



## IR Sensor Module For Reflective Sensor, Light Barrier, And Fast Proximity Applications



23051

### LINKS TO ADDITIONAL RESOURCES



Product Page



3D Models



Calculators



Marking



Packages



Holders



Bends and Cuts

### DESCRIPTION

The TSSP530.. series are compact infrared detector modules for presence and fast proximity sensing applications. They provide 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.

### 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 5.5 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)

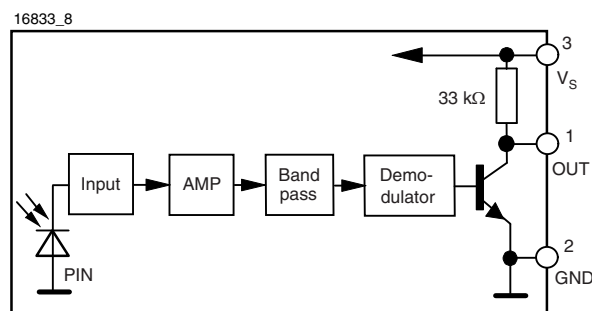
### APPLICATIONS

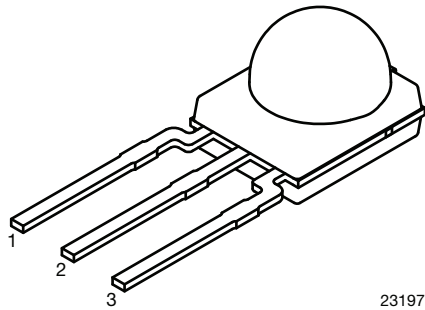
- Reflective sensors for hand dryers, towel or soap dispensers, water faucets, toilet flush
- Vending machine fall detection
- Security and pet gates
- Person or object vicinity switch
- Fast proximity sensors for toys, robotics, drones, and other consumer and industrial uses

### DESIGN SUPPORT TOOLS

- [3D models](#)
- [Window size calculator](#)

