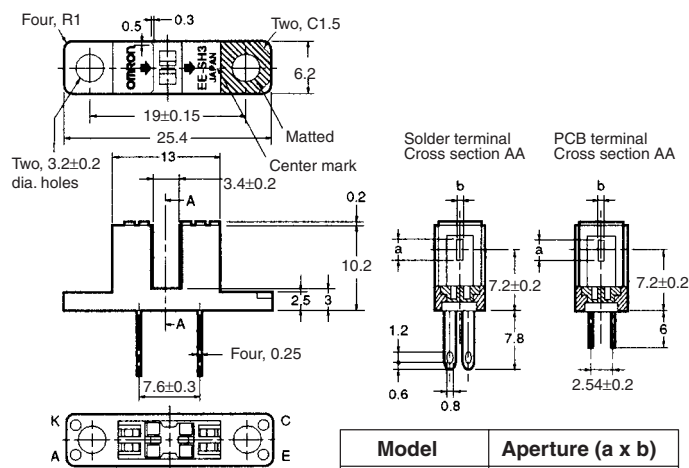


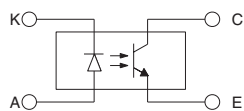
# Photomicrosensor (Transmissive) EE-SH3 Series

## ■ Dimensions

**Note:** All units are in millimeters unless otherwise indicated.



Internal Circuit



Unless otherwise specified, the tolerances are as shown below.

| Dimensions   | Tolerance |
|--------------|-----------|
| 3 mm max.    | ±0.2      |
| 3 < mm ≤ 6   | ±0.24     |
| 6 < mm ≤ 10  | ±0.29     |
| 10 < mm ≤ 18 | ±0.35     |
| 18 < mm ≤ 30 | ±0.42     |

| Terminal No. | Name      |
|--------------|-----------|
| A            | Anode     |
| K            | Cathode   |
| C            | Collector |
| E            | Emitter   |

## ■ Features

- High-resolution model with a 0.2-mm-wide or 0.5-mm-wide sensing aperture, high-sensitivity model with a 1-mm-wide sensing aperture, and model with a horizontal sensing aperture are available.
- Solder terminal models:  
EE-SH3/-SH3-CS/-SH3-DS/-SH3-GS
- PCB terminal models:  
EE-SH3-B/-SH3-C/-SH3-D/-SH3-G

## ■ Absolute Maximum Ratings (Ta = 25°C)

| Item                  | Symbol                    | Rated value               |
|-----------------------|---------------------------|---------------------------|
| Emitter               | Forward current           | $I_F$ 50 mA (see note 1)  |
|                       | Pulse forward current     | $I_{FP}$ 1 A (see note 2) |
|                       | Reverse voltage           | $V_R$ 4 V                 |
| Detector              | Collector-Emitter voltage | $V_{CEO}$ 30 V            |
|                       | Emitter-Collector voltage | $V_{ECO}$ ---             |
|                       | Collector current         | $I_C$ 20 mA               |
|                       | Collector dissipation     | $P_C$ 100 mW (see note 1) |
| Ambient temperature   | Operating                 | $T_{opr}$ -25°C to 85°C   |
|                       | Storage                   | $T_{stg}$ -30°C to 100°C  |
| Soldering temperature | $T_{sol}$                 | 260°C (see note 3)        |

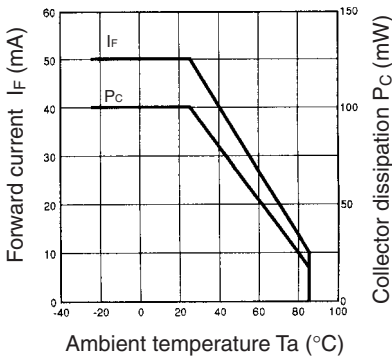
- Note:**
1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.
  2. The pulse width is 10  $\mu$ s maximum with a frequency of 100 Hz.
  3. Complete soldering within 10 seconds.

## ■ Electrical and Optical Characteristics (Ta = 25°C)

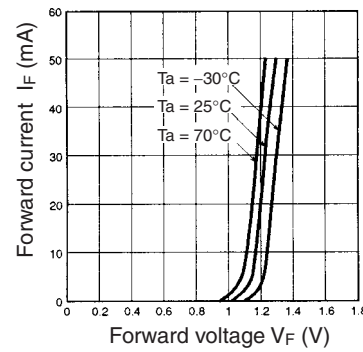
| Item         |                                      | Symbol        | Value                              |                 |             |                        | Condition                                               |
|--------------|--------------------------------------|---------------|------------------------------------|-----------------|-------------|------------------------|---------------------------------------------------------|
|              |                                      |               | EE-SH3(-B)                         | EE-SH3-C(S)     | EE-SH3-D(S) | EE-SH3-G(S)            |                                                         |
| Emitter      | Forward voltage                      | $V_F$         | 1.2 V typ., 1.5 V max.             |                 |             |                        | $I_F = 30$ mA                                           |
|              | Reverse current                      | $I_R$         | 0.01 $\mu$ A typ., 10 $\mu$ A max. |                 |             |                        | $V_R = 4$ V                                             |
|              | Peak emission wavelength             | $\lambda_p$   | 940 nm typ.                        |                 |             |                        | $I_F = 20$ mA                                           |
| Detector     | Light current                        | $I_L$         | 0.5 to 14 mA typ.                  | 1 to 28 mA typ. | 0.1 mA min. | 0.5 to 14 mA           | $I_F = 20$ mA,<br>$V_{CE} = 10$ V                       |
|              | Dark current                         | $I_D$         | 2 nA typ., 200 nA max.             |                 |             |                        | $V_{CE} = 10$ V,<br>0 lx                                |
|              | Leakage current                      | $I_{LEAK}$    | ---                                |                 |             |                        | ---                                                     |
|              | Collector-Emitter saturated voltage  | $V_{CE(sat)}$ | 0.1 V typ., 0.4 V max.             |                 | ---         | 0.1 V typ., 0.4 V max. | $I_F = 20$ mA,<br>$I_L = 0.1$ mA                        |
|              | Peak spectral sensitivity wavelength | $\lambda_p$   | 850 nm typ.                        |                 |             |                        | $V_{CE} = 10$ V                                         |
| Rising time  |                                      | $t_r$         | 4 $\mu$ s typ.                     |                 |             |                        | $V_{CC} = 5$ V,<br>$R_L = 100 \Omega$ ,<br>$I_L = 5$ mA |
| Falling time |                                      | $t_f$         | 4 $\mu$ s typ.                     |                 |             |                        |                                                         |

