

# SFH250 and SFH250V

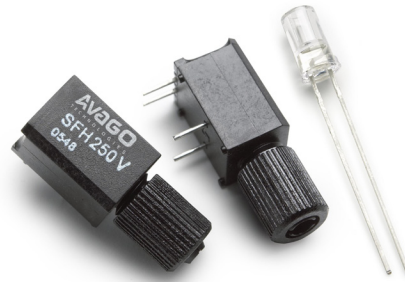
## Receiver with analog output for polymer optical fiber applications



### Data Sheet



Lead (Pb) Free  
RoHS 6 fully  
compliant



### Description

The SFH250 is a low-cost 650nm receiver for optical data transmission with polymer optical fiber. This Si-pin-photodiode works fine with the AVAGO transmitter SFH757. According to the intensity of the incident light the SFH250 generates an analog photocurrent. In typical applications the SFH250 is operated in reverse-biasing and is installed in series with a resistor, where the voltage tapping is taken. By increasing the reverse voltage the switching times decrease and the SFH250 can be used for transmission speeds up to 100MBd.

Components of the SFH series are optimized for easy coupling. No fiber stripping is required, only the cut fiber has to be inserted into the selected SFH component.

### SFH250

The transparent plastic package has an aperture where a 2.2mm fiber end can be inserted. This very easy coupling method is extremely cost-effective.

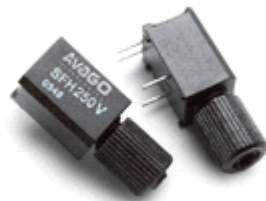
### SFH250V

The V-housing allows easy coupling of unconnectorized 2.2mm polymer optical fiber by means of an axial locking screw.

### Ordering Information



SFH250



SFH250V

| Type    | Ordering Code |
|---------|---------------|
| SFH250  | SP000063866   |
| SFH250V | SP000063852   |

### Features

- Fast Switching Time
- Sensitive in visible and near IR Range
- High linearity
- 2.2mm aperture holds standard 980/1000/2200 um plastic fiber
- No fiber stripping required
- Molded microlens for efficient coupling

### Plastic Direct Fiber Connector housing (V-housing)

- Locking screw attached to the connector
- Interference-free transmission by the light-tight housing
- Transmitter and receiver can be positioned flexibly
- No cross talk
- Auto insertable and wave solderable
- Supplied in tubes

