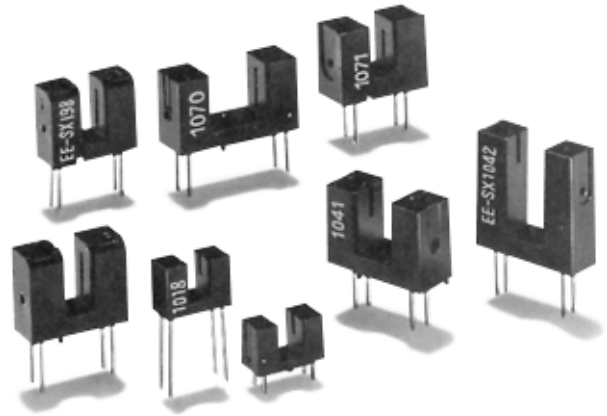










## EE-SX198/199/1018/1025/1041/1042/1070/1071

Miniature Transmissive  
Photomicrosensor with 2- to 8-mm  
Slot Width and Phototransistor  
Output

- Stable sensing at temperatures as high as 95°C (EE-SX1041, EE-SX1070)
- Compact model with a 5-mm wide slot (EE-SX1041)
- Model with 12-mm deep and 5-mm wide slot (EE-SX1042)
- Miniature model with a 2-mm wide slot (EE-SX1018)
- Low-profile model (5.4 mm high) with a 2.8-mm slot width (EE-SX1025)



### Ordering Information

| Appearance  | Sensing method | Slot width | Slot depth | Sensing object            | Output configuration | Weight        | Part number |
|---|----------------|------------|------------|---------------------------|----------------------|---------------|-------------|
|  | Transmissive   | 2 mm       | 4.5 mm     | Opaque, 0.5 x 1.5 mm min. | Phototransistor      | Approx. 0.2 g | EE-SX1018   |
|  |                | 2.8 mm     | 4.4 mm     |                           |                      |               | EE-SX1025   |
|  |                | 3 mm       | 7.5 mm     | Opaque, 0.5 x 2 mm min.   |                      | Approx. 0.6 g | EE-SX198    |
|  |                |            |            |                           |                      |               | EE-SX199    |
|  |                |            |            |                           |                      |               | EE-SX1071   |
|  |                | 5 mm       | 8.2 mm     | Opaque, 0.5 x 2.2 mm min. |                      | Approx. 0.8 g | EE-SX1041   |
|  |                | 5 mm       | 12 mm      | Opaque, 0.5 x 2 mm min.   |                      |               | EE-SX1042   |
|  |                | 8 mm       | 8.2 mm     | Opaque, 0.5 x 2.2 mm min. |                      | Approx. 0.6 g | EE-SX1070   |

# Specifications

## ■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C (77°F))

| Item                | Symbol                    | Rated value                           |
|---------------------|---------------------------|---------------------------------------|
| Emitter             | Forward current           | I <sub>F</sub> 50 mA*                 |
|                     | Reverse voltage           | V <sub>R</sub> 4 V                    |
| Detector            | Collector-emitter voltage | V <sub>CEO</sub> 30 V                 |
|                     | Collector current         | I <sub>C</sub> 20 mA                  |
|                     | Collector dissipation     | P <sub>C</sub> 100 mW*                |
| Ambient temperature | Operating                 | Topr -25°C to 85°C (-13°F to 185°F)** |
|                     | Storage                   | Tstg -30°C to 100°C (-22°F to 212°F)  |

\*Refer to Engineering Data if the ambient temperature is not within the normal room temperature range.

\*\*The operating temperature of the EE-SX1041/1070 is -25° to 95°C (-13°F to 203°F).

