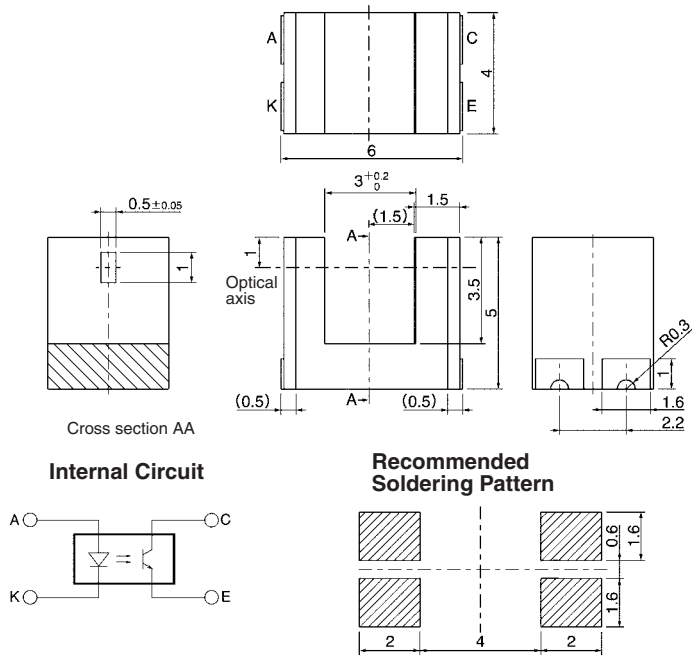


## Photomicrosensor (Transmissive) EE-SX1109

 Be sure to read *Precautions* on page 25.

### ■ Dimensions

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



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

Unless otherwise specified, the tolerances are  $\pm 0.15$  mm.

### ■ Features

- Ultra-compact with a 6-mm-wide sensor and a 3-mm-wide slot.
- PCB surface mounting type.
- High resolution with a 0.5-mm-wide aperture.

### ■ Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Item     | Symbol                    | Rated value                        |
|----------|---------------------------|------------------------------------|
| Emitter  | Forward current           | $I_F$<br>25 mA<br>(see note 1)     |
|          | Pulse forward current     | $I_{FP}$<br>100 mA<br>(see note 2) |
|          | Reverse voltage           | $V_R$<br>5 V                       |
| Detector | Collector–Emitter voltage | $V_{CEO}$<br>20 V                  |
|          | Emitter–Collector voltage | $V_{ECO}$<br>5 V                   |
|          | Collector current         | $I_C$<br>20 mA                     |
|          | Collector dissipation     | $P_C$<br>75 mW<br>(see note 1)     |
|          | Ambient temperature       | Operating                          |
|          | Storage                   | $T_{stg}$<br>–40°C to 90°C         |
|          | Reflow soldering          | $T_{sol}$<br>255°C<br>(see note 3) |
|          | Manual soldering          | $T_{sol}$<br>350°C<br>(see note 3) |

**Note:** 1. Refer to the temperature rating chart if the ambient temperature exceeds 25°C.

2. Duty: 1/100; Pulse width: 0.1 ms

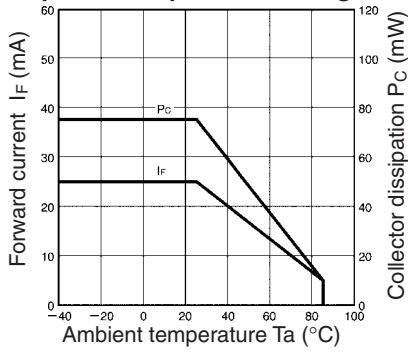
3. Complete soldering within 10 seconds for reflow soldering and within 3 seconds for manual soldering.

