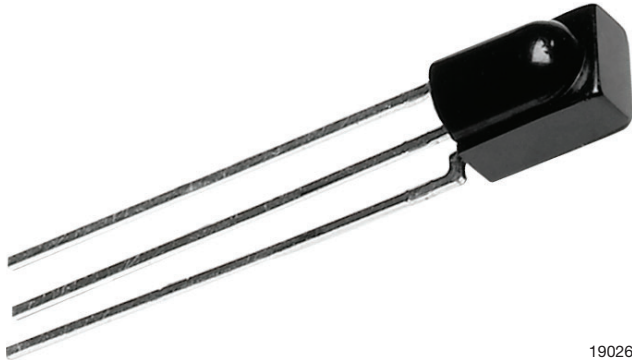


## IR Sensor Module for Remote Control Systems



19026

### LINKS TO ADDITIONAL RESOURCES



### DESCRIPTION

The TSMP98000 is a miniaturized sensor for receiving the modulated signal of infrared remote control systems. A PIN diode and preamplifier are assembled on a lead frame, the epoxy package is designed as an IR filter. The modulated output signal, carrier out, can be used for code learning applications.

This component has not been qualified according to automotive specifications.

### FEATURES

- Photo detector and preamplifier in one package
- AC coupled response from 30 kHz to 60 kHz, all data formats
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Supply voltage 2.0 V to 5.5 V
- Carrier out signal for code learning functions
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



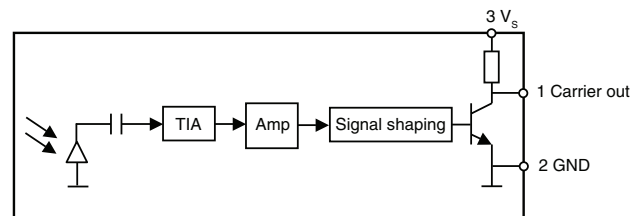
### APPLICATIONS

- Infrared code learning

### DESIGN SUPPORT TOOLS

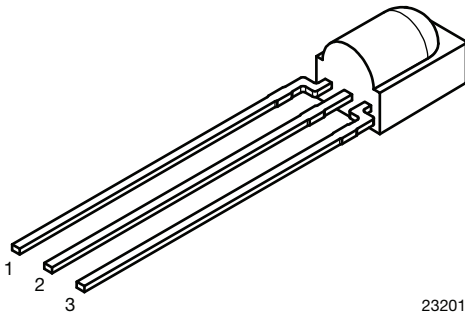
- [3D models](#)
- [Window size calculator](#)

### BLOCK DIAGRAM



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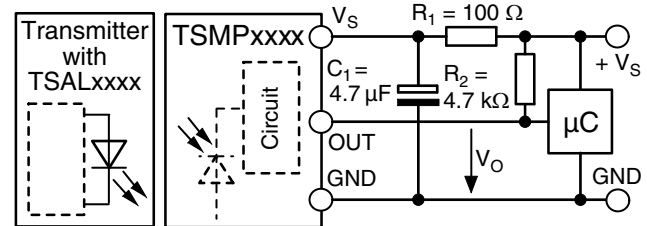
**MECHANICAL DATA**
**Pinning:**

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


23201

**ORDERING CODE**

TSMP98000 - 1500 pieces in bags

**APPLICATION CIRCUIT**

 $R_1 + C_1$  recommended to suppress power supply disturbances.

 $R_2$  recommended to get faster slopes and a correct high level of the output pulses.

**PARTS TABLE**

|                          |                  |                                     |
|--------------------------|------------------|-------------------------------------|
| <b>Carrier frequency</b> | 30 kHz to 60 kHz | TSMP98000                           |
| <b>Package</b>           |                  | Minicast                            |
| <b>Pinning</b>           |                  | 1 = carrier OUT, 2 = GND, 3 = $V_S$ |
| <b>Dimensions (mm)</b>   |                  | 5.0 W x 6.95 H x 4.8 D              |
| <b>Mounting</b>          |                  | Leaded                              |
| <b>Application</b>       |                  | Code learning                       |

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

| PARAMETER                   | TEST CONDITION                        | SYMBOL    | VALUE                   | UNIT               |
|-----------------------------|---------------------------------------|-----------|-------------------------|--------------------|
| Supply voltage (pin 3)      |                                       | $V_S$     | -0.3 to +6              | V                  |
| Output voltage (pin 1)      |                                       | $V_O$     | -0.3 to ( $V_S + 0.3$ ) | V                  |
| Output current (pin 1)      |                                       | $I_O$     | 5                       | mA                 |
| Junction temperature        |                                       | $T_j$     | 100                     | $^{\circ}\text{C}$ |
| Storage temperature range   |                                       | $T_{stg}$ | -25 to +85              | $^{\circ}\text{C}$ |
| Operating temperature range |                                       | $T_{amb}$ | -25 to +85              | $^{\circ}\text{C}$ |
| Soldering temperature       | $t \leq 10\text{ s}$ , 1 mm from case | $T_{sd}$  | 260                     | $^{\circ}\text{C}$ |

