**IR Receiver Module for Light Barrier Systems**

**FEATURES**
- Up to 2 m for presence sensing
- Uses modulated bursts at 38 kHz
- PIN diode and sensor IC in one package
- Low supply current
- Shielding against EMI
- Visible light is suppressed by IR filter
- Insensitive to supply voltage ripple and noise
- Supply voltage: 2.5 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 activation

**MECHANICAL DATA**

**Pinning:**
1 = OUT, 2 = GND, 3 = VS

**DESCRIPTION**

The TSSP58038 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.

**PARTS TABLE**

<table>
<thead>
<tr>
<th>Carrier frequency</th>
<th>38 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package</td>
<td>Minicast</td>
</tr>
<tr>
<td>Pinning</td>
<td>1 = OUT, 2 = GND, 3 = VS</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>5.0 W x 6.95 H x 4.8 D</td>
</tr>
<tr>
<td>Mounting</td>
<td>Leaded</td>
</tr>
<tr>
<td>Application</td>
<td>Presence sensors</td>
</tr>
</tbody>
</table>

**BLOCK DIAGRAM**

**PRESENCE SENSING**

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16833_8
### ABSOLUTE MAXIMUM RATINGS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>TEST CONDITION</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>V_S</td>
<td></td>
<td>-0.3 to +6</td>
<td>V</td>
</tr>
<tr>
<td>Supply current</td>
<td>I_S</td>
<td></td>
<td>5</td>
<td>mA</td>
</tr>
<tr>
<td>Output voltage</td>
<td>V_O</td>
<td></td>
<td>-0.3 to (V_S + 0.3)</td>
<td>V</td>
</tr>
<tr>
<td>Output current</td>
<td>I_O</td>
<td></td>
<td>5</td>
<td>mA</td>
</tr>
<tr>
<td>Junction temperature</td>
<td>T_j</td>
<td></td>
<td>100</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>T_stg</td>
<td></td>
<td>-25 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>T_amb</td>
<td></td>
<td>-25 to +85</td>
<td>°C</td>
</tr>
<tr>
<td>Power consumption</td>
<td></td>
<td></td>
<td>10</td>
<td>mW</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_amb = 25 °C, 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 = 5 V</td>
<td>I_SD</td>
<td>0.55</td>
<td>0.7</td>
<td>0.9</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>E_V = 40 klx, sunlight</td>
<td>I_SH</td>
<td>-</td>
<td>0.8</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>V_S</td>
<td></td>
<td>2.5</td>
<td>-</td>
<td>5.5</td>
<td>V</td>
</tr>
<tr>
<td>Transmission distance</td>
<td></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 mA, E_x = 2 mW/m², 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></td>
<td>E_e_min.</td>
<td>-</td>
<td>0.7</td>
<td>1.2</td>
<td>mW/m²</td>
</tr>
<tr>
<td>Maximum irradiance</td>
<td></td>
<td>E_e_max.</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>W/m²</td>
</tr>
<tr>
<td>Directivity</td>
<td></td>
<td>( \varphi_{1/2} )</td>
<td>-</td>
<td>± 45</td>
<td>-</td>
<td>deg</td>
</tr>
</tbody>
</table>
**TYPICAL CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)

1. **Fig. 1 - Output Active Low**
   - **Output Test Signal**
     - (IR diode TSAL6200, I<sub>p</sub> = 0.4 A, 30 pulses, f = f<sub>0</sub>, t = 10 ms)
   - **Output Signal**
     - **V<sub>O</sub>**
     - **V<sub>OH</sub>**
     - **V<sub>CL</sub>**
   - *t<sub>pi</sub> ≥ 10/f<sub>0</sub> is recommended for optimal function

2. **Fig. 2 - Pulse Length and Sensitivity in Dark Ambient**
   - **Output Pulse Width (ms)**
   - **λ = 950 nm, optical test signal, Fig. 1**

3. **Fig. 3 - Output Function**
   - **Output Test Signal**
     - 600 µs
     - t = 60 ms
   - **Output Signal, (see Fig. 4)**

4. **Fig. 4 - Output Pulse Diagram**
   - **Output Pulse Width (ms)**
   - **Δf(3 dB) = f<sub>0</sub>/10**

5. **Fig. 5 - Frequency Dependence of Responsivity**
   - **E<sub>e</sub>/E<sub>e</sub> - Relative Responsivity**
   - **f = f<sub>0</sub> ± 5 %**

6. **Fig. 6 - Sensitivity vs. Ambient Temperature**
   - **E<sub>e</sub> - Threshold Irradiance (mW/m²)**
   - **T<sub>amb</sub> - Ambient Temperature (°C)**

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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

Drawing-No.: 6.550-5263.01-4
Issue: 12; 16.04.10

Marking area

technical drawings according to DIN specifications

Not indicated to tolerances ± 0.2
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