### ■ Electrical and Optical Characteristics ( $T_a = 25^\circ\text{C}$ )

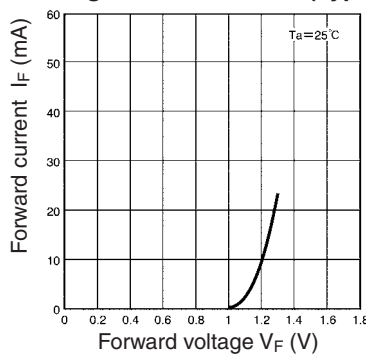
| Item         | Symbol                               | Value                 | Condition   |
|--------------|--------------------------------------|-----------------------|---|
| Emitter      | Forward voltage                      | $V_F$                 | 1.1 V typ., 1.3 V max.  |
|              | Reverse current                      | $I_R$                 | 10 $\mu\text{A}$ max.   |
|              | Peak emission wavelength             | $\lambda_p$           | 940 nm typ.   |
| Detector     | Light current                        | $I_L$                 | 50 $\mu\text{A}$ min., 150 $\mu\text{A}$ typ., 500 $\mu\text{A}$ max. |
|              | Dark current                         | $I_D$                 | 100 nA max.   |
|              | Leakage current                      | $I_{LEAK}$            | ---   |
|              | Collector–Emitter saturated voltage  | $V_{CE(sat)}$         | 0.1 V typ., 0.4 V max.  |
|              | Peak spectral sensitivity wavelength | $\lambda_p$           | 900 nm typ.   |
| Rising time  | $t_r$                                | 10 $\mu\text{s}$ typ. | $V_{CC} = 5$ V, $R_L = 1$ k $\Omega$ , $I_L = 100$ $\mu\text{A}$      |
| Falling time | $t_f$                                | 10 $\mu\text{s}$ typ. | $V_{CC} = 5$ V, $R_L = 1$ k $\Omega$ , $I_L = 100$ $\mu\text{A}$      |

# Engineering Data

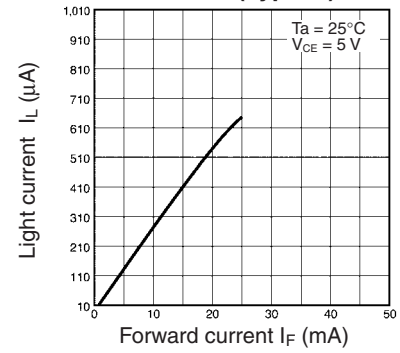
**Forward Current vs. Collector Dissipation Temperature Rating**



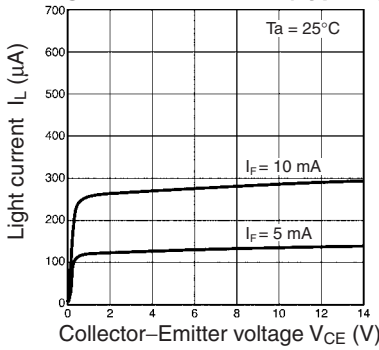
**Forward Current vs. Forward Voltage Characteristics (Typical)**



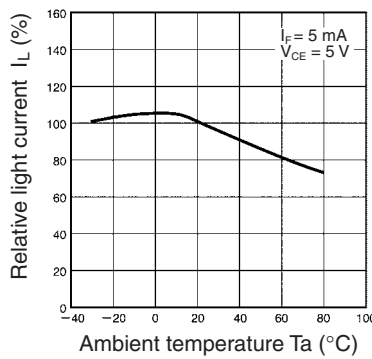
**Light Current vs. Forward Current Characteristics (Typical)**



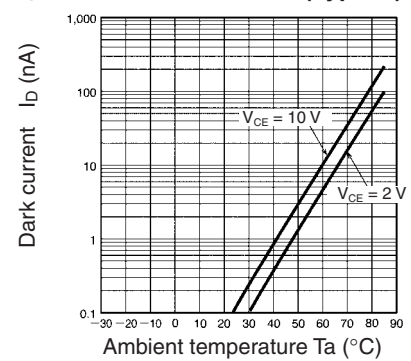
**Light Current vs. Collector-Emitter Voltage Characteristics (Typical)**