## ■ CHARACTERISTICS (T<sub>A</sub> = 25°C (77°F))

| Item        | Symbol                               | EE-SX1018/1025/1041/1042/1070/1071             |  | EE-SX198/199               |   |
|-------------|--------------------------------------|--|--|----------------------------|---|
|             |                                      | Value  | Condition  | Value                      | Condition   |
| Emitter     | Forward voltage                      | V <sub>F</sub> 1.2 V typ.<br>1.5 V max.        | I <sub>F</sub> = 30 mA   | 1.2 V typ.<br>1.4 V max.   | I <sub>F</sub> = 20 mA                            |
|             | Reverse current                      | I <sub>R</sub> 0.01 μA typ.<br>10 μA max.      | V <sub>R</sub> = 4 V   | 0.01 μA typ.<br>10 μA max. | V <sub>R</sub> = 4 V                              |
|             | Peak emission wavelength             | λ <sub>p(L)</sub> 940 nm typ.                  | I <sub>F</sub> = 20 mA   | 940 nm typ.                | I <sub>F</sub> = 20 mA                            |
| Detector    | Dark current                         | I <sub>D</sub> 2 nA typ.<br>200 nA max.        | V <sub>CE</sub> = 10 V 0/x   | 2 nA typ.<br>200 nA max.   | V <sub>CE</sub> = 10 V 0/x                        |
|             | Peak spectral sensitivity wavelength | λ <sub>p(P)</sub> 850 nm typ.                  | V <sub>CE</sub> = 10 V   | 850 nm typ.                | V <sub>CE</sub> = 10 V                            |
| Combination | Light current (collector current)    | I <sub>L</sub> 0.5 mA min.<br>14 mA max.       | I <sub>F</sub> = 20 mA<br>V <sub>CE</sub> = 10 V                         | 0.5 mA min.<br>14 mA max.  | I <sub>F</sub> = 20 mA<br>V <sub>CE</sub> = 5 V   |
|             | Collector-emitter saturated voltage  | V <sub>CE (sat)</sub> 0.1 V typ.<br>0.4 V max. | I <sub>F</sub> = 20 mA<br>I <sub>L</sub> = 0.1 mA                        | 0.1 V typ.<br>0.4 V max.   | I <sub>F</sub> = 40 mA<br>I <sub>L</sub> = 0.5 mA |
|             | Rising time (See Note.)              | t <sub>r</sub> 4 μs typ.                       | V <sub>CC</sub> = 5 V<br>R <sub>L</sub> = 100 Ω<br>I <sub>L</sub> = 5 mA | 4 μs typ.                  | V <sub>CC</sub> = 5 V<br>R <sub>L</sub> = 100 Ω   |
|             | Falling time (See Note.)             | t <sub>f</sub> 4 μs typ.                       |  | 4 μs typ.                  | I <sub>L</sub> = 5 mA                             |

Note: The following illustrations show the rising time, t<sub>r</sub>, and the falling time, t<sub>f</sub>.

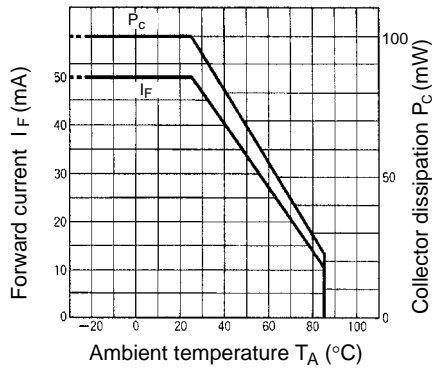


# Engineering Data

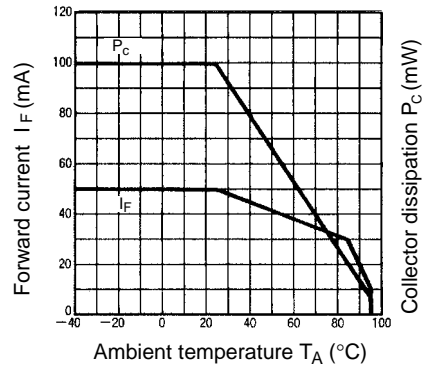
Note: The operating conditions of the photomicrosensor must be within the absolute maximum rating ranges.