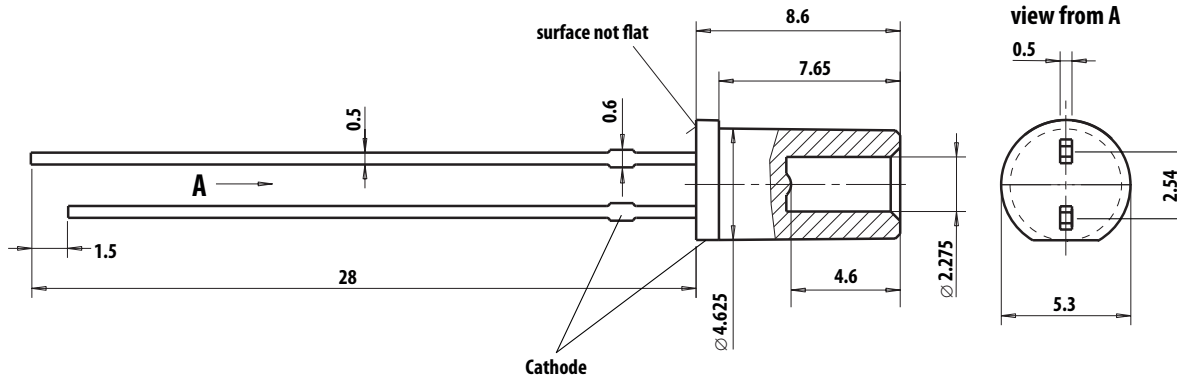
### Applications

- Household electronics
- Power electronics
- Optical networks
- Light barriers

### Application Literature

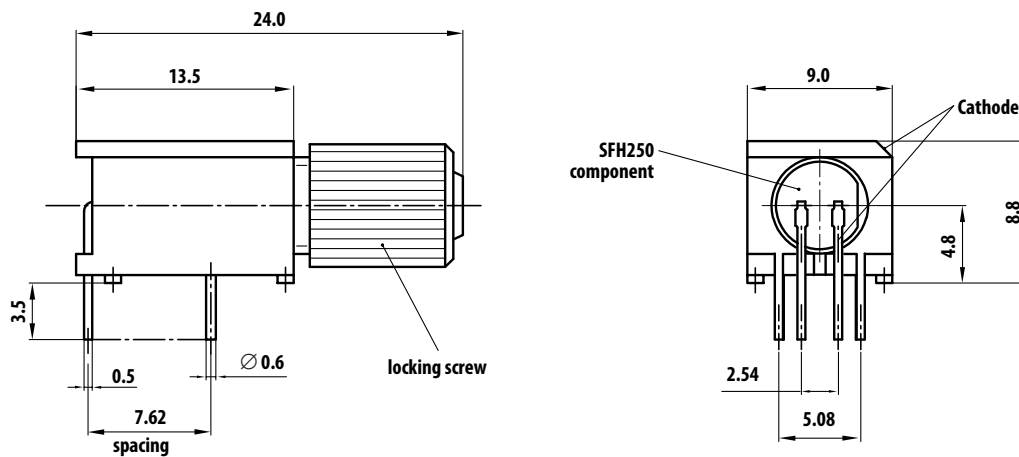
| AN # | Description                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------|
| 5342 | General information about the SFH series with Selection Guide and recommendations regarding System Planning and Mounting |
| 5341 | Information about Basic and Special Circuits for Transmitter and Receiver of the SFH series                              |

## Package Dimensions SFH250



Dimensions in mm

## SFH250V



Dimensions in mm

## Package V-housing Color

SFH V-series components are color coded just like other Avago fiber optic components. The SFH757V transmitter has a white colored housing; the SFH250V and SFH551/1-1V receiver components have a black colored housing. This prevents mistakes while making connections. Product designation and date of manufacture are printed on the housing.

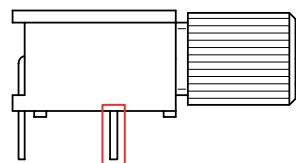
## Package V-housing mounting pins

SFH V-series components have two pins that are electrically isolated from the inner circuit. The pins are only designed for mounting the V-housing to the PCB surface. This helps increase stability, which is needed during fixing the fiber end by the axial locking screw.

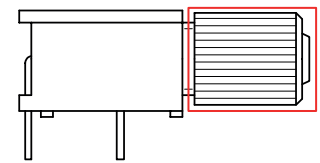
The retention force between the soldered mounting pins and the V-housing of the SFH component is about 20 N (with a vertical exertion of force). This is an approximate value.

## Package V-housing axial locking screw

Components of the SFH V-series are equipped with an axial locking screw for easy coupling to the unconnectorized 2.2 mm polymer optical fiber. The force that is necessary to pull a jammed fiber out of the V-housing is typically 50 N (with a torque of 15 cNm for tightening the locking screw). This is an approximate value that is very dependent on the fiber and torque combination.



Package V-housing mounting pins



Package V-housing axial locking screw

## Technical Data

### Absolute Maximum Ratings

| Parameter                                                     | Symbol     | Min | Typ | Max  | Unit | Notes | Figure |
|---------------------------------------------------------------|------------|-----|-----|------|------|-------|--------|
| Operating Temperature range                                   | $T_C$      | -40 |     | +85  | °C   |       |        |
| Storage Temperature range                                     | $T_{stg}$  | -40 |     | +100 | °C   |       |        |
| Junction Temperature                                          | $T_J$      |     |     | 100  | °C   |       |        |
| Soldering Temperature<br>(2mm from case bottom, $t \leq 5s$ ) | $T_S$      |     |     | +260 | °C   |       |        |
| Reverse Voltage                                               | $V_R$      |     |     | 30   | V    |       |        |
| Power Dissipation                                             | $P_{tot}$  |     |     | 100  | mW   |       |        |
| Thermal Resistance (Junction/Air)                             | $R_{thJA}$ |     |     | 750  | K/W  |       |        |
| Electrostatic Discharge Voltage Capability                    | ESD        |     |     | 2000 | V    | 1     |        |
| Electrostatic Discharge Voltage Capability                    | ESD        |     |     | 400  | V    | 2     |        |