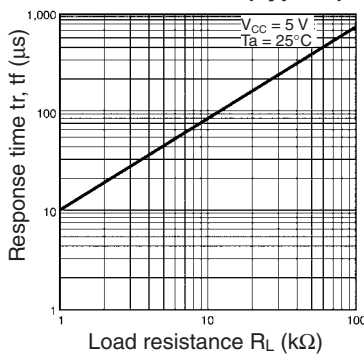
**Relative Light Current vs. Ambient Temperature Characteristics (Typical)**



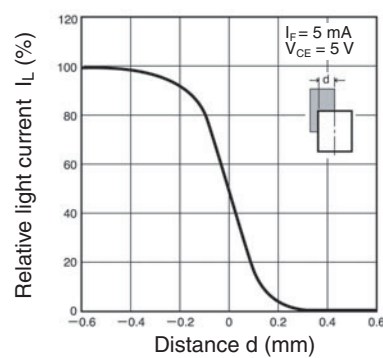
**Dark Current vs. Ambient Temperature Characteristics (Typical)**



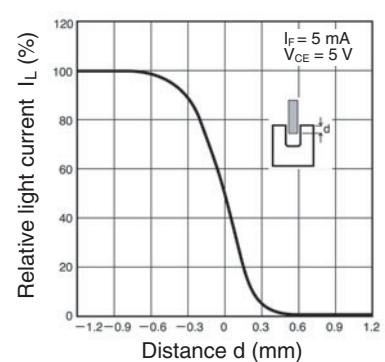
**Response Time vs. Load Resistance Characteristics (Typical)**



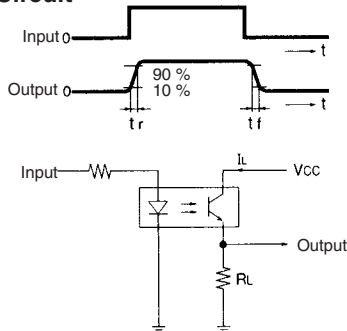
**Sensing Position Characteristics (Typical)**