### BLOCK DIAGRAM

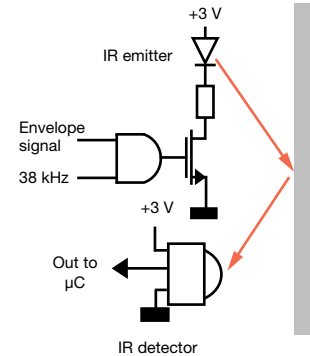


**MECHANICAL DATA****Pinning:**1 = OUT, 2 = GND, 3 =  $V_S$ 

23197

**ORDERING CODE**

TSSP530.. - 1800 pieces in bags

**PRESENCE SENSING****PARTS TABLE**

|                   |                                                                                                                                                                                                                                                      |           |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Carrier frequency | 38 kHz                                                                                                                                                                                                                                               | TSSP53038 |
|                   | 56 kHz                                                                                                                                                                                                                                               | TSSP53056 |
| Package           | Minimold                                                                                                                                                                                                                                             |           |
| Pinning           | 1 = OUT, 2 = GND, 3 = $V_S$                                                                                                                                                                                                                          |           |
| Dimensions (mm)   | 5.4 W x 6.35 H x 4.9 D                                                                                                                                                                                                                               |           |
| Mounting          | Leaded                                                                                                                                                                                                                                               |           |
| Application       | Presence sensors, fast proximity sensors                                                                                                                                                                                                             |           |
| Special options   | <ul style="list-style-type: none"> <li>Narrow optical filter: <a href="http://www.vishay.com/doc?81590">www.vishay.com/doc?81590</a></li> <li>Wide optical filter: <a href="http://www.vishay.com/doc?82726">www.vishay.com/doc?82726</a></li> </ul> |           |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER                   | TEST CONDITION                  | SYMBOL      | VALUE                   | UNIT |
|-----------------------------|---------------------------------|-------------|-------------------------|------|
| Supply voltage (pin 3)      |                                 | $V_S$       | -0.3 to +6.0            | V    |
| Supply current (pin 3)      |                                 | $I_S$       | 5                       | mA   |
| Output voltage (pin 1)      |                                 | $V_O$       | -0.3 to 5.5             | V    |
| Voltage at output to supply |                                 | $V_S - V_O$ | -0.3 to ( $V_S + 0.3$ ) | V    |
| Output current (pin 1)      |                                 | $I_O$       | 5                       | mA   |
| Junction temperature        |                                 | $T_j$       | 100                     | °C   |
| Storage temperature range   |                                 | $T_{stg}$   | -25 to +85              | °C   |
| Operating temperature range |                                 | $T_{amb}$   | -25 to +85              | °C   |
| Power consumption           | $T_{amb} \leq 85^\circ\text{C}$ | $P_{tot}$   | 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 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                                                                  |                     |      |          |      |                 |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------|------|----------|------|-----------------|
| PARAMETER                                                                                                     | TEST CONDITION                                                                                   | SYMBOL              | MIN. | TYP.     | MAX. | UNIT            |
| Supply current (pin 3)                                                                                        | $E_v = 0$ , $V_S = 3.3\text{ V}$                                                                 | $I_{SD}$            | 0.25 | 0.35     | 0.45 | mA              |
|                                                                                                               | $E_v = 40\text{ klx}$ , sunlight                                                                 | $I_{SH}$            | -    | 0.45     | -    | mA              |
| Supply voltage                                                                                                |                                                                                                  | $V_S$               | 2.0  | -        | 5.5  | V               |
| Transmission distance                                                                                         | $E_v = 0$ , test signal see Fig. 1, IR diode TSAL6200, $I_F = 50\text{ mA}$                      | $d$                 | -    | 12       | -    | m               |
| Output voltage low (pin 1)                                                                                    | $I_{OSL} = 0.5\text{ mA}$ , $E_e = 2\text{ mW/m}^2$ , test signal see Fig. 1                     | $V_{OSL}$           | -    | -        | 100  | mV              |
| Minimum irradiance                                                                                            | Pulse width tolerance:<br>$t_{pi} - 4/f_0 < t_{po} < t_{pi} + 4/f_0$ ,<br>test signal see Fig. 1 | $E_{e\text{ min.}}$ | -    | 0.4      | 0.7  | $\text{mW/m}^2$ |
| Maximum irradiance                                                                                            | Pulse width tolerance:<br>$t_{pi} - 4/f_0 < t_{po} < t_{pi} + 4/f_0$ ,<br>test signal see Fig. 1 | $E_{e\text{ max.}}$ | 30   | -        | -    | $\text{W/m}^2$  |
| Directivity                                                                                                   | Angle of half transmission distance                                                              | $\Phi_{1/2}$        | -    | $\pm 45$ | -    | $^{\circ}$      |