**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 CARRIER OUT**

 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified,  $V_S = 3\text{ V}$ )

| PARAMETER                  | TEST CONDITION   | SYMBOL           | MIN.                         | TYP.               | MAX.                         | UNIT              |
|----------------------------|--|------------------|------------------------------|--------------------|------------------------------|-------------------|
| Supply current (pin 3)     | $V_S = 3.3\text{ V}$ , $E_v = 0$   | $I_{SD}$         | 0.25                         | 0.35               | 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, $I_F = 50\text{ mA}$  | $d$              | -                            | 1.8                | -                            | m                 |
| Output voltage low (pin 1) | $I_{OSL} = 0.5\text{ mA}$ , test signal see Fig. 1   | $V_{OSL}$        | -                            | -                  | 250                          | mV                |
| Minimum irradiance         | $V_S = 3\text{ V}$ , (30 kHz to 60 kHz)  | $E_{e\ min.}$    | -                            | 12                 | 25                           | mW/m <sup>2</sup> |
| Maximum irradiance         | Test signal see Fig. 1, (30 kHz to 60 kHz)   | $E_{e\ max.}$    | 30                           | -                  | -                            | W/m <sup>2</sup>  |
| Directivity                | Angle of half transmission distance  | $\varphi_{1/2}$  | -                            | $\pm 45$           | -                            | deg               |
| Output accuracy            | $f_c = 30\text{ kHz to }60\text{ kHz}$ ,<br>$E_e = 25\text{ mW/m}^2\text{ to }30\text{ W/m}^2$ ,<br>test signal see Fig. 1, BER $\leq 2\%$ | N carrier pulses | input burst length - 1 cycle | input burst length | input burst length + 1 cycle | counts            |