## ■ TEMPERATURE CHARACTERISTICS

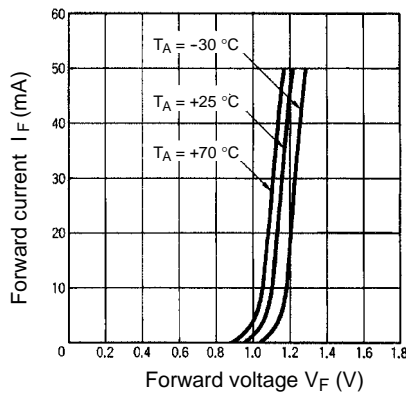
EE-SX198/199/1018/1025/1042/1071



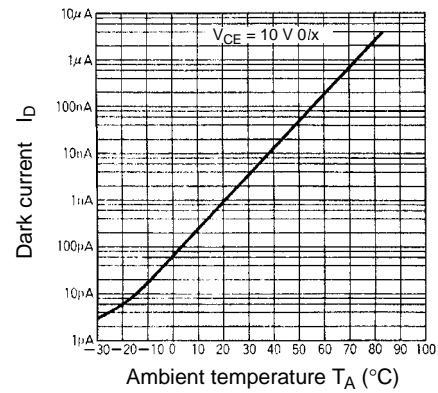
EE-SX1070/1041



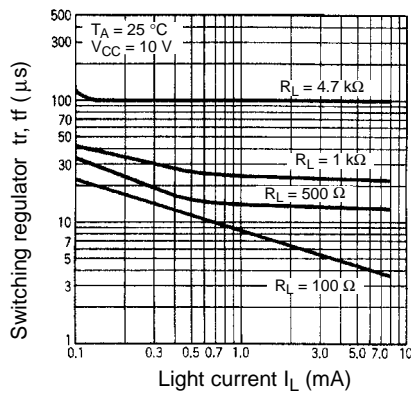
## ■ INPUT CHARACTERISTICS (TYPICAL)



## ■ DARK CURRENT TEMPERATURE DEPENDENCY (TYPICAL)

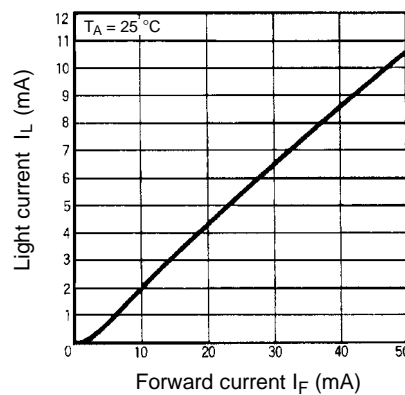


## ■ SWITCHING CHARACTERISTICS (TYPICAL)

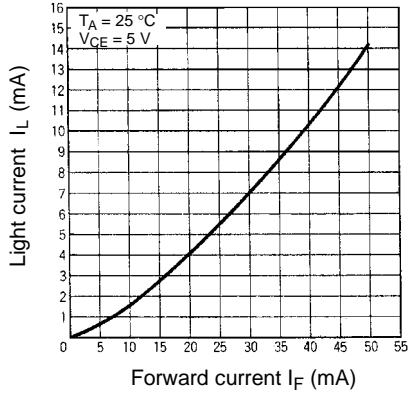


## ■ I/O CHARACTERISTIC (TYPICAL)

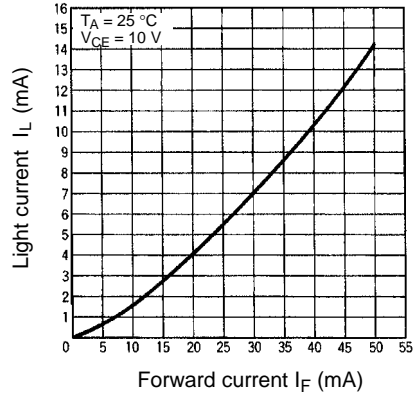
EE-SX1018/1025



EE-SX198/199

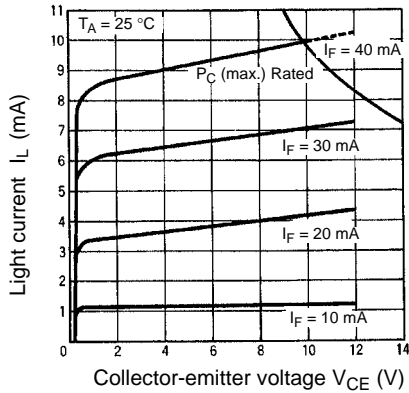


EE-SX1041/1042/1070/1071

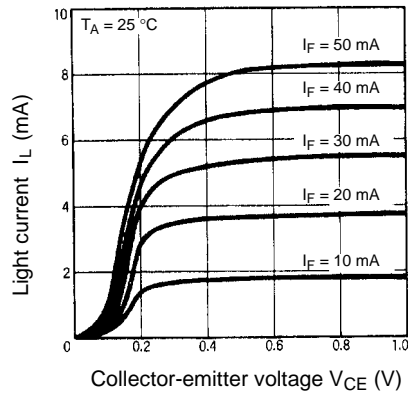


■ OUTPUT CHARACTERISTICS (TYPICAL)

