

## IR Receiver Module for Light Barrier Systems



16672

### DESIGN SUPPORT TOOLS AVAILABLE



### MECHANICAL DATA

#### Pinning:

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

### DESCRIPTION

The TSSP40..SS1XB are compact infrared detector modules for presence sensing applications. They provide an active low output in response to infrared bursts at 940 nm. The TSSP40..SS1XB are 20 x less sensitive than the TSSP40., for ease of use in reflective applications at less than 1 m range where high sensitivity is not needed and can complicate the design.

This component has not been qualified to automotive specifications.

### FEATURES

- Constant gain for consistent results under any lighting condition
- Up to 1 m for presence sensing
- 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

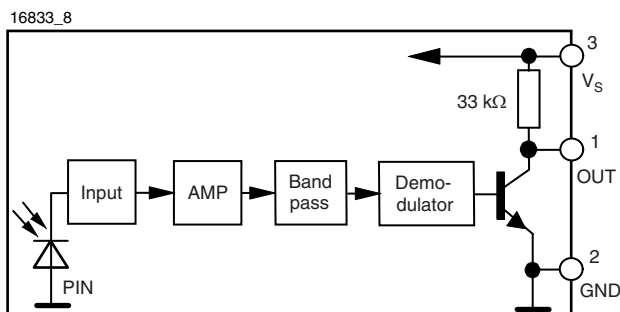


### APPLICATIONS

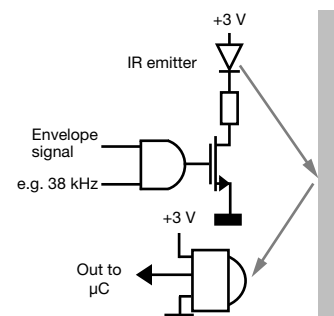
- Reflective sensors for hand dryers, towel or soap dispensers, water faucets, toilet flush
- Vending machine fall detection
- Security and pet gates
- Person or object vicinity activation

| PARTS TABLE       |                             |               |
|-------------------|-----------------------------|---------------|
| Carrier frequency | 38 kHz                      | TSSP4038SS1XB |
|                   | 56 kHz                      | TSSP4056SS1XB |
| Package           | Mold                        |               |
| Pinning           | 1 = OUT, 2 = GND, 3 = $V_S$ |               |
| Dimensions (mm)   | 6.0 W x 6.95 H x 5.6 D      |               |
| Mounting          | Leaded                      |               |
| Application       | Presence sensors            |               |

### BLOCK DIAGRAM



### PRESENCE SENSING



| 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   |
| Soldering temperature       | $t \leq 10$ s, 1 mm from case | $T_{sd}$    | 260                   | °C   |
| Power consumption           | $T_{amb} \leq 85$ °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 ( $T_{amb} = 25$ °C, unless otherwise specified) |  |              |      |          |      |                   |
|---|--|--------------|------|----------|------|-------------------|
| PARAMETER   | TEST CONDITION   | SYMBOL       | MIN. | TYP.     | MAX. | UNIT              |
| Supply current (pin 3)  | $E_v = 0, V_S = 5$ V   | $I_{SD}$     | 0.55 | 0.7      | 0.9  | mA                |
|   | $E_v = 40$ klx, sunlight   | $I_{SH}$     | -    | 0.8      | -    | mA                |
| Supply voltage  |  | $V_S$        | 2.5  | -        | 5.5  | V                 |
| Transmission distance   | $E_v = 0$ , test signal see Fig. 1, IR diode TSAL6200, $I_F = 50$ mA                       | $d$          | -    | 2.4      | -    | m                 |
| Output voltage low (pin 1)  | $I_{OSL} = 0.5$ mA, $E_e = 2$ mW/m <sup>2</sup> , test signal see Fig. 1                   | $V_{OSL}$    | -    | -        | 100  | mV                |
| Minimum irradiance  | Pulse width tolerance: $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see Fig. 1 | $E_e$ min.   | -    | 7        | 14   | mW/m <sup>2</sup> |
| Maximum irradiance  | $t_{pi} - 5/f_0 < t_{po} < t_{pi} + 6/f_0$ , test signal see Fig. 1                        | $E_e$ max.   | 50   | -        | -    | W/m <sup>2</sup>  |
| Directivity   | Angle of half transmission distance  | $\phi_{1/2}$ | -    | $\pm 45$ | -    | deg               |

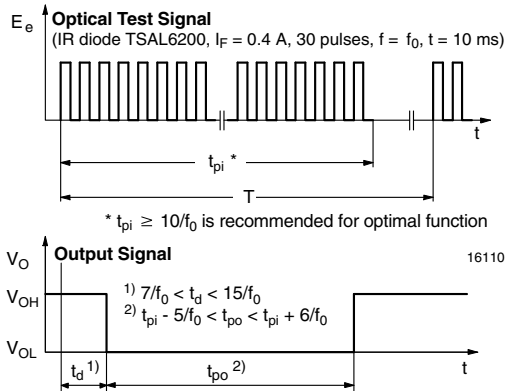
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25$  °C, unless otherwise specified)


