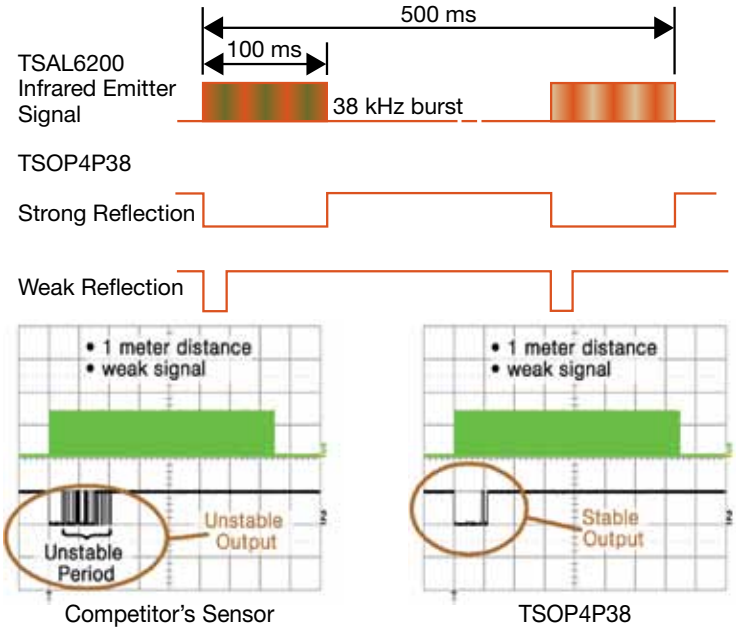
TSOP5038
TSOP5P38

* 38 kHz sensors, other modulation frequencies available by request

Mid-Range Detection and Proximity—Analog Output

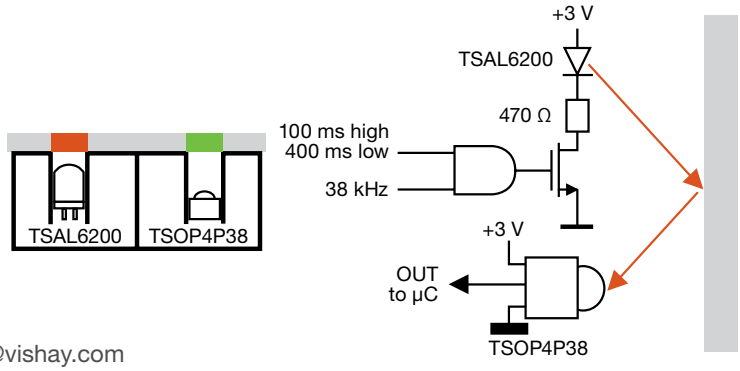
Many applications require a reflective sensor that detects not only presence but also the strength or weakness of the reflected signal. Instead of a fixed detection threshold, analog information from the sensor is needed. This is possible with Vishay's TSOP4P38, TSOP5P38, and TSOP58P38 infrared sensors with variable gain, proximity sensors.

The length of the sensor's output pulse in response to the TSAL6200 IR emitter signal varies in proportion to the amount of light reflected from the object being detected. For near objects, the output pulse approaches 100 % of the emitted pulse. With Vishay sensors, the leading and trailing edges of the output signal are clean and stable at all ranges.



No Crosstalk Allowed

Like all infrared proximity sensors, the receiver's view must be limited to only the reflected infrared light. If the detector is exposed to light within the package or if the emitter and detector share a common window, this will lead to crosstalk. Detection will be unreliable. The distance between the emitter and detector, and how far they are recessed, will affect the range.



For more information, send an e-mail to midrangesensors@vishay.com

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