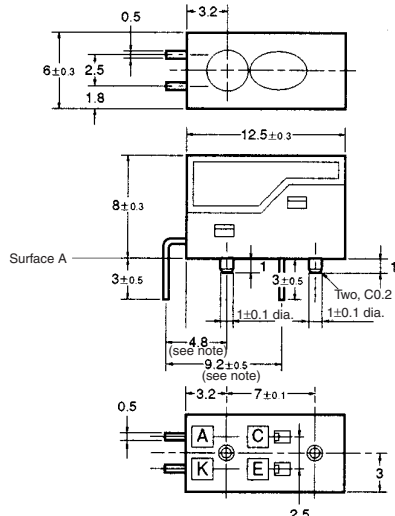


# Photomicrosensor (Reflective) EE-SY169

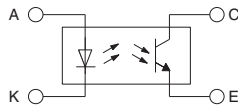
 Be sure to read *Precautions* on page 25.

## ■ Dimensions

Note: All units are in millimeters unless otherwise indicated.



Internal Circuit



Note: These dimensions are for the surface A. Other lead wire pitch dimensions are for the housing surface.

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

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

## ■ Features

- High-quality model with plastic lenses.
- Highly precise sensing range with a tolerance of ±0.6 mm horizontally and vertically.
- With a red LED sensing dyestuff-type inks.
- Limited reflective model.
- For lesser LED forward current the EE-SY169B would be a better choice.

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

Item	Symbol	Rated value
Emitter	Forward current	$I_F$ 40 mA (see note 1)
	Pulse forward current	$I_{FP}$ 300 mA (see note 2)
	Reverse voltage	$V_R$ 3 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	$T_{opr}$ 0°C to 70°C
	Storage	$T_{stg}$ -20°C to 80°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 μs maximum with a frequency of 100 Hz.  
 3. Complete soldering within 10 seconds.

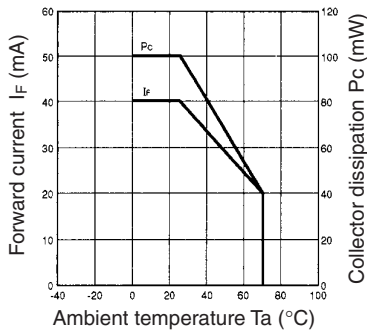
## ■ Electrical and Optical Characteristics (Ta = 25°C)

Item	Symbol	Value	Condition
Emitter	Forward voltage	$V_F$ 1.85 V typ., 2.3 V max.	$I_F = 20$ mA
	Reverse current	$I_R$ 0.01 μA typ., 10 μA max.	$V_R = 3$ V
	Peak emission wavelength	$\lambda_p$ 660 nm typ.	$I_F = 20$ mA
Detector	Light current	$I_L$ 160 μA min., 2,000 μA max.	$I_F = 20$ mA, $V_{CE} = 5$ V White paper with a reflection ratio of 90%, $d = 4$ mm (see note)
	Dark current	$I_D$ 2 nA typ., 200 nA max.	$V_{CE} = 5$ V, 0 lx
	Leakage current	$I_{LEAK}$ 2 μA max.	$I_F = 20$ mA, $V_{CE} = 5$ V with no reflection
	Collector–Emitter saturated voltage	$V_{CE(sat)}$	---
	Peak spectral sensitivity wavelength	$\lambda_p$	850 nm typ.
Rising time	$t_r$	30 μs typ.	$V_{CC} = 5$ V, $R_L = 1$ kΩ, $I_L = 1$ mA
Falling time	$t_f$	30 μs typ.	$V_{CC} = 5$ V, $R_L = 1$ kΩ, $I_L = 1$ mA

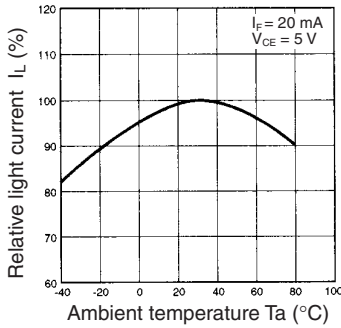
Note: The letter “d” indicates the distance between the top surface of the sensor and the sensing object.