Fig. 1 - Output Active Low

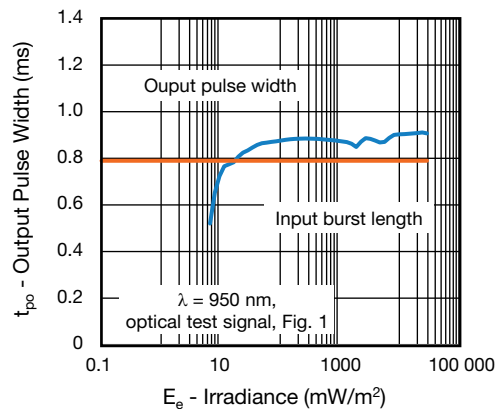


Fig. 2 - Pulse Length and Sensitivity in Dark Ambient

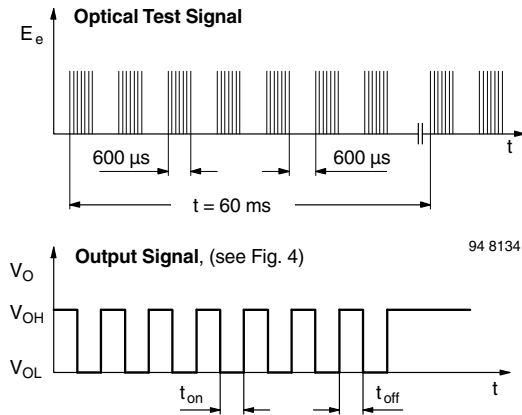


Fig. 3 - Output Function

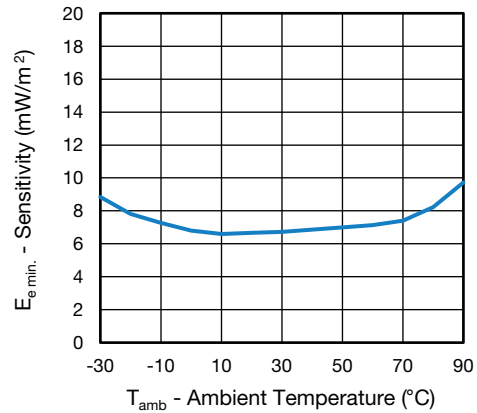


Fig. 6 - Sensitivity vs. Ambient Temperature

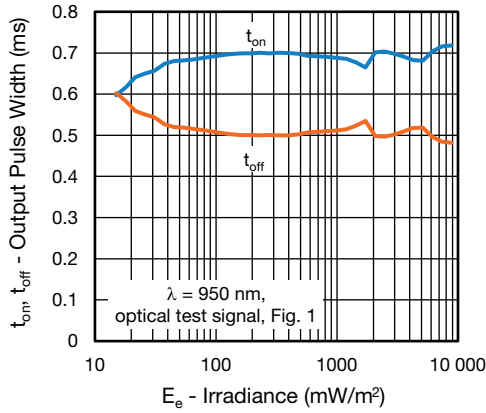


Fig. 4 - Output Pulse Diagram

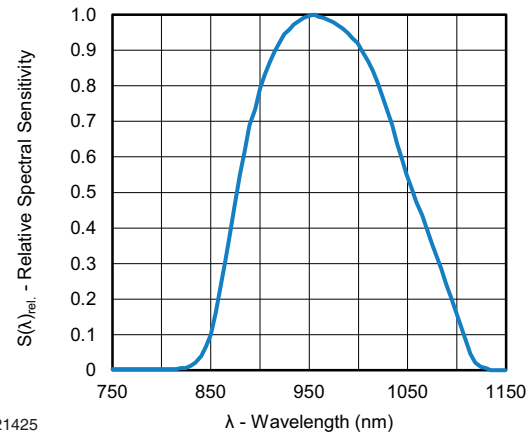


Fig. 7 - Relative Spectral Sensitivity vs. Wavelength

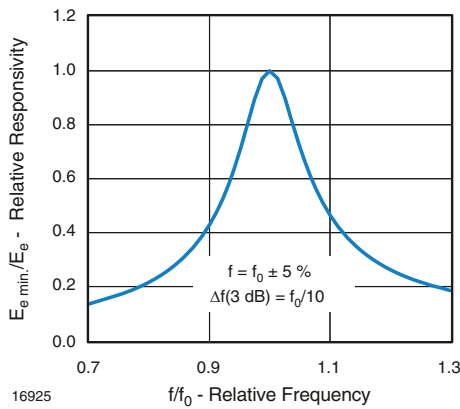


Fig. 5 - Frequency Dependence of Responsivity

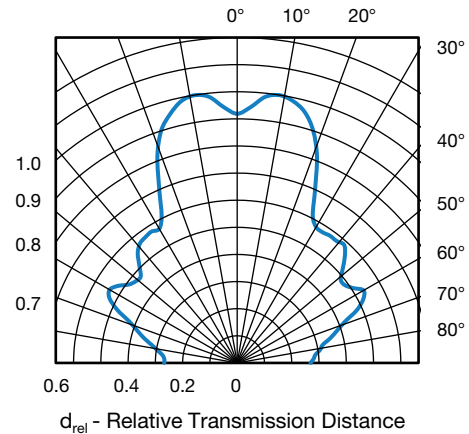


Fig. 8 - Horizontal Directivity

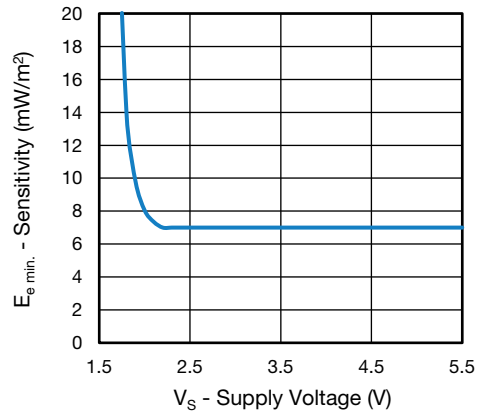
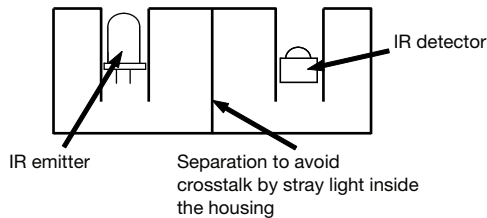


Fig. 9 - Sensitivity vs. Supply Voltage