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

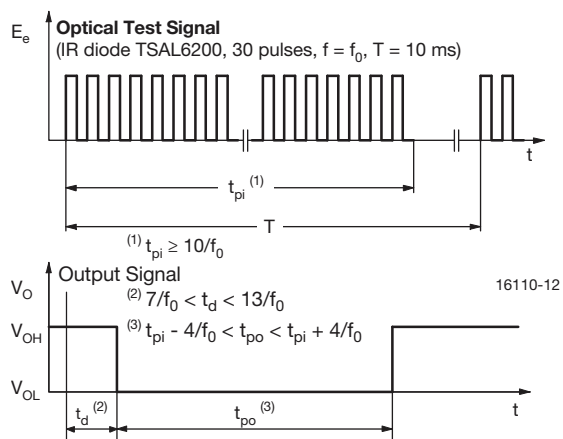


Fig. 1 - Output Active Low

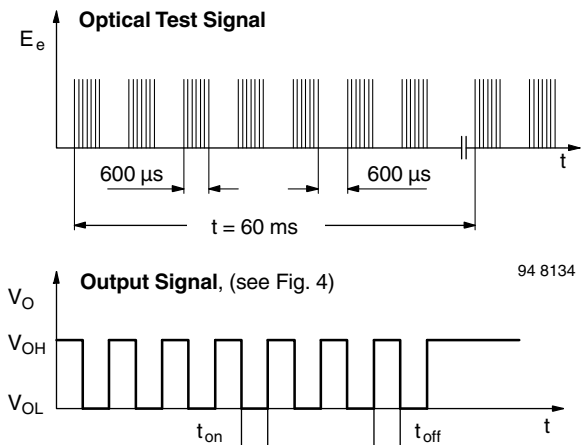


Fig. 3 - Output Function

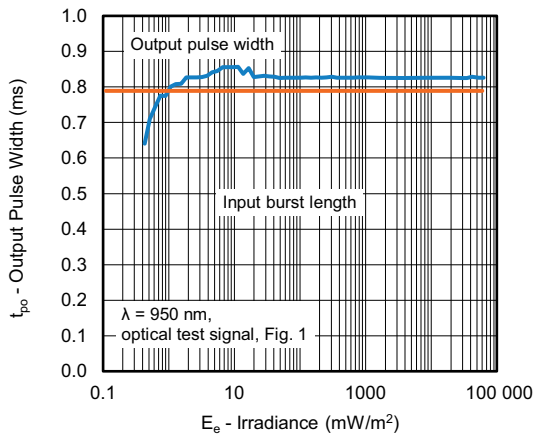


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

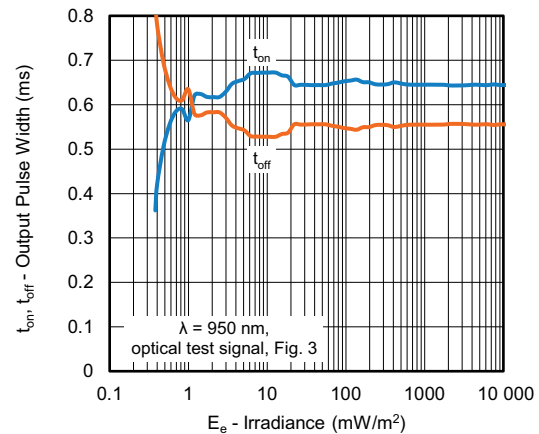


Fig. 4 - Output Pulse Diagram

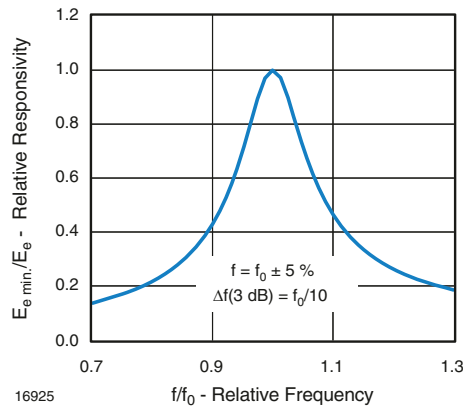


Fig. 5 - Frequency Dependence of Responsivity

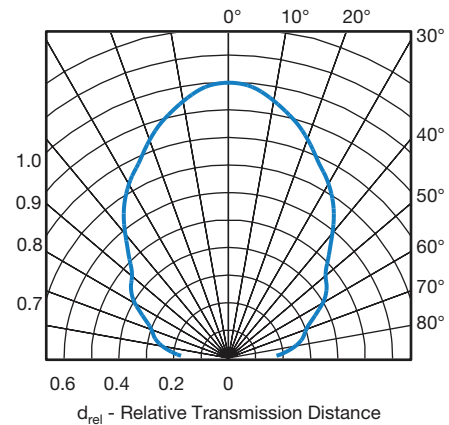


Fig. 8 - Directivity

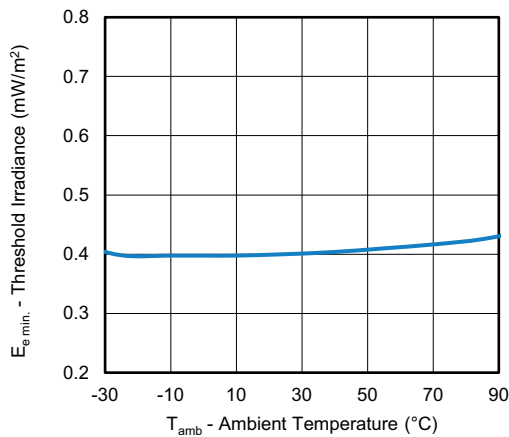


Fig. 6 - Sensitivity vs. Ambient Temperature

