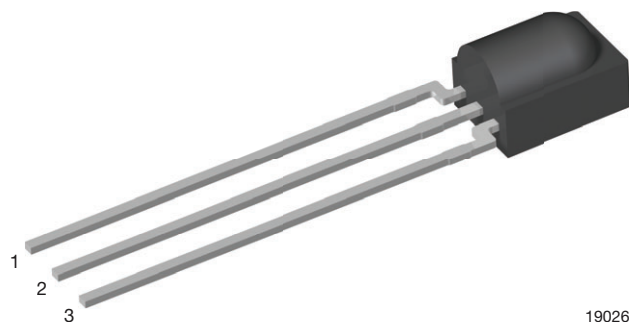


# IR Receiver Module for Light Barrier Systems



## LINKS TO ADDITIONAL RESOURCES



Product Page



3D Models



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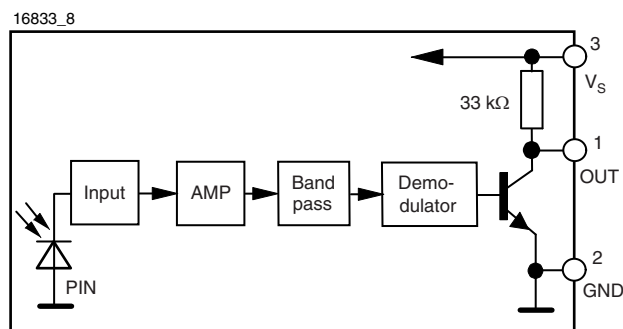
Bends and Cuts

## DESCRIPTION

The TSSP980.. is a compact infrared detector module for presence, proximity, or light curtain applications. It provides an active low output in response to infrared bursts at 940 nm. The frequency of the burst should correspond to the carrier frequency shown in the parts table.

This component has not been qualified according to automotive specifications.

## BLOCK DIAGRAM



## FEATURES

- Presence sensor: up to 2 m distance, find more info at: [www.vishay.com/doc?49009](http://www.vishay.com/doc?49009)
- Light barrier: up to 12 m distance, TSAL6200 with  $I_F = 50$  mA, find more info at: [www.vishay.com/doc?49650](http://www.vishay.com/doc?49650)
- Fast proximity: up to 2 m range at 5 ms response time, find more info at: [www.vishay.com/doc?82741](http://www.vishay.com/doc?82741)
- Supply voltage: 2.0 V to 3.6 V
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

## MECHANICAL DATA

### Pinning:

1 = OUT, 2 = GND, 3 =  $V_S$

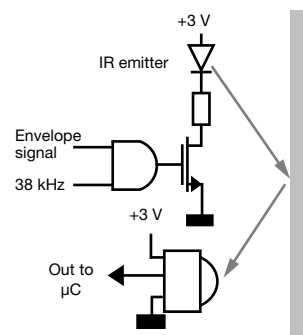
## ORDERING CODE

TSSP980.. - 1500 pieces in bags

## APPLICATIONS

- Reflective sensors for hand dryers, towel or soap dispensers, water faucets, toilet flush
- Vending machine fall detection
- Security and pet gates
- Person or object vicinity switch
- Fast proximity sensors for toys, robotics, drones, and other consumer and industrial uses

## PRESENCE SENSING



**PARTS TABLE**

|                   |  |           |
|-------------------|--|-----------|
| Carrier frequency | 38 kHz                                   | TSSP98038 |
|                   | 56 kHz                                   | TSSP98056 |
| Package           | Minicast                                 |           |
| Pinning           | 1 = OUT, 2 = GND, 3 = V <sub>S</sub>     |           |
| Dimensions (mm)   | 5.0 W x 6.95 H x 4.8 D                   |           |
| Mounting          | Leaded                                   |           |
| Application       | Presence sensors, fast proximity sensors |           |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER                   | TEST CONDITION           | SYMBOL           | VALUE        | UNIT |
|-----------------------------|--------------------------|------------------|--------------|------|
| Supply voltage              |                          | V <sub>S</sub>   | -0.3 to +3.6 | V    |
| Supply current              |                          | I <sub>S</sub>   | 5            | mA   |
| Output voltage              |                          | V <sub>O</sub>   | -0.3 to +3.6 | V    |
| Output current              |                          | I <sub>O</sub>   | 5            | mA   |
| Junction temperature        |                          | T <sub>j</sub>   | 100          | °C   |
| Storage temperature range   |                          | T <sub>stg</sub> | -25 to +85   | °C   |
| Operating temperature range |                          | T <sub>amb</sub> | -25 to +85   | °C   |
| Power consumption           | T <sub>amb</sub> ≤ 85 °C | P <sub>tot</sub> | 10           | mW   |