EE-SX198/199/1041/1042/1070/1071

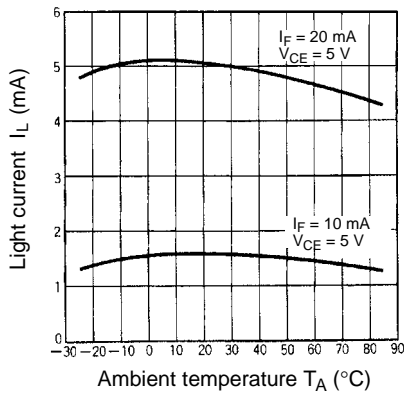


EE-SX1018/1025

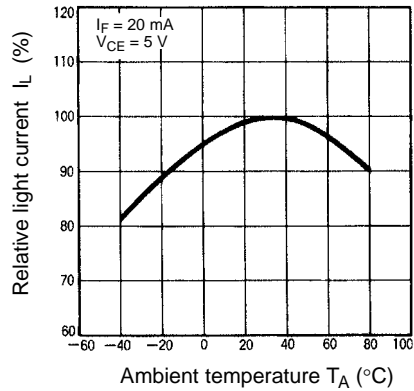


■ LIGHT CURRENT TEMPERATURE DEPENDENCY (TYPICAL)

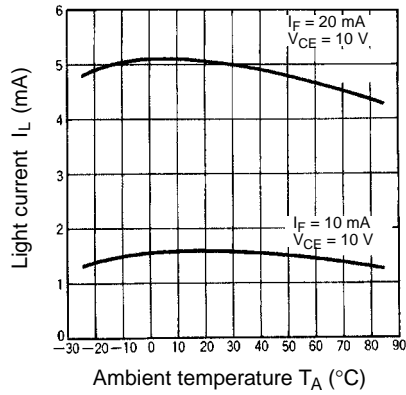
EE-SX198/199



EE-SX1018/1025



**EE-SX1041/1042/1070/1071**



■ **SENSING POSITION CHARACTERISTICS (TYPICAL)**

**EE-SX198/199**



**EE-SX1018**



**EE-SX1025**



**EE-SX1041**



**EE-SX1042**



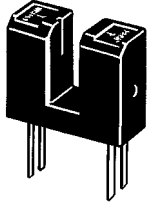
**EE-SX1070/1071**



# Dimensions

Unit: mm (inch)

## EE-SX198



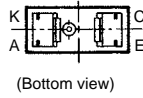
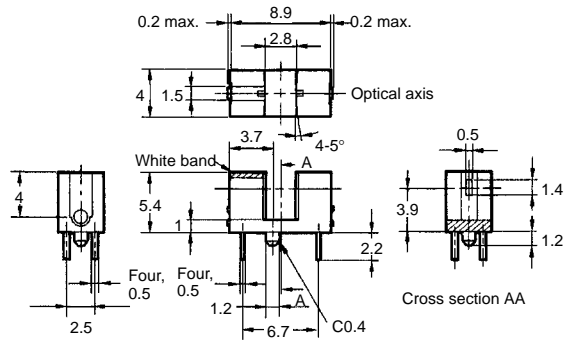
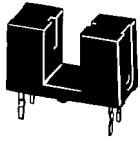
## EE-SX199