Notes:

- ESD Capability for all Pins HBM(Human Body Model) according JESD22-A114
- ESD Capability for all Pins MM (Machine Model) according JESD22-A115

### Characteristics ( $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$ ) unless otherwise specified

| Parameter                                                                                 | Symbol           | Min | Typ*  | Max  | Unit                      | Notes | Figure |
|-------------------------------------------------------------------------------------------|------------------|-----|-------|------|---------------------------|-------|--------|
| Maximum Photosensitivity Wavelength                                                       | $\lambda_{smax}$ |     | 850   |      | nm                        |       | 1      |
| Photosensitivity Spectral Range<br>( $S=80\%S_{max}$ )                                    | $\lambda_s$      | 400 |       | 1100 | nm                        |       | 1      |
| Dark Current<br>( $R_L=50\Omega, V_R=5V, T_A=25^\circ\text{C}$ )                          | $I_R$            |     | 1     | 10   | nA                        | 2     | 5      |
| Capacitance<br>( $f=1\text{MHz}, V_R=0$ )                                                 | $C_S$            |     | 11    |      | pF                        |       | 5      |
| Switching Times ( $R_L=50\Omega, V_R=5.0V, \lambda=650\text{nm}$ )                        |                  |     |       |      |                           |       |        |
| $T_{rise}$ (10%...90%)                                                                    | $t_r$            |     | 5     | 12   | ns                        | 1,2   | 6, 4   |
| $T_{fall}$ (90%.. 10%)                                                                    | $t_f$            |     | 8     | 16   | ns                        |       |        |
| Switching Times ( $R_L=50\Omega, V_R=30.0V, \lambda=650\text{nm}$ )                       |                  |     |       |      |                           |       |        |
| $T_{rise}$ (10%...90%)                                                                    | $t_r$            |     | 3     | 10   | ns                        | 1,2   | 6, 4   |
| $T_{fall}$ (90%.. 10%)                                                                    | $t_f$            |     | 4     | 10   | ns                        |       |        |
| Photocurrent<br>( $R_L=50\Omega, P_{opt}=10\mu\text{W}, V_R=5.0V, \lambda=650\text{nm}$ ) | $I_P$            | 2.4 | 4.4   |      | $\mu\text{A}$             |       | 2,3    |
| Responsivity<br>( $\lambda=650\text{nm}, R_L=50\Omega$ )                                  | $R_{IP}$         | 240 | 440   |      | $\mu\text{A} / \text{mW}$ | 3     | 3      |
| Photocurrent Temperature Coefficient<br>( $\lambda=650\text{nm}$ )                        | $T_{IP}$         |     | -0.03 |      | % / K                     |       | 2      |

\* Typical value = mean value at  $T_A=25^\circ\text{C}$

Note:

- Measured with optical input power -4dBm(mean) and pattern: "1010" at 5MBd
- Increase with temperature
- Not strictly linear behavior. Actual value at high optical input power could vary from the typical value.