**Note**

- Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect the device reliability

**ELECTRICAL AND OPTICAL CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

| PARAMETER                  | TEST CONDITION  | SYMBOL              | MIN. | TYP. | MAX. | UNIT              |
|----------------------------|---|---------------------|------|------|------|-------------------|
| Supply current (pin 3)     | E <sub>v</sub> = 0, V <sub>S</sub> = 5 V  | I <sub>SD</sub>     | 0.25 | 0.37 | 0.45 | mA                |
|                            | E <sub>v</sub> = 40 klx, sunlight   | I <sub>SH</sub>     | -    | 0.8  | -    | mA                |
| Supply voltage             |   | V <sub>S</sub>      | 2.0  | -    | 3.6  | V                 |
| Transmission distance      | E <sub>v</sub> = 0, test signal see fig. 1, IR diode TSAL6200, I <sub>F</sub> = 50 mA   | d                   | -    | 8    | -    | m                 |
| Output voltage low (pin 1) | I <sub>OSL</sub> = 0.5 mA, E <sub>e</sub> = 2 mW/m <sup>2</sup> , test signal see fig. 1  | V <sub>OSL</sub>    | -    | -    | 100  | mV                |
| Minimum irradiance         | Pulse width tolerance: t <sub>pi</sub> - 5/f <sub>o</sub> < t <sub>po</sub> < t <sub>pi</sub> + 6/f <sub>o</sub> , test signal see fig. 1 | E <sub>e min.</sub> | -    | 0.7  | 1.2  | mW/m <sup>2</sup> |
| Maximum irradiance         | t <sub>pi</sub> - 5/f <sub>o</sub> < t <sub>po</sub> < t <sub>pi</sub> + 6/f <sub>o</sub> , test signal see fig. 1                        | E <sub>e max.</sub> | 30   | -    | -    | W/m <sup>2</sup>  |
| Directivity                | Angle of half transmission distance   | φ <sub>1/2</sub>    | -    | ± 45 | -    | °                 |

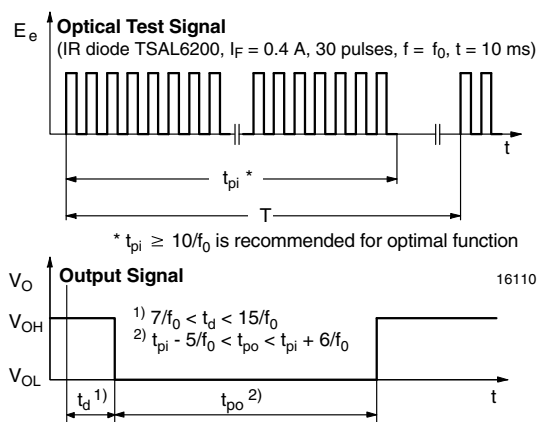
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Output Active Low

