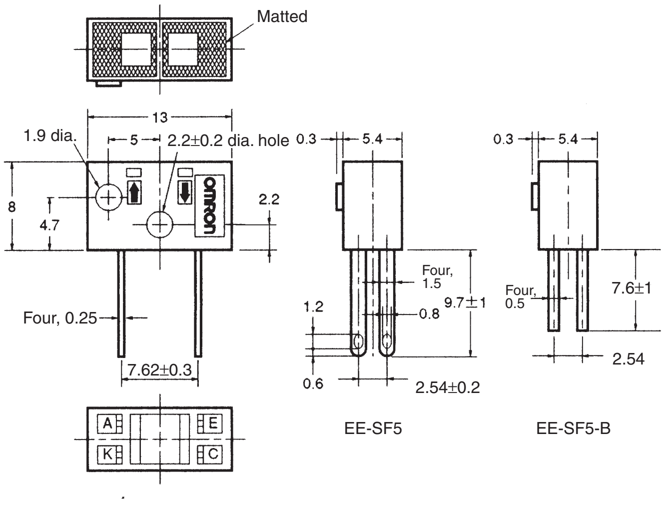
Photomicrosensor (Reflective)
EE-SF5(-B)

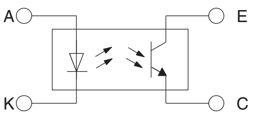
⚠ **Be sure to read *Precautions* on page 24.**

■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



Internal Circuit



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

Unless otherwise specified, the tolerances are as shown below.

Dimensions	Tolerance
3 mm max.	±0.3
3 < mm ≤ 6	±0.375
6 < mm ≤ 10	±0.45
10 < mm ≤ 18	±0.55
18 < mm ≤ 30	±0.65

■ Features

- Dust-tight construction.
- With a visible-light intercepting filter which allows objects to be sensed without being greatly influenced by the light radiated from fluorescent lamps.
- Mounted with M2 screws.
- Model with soldering terminals (EE-SF5).
- Model with PCB terminals (EE-SF5-B).
- Recommended sensing distance = 5.0 mm

■ 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**	Topr	–25°C to 80°C
	Storage	Tstg	–30°C to 80°C
Soldering temperature		Tsol	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 μs maximum with a frequency of 100 Hz.

3. Complete soldering within 10 seconds.

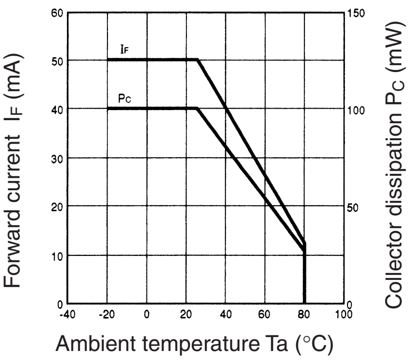
■ Electrical and Optical Characteristics (Ta = 25°C)

Item		Symbol	Value	Condition
Emitter	**Forward voltage**	V_F	1.2 V typ., 1.5 V max.	I_F = 30 mA
	Reverse current	I_R	0.01 μA typ., 10 μA max.	V_R = 4 V
	Peak emission wavelength	λ_P	940 nm typ.	I_F = 20 mA
Detector	**Light current**	I_L	200 μA min., 2,000 μA max.	I_F = 20 mA, V_{CE} = 10 V White paper with a reflection ratio of 90%, d = 5 mm (see note)
	Dark current	I_D	2 nA typ., 200 nA max.	V_{CE} = 10 V, 0 ℓx
	Leakage current	I_{LEAK}	2 μA max.	I_F = 20 mA, V_{CE} = 10 V with no reflection
	Collector–Emitter saturated voltage	V_{CE} (sat)	---	---
	Peak spectral sensitivity wavelength	λ_P	850 nm typ.	V_{CE} = 10 V
Rising time		tr	30 μs typ.	V_{CC} = 5 V, R_L = 1 kΩ, I_L = 1 mA
Falling time		tf	30 μs typ.	V_{CC} = 5 V, R_L = 1 kΩ, I_L = 1 mA

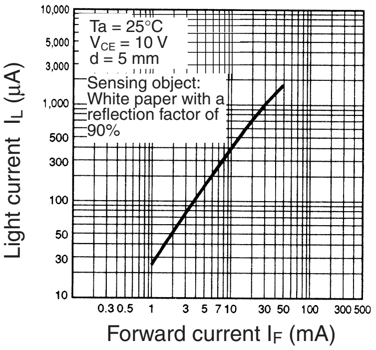
Note: The letter “d” indicates the distance between the top surface of the sensor and the sensing object.