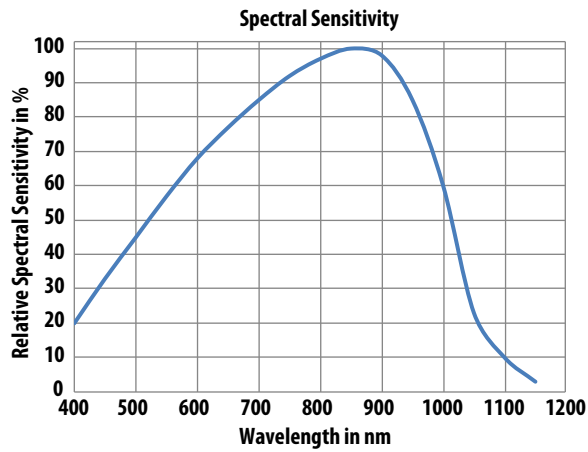


Figure 1. Typical Spectral Sensitivity

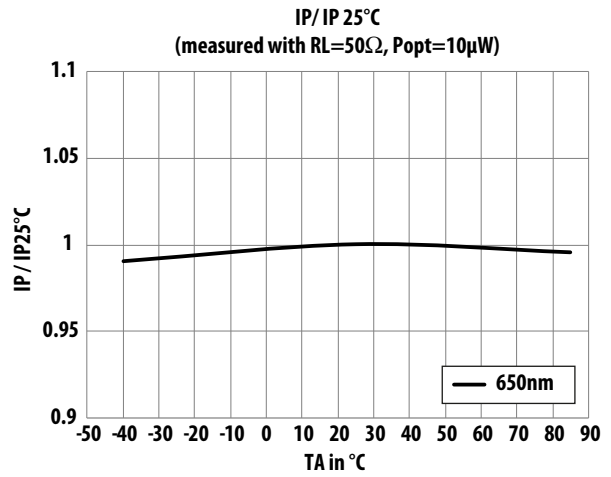


Figure 2. Typical Photocurrent depending on temperature

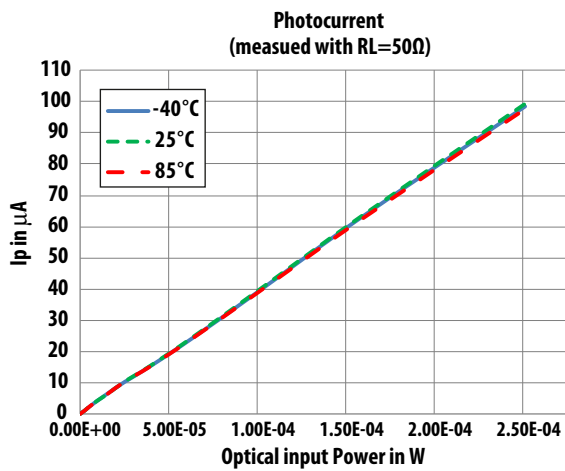


Figure 3. Typical Photocurrent at constant "Light ON"

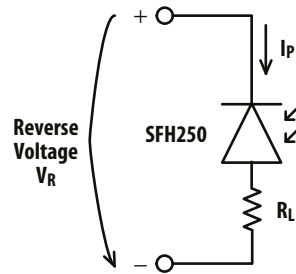


Figure 4. Test circuit

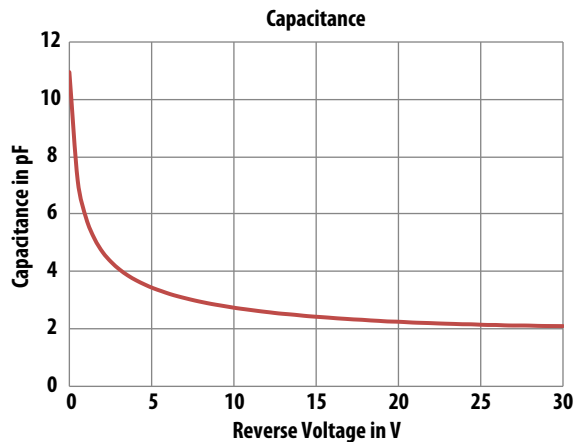


Figure 5. Typical Capacitance; measured at TA=25°C with fmeasured =1MHz

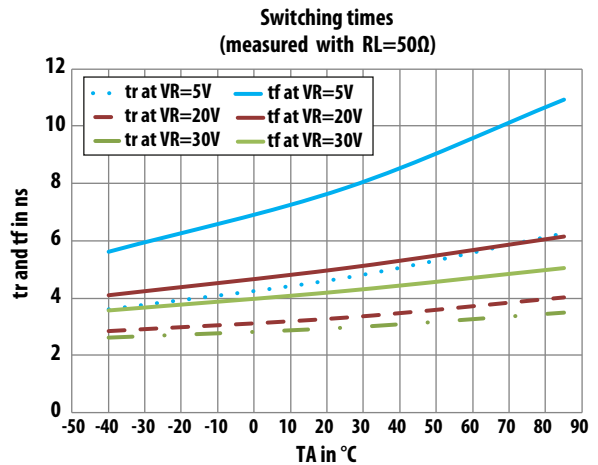


Figure 6. Typical Switching times; measured with pattern "1010" (5Mbd) at -4dBm (mean) optical input power

For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)

Avago, Avago Technologies, and the A logo are trademarks of Avago Technologies in the United States and other countries. Data subject to change. Copyright © 2005-2011 Avago Technologies. All rights reserved. Obsoletes AV01-0711EN AV02-3095EN - October 25, 2011