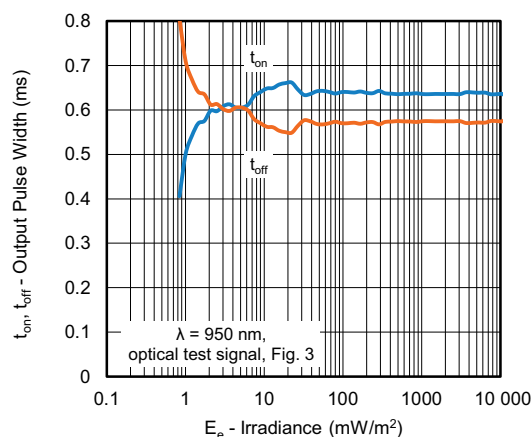


Fig. 4 - Output Pulse Diagram

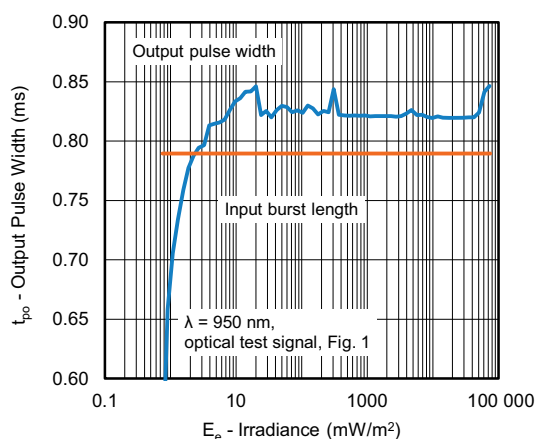


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

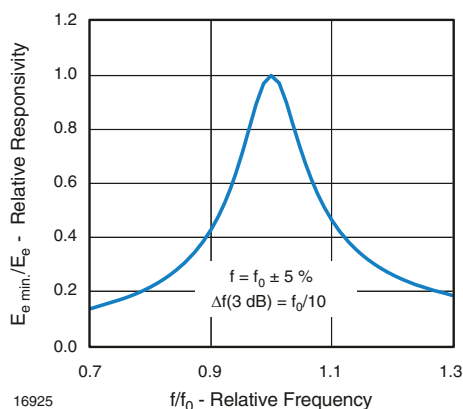


Fig. 5 - Frequency Dependence of Responsivity

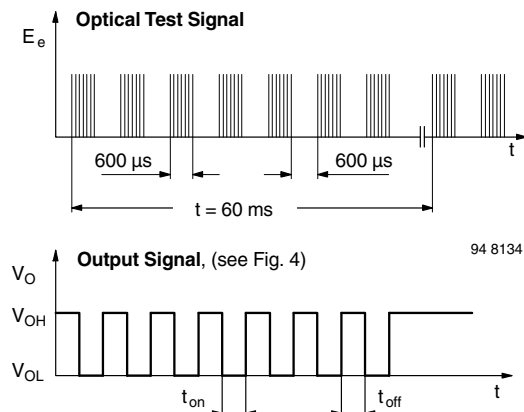


Fig. 3 - Output Function

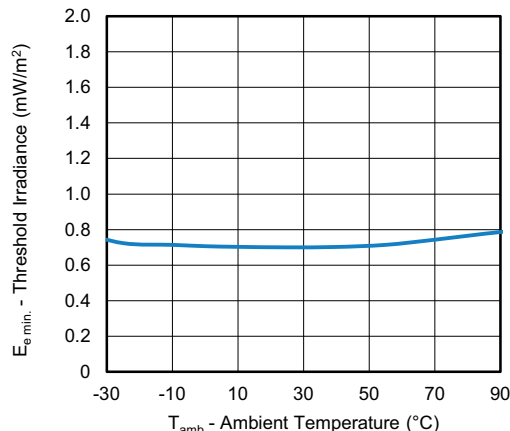


Fig. 6 - Sensitivity vs. Ambient Temperature

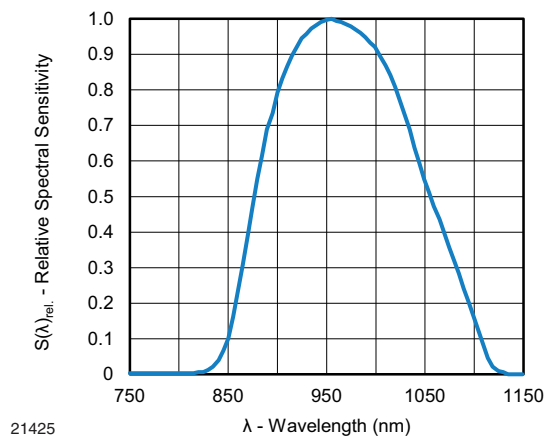


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

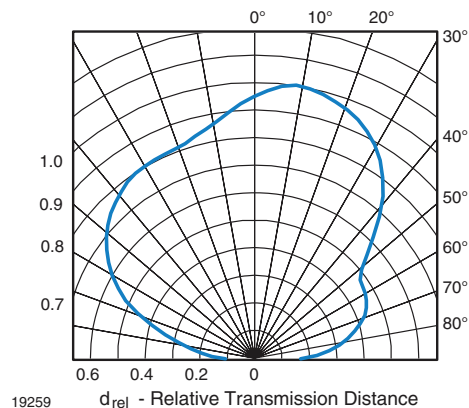


Fig. 9 - Vertical Directivity

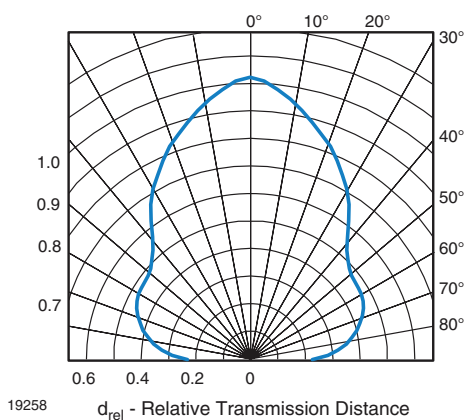


Fig. 8 - Horizontal Directivity

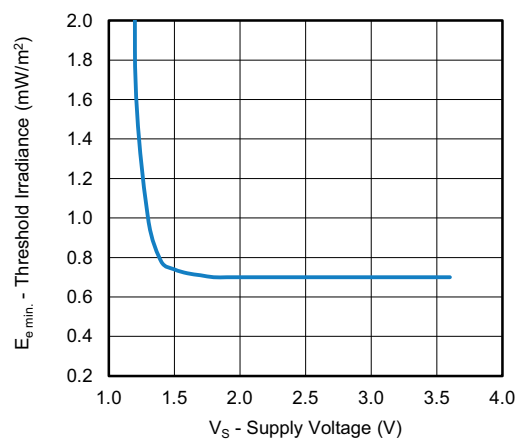
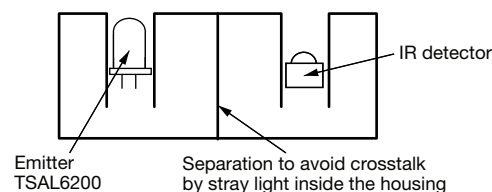