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

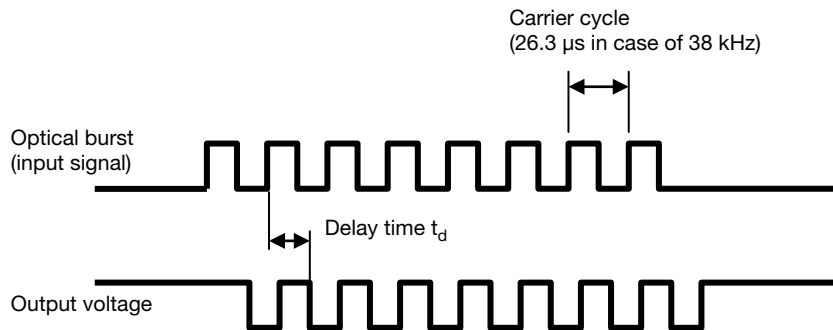


Fig. 1 - Testsignal

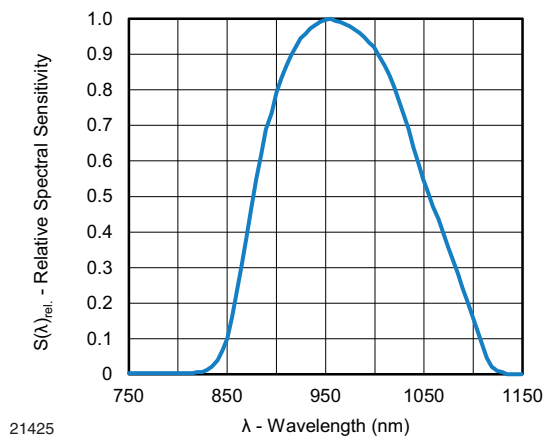


Fig. 2 - Relative Spectral Sensitivity vs. Wavelength

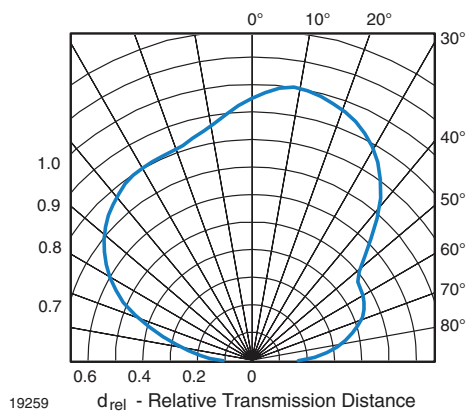


Fig. 4 - Vertical Directivity

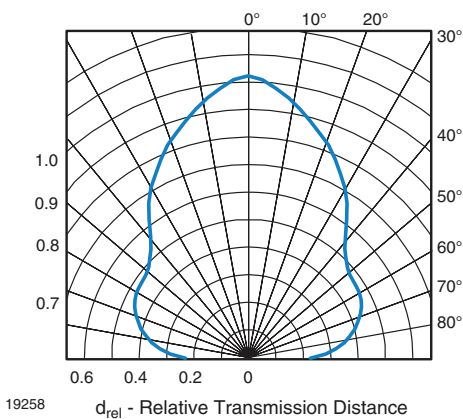
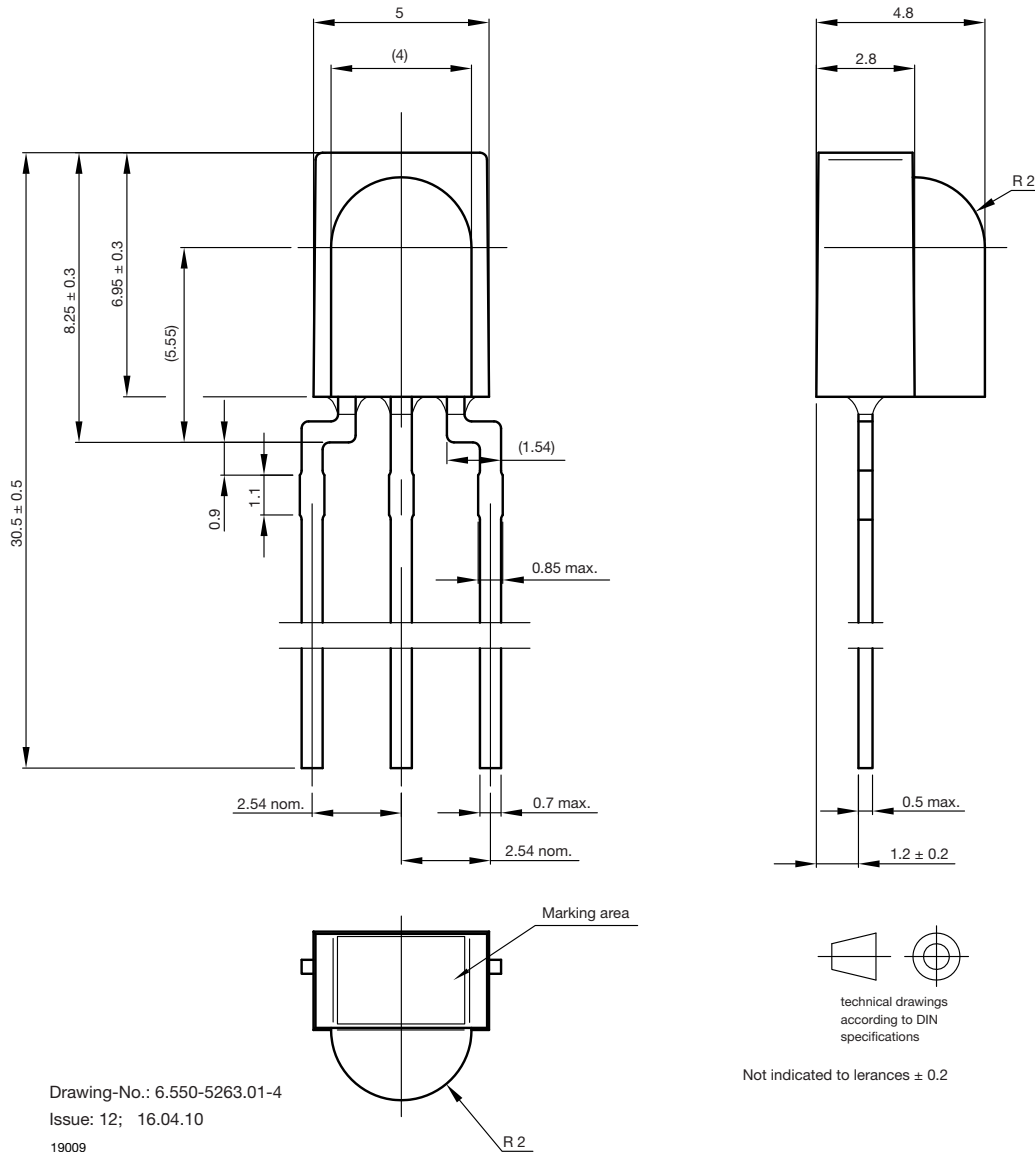


Fig. 3 - Horizontal Directivity



PACKAGE DIMENSIONS in millimeters





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