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 1 m beam break or 0.5 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.

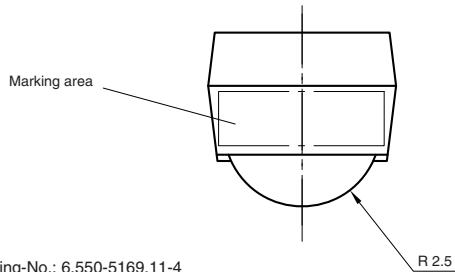
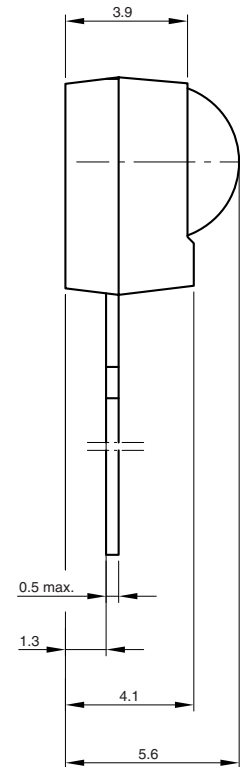
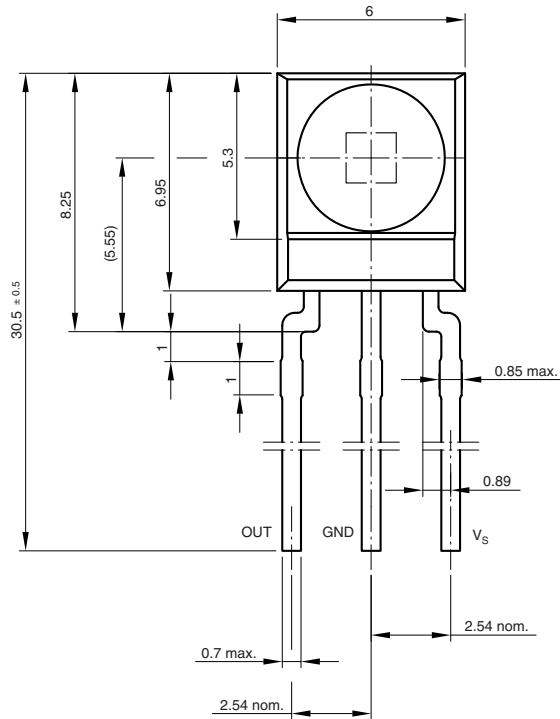
Example for a sensor hardware:



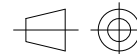
There should be no common window in front of the emitter and detector in order to avoid crosstalk via guided light through the window.



## PACKAGE DIMENSIONS in millimeters



Not indicated tolerances ± 0.2



technical drawings according to DIN specifications

Drawing-No.: 6.550-5169.11-4

Issue: 13; 17.12.08

16003



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