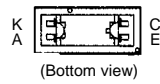
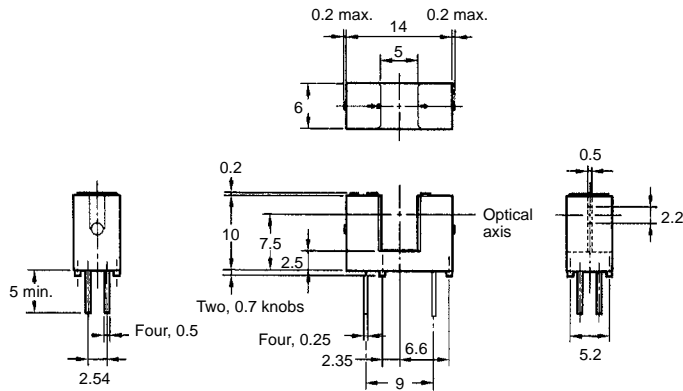
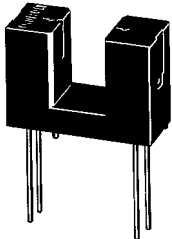
## EE-SX1018



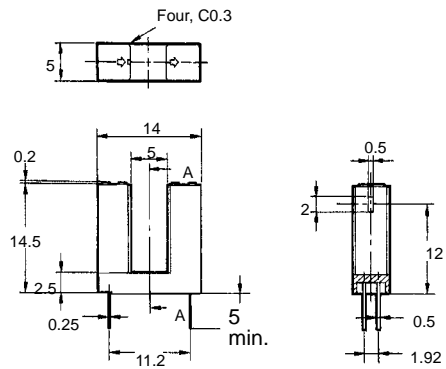
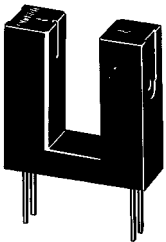
■ EE-SX1025



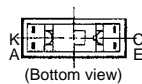
■ EE-SX1041



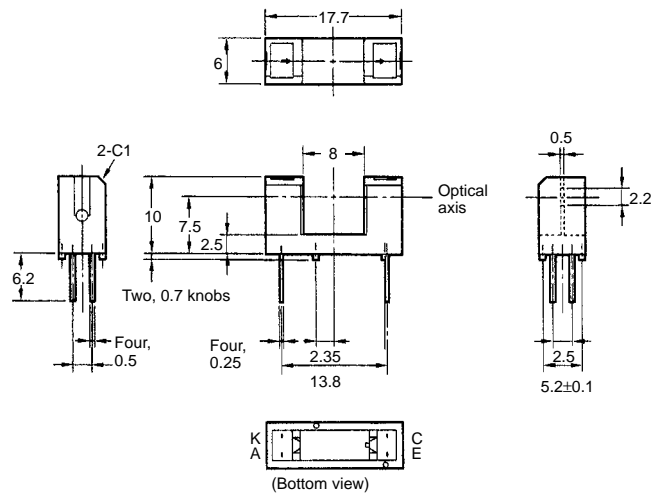
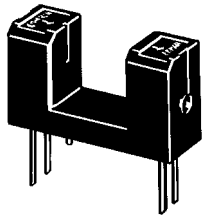
■ EE-SX1042



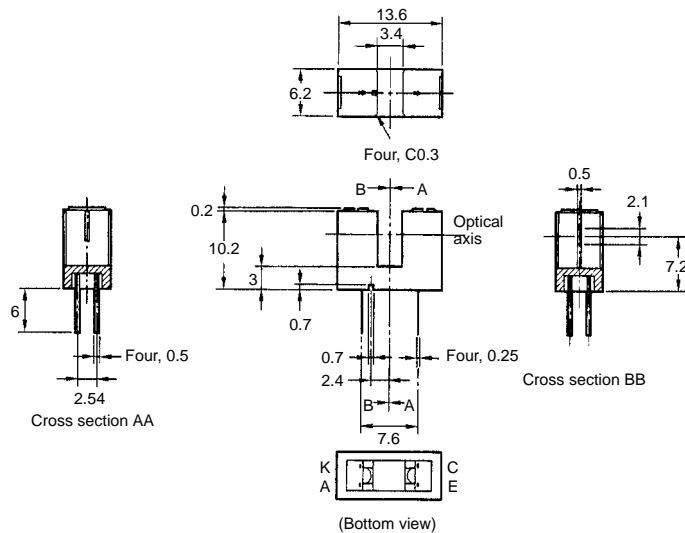
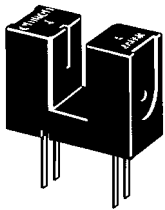
Cross section AA



■ EE-SX1070



■ EE-SX1071



## Precautions

Refer to the Technical Information Section for general precautions.

**NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.**

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