**Sensing Position Characteristics (Typical)**



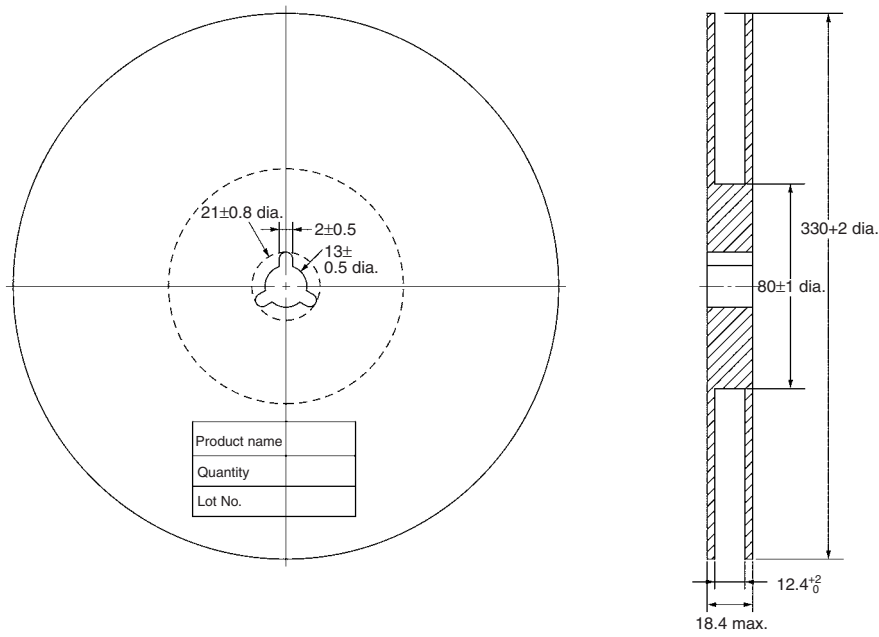
**Response Time Measurement Circuit**



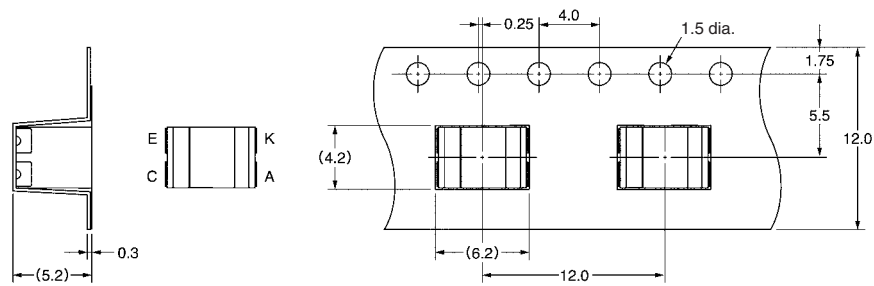
Unit: mm (inch)

## ■ Tape and Reel

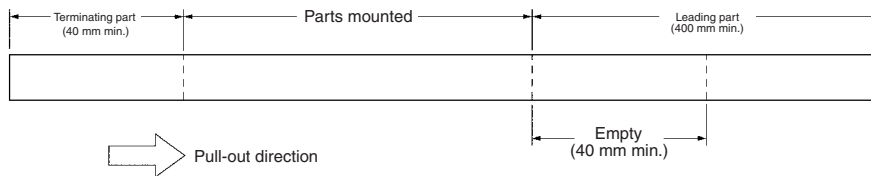
### Reel



### Tape



### Tape configuration



### Tape quantity

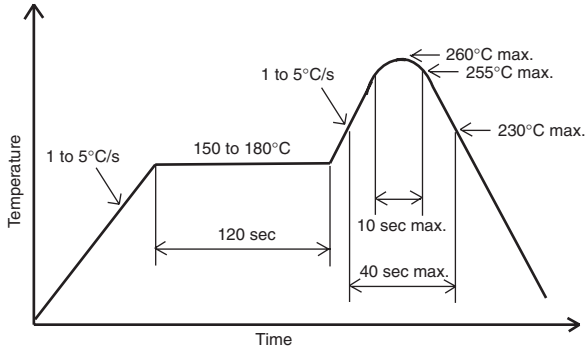
1,000 pcs./reel

# Precautions

## ■ Soldering Information

### Reflow soldering

- The following soldering paste is recommended:  
Melting temperature: 216 to 220°C  
Composition: Sn 3.5 Ag 0.75 Cu
- The recommended thickness of the metal mask for screen printing is between 0.2 and 0.25 mm.
- Set the reflow oven so that the temperature profile shown in the following chart is obtained for the upper surface of the product being soldered.



### Manual soldering

- Use "Sn 60" (60% tin and 40% lead) or solder with silver content.
- Use a soldering iron of less than 25 W, and keep the temperature of the iron tip at 300°C or below.
- Solder each point for a maximum of three seconds.
- After soldering, allow the product to return to room temperature before handling it.

### Storage

To protect the product from the effects of humidity until the package is opened, dry-box storage is recommended. If this is not possible, store the product under the following conditions:

Temperature: 10 to 30°C

Humidity: 60% max.

The product is packed in a humidity-proof envelope. Reflow soldering must be done within 48 hours after opening the envelope, during which time the product must be stored under 30°C at 80% maximum humidity.

If it is necessary to store the product after opening the envelope, use dry-box storage or reseal the envelope.

### Baking

If a product has remained packed in a humidity-proof envelope for six months or more, or if more than 48 hours have lapsed since the envelope was opened, bake the product under the following conditions before use:

Reel: 60°C for 24 hours or more

Bulk: 80°C for 4 hours or more

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