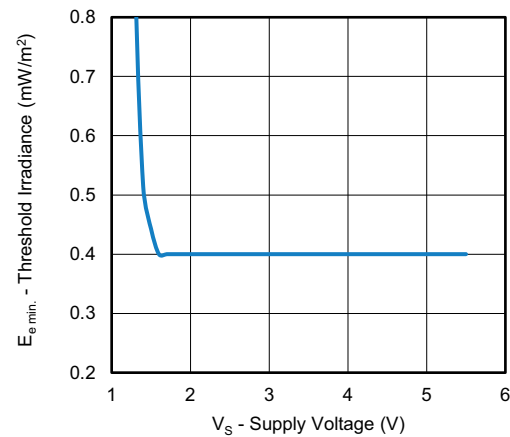


Fig. 9 - Sensitivity vs. Supply Voltage

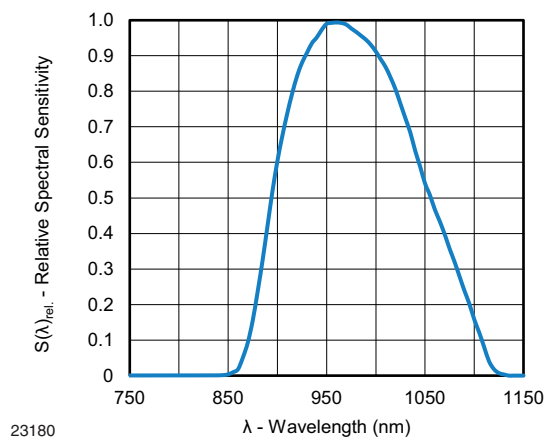
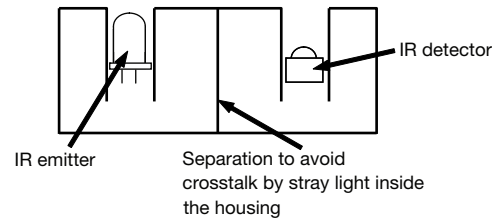


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength



The typical application of these devices is a reflective or beam break sensor with active low “detect” or “no detect” information contained in its output. The TSSP53056 is also suitable for fast (~ 5 ms) proximity sensor applications for ranges between 10 cm and 2 m. Please see application note “Vishay’s TSSP4056 Sensor for Fast Proximity Sensing” ([www.vishay.com/doc?82741](http://www.vishay.com/doc?82741)).