# Engineering Data

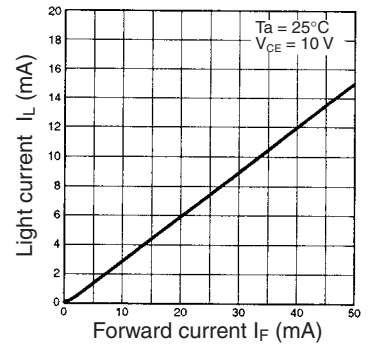
**Forward Current vs. Collector Dissipation Temperature Rating**



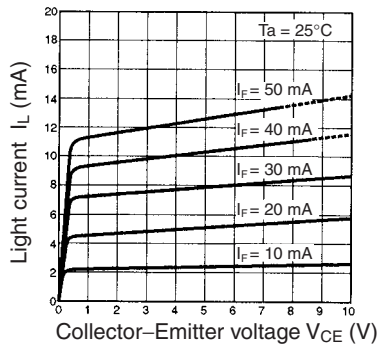
**Forward Current vs. Forward Voltage Characteristics (Typical)**



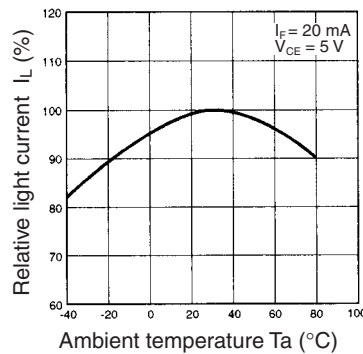
**Light Current vs. Forward Current Characteristics (Typical)**



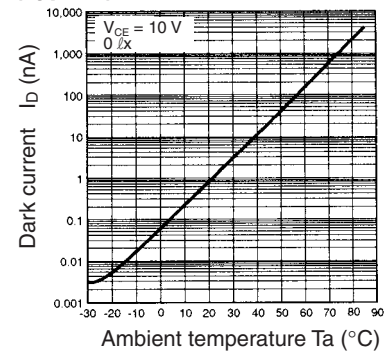
**Light Current vs. Collector-Emitter Voltage Characteristics (EE-SH3(-B))**



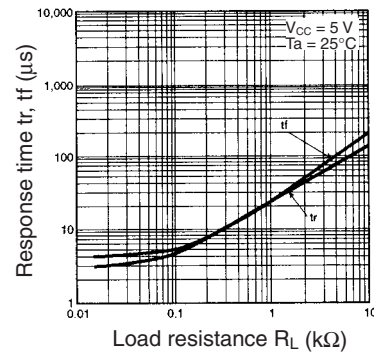
**Relative Light Current vs. Ambient Temperature Characteristics (Typical)**



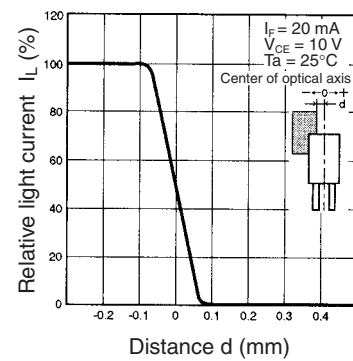
**Dark Current vs. Ambient Temperature Characteristics (Typical)**



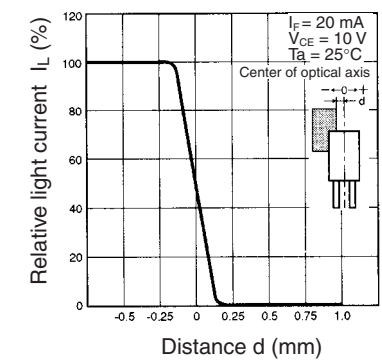
**Response Time vs. Load Resistance Characteristics (Typical)**



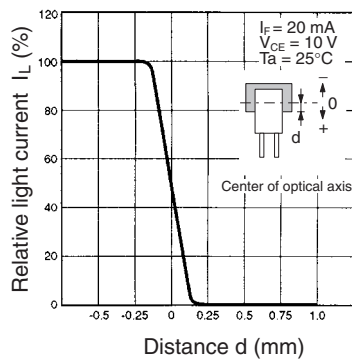
**Sensing Position Characteristics (EE-SH3-D(S))**



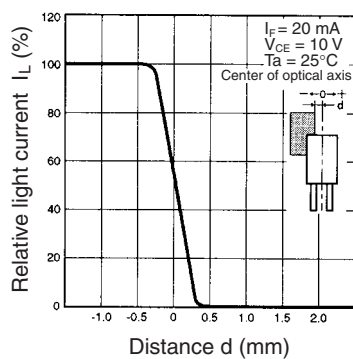
**Sensing Position Characteristics (EE-SH3(-B))**



**Sensing Position Characteristics (EE-SH3-G(S))**



**Sensing Position Characteristics (EE-SH3-C(S))**



**Response Time Measurement Circuit**