■ Engineering Data

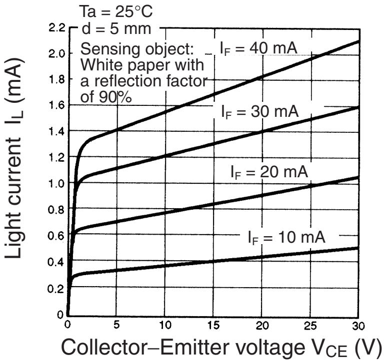
Forward Current vs. Collector Dissipation Temperature Rating



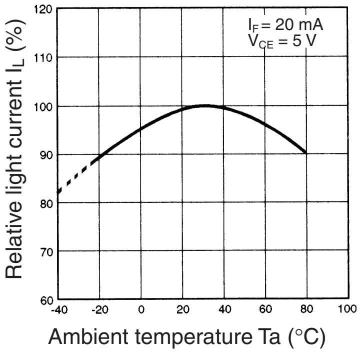
Light Current vs. Forward Current Characteristics (Typical)



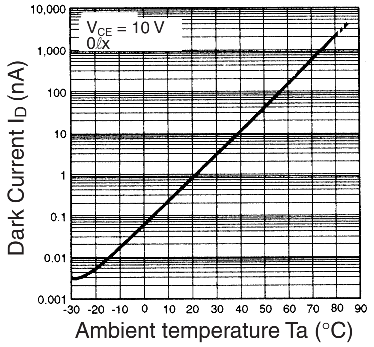
Light Current vs. Collector−Emitter Voltage Characteristics (Typical)



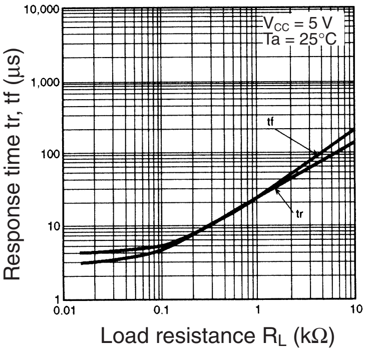
Relative Light Current vs. Ambient Temperature Characteristics (Typical)



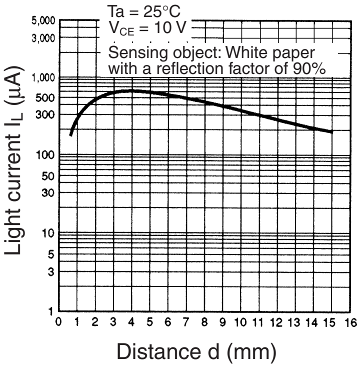
Dark Current vs. Ambient Temperature Characteristics (Typical)



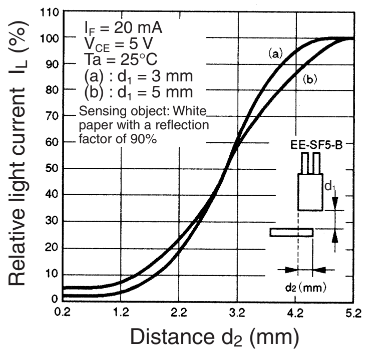
Response Time vs. Load Resistance Characteristics (Typical)



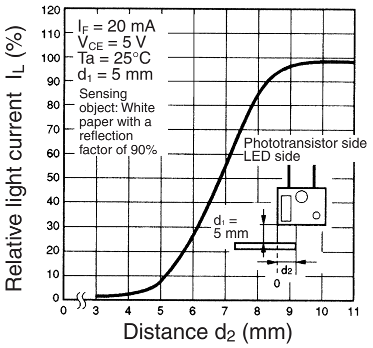
Sensing Distance Characteristics (Typical)



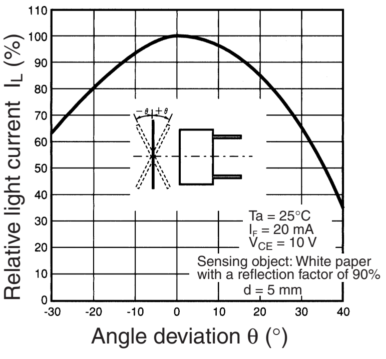
Sensing Position Characteristics (Typical)



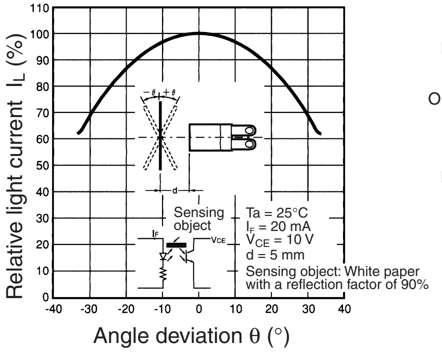
Sensing Position Characteristics (Typical)



Sensing Angle Characteristics (Typical)



Sensing Angle Characteristics (Typical)



Response Time Measurement Circuit