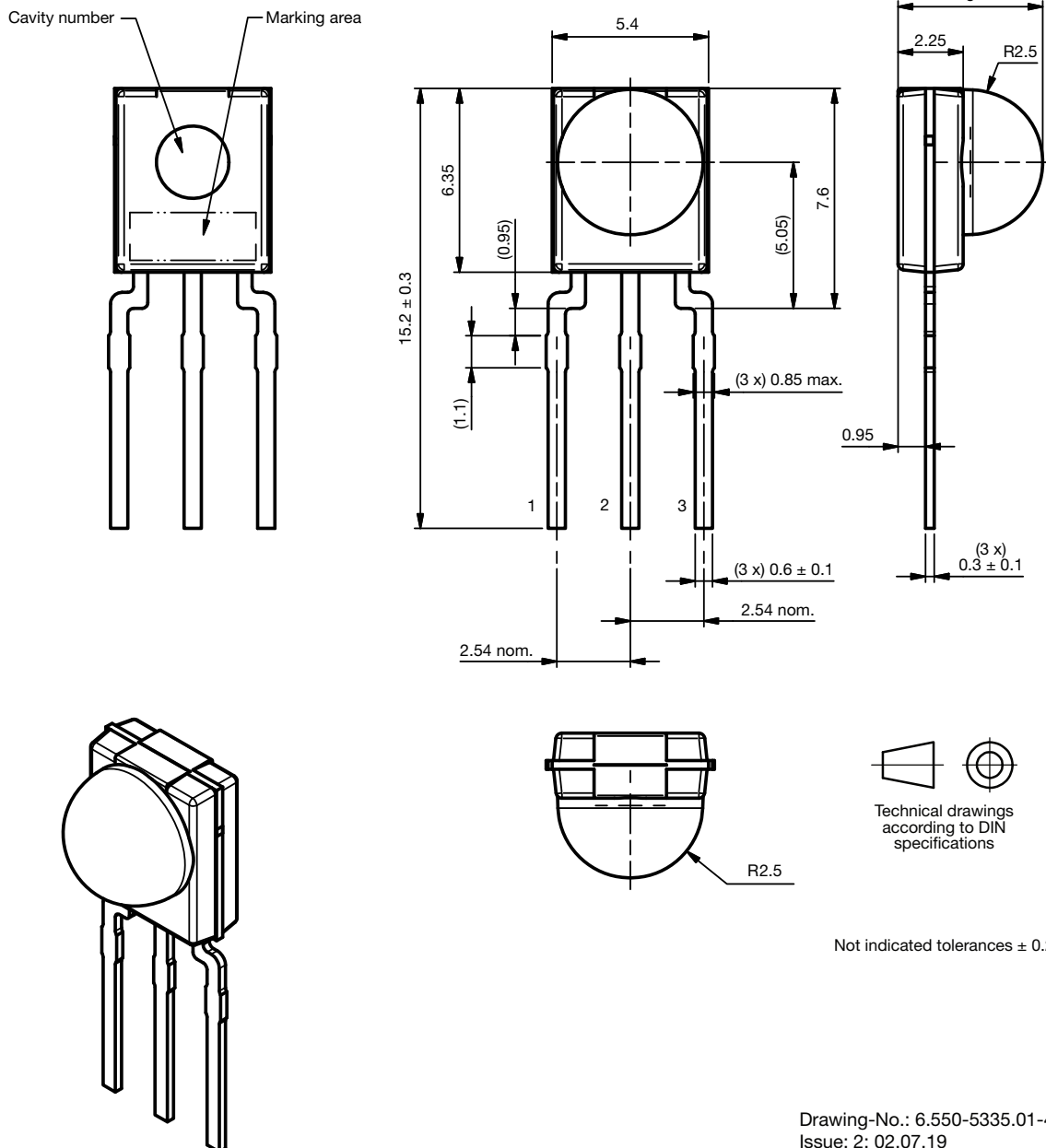
Example for a sensor hardware:



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

Cavity number      Marking area



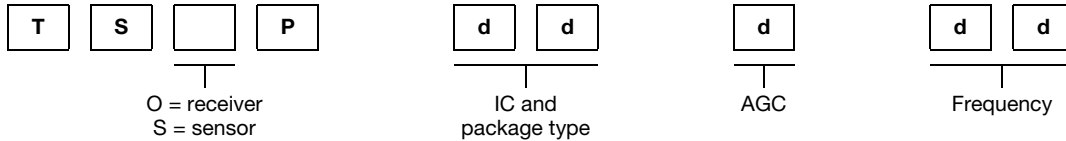
Drawing-No.: 6.550-5335.01-4  
Issue: 2; 02.07.19



## BULK PACKAGING

Standard shipping for minimold is in conductive plastic bags. The packing quantity is determined by weight and a maximum of 0.3 % of the components per carton may be missing.

## ORDERING INFORMATION



### Note

- d = "digit", please consult the list of available series on the previous page to create a valid part number

**Examples:** TSSP53038  
TSSP53056

## PACKAGING QUANTITY

- 300 pieces per bag (each bag is individually boxed)
- 6 bags per carton



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