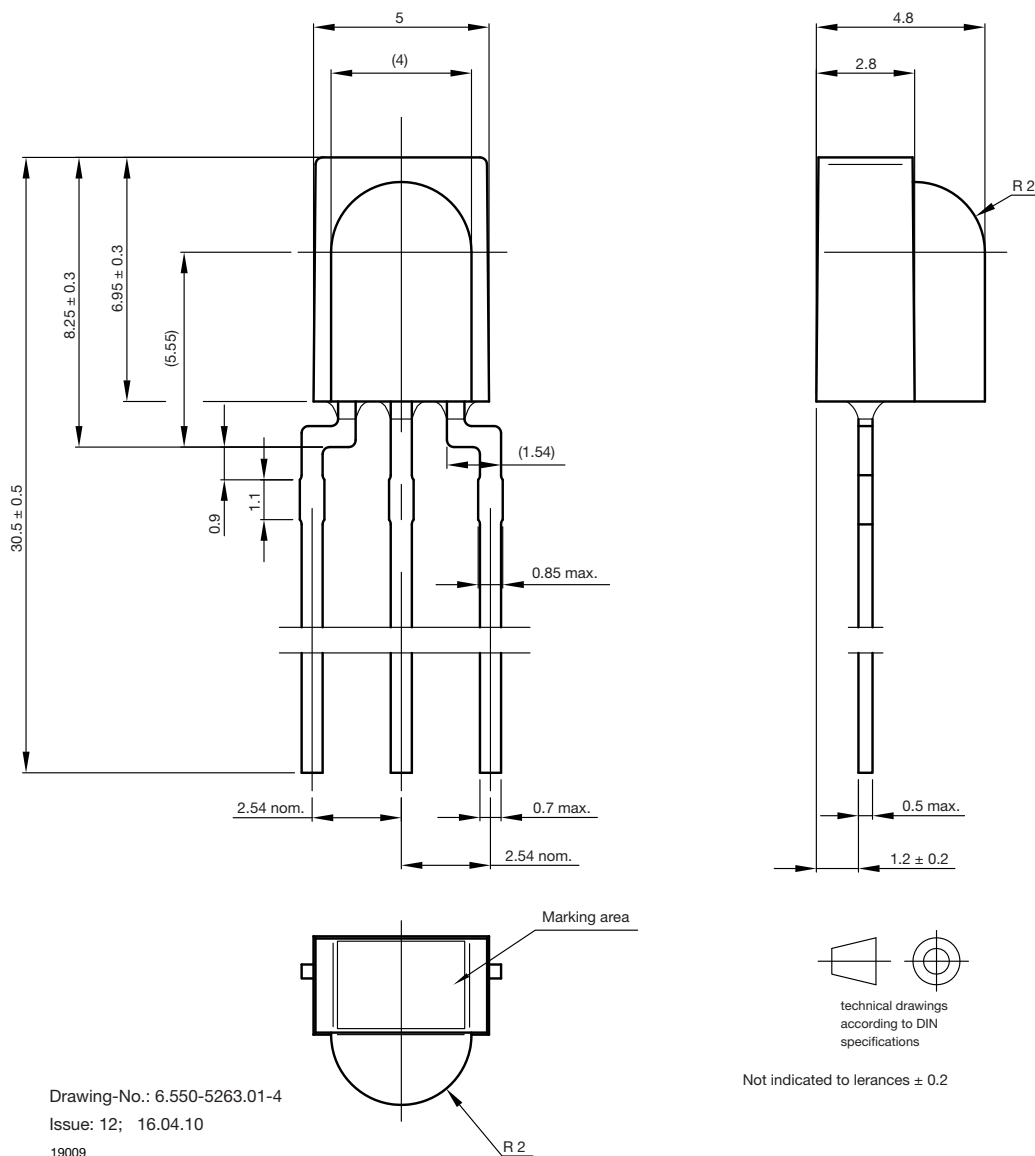
Fig. 10 - Sensitivity vs. Supply Voltage

The typical application of this device is a reflective or beam break sensor with active low “detect” or “no detect” information contained in its output. The TSSP980.. is also suitable for fast (~ 15 ms) proximity sensor applications for ranges between 10 cm and 2 m, if a burst pattern with variable intensity is used.

Example for a sensor hardware:



There should be no common window in front of the emitter and detector in order to avoid crosstalk via guided light through the window.

**PACKAGE DIMENSIONS** in millimeters




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