■ Engineering Data

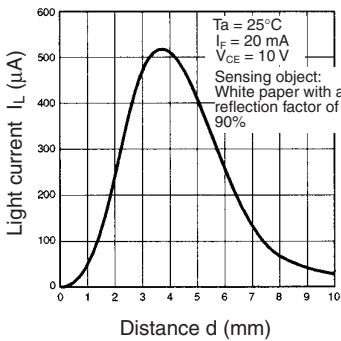
**Forward Current vs. Collector Dissipation Temperature Rating**



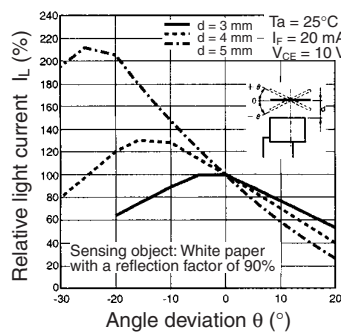
**Relative Light Current vs. Ambient Temperature Characteristics (Typical)**



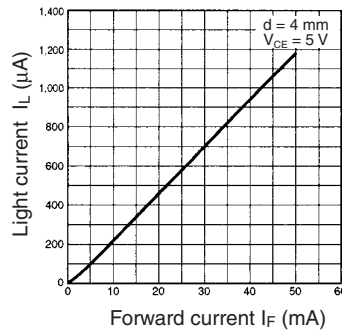
**Sensing Distance Characteristics (Typical)**



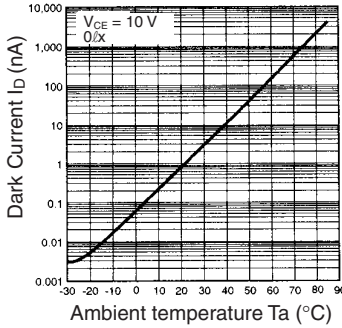
**Sensing Angle Characteristics (Typical)**



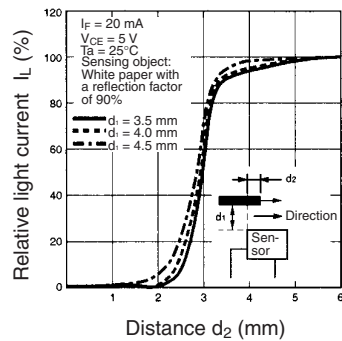
**Light Current vs. Forward Current Characteristics (Typical)**



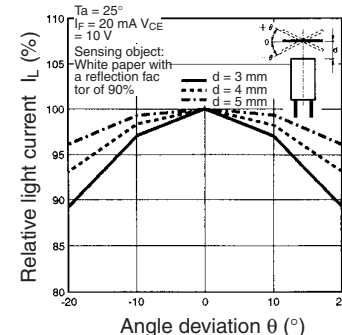
**Dark Current vs. Ambient Temperature Characteristics (Typical)**



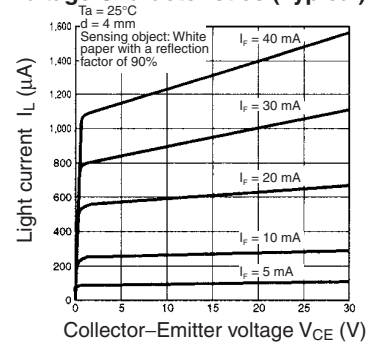
**Sensing Position Characteristics (Typical)**



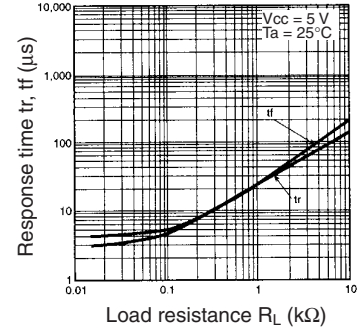
**Sensing Angle Characteristics (Typical)**



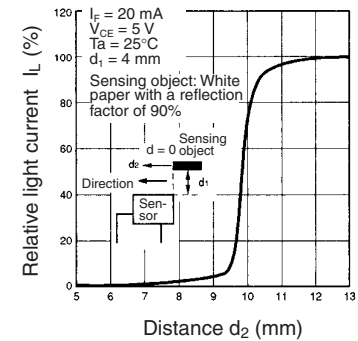
**Light Current vs. Collector-Emitter Voltage Characteristics (Typical)**



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



**Sensing Position Characteristics (Typical)**



**Response Time Measurement Circuit**

