IR Receiver Module for Light Barrier Systems

**DESCRIPTION**
The TSSP580.. is a compact infrared detector module for presence sensing applications. It receives 38 kHz modulated signals and has a peak sensitivity of 940 nm. 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 8 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

**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**

[Diagram of IR Receiver Module]
MECHANICAL DATA

Pinning:
1 = OUT, 2 = GND, 3 = V_S

ORDERING CODE

TSSP580.. - 1500 pieces in bags

PARTS TABLE

<table>
<thead>
<tr>
<th>Carrier frequency</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 kHz</td>
<td>V_S</td>
<td>-0.3 to +6</td>
<td>V</td>
</tr>
<tr>
<td>56 kHz</td>
<td>I_S</td>
<td>5 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V_O</td>
<td>-0.3 to (V_S + 0.3)</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>I_O</td>
<td>5 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T_j</td>
<td>100 °C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T_stg</td>
<td>-25 to +85</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>T_amb</td>
<td>-25 to +85</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>P_tot</td>
<td>10 mW</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply current (pin 3)</td>
<td>( E_v = 0 ), ( V_S = 3.3 , \text{V} )</td>
<td>( I_{SD} )</td>
<td>0.25</td>
<td>0.35</td>
<td>0.45</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>( E_v = 40 , \text{klx}, \text{sunlight} )</td>
<td>( I_{SH} )</td>
<td>-</td>
<td>0.45</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>Supply voltage</td>
<td></td>
<td>( V_S )</td>
<td>2.0</td>
<td>-</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Transmission distance</td>
<td>( E_v = 0 ), test signal see Fig. 1, IR diode TSAL6200, ( I_F = 50 , \text{mA} )</td>
<td>( d )</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>m</td>
</tr>
<tr>
<td>Output voltage low (pin 1)</td>
<td>( I_{OSL} = 0.5 , \text{mA}, E_e = 2 , \text{mW/m}^2 ), test signal see Fig. 1</td>
<td>( V_{OSL} )</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>mV</td>
</tr>
<tr>
<td>Minimum irradiance</td>
<td>Pulse width tolerance: ( t_{pi} - 4/f_0 &lt; t_{po} &lt; t_{pi} + 4/f_0 ), test signal see Fig. 1</td>
<td>( E_{e \text{min.}} )</td>
<td>-</td>
<td>0.7</td>
<td>1.2</td>
<td>mW/m(^2)</td>
</tr>
<tr>
<td>Maximum irradiance</td>
<td>Pulse width tolerance: ( t_{pi} - 4/f_0 &lt; t_{po} &lt; t_{pi} + 4/f_0 ), test signal see Fig. 1</td>
<td>( E_{e \text{max.}} )</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>W/m(^2)</td>
</tr>
<tr>
<td>Directivity</td>
<td>Angle of half transmission distance</td>
<td>( \varphi_{1/2} )</td>
<td>-</td>
<td>( \pm 45 )</td>
<td>-</td>
<td>deg</td>
</tr>
</tbody>
</table>

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

![Optical Test Signal](image)

![Output Signal](image)

![Output Pulse Width](image)

![Irradiance](image)
Fig. 5 - Frequency Dependence of Responsivity

Fig. 6 - Sensitivity vs. Ambient Temperature

Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

Fig. 8 - Horizontal Directivity

Fig. 9 - Vertical 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. Applications requiring up to 2 m beam break or 1 m reflective range benefit from the lower gain of these sensors because they are less sensitive to stray signal from the emitter, simplifying the mechanical design.

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

![Diagram of package dimensions]

Marking area

Technical drawings according to DIN specifications

Not indicated tolerances ± 0.2

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